TELEFUNKEN

Semiconductors

Power Management

High Voltage Products

- 700 Volt AC / DC Primary Switchers
- 600 Volt Gate Drivers

Low Voltage Products

- DC / DC Step-Down Regulators
- 40 Volt Step-Up LED Drivers
- Voltage Detectors

Interface Products

- Crosspoint Switches
- LVDS Drivers and Receivers
- Repeaters
- M-LVDS Transceivers
- Multiplexors

March 2012

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* 'Advance Info' or 'Preliminary' status.

Introduction

Telefunken Semiconductors, an innovator in advanced process technology has tackled some of the industries toughest challenges in the areas of power management and interface. Combining proprietary process technology such as BCD on SOI and an 800V BCD process with design and applications expertise Telefunken has established the standard for efficiency and performance.

Utilizing the performance advantages of the BCD SOI process, Telefunken Semiconductors offers a family of switching regulators featuring very high efficiency in very small form factors. These products address systems that need to generate lower or higher voltages from an intermediate bus such as 5V, 12V or 24V. The synchronous buck regulators with integrated MOSFETs operate from 4.5V to 26V input and can generate lower voltages with output currents ranging from 1A to 3A. Telefunken Semiconductors will further expand this family with much higher input voltage range, higher output currents and enhanced feature set. The same energy efficient process technology is used for a family of boost converters targeted at White LED driver applications for small and medium sized LCD Displays used in smart phones, personal navigation devices, tablet PCs and other portable consumer devices. With an aggressive roadmap to offer backlighting solutions for larger LCD Displays, Telefunken Semiconductors will provide an entire array of solutions for Display applications.

The 800V BCD technology which is used in developing products for Offline AC/DC applications and high voltage gate drivers. The offline switchers integrate the PWM control circuitry and the 800V MOSFET to deliver AC/DC solutions to 30W power level. Applications include AC/DC adapters, power supplies for Set-Top Boxes, White Goods, Smart Meters and a host of other consumer and industrial equipment. Telefunken also offers 600V gate drivers used in motor control and high power SMPS.

High performance Interface is an essential component of today's electronics providing the error-free routing and switching required for video, data, clocks, control and test signals. LVDS has become pervasive, providing excellent bandwidth for minimal power consumption. While maintaining all of the LVDS performance advantages, Telefunken has drastically expanded the operational common mode extending LVDS applications even further. An expanded common mode adds additional noise margin required in electrically noisy environments such as factory automation, instrumentation, avionics and automotive.

M-LVDS is the multidrop version of LVDS and offers controlled edge rates, additional drive and tighter thresholds all contributing to improved performance in backplanes and other multidrop applications.

The IEEE1149 JTAG bus is now over 20 years old, and continues to be the preferred solution for test, FPGA programming and software debug. Telefunken is a leader in system JTAG offering well supported scan chain multiplexers that reduce costs by improving test and programming times.

Telefunken continues to innovate, improving efficiency and performance in both Interface and Power Management. For more information, check our website http://www.telefunkensemiconductor.com/ or contact your local sales rep (locations listed on the last page of this brochure).

Disclosure:

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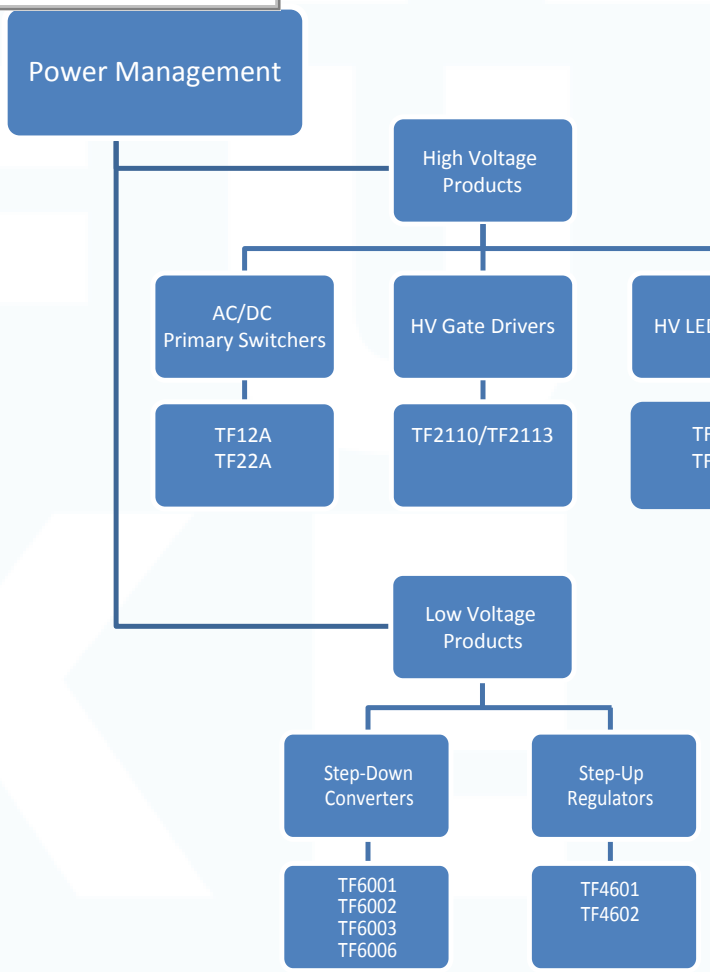
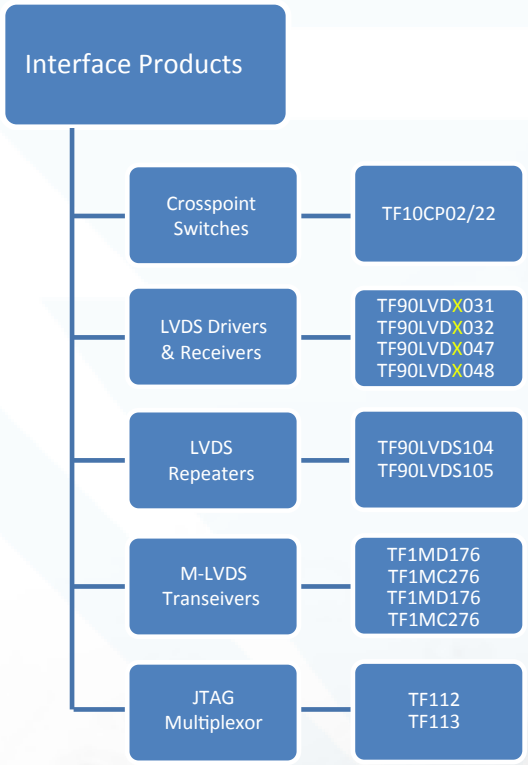


TF 12A, ***8 Watt Low Power Off-Line SMPS Primary Switcher***
*TF 22A, ***12 Watt Low Power Off-Line SMPS Primary Switcher***
*TF 2110 / 2113, ***High-Side and Low-Side Gate Drivers***

TF 6001, ***1A, 26V Synchronous Rectified Step-Down Converter***
TF 6002, ***2A, 26V Synchronous Rectified Step-Down Converter***
TF 6003, ***3A, 26V Synchronous Rectified Step-Down Converter***
*TF 6006, ***500mA, 26V Synchronous Rectified Step-Down Converter***
TF 4601, ***1 MHz Asynchronous Step-Up Regulator LED Driver***
TF 4602, ***1.3 MHz Asynchronous Step-Up Regulator LED Driver***



TF10CP02/22 - ***1.5 Gbps 2x2 LVDS Crosspoint Switches***
TF90LVDS031 - ***Quad LVDS Line Driver***
TF90LVDS032 - ***Quad LVDS Line Receivers with Extended Common Mode***
TF90LVDS047 - ***Quad LVDS Line Driver with Flow-Through Pinout***
TF90LVDS048 - ***Quad LVDS Line Receivers with Extended Common Mode***
*TF90LVDS104 - ***800 Mbps 1:4 LVDS Fanout Buffers***
*TF90LVDS105 - ***400 Mbps 1:4 LVDS Fanout Buffers, with LVCMOS Input***
*TF0M176 - ***Single Channel M-LVDS Transceiver***
TF112 - ***7 Port Multidrop IEEE 1149.1 (JTAG) Multiplexer***

TELEFUNKEN Semiconductors

TF12A

Low Power Off-Line SMPS Primary Switcher

Features

- **V_{DD} range: 9V to 38V**
- **60 kHz fixed frequency operation**
- **Current-mode control**
- **Auxiliary under-voltage lockout with hysteresis**
- **High-voltage start-up current source**
- **Over-voltage, over-current and over-temperature protection with auto-restart**
- **Industrial temperature range: -40 °C to +85 °C**
- **Drop-in replacement for the VIPer12A**

Applications

- Switch Mode Power Supplies
- Auxiliary Power Supplies for Industrial Systems
- Adapters for Portable Electronics

Typical Power Capability

MAINS TYPE	PDIP-8	SOIC-8(N)
European (195 - 265 Vac)	13W	8W
Universal (85 - 265 Vac)	8W	5W

Description

The TF12A is a low power primary switcher best suitable for Off-line SMPS battery charger adapters, auxiliary power supplies for industrial systems and standby power supplies for TVs or monitors. It consists of a dedicated current mode PWM controller and a high-voltage Power MOSFET.

The TF12A operates at fixed 60 kHz switching frequency. Its control circuitry provides large V_{DD} range desired in applications in which auxiliary power supply changes are expected. It also provides over-voltage, over-current and over-temperature protection.

The TF12A is offered in 8-pin PDIP and SOIC narrow packages and operates over an extended -40 °C to +85 °C temperature range.

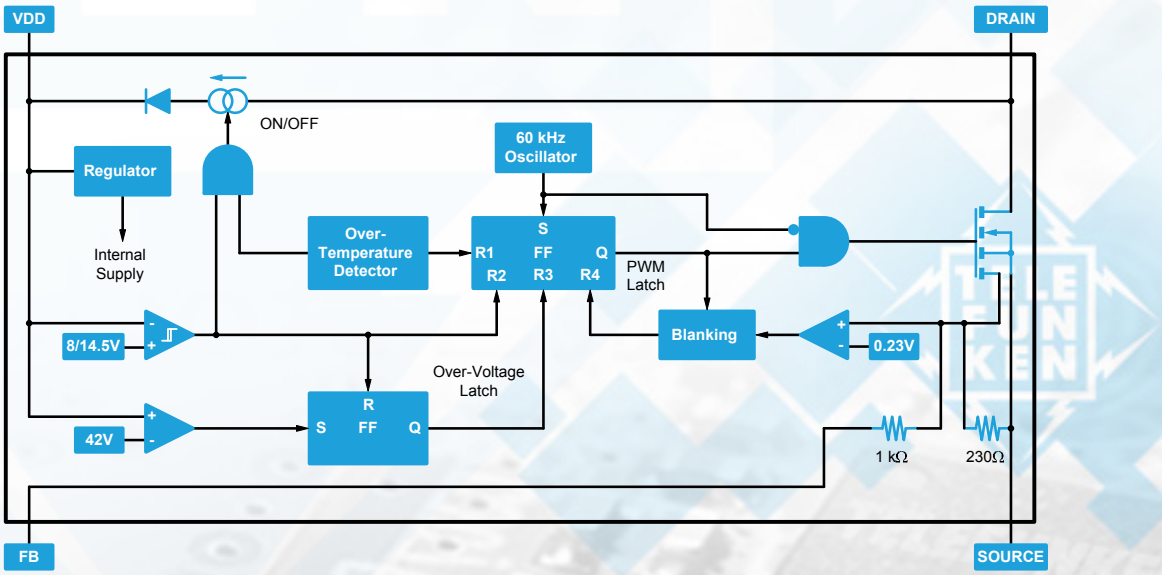
PDIP-8   SOIC-8(N)

Ordering Information

Year Year Week Week

PART NUMBER	PACKAGE	PACKING / Qty	MARK
TF12A-3AS	PDIP-8	Tube, 50	YYWW TF12A Lot ID
TF12A-TAU	SOIC-8(N)	Tube, 95	YYWW TF12A Lot ID
TF12A-TAH	SOIC-8(N)	Tape & Reel, 2500	

Function Diagram



TELEFUNKEN
Semiconductors

ADVANCE INFO

TF22A

Low Power OFF-Line SMPS Primary Switcher

Features

- **V_{DD} range: 9V to 38V**
- **60 kHz operation**
- **Current-mode control**
- **Auxiliary under-voltage lockout with hysteresis**
- **High-voltage start-up current source**
- **Over-voltage, over-current and over-temperature protection with auto-restart**
- **Industrial temperature range: -40 °C to +85 °C**
- **Drop-in replacement for the VIPer22A**

Applications

- Switch Model Power Supplies
- Auxiliary Power Supplies for Industrial Systems
- Adapters for Portable Electronics

Typical Power Capability

MAINS TYPE	PDIP-8	SOIC-8
European (195 - 265 V ac)	20W	12W
US (85 - 265 V ac)	12W	7W

Description

The TF22A is a low power primary switcher best suitable for Off-line SMPS battery charger adapters, auxiliary power supplies for industrial systems and standby power supplies for TVs or monitors. It consists of a dedicated current mode PWM controller and a high-voltage Power MOSFET.

The TF22A operates at fixed 60 kHz switching frequency. Its control circuitry provides large V_{DD} range desired in applications in which auxiliary power supply changes are expected. It also provides over-voltage, over-current and over-temperature protection.

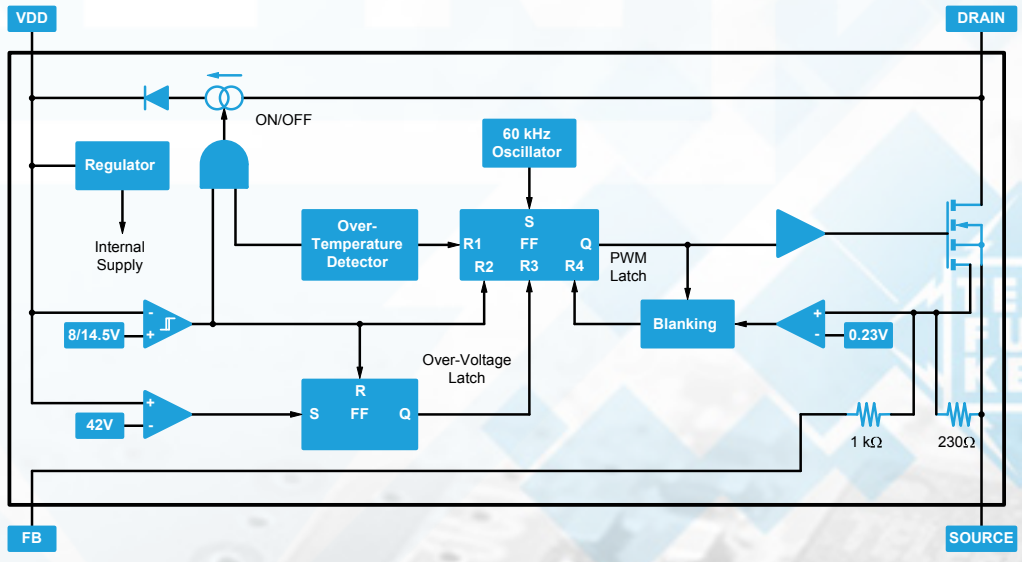
The TF22A is offered in 8-pin PDIP and SOIC narrow packages and operates over an extended -40 °C to +85 °C temperature range.

Ordering Information

Year Year Week Week

PART NUMBER	PACKAGE	PACKING / Qty	MARK
TF22A-3AS	PDIP-8	Tube, 50	YYWW TF22 Lot ID
TF22A-TAU	SOIC-8(N)	Tube, 95	YYWW TF22 Lot ID
TF22A-TAH	SOIC-8(N)	Tape & Reel, 2500	

Function Diagram



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ADVANCE INFO

TF2110 / TF2113

High-Side and Low-Side Gate Drivers

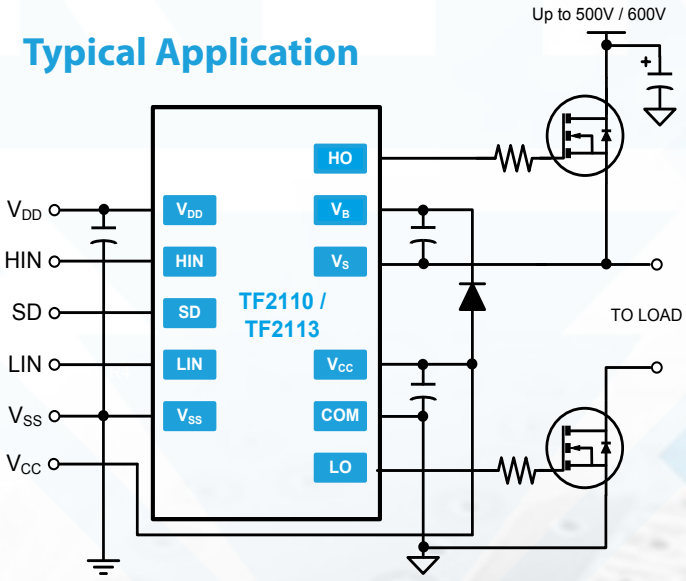
Features

- **Drive two N-channel MOSFETs or IGBTs in high-side / low side configuration**
- **The floating, high-side, drivers drive gates operating at up to 500V / 600V**
- **2.5A sink / 2.5A source typical output currents**
- **Outputs tolerant to negative transients**
- **Wide gate driver supply voltage range: 10V to 20V**
- **Wide logic input supply voltage range: 3.3V to 20V**
- **Wide logic supply offset voltage range: -5V to 5V**
- **10 ns (TF2110) / 20 ns (TF2113) maximum delay matching**
- **27 ns (typ) rise / 17 ns (typ) fall times with 1000 pF load**
- **120 ns (typ) turn-on / 94 ns (typ) turn-off delay times**
- **Under-voltage lockout for high- and low-side drivers**
- **Cycle-by-cycle edge-triggered shutdown circuitry**
- **Extended temperature range: -40 °C to +125 °C**
- **Drop-in replacements for IR2110 / IR2113**

Applications

- DC-DC Converters
- AC-DC Inverters
- Motor Controls
- Class D Power Amplifiers

Typical Application



Description

The TF2110 and TF2113 are high voltage, high-speed MOSFET and IGBT drivers with independent high-side and low-side outputs. The high-side driver features floating supply for operation at up to 500V / 600V. The 10 ns (max) / 20 ns (max) propagation delay matching between the high and the low side drivers allows high frequency operation.

The TF2110 and TF2113 logic inputs are compatible with standard CMOS levels (as low as 3.3V) while driver outputs feature high pulse current buffers designed for minimum driver cross-conduction.

The TF2110 and TF2113 are offered in 16-pin SOIC wide and 14-pin PDIP packages. They operate over an extended -40 °C to +125 °C temperature range.

PDIP-14

SOIC-16W

SOIC-14(N)

Ordering Information

Year Year Week Week

PART NUMBER	PACKAGE	PACK / Qty	MARK
TF2110-3BS	PDIP-14	Tube / 25	YYWW TF2110 Lot ID
TF2110-TEU	SOIC-16W	Tube / 47	
TF2110-TEH	SOIC-16W	T & R / 2500	
TF2110-TUH	SOIC-14 (N)	T & R / 2500	
TF2113-3BS	PDIP-14	Tube / 25	YYWW TF2113 Lot ID
TF2113-TEU	SOIC-16W	Tube / 47	
TF2113-TEH	SOIC-16W	T & R / 2500	
TF2113-TUH	SOIC-14 (N)	T & R / 2500	

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TF6001

1A, 26V Synchronous Rectified Step-Down Converter

Features

- **1A continuous output current**
- **Wide input voltage range: 4.5V to 26V**
- **Wide output voltage range: 0.923V to 23V**
- **High, >90%, efficiency (V_{IN} = 5V, 0.15A < I_L < 1A) enabled by integrated 140 mΩ MOSFET switches**
- **Operates at fixed 340 kHz frequency for small filter size**
- **3 µA (MAX) shut-down supply current**
- **Programmable soft-start, cycle-by-cycle over-current protection and input under-voltage lockout**
- **Industrial temperature range: -40 °C to +85 °C**
- **Drop-in replacement for MP2309**

Applications

- High-Density Point-of-Load Regulators
- Distributed Power Systems
- Notebook and Netbook Computers
- Power Supplies for FPGAs, DSP Blocks and ASICs
- Set-Top Boxes
- xDSL Modems

Description

The TF6001 is a monolithic synchronous buck regulator featuring integrated 140 mΩ MOSFETs that provide continuous 1A output load current. It operates over a wide 4.5V to 26V input voltage range and provides output voltage from 0.923V to 23V at up to 93% efficiency. Its current mode control circuitry provides fast transient response and cycle-by-cycle current limit.

The TF6001 operates at fixed 340 kHz switching frequency. It features programmable soft-start which prevents inrush current at turn-on. In shut-down mode it draws only 3 µA (MAX).

The TF6001 is offered in an 8-pin SOIC narrow package and operates over an extended -40 °C to +85 °C temperature range.

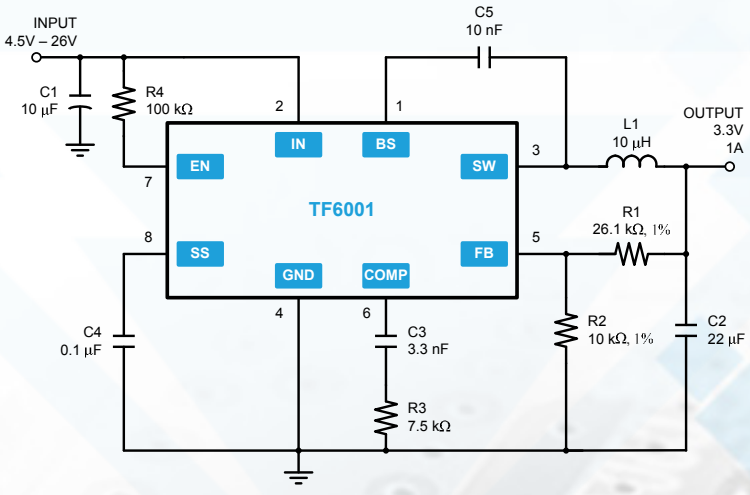
SOIC-8(N)

Ordering Information

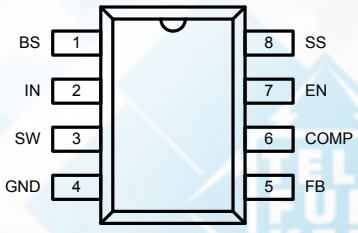
Year Year Week Week

PART NUMBER	PACKAGE	PACKING / Qty	MARK
TF6001-TAS	SOIC-8(N)	Tube, 95	YYWW TF6001 Lot ID
TF6001-TAP	SOIC-8(N)	Tape & Reel, 1000	
TF6001-TAQ	SOIC-8(N)	Tape & Reel, 2500	

Typical Application



Pin Diagram



Top View

TELEFUNKEN Semiconductors

TF6002/ TF6002A

2A, 26V Synchronous Rectified Step-Down Converter

Features

- **2A continuous output current**
- **Wide input voltage range: 4.5V to 26V**
- **Wide output voltage range: 0.923V to 23V**
- **Tight V_{FB} variation: 1.5% (TF6002A), 2.5% (TF6002)**
- **High, >90%, efficiency (V_{IN} = 5V, 0.15A < I_L < 2A) enabled by integrated 130 mΩ MOSFET switches**
- **Operates at fixed 340 kHz frequency for small filter size**
- **3 µA (MAX) shut-down supply current**
- **Programmable soft-start, cycle-by-cycle over-current protection and input under-voltage lockout**
- **Industrial temperature range: -40 °C to +85 °C**
- **Drop-in replacement for MP2305, MP1482**

Applications

- High-Density Point-of-Load Regulators
- Distributed Power Systems
- Notebook and Netbook Computers
- Power Supplies for FPGAs, DSP Blocks and ASICs
- Set-Top Boxes
- xDSL Modems

Description

The TF6002 and TF6002A are monolithic synchronous buck regulators featuring integrated 130 mΩ MOSFETs that provide continuous 2A output load current. They operates over a wide 4.5V to 26V input voltage range and provides output voltage from 0.923V to 23V at up to 93% efficiency. Their current mode control circuitry provides fast transient response and cycle-by-cycle current limit.

The TF6002 and TF6002A have the V_{FB} variation of only 2.5% and 1.5%, respectively, providing tight output regulation.

The TF6002 and TF6002A operate at fixed 340 kHz switching frequency. They features programmable soft-start which prevents inrush current at turn-on. In shut-down mode they draw only 3 µA (MAX).

Both devices are offered in an 8-pin SOIC narrow package and operate over an extended -40 °C to +85 °C temperature range.

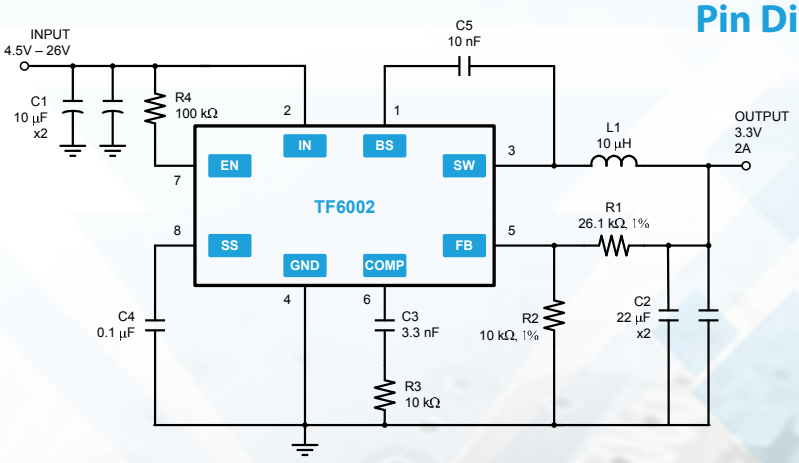
SOIC-8(N)

Ordering Information

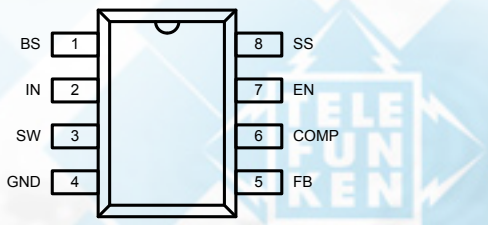
Year Year Week Week

PART NUMBER	PACKAGE	PACKING / Qty	MARK
TF6002-TAS	SOIC-8(N)	Tube, 95	YYWW TF6002 Lot ID
TF6002-TAP	SOIC-8(N)	Tape & Reel, 1000	
TF6002-TAQ	SOIC-8(N)	Tape & Reel, 2500	
TF6002A-TAP	SOIC-8(N)	Tape & Reel, 1000	YYWW TF6002A Lot ID
TF6002A-TAQ	SOIC-8(N)	Tape & Reel, 2500	

Typical Application



Pin Diagram



Top View

TELEFUNKEN Semiconductors

TF6003

3A, 26V Synchronous Rectified Step-Down Converter

Features

- **3A continuous (4A peak) output current**
- **Wide input voltage range: 4.5V to 26V**
- **Wide output voltage range: 0.923V to 23V**
- **High, >90%, efficiency (V_{IN} = 5V, 0.15A < I_L < 3A) enabled by integrated 100 mΩ MOSFET switches**
- **Operates at fixed 340 kHz frequency for small filter size**
- **3 µA (MAX) shut-down supply current**
- **Programmable soft-start, cycle-by-cycle over-current protection and input under-voltage lockout**
- **Industrial temperature range: -40 °C to +85 °C**
- **Drop-in replacement for MP2307**

Applications

- High-Density Point-of-Load Regulators
- Distributed Power Systems
- Notebook and Netbook Computers
- Power Supplies for FPGAs, DSP Blocks and ASICs
- Set-Top Boxes
- xDSL Modems

Description

The TF6003 is a monolithic synchronous buck regulator featuring integrated 100 mΩ MOSFETs that provide continuous 3A output load current. It operates over a wide 4.5V to 26V input voltage range and provides output voltage from 0.923V to 23V at up to 93% efficiency. Its current mode control circuitry provides fast transient response and cycle-by-cycle current limit.

The TF6003 operates at fixed 340 kHz switching frequency. It features programmable soft-start which prevents inrush current at turn-on. In shut-down mode it draws only 3 µA (MAX).

The TF6003 is offered in a thermally enhanced 8-pin SOIC package and operates over an extended -40 °C to +85 °C temperature range.

SOIC-8EP

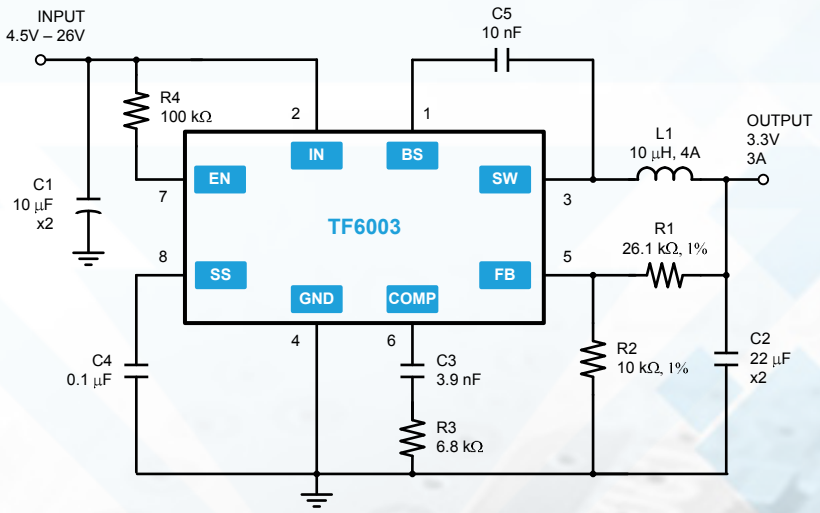
Bottom
(Exposed Paddle)

Ordering Information

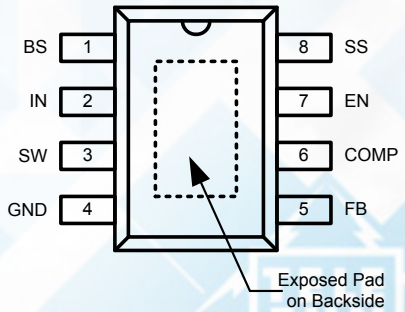
Year Year Week Week

PART NUMBER	PACKAGE	PACKING / Qty	MARK
TF6003-TPS	SOIC-8EP	Tube, 95	YYWW TF6003 Lot ID
TF6003-TPP	SOIC-8EP	Tape & Reel, 1000	
TF6003-TPQ	SOIC-8EP	Tape & Reel, 2500	

Typical Application



Pin Diagram



Top View

TELEFUNKEN Semiconductors

ADVANCE INFO

TF6006

500 mA, 26V Synchronous Rectified Step-Down Converter

Features

- **500 mA continuous output current**
- **Wide input voltage range: 4.5V to 26V**
- **Wide output voltage range: 0.8V to 23V**
- **High, >86%, efficiency (V_{IN} = 12V, V_{OUT} = 5V, 50mA < I_{OUT} < 0.5A) enabled by integrated MOSFET switches**
- **Operates at fixed 500 kHz frequency for small filter size**
- **3 µA (MAX) shut-down supply current**
- **Programmable soft-start, cycle-by-cycle over-current protection and input under-voltage lockout**
- **Industrial temperature range: -40 °C to +85 °C**

Applications

- High-Density Point-of-Load Regulators
- Distributed Power Systems
- Notebook and Netbook Computers
- Power Supplies for FPGAs, DSP Blocks and ASICs
- Set-Top Boxes
- Servers
- xDSL Modems

Description

The TF6006 is a monolithic synchronous buck regulator featuring integrated MOSFETs that provide continuous 500 mA output load current. It operates over a wide 4.5V to 26V input voltage range and provides output voltage from 0.8V to 23V at up to 93% efficiency. Its current mode control circuitry provides fast transient response and cycle-by-cycle current limit.

The TF6006 operates at fixed 500 kHz switching frequency. It features programmable soft-start which prevents inrush current at turn-on. In shut-down mode it draws only 3 µA (MAX).

The TF6006 is offered in an 8-pin DFN 2mm x 3mm package and operates over an extended -40 °C to +85 °C temperature range.

DFN-8

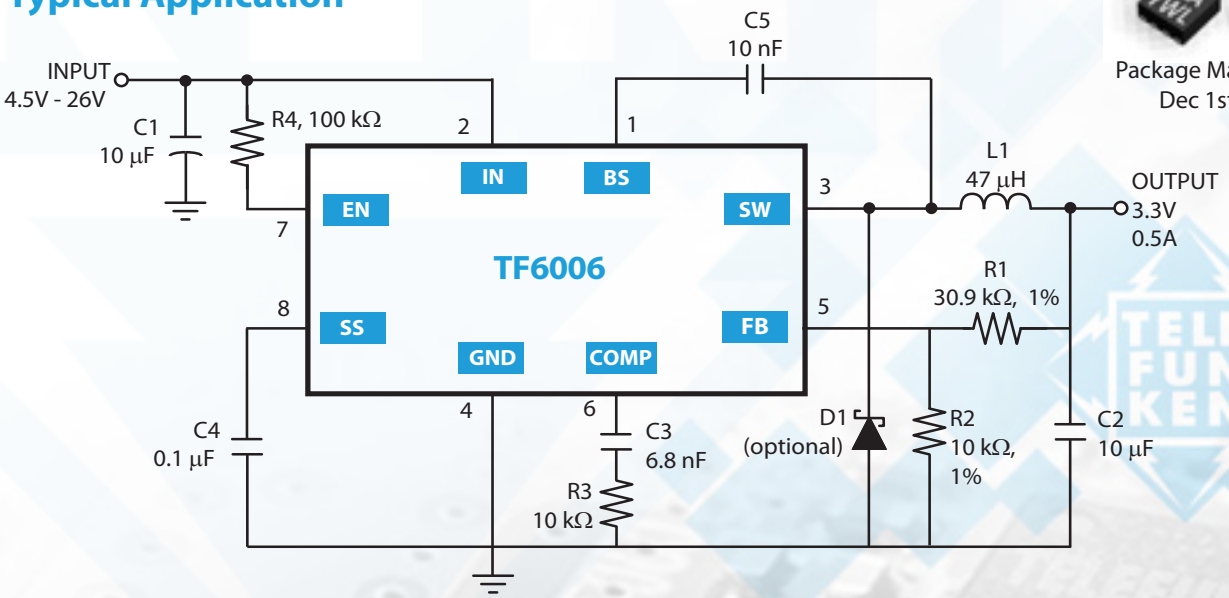
Ordering Information

Year Week Lot Lot

PART NUMBER	PACKAGE	PACK / Qty	MARK	
			top	botm
TF6006-NDP	DFN-8	T&R / 3,000	YWLL 6AA	
TF6006-NDQ	DFN-8	T&R / 10,000	YWLL 6AA	

Package Mark prior to Dec 1st, 2011

Typical Application



TELEFUNKEN Semiconductors

TF4601

1 MHz Asynchronous Step-Up Regulator White LED Driver

Features

- **Drives up to 10 WLEDs in series or up to 13 parallel strings of 3 WLEDs for display backlighting**
- **Wide input voltage range: 2.5V to 5.5V**
- **High efficiency enabled by an integrated 500 mΩ power MOSFET switch**
- **Available with two internal voltage references:**
  - **Version A (104 mV) offers improved efficiency**
  - **Version B (300 mV) offers improved accuracy**
- **Operates at fixed 1 MHz frequency for small filter size**
- **0.1 µA typical shut-down supply current**
- **Integrated soft-start function, 45V / 20V over-voltage protection, over-temperature protection and input under-voltage lockout**
- **Industrial temperature range: -40 °C to +85 °C**
- **Available in space saving DFN-8 and TSOT23-6 packages**

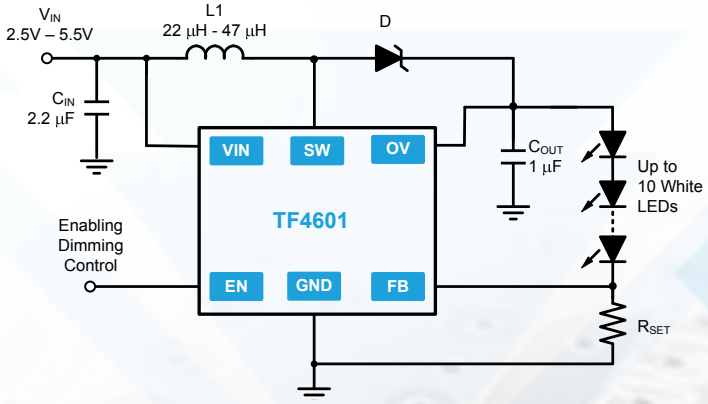
DFN-8

TSOT23-6

Applications

- White and Organic LED backlights
- Cellular Phones
- Digital Cameras
- PDAs, Smart Phones, MP3 Players
- Portable Instruments

Typical Application



Description

The TF4601 is a monolithic asynchronous boost regulator. An integrated 500 mΩ Power MOSFET drives up to 10 WLEDs in series or up to 13 parallel strings of 3 WLEDs. It operates at fixed 1 MHz switching frequency, maximizing conversion efficiency, enabling smaller external components and reducing output ripple. The TF4601 features an integrated soft-start function that minimizes inrush current during turn-on. Under-voltage lockout, over-voltage and over-temperature protection features are added for system robustness.

The TF4601 is available with two internal voltage references. A versions with a 104 mV reference offer highest efficiency, while B versions with 300 mV reference offer improved accuracy. The current mode control loop is compensated internally minimizing the number of external components.

The TF4601 is offered in space saving 8-pin DFN and 6-pin TSOT23 packages. It operates over the industrial temperature range of -40 °C to +85 °C.

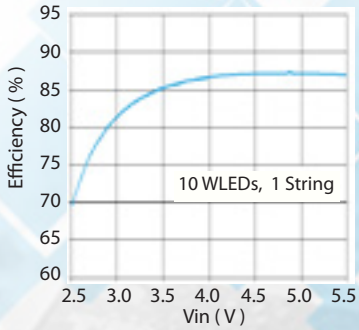
Ordering Information

Year Week Lot

PART NUMBER (*NOTE1*)	V_{FB}	V_{OV}	PACKAGE	MARK *	
				top	botm
TF4601A45-UTX	104 mV	45V	TSOT23-6	4AA	YWL
TF4601A45-NBX	104 mV	45V	DFN-8	4AA YWL	
TF4601B45-UTX	300 mV	45V	TSOT23-6	4AB	YWL
TF4601B45-NBX	300 mV	45V	DFN-8	4AB YWL	
TF4601B20-UTX	300 mV	20V	TSOT23-6	4AC	YWL
TF4601B20-NBX	300 mV	20V	DFN-8	4AC YWL	

NOTE1 *REPLACE X with P for 180 mm Tape & Reel Packing (Qty 3,000) or Q for 330 mm Tape & Reel Packing (Qty 10,000).*

Typical Efficiency



**For more information regarding Package Mark, please view package info at end of this document*

TELEFUNKEN Semiconductors

TF4602

1.3 MHz Asynchronous Step-Up Regulator White LED Driver

Features

- **Drives white LED arrays, up to 13x3 in size, for display backlighting**
- **Wide input voltage range: 2.5V to 6V**
- **High efficiency enabled by an integrated 500 mΩ power MOSFET switch**
- **Low 104 mV internal reference voltage brings additional power savings**
- **Operates at fixed 1.3 MHz frequency for small filter size**
- **0.1 µA typical shut-down supply current**
- **Integrated soft-start function, 28V over-voltage protection, over-temperature protection and input under-voltage lockout**
- **Industrial temperature range: -40 °C to +85 °C**
- **Available in space saving DFN-8 and TSOT23-6 packages**

DFN-8

TSOT23-6

Applications

- White and Organic LED backlights
- Cellular Phones
- Digital Cameras
- PDAs, Smart Phones, MP3 Players
- Portable Instruments

Description

The TF4602 is a monolithic asynchronous boost regulator. An integrated 500 mΩ Power MOSFET drives up to 13 parallel strings of 3 WLEDs. It operates at fixed 1.3 MHz switching frequency, maximizing conversion efficiency, enabling smaller external components and reducing output ripple. Combined with a wide input voltage range of 2.5V to 6V the TF4602 is an ideal solution for portable electronic devices.

The TF4602 features an integrated soft-start function that minimizes inrush current during turn-on. Under-voltage lockout, over-voltage and over-temperature protection features are added for system robustness. It is available with an internal low voltage references of 104 mV for high efficiency. The current mode control loop is compensated internally minimizing the number of external components.

The TF4602 is offered in space saving 8-pin DFN and 6-pin TSOT23 packages. It operates over the industrial temperature range of -40 °C to +85 °C.

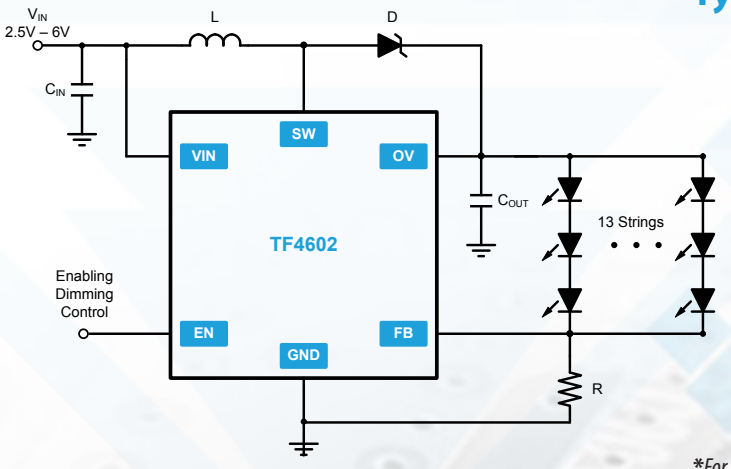
Ordering Information

Year Week Lot

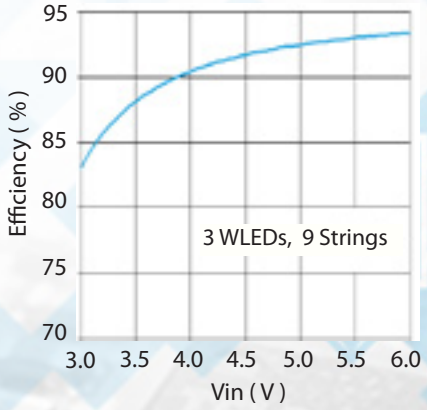
PART NUMBER (*NOTE1*)	V_{FB}	V_{OV}	PACKAGE	MARK*	
				top	botm
TF4602-UTX	104 mV	28V	TSOT23-6	4AD	YWL
TF4602-NBX	104 mV	28V	DFN-8	4AD YWL	

NOTE1 *REPLACE* X *with* P *for 180 mm Tape & Reel Packing (Qty 3,000) or* Q *for 330 mm Tape & Reel Packing (Qty 10,000).*

Typical Application



Typical Efficiency



**For more information regarding Package Mark, please view package info at end of this document*

TELEFUNKEN
Semiconductors

TF10CP02 / TF10CP22

1.5 Gbps 2x2 LVDS Crosspoint Switches

Features

- **DC to 1.5 Gbps low jitter, low skew, low power operation**
- **Pin configurable, fully differential, non-blocking architecture eases system design and PCB layout**
- **On-chip 100Ω input termination minimizes return loss, component count and board space (TF10CP02 only)**
- **Splitter, mux, repeater or crosspoint**
- **Receivers with wide input voltage range allow easy AC or DC coupled interface to most differential drivers (LVDS, LVPECL, CML)**
- **Point to point applications**
- **Guaranteed operation within industrial temperature range -40° to +85°C**
- **Available in space saving SOIC-16 package**
- **Pin and function compatable with DS90CP22 and SN6SLVCP22**

Applications

- High-Speed Backplane Redundancy
- Wireless Base Stations
- Telecom / Datacom
- Network Routing

Ordering Information

Year Year Week Week

PART NUMBER	PACKAGE	PACK / Qty	MARK
TF10CP02-TBS	SOIC-16(N)	Tube / 48	YYWW TF10CP02TB Lot ID
TF10CP02-TBP		T&R / 500	
TF10CP22-TBS	SOIC-16(N)	Tube / 48	YYWW TF10CP22TB Lot ID
TF10CP22-TBP		T&R / 500	
TF10CP02-6CX	TSSOP-16	Check for Availabilty	YYWW TF10CP026C Lot ID
TF10CP22-6CX	TSSOP-16	Check for Availabilty	YYWW TF10CP226C Lot ID

***Replace** X with U (Qty = 94) or G (Qty = 100).*

TF10CP02 *is Terminated.* TF10CP22 *is **Not** Terminated.*

Description

The TF10CP02 and TF10CP22 are low-jitter, fully differential, non-blocking LVDS 2x2 crosspoint switches ideal for applications that require high-speed data or clock distribution, switching, buffering, muxing or routing while minimizing power, space, and noise.

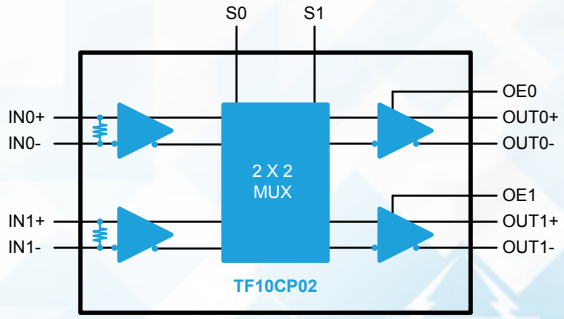
Low 100 ps (max) channel-channel skew and 80 ps P-P (max) added deterministic jitter ensure reliable communication in high-speed links that are highly sensitive to timing error, especially those incorporating clock-and-data recovery or serializers and deserializers.

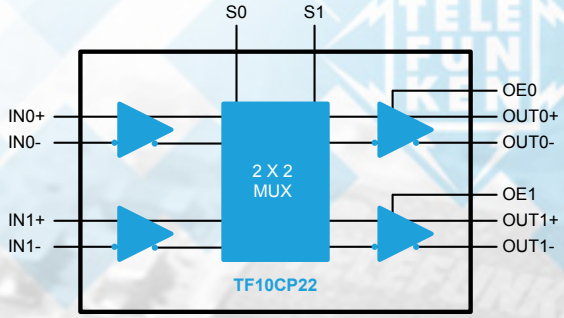
The TF10CP02 features on-chip 100Ω input termination which minimizes input return loss, component count and board space. The TF10CP22 differential inputs are without input termination resistors and are suitable for applications requiring custom termination schemes.

Supply current is 70 mA (max). LVDS inputs and outputs conform to the ANSI/EIA/TIA-644-A standard. The TF10CP02 and TF10CP22 are offered in 16-pin SOIC narrow and TSSOP packages, and operate over an extended -40 °C to +85 °C temperature range.

SOIC-16(N)   TSSOP-16

Function Diagram





TELEFUNKEN
Semiconductors

TF90LVDS031

Quad LVDS Line Driver

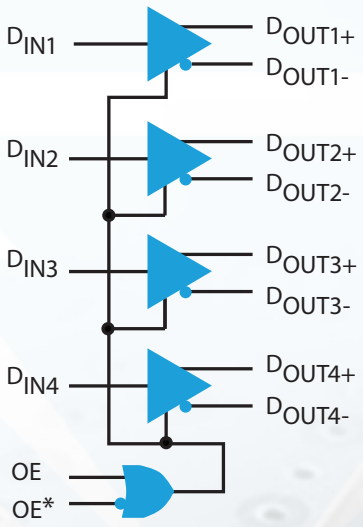
Features

- **DC to 400 Mbps / 200 MHz low noise, low skew, low power operation**
  - **—300 ps (max) channel-to-channel skew**
  - **—250 ps (max) pulse skew**
  - **—23 mA (max) power supply current**
- **LVDS outputs conform to TIA/EIA-644-A standard**
- **Standard output enable scheme eliminates power consumption when device is not in use**
- **Guaranteed operation within industrial temperature range-40° to +85°C**
- **Available in space saving SOIC-16 and TSSOP-16 packages**
- **For Point to Point Applications**
- **Pin and function compatible with DS90LV031A and SN65LVDS31**

Applications

- Digital Copiers
- Wireless Base Stations
- Telecom / Datacom
- Network Routing

Function Diagram



Description

The TF90LVDS031 is a 400 Mbps Quad LVDS (low voltage differential signaling) Line Driver optimized for high-speed, low power, low noise transmission over controlled impedance (approximately 100Ω) transmission media (e.g. cables, printed circuit board traces, backplanes).

The TF90LVDS031 accepts four LVCMOS / LVTTL signals and translates them to four LVDS signals. Its differential outputs can be disabled and put in a high-impedance state via two enable pins, OE and OE*.

Low 300 ps (max) channel-channel skew and 250 ps (max) pulse skew ensure reliable communication in high-speed links that are highly sensitive to timing error.

Supply current is 23 mA (max). LVDS outputs conform to the ANSI/EIA/TIA-644-A standard. The TF90LVDS031 is offered in 16-pin SOIC and TSSOP packages and operates over an extended -40 °C to +85 °C temperature range.

SOIC-16(N)

TSSOP-16

Ordering Information

YearYear WeekWeek

PART NUMBER	PACKAGE	PACK / Qty	MARK
TF90LVDS031-TBU	SOIC-16(N)	Tube / 48	YYWW TFS031TB Lot ID
TF90LVDS031-TBG	SOIC-16(N)	T&R / 500	
TF90LVDS031-6CU	TSSOP-16	Tube / 94	YYWW TFS0316C Lot ID
TF90LVDS031-6CG	TSSOP-16	T&R / 1000	

TELEFUNKEN Semiconductors

TF90LVDS032 / TF90LVDT032

Quad LVDS Line Receivers with Extended Common Mode

Features

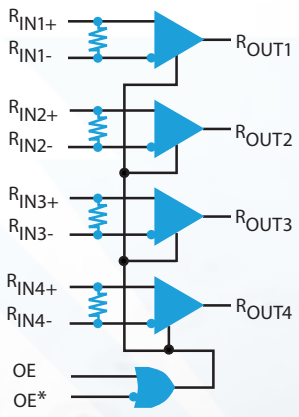
- **Extended input common mode voltage range: -7V to 12V**
- **DC to 400 Mbps / 200 MHz low noise, low skew, low power operation**
  - **—400 ps (max) channel-to-channel skew**
  - **—300 ps (max) pulse skew**
  - **—7 mA (max) power supply current**
- **On-chip 100Ω input termination minimizes return loss, component count and board space (TF90LVDT032 only)**
- **Open or undriven fail-safe support (TF90LVDS032)**
- **LVDS inputs conform to TIA/EIA-644-A standard**
- **Standard output enable scheme eliminates power consumption when device is not in use**
- **Guaranteed operation within industrial temperature range-40° to +85°C**
- **Available in space saving SOIC-16 and TSSOP-16 packages**
- **Pin and function compatible with DS90LV032A and SN65LVDS32 and SN65LVDS32B**

Applications

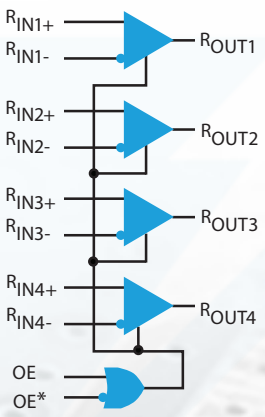
- Digital Copiers
- Wireless Base Stations
- Telecom / Datacom
- Network Routing
- Laser Printers
- LCD Displays

Function Diagrams

TF90LVDT032



TF90LVDS032



Description

The TF90LVDS032 and TF90LVDT032 are 400 Mbps Quad LVDS (low voltage differential signaling) Line Receivers optimized for high-speed, low power, low noise transmission over controlled impedance (approximately 100Ω) transmission media (e.g. cables, printed circuit board traces, backplanes).

The TF90LVDS032 and TF90LVDT032 accept four LVDS signals and translates them to four LVCMOS signals. Their outputs can be disabled and put in a high-impedance state via two enable pins, OE and OE*.

The TF90LVDS032 and TF90LVDT032 input receivers support wide input voltage range of -7 V to 12 V for exceptional noise immunity. A fail-safe feature sets the outputs to a high state when both inputs are open, or undriven.

The TF90LVDT032 features on-chip 100Ω input termination resistors that minimize input return loss, component count and board space. The TF90LVDS032 differential inputs are without input termination resistors and are suitable for applications requiring custom termination schemes.

Supply current is 7 mA (max). LVDS inputs conform to the ANSI/EIA/TIA-644-A standard. The TF90LVDS032 and TF90LVDT032 are offered in 16-pin SOIC(N) and TSSOP packages and operate over an extended -40 °C to +85 °C temperature range.

SOIC-16(N)

TSSOP-16

Ordering Information

Year Year Week Week

PART NUMBER	PACKAGE	PACK / Qty	MARK
TF90LVDX032-TBU	SOIC-16(N)	Tube / 48	YYWW TFX032TB Lot ID
TF90LVDX032-TBG	SOIC-16(N)	T&R / 500	
TF90LVDX032-6CU	TSSOP-16	Tube / 94	YYWW TFX0326C Lot ID
TF90LVDX032-6CG	TSSOP-16	T&R / 1000	

Replace X with S for No Termination, or T for Termination.

TELEFUNKEN Semiconductors

TF90LVDS047

Quad LVDS Line Driver with Flow-Through Pinout

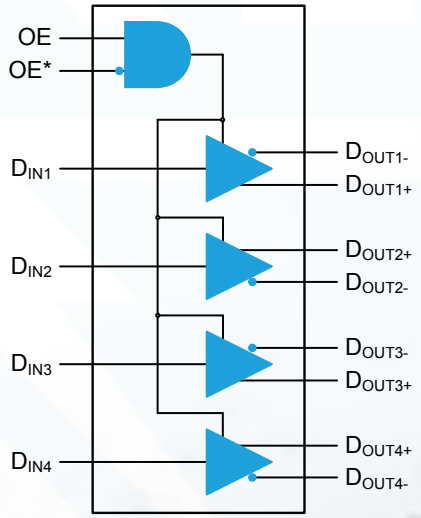
Features

- **Companion driver to Quad Extended Common Mode LVDS Receiver TF0LVDS048**
- **DC to 400 Mbps / 200 MHz low noise, low skew, low power operation**
  - **350 ps (max) channel-to-channel skew**
  - **250 ps (max) pulse skew**
  - **25 mA (max) power supply current**
- **Flow-through pinout eases PCB layout and reduces crosstalk.**
- **LVDS outputs conform to TIA/EIA-644-A standard**
- **Standard output enable scheme eliminates power consumption when device is not in use**
- **Guaranteed operation within industrial temperature range-40° to +85°C**
- **Available in space saving SOIC-16 and TSSOP-16 packages**
- **For Point to Point Applications**
- **Pin and function compatible with NSC DS90LV047A and TI SN65LVDS047**

Applications

- Digital Copiers
- Wireless Base Stations
- Telecom / Datacom
- Network Routing

Function Diagram



Description

The TF90LVDS047 is a 400 Mbps Quad LVDS (low voltage differential signaling) Line Driver optimized for high-speed, low power, low noise transmission over controlled impedance (approximately 100Ω) transmission media (e.g. cables, printed circuit board traces, backplanes).

The TF90LVDS047 accepts four LVCMOS / LVTTL signals and translates them to four LVDS signals. Its differential outputs can be disabled and put in a high-impedance state via two enable pins, OE and OE*. Its flow-through pinout simplifies PCB layout and minimizes crosstalk by isolating the LVDS outputs from the LVCMOS / LVTTL inputs

Low 350 ps (max) channel-channel skew and 250 ps (max) pulse skew ensure reliable communication in high-speed links that are highly sensitive to timing error.

Supply current is 23 mA (max). LVDS outputs conform to the ANSI/EIA/TIA-644-A standard. The TF90LVDS047 is offered in 16-pin SOIC and TSSOP packages and operates over an extended -40 °C to +85 °C temperature range.

SOIC-16(N)

TSSOP-16

Ordering Information

Year Year Week Week

PART NUMBER	PACKAGE	PACK / Qty	MARK
TF90LVDS047-TBU	SOIC-16	Tube / 48	YYWW TFS047TB Lot ID
TF90LVDS047-TBG	SOIC-16	T&R / 500	
TF90LVDS047-6CU	TSSOP-16	Tube / 94	YYWW TFS0476C Lot ID
TF90LVDS047-6CG	TSSOP-16	T&R / 1000	

TELEFUNKEN Semiconductors

TF90LVDS048 / TF90LVDT048

Quad LVDS Line Receivers with Extended Common Mode

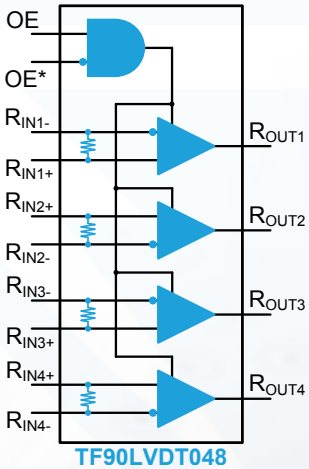
Features

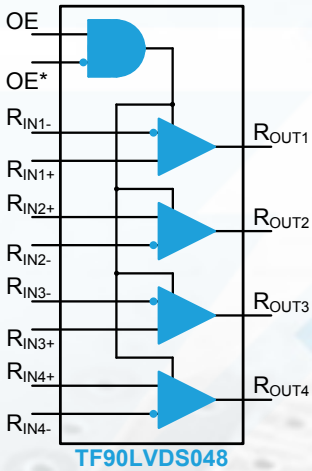
- **Extended input common mode voltage range: -7V to 12V**
- **DC to 400 Mbps / 200 MHz low noise, low skew, low power operation**
  - **500 ps (max) channel-to-channel skew**
  - **350 ps (max) pulse skew**
  - **7 mA (max) power supply current**
- **Flow-through pinout eases PCB layout and reduces crosstalk**
- **On-chip 100Ω input termination minimizes return loss, component count and board space (TF90LVDT048)**
- **Classic pull-up/down resistor fail-safe(TF90LVDS048)**
- **LVDS inputs conform to TIA/EIA-644-A standard**
- **Standard output enable scheme eliminates power consumption when device is not in use**
- **Guaranteed operation within industrial temperature range -40° to +85°C**
- **Available in space saving SOIC-16 and TSSOP-16 packages**
- **TF90LVDS048 pin and function compatible with NSC DS90LV048A and TI SN65LVDS048A, SN65LVDS348, TF90LVDT048 with TI SN65LVDT348**

Applications

- Digital Copiers
- Wireless Base Stations
- Telecom / Datacom
- Network Routing
- Laser Printers
- LCD Displays

Function Diagrams





Description

The TF90LVDS048 and TF90LVDT048 are 400 Mbps Quad LVDS (low voltage differential signaling) Line Receivers optimized for high-speed, low power, low noise transmission over controlled impedance (approximately 100Ω) transmission media (e.g. cables, printed circuit board traces, backplanes).

The TF90LVDS048 and TF90LVDT048 input receivers support wide input voltage range of -7V to 12V for exceptional noise immunity.

The TF90LVDS048 and TF90LVDT048 accept four LVDS signals and translate them to four LVCMOS signals. The outputs can be disabled and put in a high-impedance state via two enable pins, OE and OE*. The flow-through pinout simplifies PCB layout and minimizes crosstalk by isolating the LVDS inputs from the LVCMOS / LVTTL outputs.

The TF90LVDT048 features on-chip 100Ω input termination resistors that minimize input return loss, component count and board space. The TF90LVDS048 differential inputs are without input termination resistors and are suitable for applications requiring custom termination schemes.

Supply current is 7 mA (max). LVDS inputs conform to the ANSI/EIA/TIA-644-A standard. The TF90LVDS048 and TF90LVDT048 are offered in 16-pin SOIC and TSSOP packages and operate over an extended -40 °C to +85 °C temperature range.

SOIC-16(N)

TSSOP-16

Ordering Information

Year Year Week Week

PART NUMBER	PACKAGE	PACK / Qty	MARK
TF90LVDX048-TBU	SOIC-16	Tube / 48	YYWW TFX048TB Lot ID
TF90LVDX048-TBG	SOIC-16	T&R / 500	
TF90LVDX048-6CU	TSSOP-16	Tube / 94	YYWW TFX0486C Lot ID
TF90LVDX048-6CG	TSSOP-16	T&R / 1000	

Replace X with S for No Termination, or T for Termination.

TELEFUNKEN Semiconductors

PRELIMINARY

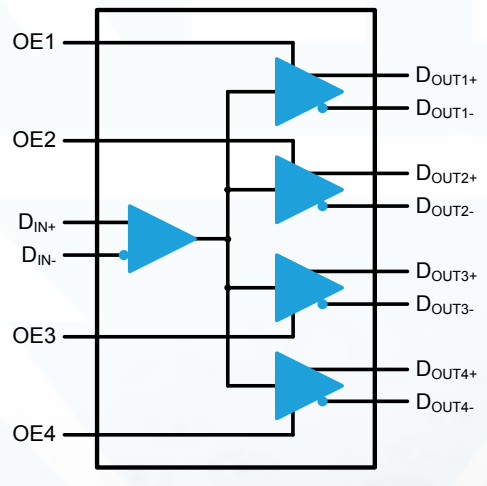
TF90LVDS104 / TF90LVDT104

800 Mbps 1:4 LVDS Fanout Buffers

Features

- **DC to 800 Mbps / 400 MHz low noise, low skew, low power operation**
  - **—100 ps (max) channel-to-channel skew**
  - **—300 ps (max) pulse skew**
  - **—23 mA (max) power supply current**
- **Wide input common mode voltage range: -7V to 12V**
- **On-chip 100Ω input termination minimizes return loss, component count and board space (TF90LVDT104 only)**
- **Open or undriven fail-safe support (TF90LVDS104)**
- **LVDS input and outputs conform to TIA/EIA-644-A standard**
- **Per channel output enable pins minimize power consumption when a channel(s) is not in use**
- **Guaranteed operation within industrial temperature range-40° to +85°C**
- **Available in space saving SOIC-16 and TSSOP-16 packages**
- **Pin compatible with SN65LVDS104 and MAX9169**

Function Diagram



TF90LVDS104

Description

The TF90LVDS104 and TF90LVDT104 are 800 Mbps 1:4 LVDS (low voltage differential signaling) Fanout Buffers optimized for high-speed, low power, low noise transmission over controlled impedance (approximately 100Ω) transmission media (e.g. cables, printed circuit board traces, backplanes).

The TF90LVDS104 and TF90LVDT104 accept a single LVDS signal and create four copies of the signal with LVDS levels. Each differential output can be disabled and put in a high-impedance state via its dedicated enable pin

The TF90LVDS104 and TF90LVDT104 input receivers support wide input voltage range. A fail-safe feature (TF90LVDS104 only) sets the outputs to high state when the input is open, or undriven.

The TF90LVDT104 features on-chip 100Ω input termination resistor which minimizes input return loss, component count and board space. The TF90LVDS104 differential input is without input termination resistor and is suitable for applications requiring custom termination schemes.

Supply current is 23 mA (max). LVDS input and outputs conform to the ANSI/EIA/TIA-644-A standard. The TF90LVDS104 and TF90LVDT104 are offered in 16-pin SOIC and TSSOP packages and operate over an extended -40 °C to +85 °C temperature range.

SOIC-16(N)   TSSOP-16

Applications

- Digital Copiers
- Wireless Base Stations
- Telecom / Datacom
- Network Routing
- Clock Distribution

Ordering Information

Year Year Week Week

PART NUMBER	PACKAGE	PACK / Qty	MARK
TF90LVDX104-TBU	SOIC-16(N)	Tube / 48	YYWW TFX104TB Lot ID
TF90LVDX104-TBG	SOIC-16(N)	T&R / 500	
TF90LVDX104-6CU	TSSOP-16	Tube / 94	YYWW TFX1046C Lot ID
TF90LVDX104-6CG	TSSOP-16	T&R / 1000	

Replace X with S for No Termination, or T for Termination.

TELEFUNKEN Semiconductors

PRELIMINARY

TF90LVDS105

400 Mbps 1:4 LVDS Fanout Buffer with LVCMOS Input

Features

- **DC to 400 Mbps / 200 MHz low noise, low skew, low power operation**
  - **—200 ps (max) channel-to-channel skew**
  - **—100 ps (max) pulse skew**
  - **—25 mA (max) power supply current**
- **LVDS outputs meet or exceed requirements of ANSI TIA/EIA-644-A standard**
- **Per channel output enable pins minimize power consumption when a channel is not in use**
- **Guaranteed operation within industrial temperature range-40° to +85°C**
- **Available in space saving SOIC-16 and TSSOP-16 packages**
- **Pin compatible with SN65LVDS105**

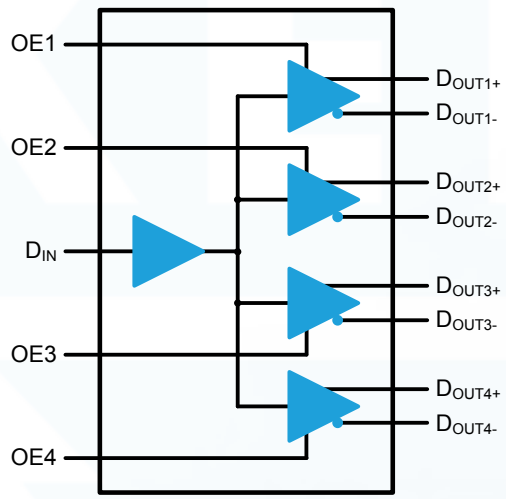
Description

The TF90LVDS105 is a 400 Mbps 1:4 LVDS (low voltage differential signaling) Fanout Buffer optimized for high-speed, low power, low noise transmission over controlled impedance (approximately 100Ω) transmission media (e.g. cables, printed circuit board traces, backplanes).

The TF90LVDS105 accepts a single LVCMOS signal and creates four copies of the signal with LVDS levels. Each differential output can be disabled and put in a high-impedance state via its dedicated enable pin.

Supply current is 25 mA (max). LVDS outputs conform to the ANSI/EIA/TIA-644-A standard. The TF90LVDS105 is offered in 16-pin SOIC and TSSOP packages and operates over an extended -40 °C to +85 °C temperature range.

Function Diagram



TF90LVDS105

Applications

- Digital Copiers
- Wireless Base Stations
- Telecom / Datacom
- Network Routing
- Clock Distribution

SOIC-16(N)

TSSOP-16

Ordering Information

Year Year Week Week

PART NUMBER	PACKAGE	PACK / Qty	MARK
TF90LVDS105-TBU	SOIC-16	Tube / 48	YYWW TFS105TB Lot ID
TF90LVDS105-TBG	SOIC-16	T&R / 500	
TF90LVDS105-6CU	TSSOP-16	Tube / 94	YYWW TFS1056C Lot ID
TF90LVDS105-6CG	TSSOP-16	T&R / 1000	

TELEFUNKEN Semiconductors

ADVANCE INFO

TF1MC076, TF1MD076 /176 / 276

Single Channel M-LVDS Transceivers

Features

- **DC to 250 MHz low jitter, low power operation**
  - **Application optimized controlled edge rates**
  - **20 mA (max) power supply current (R_L=50Ω)**
- **Meets or exceeds TIA/EIA-899 M-LVDS Standard**
  - **Type 1 Data input**
  - **Type 2 Control input with 100mV Offset**
  - **Compatible with -1 to 3.4V Common Mode Voltages**
- **Three speed grades available**
  - **TF1MC076/TF1D076 DC to 30MHz with 6ns edges**
  - **TF1MC176/TF1D176 DC to 125MHz with 2ns edges**
  - **TF1MC276/TF1D276 DC to 250MHz with 1ns edges**
- **The A and B bus pins can be disabled and present a High Impedance with the OE pin or setting $V_{DD} \leq 1.5V$**
- **Guaranteed operation within industrial temperature range -40° to +85°C**
- **Telefunken's Single Channel M-LVDS transceivers are pin and function compatible with NSC and TI's Single Channel M-LVDS transceivers**

Applications

- ATCA
- µTCA
- Clock Distribution
- Multipoint Data

Description

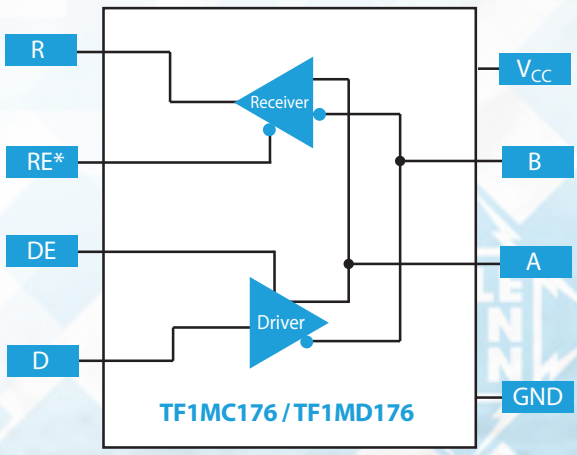
The Single Channel M-LVDS transceiver family consist of 6 devices that have two types of M-LVDS inputs and three drive strengths of M-LVDS and LVCMOS outputs. The two inputs meet the TIA/EIA-899 standard for type 1 (data) and type 2 (control) inputs. New to the M-LVDS family of devices are the variable edge rates that are optimized for three frequency ranges.

These Transceivers are half-duplex with bidirectional bus pins that are TIA/EIA-899 compliant and LVCMOS level signals. The device consist of a receiver and a driver. The receiver converts the M-LVDS bus signals to an LVCMOS output whereas the driver converts the LVCMOS inputs to M-LVDS bus signals.

The M-LVDS and the LVCMOS outputs feature Gradual Turn On (GTO) circuitry. The edge rates are optimized for the targeted operational frequency of the device. GTO outputs reduce ground bounce, overshoot, and undershoot resulting in better noise margin and reduced chance of false triggering.

SOIC-8(N)

Function Diagram



Ordering Information

Year Year Week Week

PART NUMBER	INPUT TYPE/ SPEED	SOIC-8 PACK / Qty	MARK
TF1MC076-TAU	TYPE 2 / 30	Tube / 95	YYWW TFX076 Lot ID
TF1MD076-TAU	TYPE 1 / 30	Tube / 95	
TF1MC176-TAU	TYPE 2 / 125	Tube / 95	YYWW TFX176 Lot ID
TF1MD176-TAU	TYPE 1 / 125	Tube / 95	
TF1MC276-TAU	TYPE 2 / 250	Tube / 95	YYWW TFX276 Lot ID
TF1MD276-TAU	TYPE 1 / 250	Tube / 95	

REPLACE U *with* T *for Tape & Reel (Qty 1,000).*

REPLACE X *with* C *or* D *depending on input type .*

TELEFUNKEN Semiconductors

TF112

7 Port Multidrop IEEE 1149.1 (JTAG) Multiplexer

Features

- **ATPG support from all major vendors**
- **Fully pin and function compatible with NSC SCANSTA112**
- **Muxes 7 local JTAG ports from 1 source**
- **Supports multidrop addressing**
- **Backplane Port and LSP0 can act as slave/master for multi-master operation**
- **Supports live insertion**
- **Transparent Mode for simplified FPGA/CPLD programming**
- **Pass-thru bits can be driven by pins or internal registers to assist Flash Programming**

Applications

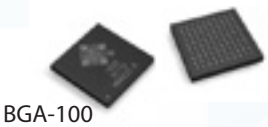
- Muxing multiple Scan Chains
- System Level JTAG Test and Programming
- Multidrop and Hierarchical Scan Path Management

Description

The TF112 combines a 7 port IEEE1149.1 (JTAG) multiplexer with addressable multi-drop capability. As a multiplexer, 7 local ports allow partitioning of scan chains to simplify and accelerate programming and test and debug sequences. Optional daughter cards or ICs are easily handled with dedicated scan chains. Local chains can be selected individually or in combination as required.

Addressable multi-drop capability allows operation on a backplane with other TF112s or similar addressable devices. 8 address pins are used to set the unique device address. Addressing the device is accomplished by loading the instruction register with a value matching the address pins. The backplane port and one of the local ports are bi-directional and may be set as master or slave. This feature enables multi-master operation.

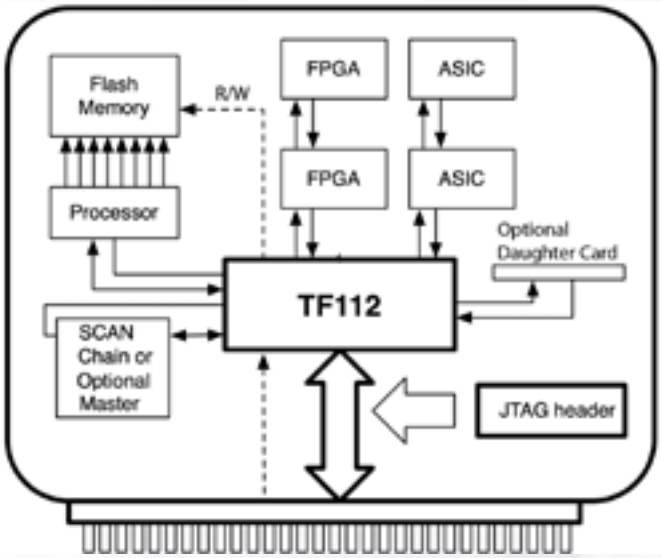
All major ATPG vendors support this function and both addressing and selection of local ports is handled automatically by the vector generation software.



BGA-100

TQFP-100

Function Diagrams



Ordering Information

Year Year Week Week

PART NUMBER	PACKAGE	PACK / Qty	MARK
TF112-BBV	BGA-100	Tray, 240	YYWW TF112 Lot ID
TF112-PBV	TQFP-100	Tray, 90	YYWW TF112 Lot ID

Competitive Product Cross Reference

High Voltage Products	ST	IR	Fairchild	On Semi	TELEFUNKEN	Samples
8 Watt, Off-Line Primary Switcher	Viper12A				TF12A	Now
12 Watt, Off-Line Primary Switcher	Viper22A				TF22A	Now
High Side / Low Side Gate Driver		IR2110 / IRS2110	FAN7392	NCP5181	TF2110	Now
High Side / Low Side Gate Driver		IR2113 / IRS2113	FAN7392	NCP5181	TF2113	Now
High Side / Low Side Gate Driver		IR2101 / IRS2101	FAN7382 / FAN7842	NCP5106A / NCP5111	TF2101	Now
Half Bridge Driver		IR2184 / IRS2184	FAN73932		TF2184	Now
High Side Driver		IRS2117	FAN7361 / FAN7362		TF2117	Now
High Side Driver		IRS2118	FAN7361 / FAN7362		TF2118	Now

Low Voltage Products	MPS	Richtek	TELEFUNKEN	Samples
1A Synchronous Rectified Step-Down Converter	MP2309		TF6001	Now
2A Synchronous Rectified Step-Down Converter	MP2305, MP1482	RT8294, RT8295A	TF6002	Now
3A Synchronous Rectified Step-Down Converter	MP2307, MP1484	RT8290, RT8293A	TF6003	Now
1MHz Step-Up White LED Driver	MP1518	RT9293	TF4601	Now
1.3 MHz Step-Up White LED Driver	MP3202		TF4602	Now

Interface Products	NSC / TI		Maxim	Fairchild	TELEFUNKEN	Samples
2 X 2 Crosspoint	DS90CP22	SN65LVCP22	MAX9152	FIN1022	TF10CP22	Now
Quad flow-thru LVDS Driver	DS90LV047A	SN65LVDS047	MAX9123	FIN1047	TF90LVDS047	Now
Quad flow-thru LVDS Receiver	DS90LV048A	SN65LVDS048A	MAX9173	FIN1048	TF90LVDS048	Now
" with Extended Common Mode " with Integrated Termination		SN65LVDS348 SN65LVDT348	MAX9122		TF90LVDS048 TF90LVDT048	Now
Quad LVDS Driver	DS90LV031A	SN65LVDS31	MAX9124	FIN1031	TF90LVDS031	Now
Quad LVDS Receiver " with Extended Common Mode " with Integrated Termination	DS90LV032A	SN65LVDS32 SN65LVDS33 SN65LVDT33	MAX9125 MAX9126	FIN1032	TF90LVDS032 TF90LVDS032 TF90LVDT032	Now
LVDS 1 to 4 Repeater		SN65LVDS104	MAX9169		TF90LVDS104	Now
LVCMOS to LVDS 1 to 4 Repeater		SN65LVDS105	MAX9170		TF90LVDS105	Now
M-LVDS Transceiver (type 1)	DS91D176	SN65MLVD201			TF1MD176	Q2
M-LVDS Transceiver (type 2)	DS91C176	SN65MLVD206			TF1MC176	Q2
M-LVDS Transceiver (type 1)	DS91D176	SN65MLVD200			TF1MD176	Q2
M-LVDS Transceiver (type 2)	DS91C176	SN65MLVD204A			TF1MC176	Q2
7 Port JTAG Multiplexor	SCANSTA112				TF112	Now

Package Codes

Ordering Codes

TFxxx - PPZ

Device Function | Package Code | Pack Form (Tube or T&R)

Package and Pack Codes

* Dry Pack

Package Name	Abreviated Package Name	Pin Count	Package Code	Tube Mark Code	Tube Pack Quantity	Tray Mark Code	Tray Pack Quantity	180 mm Code	180 mm Pack Quantity	330 mm Code	330 mm Pack Quantity
Plastic Dual In-line Package Narrow	PDIP (N)	8	3A	S	50						
	PDIP (N)	14	3B	S	25						
	PDIP (N)	16	3E								
	PDIP (N)	22	3H	S	18						
Small Outline IC Narrow	SOIC (N)	8	TA	S / U*	95			P / G*	1000	Q / H*	2500
	SOIC (N)	14	TU	S / U*	54					Q / H*	2500
	SOIC (N)	16	TB	S / U*	48			P / G*	500	Q / H*	2500
Small Outline IC Wide	SOIC (W)	16	TE	U*	47					H*	2500
	SOIC (W)	20	TG								
Small Outline IC Narrow w/ Exposed Pad	SOIC (N)-EP	8	TP	S	95			P	1000	Q	2500
	SOIC (N)-EP	16	TR	S	48						
Thin Shrink Small Outline Package	TSSOP	14	6B								
	TSSOP	16	6C	U*	94			G	1000		
Small Outline Transistor Package	SOT23	3	UR					P	3000	Q	10000
	SOT23	5	US					P	3000	Q	10000
	SOT23	6	UT					P	3000	Q	10000
SC70 Transistor Package	SC70	3	XR					P	3000	Q	10000
	SC70	5	XS					P	3000	Q	10000
	SC70	6	XT					P	3000	Q	10000
Dual / Quad Flatpack, Leadless	DFN 2x3	2x4	ND					P	3000	Q	10000
	DFN 2x2	2x4	NB					P	3000	Q	10000
	DFN 4x3	2x7	NF					P	1000	Q	3000
	QFN 4x4	4x6	NE								
	QFN 7x7	4x11	NC	U*	52			G*	1000		
Quad Flatpack, Leads	TQFP	4x25	PB			V*	90				
Ball Grid Array	BGA	10x10	BB			V*	240				
Evaluation Board	EVK										

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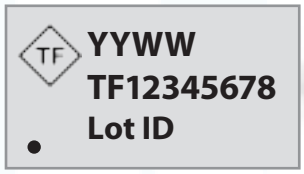
Product Mark

ALL PACKAGES ≥ 4.9mm X 3.9mm (SOIC-8)

Line 1: Date Code
Line 2: Product Name (up to 10 total characters)
Line 3: Lot Identifier

TF Logo



YYWW
1203 = Year 2012, Week 03

7X7 QFN/DFN

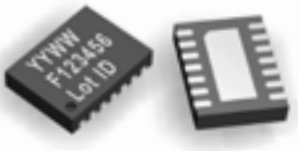
Line 1: Date Code
Line 2: Product Name (up to 8 total characters)
Line 3: Lot Identifier

TF Logo

4X3 QFN/DFN

Line 1: Date Code
Line 2: Product Name (up to 7 total characters)
Line 3: Lot Identifier

NO Logo



2X3, 2X2 QFN/DFN

Line 1: Date Code (Year, **W**eek as per table), and Lot Identifier
Line 2 Product Name (3 Character Code established by Telefunken)

NO Logo

WorkWeek	Date Code Week	WorkWeek	Date Code Week	WorkWeek	Date Code Week	WorkWeek	Date Code Week
VWW01	A	VWW14	N	VWW27	a	VWW40	n
VWW02	B	VWW15	O	VWW28	b	VWW41	o
VWW03	C	VWW16	P	VWW29	c	VWW42	p
VWW04	D	VWW17	Q	VWW30	d	VWW43	q
VWW05	E	VWW18	R	VWW31	e	VWW44	r
VWW06	F	VWW19	S	VWW32	f	VWW45	s
VWW07	G	VWW20	T	VWW33	g	VWW46	t
VWW08	H	VWW21	U	VWW34	h	VWW47	u
VWW09	I	VWW22	V	VWW35	i	VWW48	v
VWW10	J	VWW23	W	VWW36	j	VWW49	w
VWW11	K	VWW24	X	VWW37	k	VWW50	x
VWW12	L	VWW25	Y	VWW38	l	VWW51	y
VWW13	M	VWW26	Z	VWW39	m	VWW52	z

Line 1: Product Name (3 Character Code established by Telefunken)
Line 2: Date Code (Year, **W**eek as per table), and Lot Identifier

NO Logo

WorkWeek	Date Code Week	WorkWeek	Date Code Week	WorkWeek	Date Code Week	WorkWeek	Date Code Week
VWW01	A	VWW14	G	VWW27	N	VWW40	T
VWW02		VWW15	H	VWW28		VWW41	U
VWW03	B	VWW16		VWW29	O	VWW42	
VWW04		VWW17	I	VWW30		VWW43	V
VWW05	C	VWW18		VWW31	P	VWW44	
VWW06		VWW19	J	VWW32		VWW45	W
VWW07	D	VWW20		VWW33	Q	VWW46	
VWW08		VWW21	K	VWW34		VWW47	X
VWW09	E	VWW22		VWW35	R	VWW48	
VWW10		VWW23	L	VWW36		VWW49	Y
VWW11	F	VWW24		VWW37	S	VWW50	
VWW12		VWW25	M	VWW38		VWW51	Z
VWW13	G	VWW26		VWW39	T	VWW52	

*Prior to date code **1X***
(Dec 1st, 2011)

Product Mark

SOT, SC70

TOP: Product Name (3 Character Code established by Telefunken)

BOTTOM: Date Code (Year, **W**eek as per table), and Lot Identifier

Reference Table: Definition of single **W** format.

WorkWeek	Date Code Week
VWV01	A
VWV02	B
VWV03	C
VWV04	D
VWV05	E
VWV06	F
VWV07	G
VWV08	H
VWV09	I
VWV10	J
VWV11	K
VWV12	L
VWV13	M

WorkWeek	Date Code Week
VWV14	N
VWV15	O
VWV16	P
VWV17	Q
VWV18	R
VWV19	S
VWV20	T
VWV21	U
VWV22	V
VWV23	W
VWV24	X
VWV25	Y
VWV26	Z

WorkWeek	Date Code Week
VWV27	a
VWV28	b
VWV29	c
VWV30	d
VWV31	e
VWV32	f
VWV33	g
VWV34	h
VWV35	i
VWV36	j
VWV37	k
VWV38	l
VWV39	m

WorkWeek	Date Code Week
VWV40	n
VWV41	o
VWV42	p
VWV43	q
VWV44	r
VWV45	s
VWV46	t
VWV47	u
VWV48	v
VWV49	w
VWV50	x
VWV51	y
VWV52	z

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*Prior to date code **1X** (Dec 1st, 2011)*

TOP: Product Name (3 Character Code established by Telefunken)

BOTTOM: Date Code (Year, **W**eek as per table), and Lot Identifier

Reference Table: Definition of single **W** format.

WorkWeek	Date Code Week
VWV01	A
VWV02	
VWV03	B
VWV04	
VWV05	C
VWV06	
VWV07	D
VWV08	
VWV09	E
VWV10	
VWV11	F
VWV12	
VWV13	G

WorkWeek	Date Code Week
VWV14	G
VWV15	H
VWV16	
VWV17	I
VWV18	
VWV19	J
VWV20	
VWV21	K
VWV22	
VWV23	L
VWV24	
VWV25	M
VWV26	

WorkWeek	Date Code Week
VWV27	N
VWV28	
VWV29	O
VWV30	
VWV31	P
VWV32	
VWV33	Q
VWV34	
VWV35	R
VWV36	
VWV37	S
VWV38	
VWV39	T

WorkWeek	Date Code Week
VWV40	T
VWV41	U
VWV42	
VWV43	V
VWV44	
VWV45	W
VWV46	
VWV47	X
VWV48	
VWV49	Y
VWV50	
VWV51	Z
VWV52	

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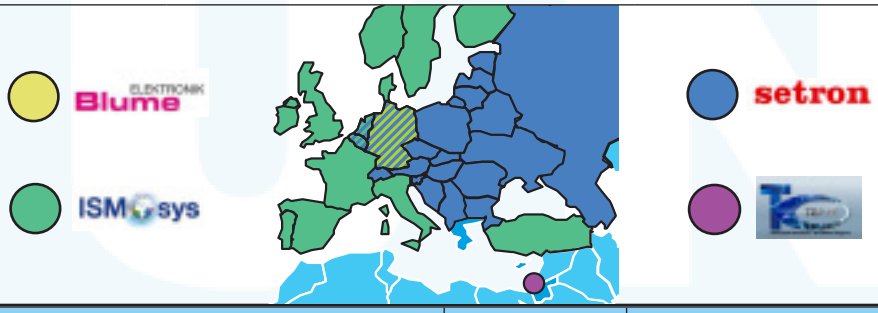

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Europe Regional Representative	**Telefunken Semiconductor Sales Office**	TELEFUNKEN	Herbert Scheitler Tel: +(49) 176-107-13170 herbert.scheitler@telefunkensemi.com
Belgium, Holland, Luxemburg	**ISMOsys**, Drabstraat 305, 2640 Mortsel, Belgium	ISMOsys	Tel: +(32) 478 30 72 72 (Belgium) +(31) 653-226-26-64 (Holland) infoBNX@ismosys.com www.ismosys.com
Germany	**Blume Elektronik GmbH,** TecCenter 1, 31162 Bad Salzdetfurth	Blume	Tel: +(49) 50-63-27-12-0 info@blume-elektronik.de www.blume-elektronik.de
Germany/Switzerland	**Setron GmbH,** Friedrich-Seele-Straße 3a 38122 Braunschweig, Germany	setron	Tel: +(49) 531-8098-0 info@setron.de www.setron.de
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Poland	**Setron Polska,** ul.Pilsudskiego 41, 41-209 Sosnowiec	setron	Tel: +(48) 32-363-2015 michal.maciol@setron.de www.setron.de
Czech Republic	**Setron Czech Republic,** Orechová 735, Opocno, CZ-51773	setron	Tel: +(420) 494-621318 jiri.froede@setron.de www.setron.de
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Russia	**Setron GlobCom,** Pr. Engelsa 71Office 311, 194214 St. Petersburg	setron	info@setron.de www.setron.de
Ukraine	**Setron Ukraine,** ul. Metrobudivska 5, app. 65, 03065 Kyiv	setron	Tel: +(38) 044-332-8281 sergiy.grogol@setron.de www.setron.de
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United Kingdom, Ireland	**ISMOsys,** 5 Willows Gate, Stoke Lyne Road Stratton Audley, Oxfordshire OX279AU, UK	ISMOsys	Tel: +(44) 1869-278743 infoUK@ismosys.com www.ismosys.com
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Israel	**ISMOsys/Toteam**, Derech Ha'Nehalim 25, 70700 Gedera, Israel		Tel: +(972) 77-540-11-43 nd@toteam.co.il www.toteam.co.il

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United States, Canada, Mexico, Distributor	**Nu Horizons Electronics** 70 Maxess Road, Melville, NY 11747	NU HORIZONS ELECTRONICS	Tel: +(1) 631 396-5000 www.nuhorizons.com
United States, Distributor	**Phoenics Electronics Corporation,** 31 Nagog Park, Suite 106, Acton, MA 01720	Phoenics	Tel: +(1) 978-856-0111 www.phoenicselectronics.com
North Central (MN, WI, IL)	**Core Sales**, 901 Warrenville Road, Suite 211, Lisle, IL 60532		Tel: +(1) 847-843-8888 www.coresales.com
New England (MA, NH, VT, RI, ME)	**SemiTech Solutions**, 31 Nagog Park, Acton, MA 01720		Tel: +(1) 978-589-3850 www.stechsolutions.com
West (No-CA, No-NV)	**Centaur North**, 440 Oakmead Parkway, Sunnyvale, CA 94085		Tel: +(1) 408-328-9260 http://www.centaur-corp.com
Rocky Mt. (CO, UT, MT)	**Lange Sales**, 1500 West Canal Court, Building A, Suite 100, Littleton, CO 80120	LANGE	Tel: +(1) 303-795-3600 www.langesales.com
Mid-West (MI, OH, IN, KY, W.PA)	**CC Electro Sales**, 715 North Senate Avenue Indianapolis, IN 46202-3111		Tel: +(1) 317-612-5000 www.ccrep.com
South (NC, SC, GA, AL, TN, MS)	**Baker Information Technology Sales**, 3900 Merton Drive, Suite 260, Raleigh, NC 27609	BITS, Inc.	Tel: +(1) 919-807-1000 http://www.bits1.com
Southwest (AZ, NM, So-NV)	**Summit Sales,** 7802 East Gray Road, Suite 600, Scottsdale, AZ 85260		Tel: +(1) 480-998-4850 www.summitsales.com
South Central (TX, OK, AK, LA)	**MRB Sales, Inc.,** 16801 Addison Road, Suite 375, Addison, TX 75001		Tel: +(1) 972-250-2900 www.bravotex.com
Southeast (FL)	**Mega Technologies Inc,** 1600 Sarno Rd # 21, Melbourne, FL 32935		Tel: +(1) 321-752-6767 www.megatechnologiesinc.com
Eastern Canada (ON, QB, NS)	**Apera Technologies,** 905 Michele-Bohec Bureau 104 Blainville, Quebec J7C 5J6, Canada	Apera	Tel: +(1) 450-971-6969 www.aperatech.com

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Asia Pacific Regional Representative		**Telefunken Semiconductor Sales Office**	TELEFUNKEN Semiconductors	Cordon Szeto Tel: +(020) 3647-3008 cordon.szeto@telefunkensemi.com
Asia/Pacific (All) Distributor		**Nu Horizons Electronics Asia Pte Ltd.** No. 50 Kallang Avenue #06-01, Singapore 339505	NU HORIZONS ELECTRONICS	Tel: +(65) 6844-1650 www.nuhorizons.com
China	Guangzhou	**Etron Electronics Technology Co., Ltd**		Tel: +(86) 20-3647-1221 www.cneet.cn
	Shenzhen	**Etron Electronics Technology Co., Ltd**		Tel: +(86) 755-2588-0201 www.cneet.cn
	Shenzhen	**Brilliantech Co., Limited,**		Tel: +(86) 755-2588-0201 www.brntec.com
	Beijing	**Brilliantech Co., Limited,**		Tel: +(86) 10-6216-7259 www.brntec.com
	Hangzhou City	**Zhejiang Jingbei Electronics Technology Co., Ltd**		Tel: +(0571) 8990-1234 http://www.ic-jb.com
Hong Kong		**Beau & Light, Ltd,**		Tel: +(852) 2413-0139 www.beau-light.com.hk
		Brilliantech Co., Limited,		Tel: +(852) 3524-7908 www.brntec.com
		Handle Electronics Co. Ltd		Tel: +(852) 2637-8080 www.handlegroup.com
Taiwan		**Prohubs International Corp,**	PROHUBS	Tel: +(886) 2-2698-8800 www.prohubs.com.tw
		Mostyle Corp,		Tel: +(886) 2-8797-2800 www.mostyle.com.tw
Korea		**Silicon Bridge Co., Ltd.**		Tel: +(82)-31-382-9975 james@siliconbridge.net
		Taein System Inc.		Tel: +(82)-31-345-6700 www.taeinsys.co.kr