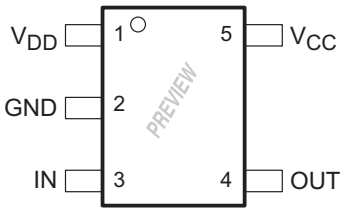
Single-Channel High-Speed MOSFET Drivers

Check for Samples: TPS2816-Q1 , TPS2817-Q1, TPS2818-Q1, TPS2819-Q1, TPS2828-Q1, TPS2829-Q1

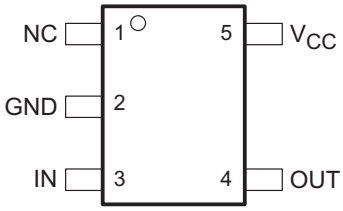
FEATURES

- **Qualified for Automotive Applications**
- **Customer-Specific Configuration Control Can Be Supported Along With Major-Change Approval**
- **Low-Cost Single-Channel High-Speed MOSFET Driver**
- **15-mA Max I_{CC} (TPS2828, TPS2829)**
- **25-ns Max Rise/Fall Times and 40-ns Max Propagation Delay. . . 1-nF Load**
- **2-A Peak Output Current**
- **4-V to 14-V Driver Supply-Voltage Range, Internal Regulator Extends Range to 40 V (TPS2816, TPS2817, TPS2818, TPS2819)**
- **5-pin SOT-23 Package**
- **–40°C to 125°C Ambient-Temperature Operating Range**
- **Highly Resistant to Latch-Ups**

TPS2816, TPS2817
TPS2818, TPS2819
DBV PACKAGE
(TOP VIEW)



TPS2828, TPS2829
DBV PACKAGE
(TOP VIEW)



NC No internal connection

DESCRIPTION

The TPS28xx single-channel high-speed MOSFET drivers are capable of delivering peak currents of up to 2 A into highly capacitive loads. High switching speeds (t_r and t_f = 14 ns typ) are obtained with the use of BiCMOS outputs. Typical threshold switching voltages are two-thirds and one-third of V_{CC}. The design inherently minimizes shoot-through current.

A regulator is provided on TPS2816 through TPS2819 devices to allow operation with supply inputs between 14V and 40V. The regulator output can be used to power other circuits, provided power dissipation does not exceed package limitations. If the regulator is not required, V_{DD} (the regulator input) should be connected to V_{CC}. The TPS2816 and TPS2817 input circuits include an active pullup circuit to eliminate the need for an external resistor when using open-collector PWM controllers. The TPS2818 and TPS2819 are identical to the TPS2816 and TPS2817, except that the active pullup circuit is omitted. The TPS2828 and TPS2829 are identical to the TPS2818 and TPS2819, except that the internal voltage regulator is omitted, allowing quiescent current to drop to less than 15 µA when the inputs are high or low.

The TPS28xx series devices are available in 5-pin SOT-23 (DBV) packages and operate over an ambient temperature range of –40°C to 125°C.

Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of the Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

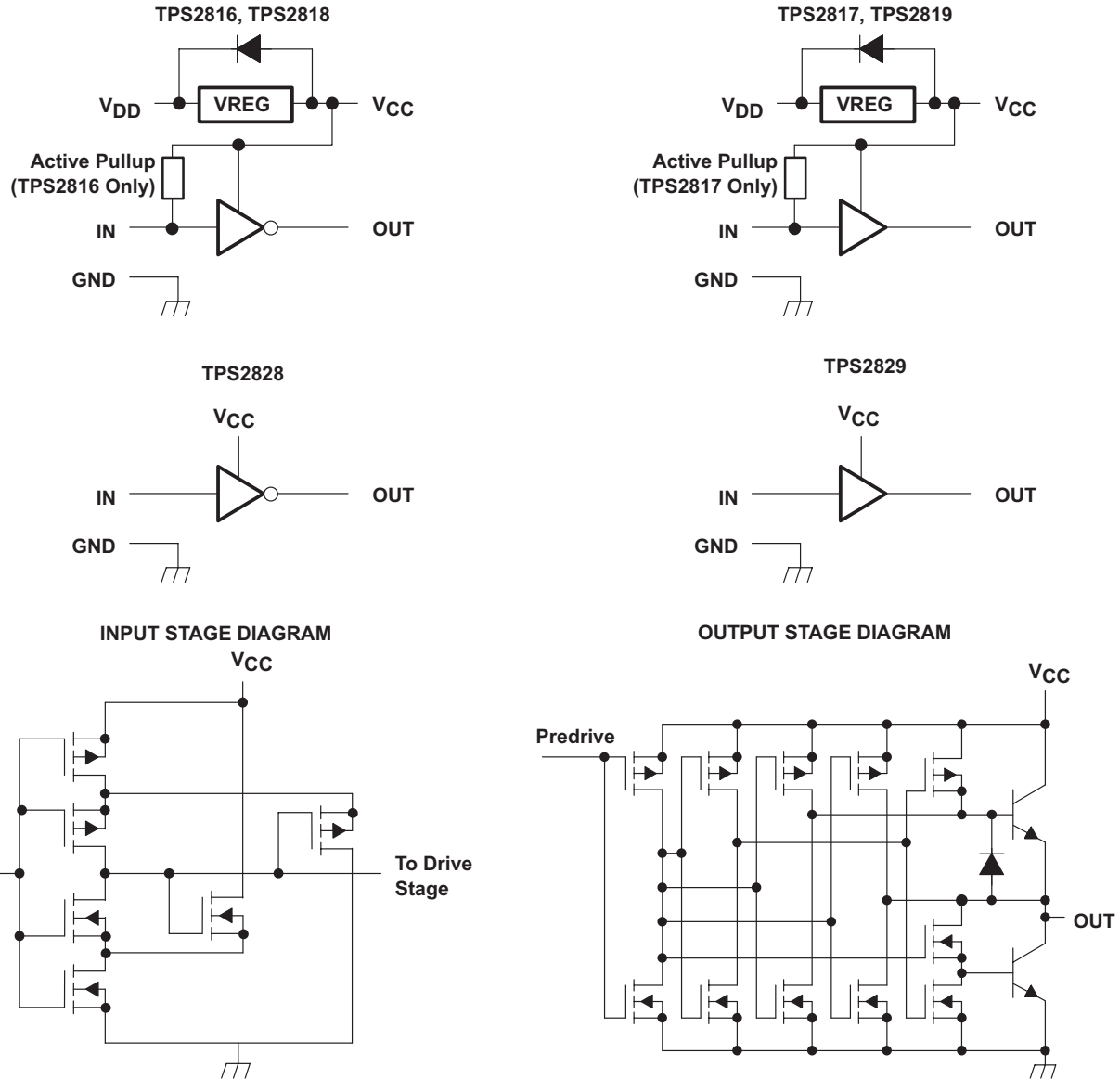
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These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

ORDERING INFORMATION

T_A	FUNCTION	PACKAGED DEVICES	TOP-SIDE MARKING
		SOT-23-5 (DBV)	
–40°C to 125°C	Inverting driver with active pullup input	TPS2816DBV	PREVIEW
	Noninverting driver with active pullup input	TPS2817DBV	PREVIEW
	Inverting driver	TPS2818DBV	PREVIEW
	Noninverting driver	TPS2819QDBVRQ1	PAYI
	Inverting driver, no regulator	TPS2828DBV	PREVIEW

FUNCTIONAL BLOCK DIAGRAM



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ABSOLUTE MAXIMUM RATINGS(1)(2)

over operating free-air temperature range (unless otherwise noted)(2)

		VALUE / UNITS
V_{CC}	Supply voltage range	–0.3 V to 15 V
V_{DD}	Regulator supply voltage range	V_{CC} –0.3 V to 42 V
	Input voltage range, IN	–0.3 V to V_{CC} +0.5 V
	Output voltage range (pin 4)	–0.5 V to V_{CC} +0.5 V
V_{CC}	Continuous regulator output current	25 mA
	Continuous output current, OUT	±100 mA
	Continuous total power dissipation	See Dissipation Rating Table
T_J	Operating junction temperature range	–40°C to 150°C
T_{stg}	Storage temperature range	–65°C to 150°C
	Lead temperature 1,6 mm (1/16 in) from case for 10 s	260°C

(1) Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
(2) All voltages are with respect to device GND terminal.

DISSIPATION RATINGS(1)

PACKAGE	T_A 3 25°C POWER RATING	DERATING FACTOR ABOVE T_A = 25°C	T_A = 70°C POWER RATING	T_A = 80°C POWER RATING
DBV	437 mW	3.5 mW/°C	280 mW	227 mW

(1) These dissipation ratings are based upon EIA specification JESD51-3, *Low Effective Thermal Conductivity Test Board for Leaded Surface Mount Packages*, in tests conducted in a zero-airflow, wind-tunnel environment.

ESD RATINGS, TPS2819

over operating free-air temperature range (unless otherwise noted).

PARAMETER		VALUE	UNIT
ESD	Human Body Model (HBM)	2000	V
	Machine Model (MM)	200	V
	Charged-Device Model (CDM)	500	V

RECOMMENDED OPERATING CONDITIONS

over operating free-air temperature range (unless otherwise noted)

		MIN	MAX	UNIT
V_{DD}	Regulator input voltage range, TPS2816 through TPS2819	8	40	V
V_{CC}	Supply voltage	4	14	V
IN	Input voltage	–0.3	V_{CC}	V
I_{CC}	Continuous regulator output current	0	20	mA
T_J	Operating junction temperature	–40	125	°C

TPS28xx ELECTRICAL CHARACTERISTICS

over recommended operating ambient temperature range, V_{CC} = 10 V, V_{DD} tied to V_{CC}, C_L = 1 nF (unless otherwise specified)

PARAMETER	TEST CONDITIONS	MIN	TYP(1)	MAX	UNIT
INPUTS					
Positive-going input threshold voltage	V_{CC} = 5 V		3.3	4	V
	V_{CC} = 10 V		6.6	7	
	V_{CC} = 14 V		9.3	10	

(1) Typical values are for T_A = 25°C, unless otherwise noted.

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TPS28xx ELECTRICAL CHARACTERISTICS (continued)

over recommended operating ambient temperature range, V_{CC} = 10 V, V_{DD} tied to V_{CC}, C_L = 1 nF (unless otherwise specified)

PARAMETER		TEST CONDITIONS		MIN	TYP(1)	MAX	UNIT
Negative-going input threshold voltage		V_{CC} = 5 V		1	1.7		V
		V_{CC} = 10 V		2	3.3		
		V_{CC} = 14 V		2.5	4.6		
Input voltage hysteresis					1.3		V
Input current, TPS2818/19/28/29		Input = 0 V or V_{CC}			0.2		µA
Input current, TPS2816/17		Input = 0 V			650		µA
		Input = V_{CC}			15		
Input capacitance(2)					5	10	pF
OUTPUTS							
High-level output voltage	TPS2816, TPS2817, TPS2818, TPS2828, TPS2829	I_O = –1 mA		9.75	9.9		V
	TPS2819	I_O = –100 mA	T_A = 25°C	8	9.1		
	TPS2816, TPS2817, TPS2818, TPS2828, TPS2829		T_A = –40°C to 125°C	7	9.1		
Low-level output voltage		I_O = 1 mA			0.18	0.25	V
		I_O = 100 mA			1	2	
REGULATOR, TPS2816 THROUGH TPS2819							
Output voltage		14 ≤ V_{DD} ≤ 40 V, 0 ≤ I_O ≤ 20 mA		10	11.5	13	V
Output voltage in dropout		I_O = 10 mA, V_{DD} = 10 V		8		10	V
SUPPLY CURRENT							
Supply current into V_{CC}	TPS2816, TPS2817	IN = high = 10 V			150	250	µA
		IN = low = 0 V			650	1000	
	TPS2819	IN = high or low, High = 10 V, Low = 0 V	T_A = 25°C		25	50	
	TPS2818		T_A = –40°C to 125°C		25	60	
	TPS2828, TPS2829	IN = high or low, High = 10 V, Low = 0 V			0.1	15	
Supply current into V_{DD}	TPS2816, TPS2817	V_{DD} = 20 V,	IN = high = 10 V or low = 0 V		650	1000	µA
	TPS2818				50	150	
	TPS2819		IN = high = 11 V or low = 0 V		50	150	

(2) Not production tested. Specified by design.

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TPS28xxY ELECTRICAL CHARACTERISTICS

at T_A = 25°C, V_{CC} = 10 V, V_{DD} tied to V_{CC}, C_L = 1 nF (unless otherwise specified)

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
INPUTS						
Positive-going input threshold voltage		V_{CC} = 5 V		3.3		V
		V_{CC} = 10 V		6.6		
		V_{CC} = 14 V		9.3		
Negative-going input threshold voltage		V_{CC} = 5 V		1.7		V
		V_{CC} = 10 V		3.3		
		V_{CC} = 14 V		4.6		
Input voltage hysteresis				1.3		V
Input current, TPS2818/19/28/29		Input = 0 V or V_{CC}		0.2		µA
Input current, TPS2816/17		Input = 0 V		650		µA
		Input = V_{CC}		15		
Input resistance				1000		MΩ
Input capacitance				5		pF
OUTPUTS						
High-level outupt voltage		I_O = –1 mA		9.9		V
		I_O = –100 mA		9.1		
Low-level outupt voltage		I_O = 1 mA		0.18		V
		I_O = 100 mA		1		
REGULATOR, TPS2816 THROUGH TPS2819						
Output voltage		14 ≤ V_{DD} ≤ 40 V, 0 ≤ I_O ≤ 20 mA		11.5		V
Output voltage in dropout		I_O = 10 mA, V_{DD} = 10 V		9		V
SUPPLY CURRENT						
Supply current into V_{CC}	TPS2816, TPS2817	IN = high = 10 V		150		µA
		IN = low = 0 V		650		
	TPS2818, TPS2819	IN = high or low, High = 10 V, Low = 0 V		25		
	TPS2828, TPS2829			0.1		
Supply current into V_{DD}	TPS2816, TPS2817	V_{DD} = 20 V, IN = high = 10 V or low = 0 V		650		µA
	TPS2818, TPS2819			50		

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SWITCHING CHARACTERISTICS

for all devices over recommended operating ambient temperature range, V_{CC} = 10 V, V_{DD} tied to V_{CC}, C_L = 1 nF (unless otherwise specified)

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_r	Rise time	V_{CC} = 14 V			25	ns
		V_{CC} = 10 V		14	30	
		V_{CC} = 5 V			35	
t_f	Fall time	V_{CC} = 14 V			25	ns
		V_{CC} = 10 V		14	30	
		V_{CC} = 5 V			35	
t_{PHL}	Propagation delay time, high-to-low-level output	V_{CC} = 14 V			40	ns
		V_{CC} = 10 V		24	45	
		V_{CC} = 5 V			50	
t_{PLH}	Propagation delay time, low-to-high-level output	V_{CC} = 14 V			40	ns
		V_{CC} = 10 V		24	45	
		V_{CC} = 5 V			50	

PARAMETER MEASUREMENT INFORMATION

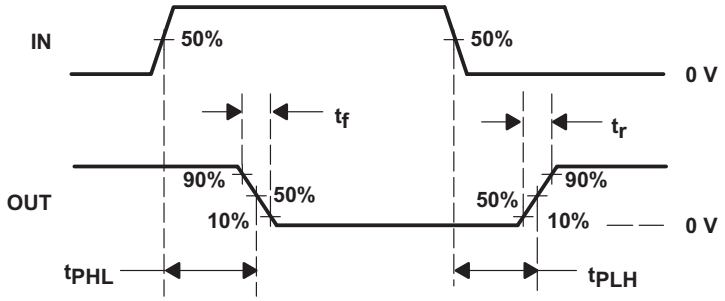


Figure 1. Typical Timing Diagram (TPS2816)

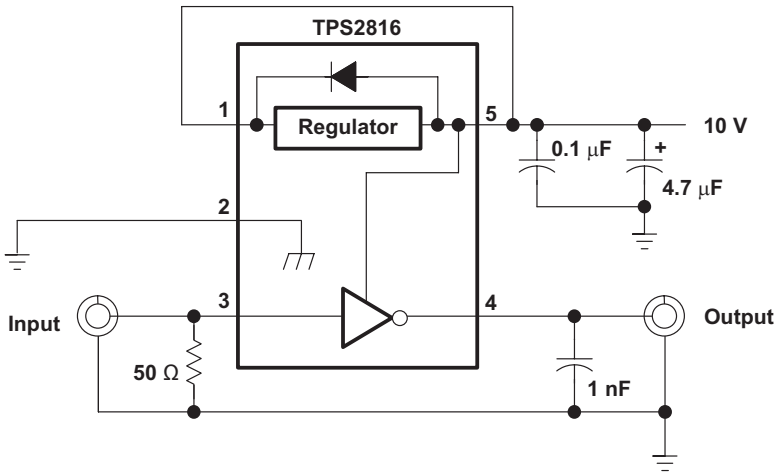


Figure 2. Switching-Time Test Setup

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PARAMETER MEASUREMENT INFORMATION (continued)

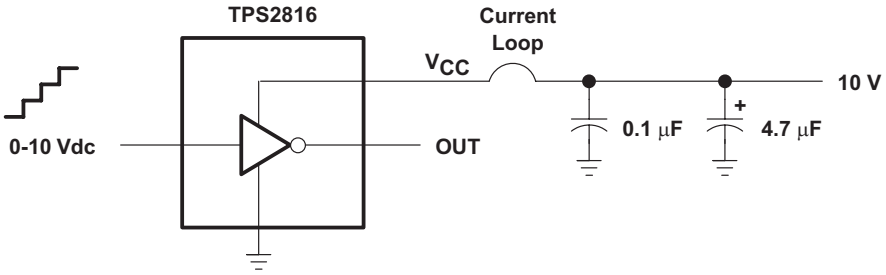


Figure 3. Shoot-Through Current Test Setup

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TYPICAL CHARACTERISTICS

Table of Graphs

		FIGURE
Rise time	vs Supply voltage	Figure 4
Fall time	vs Supply voltage	Figure 5
Propagation time (L → H)	vs Supply voltage	Figure 6
Propagation time (H → L)	vs Supply voltage	Figure 7
Rise time	vs Ambient temperature	Figure 8
Fall time	vs Ambient temperature	Figure 9
Propagation time (L → H)	vs Supply voltage	Figure 10
Propagation time (H → L)	vs Ambient temperature	Figure 11
Supply current (V_{CC})	vs Supply voltage	Figure 12
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Shoot-through current	vs Input voltage (L → H)	Figure 18
Shoot-through current	vs Input voltage (H → L)	Figure 19

RISE TIME vs SUPPLY VOLTAGE

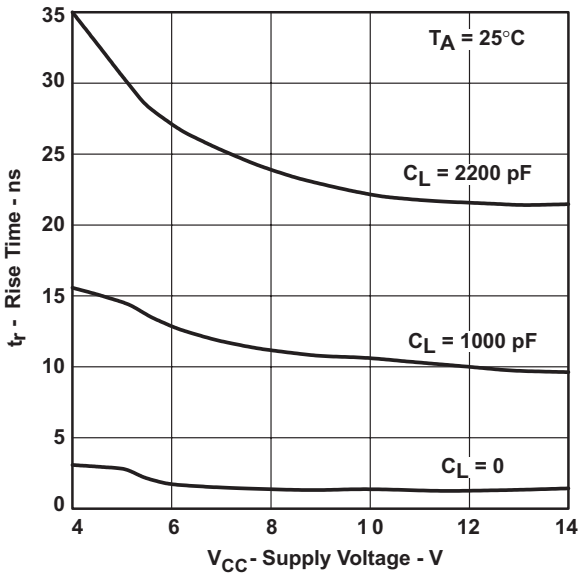


Figure 4.

FALL TIME vs SUPPLY VOLTAGE

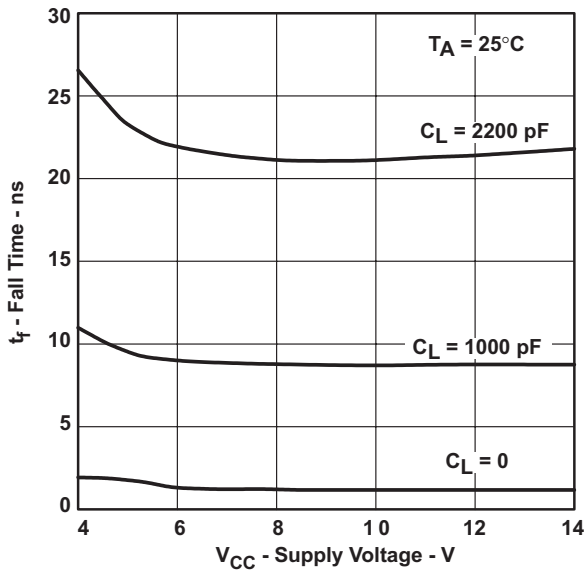


Figure 5.

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**PROPAGATION DELAY TIME,
LOW-TO-HIGH-LEVEL OUTPUT
vs
SUPPLY VOLTAGE**

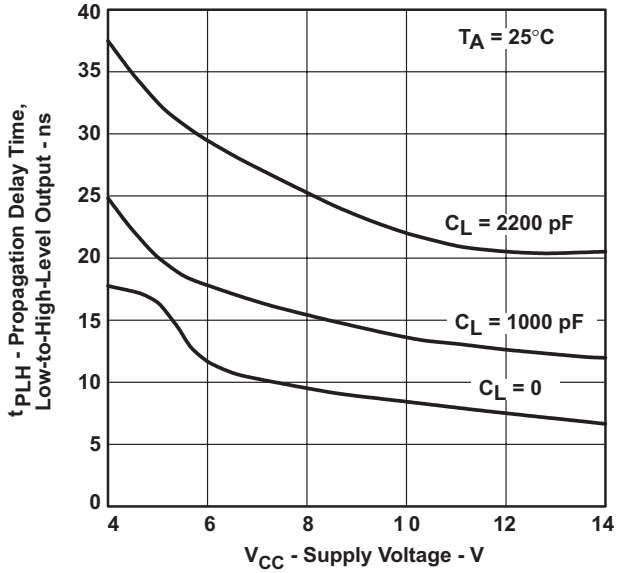


Figure 6.

**PROPAGATION DELAY TIME,
HIGH-TO-LOW-LEVEL OUTPUT
vs
SUPPLY VOLTAGE**

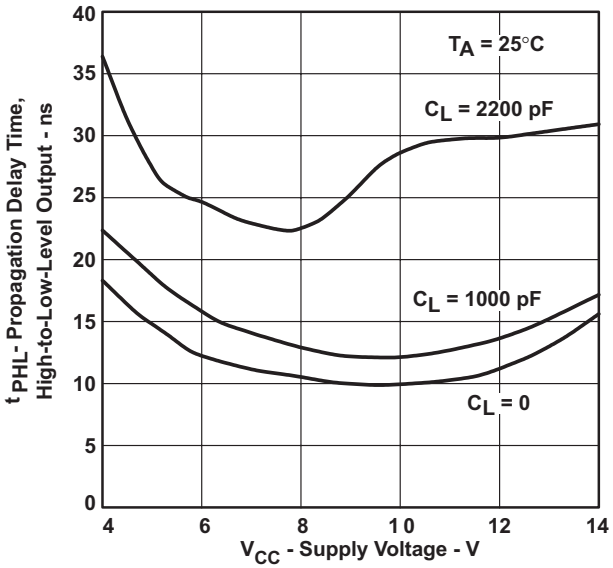


Figure 7.

**RISE TIME
vs
AMBIENT TEMPERATURE**

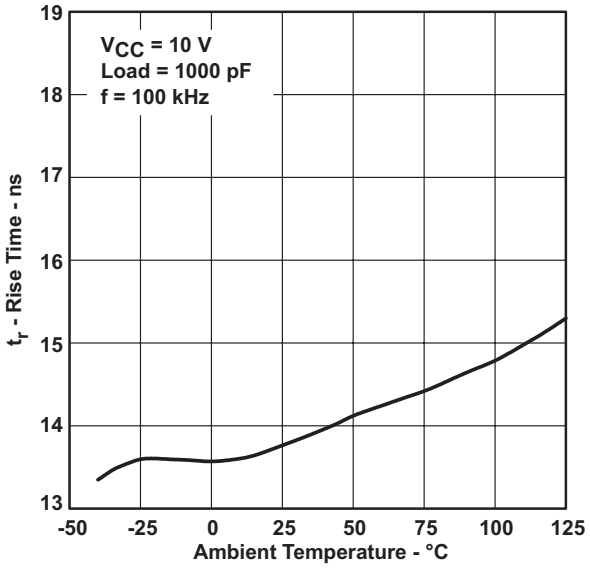


Figure 8.

**FALL TIME
vs
AMBIENT TEMPERATURE**

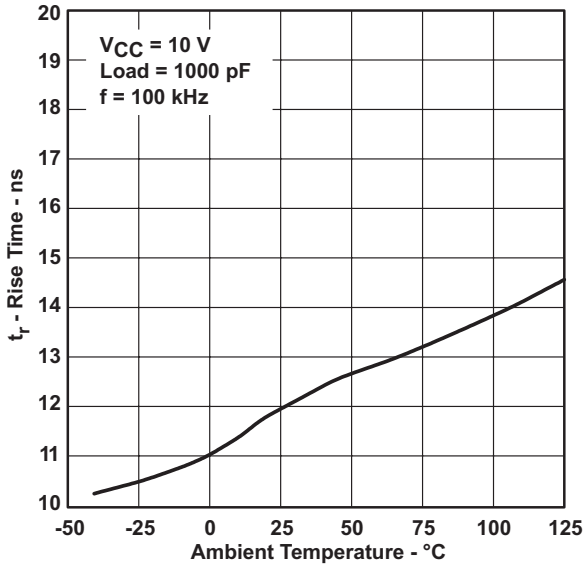


Figure 9.

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PROPAGATION DELAY TIME, LOW-TO-HIGH-LEVEL OUTPUT vs SUPPLY VOLTAGE

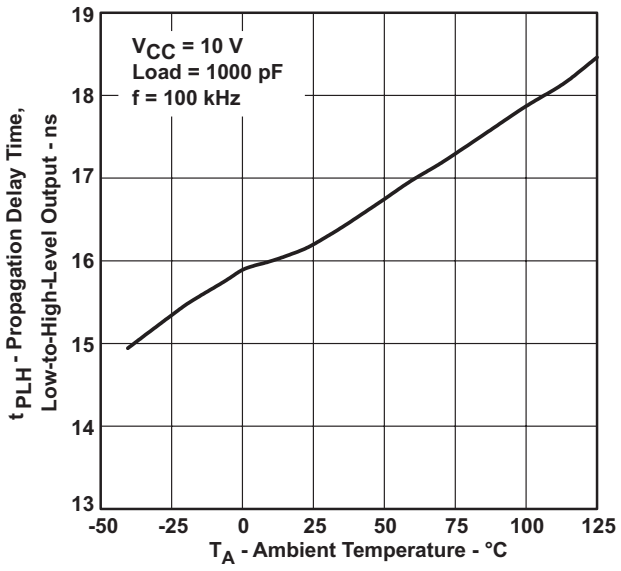


Figure 10.

PROPAGATION DELAY TIME, HIGH-TO-LOW-LEVEL OUTPUT vs AMBIENT TEMPERATURE

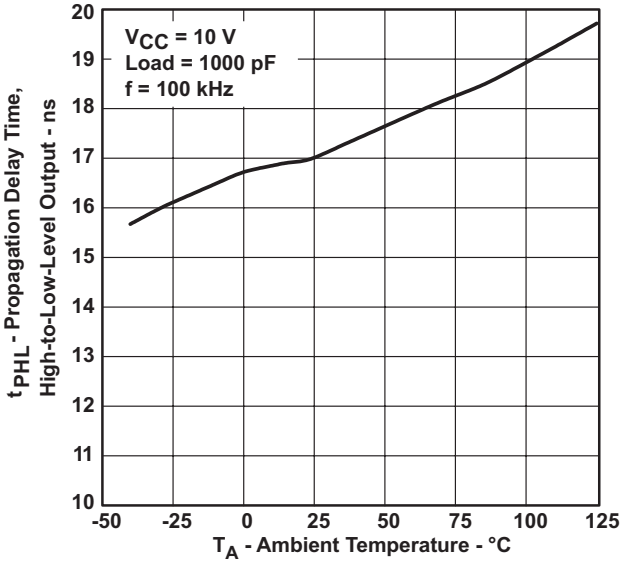


Figure 11.

SUPPLY CURRENT vs SUPPLY VOLTAGE

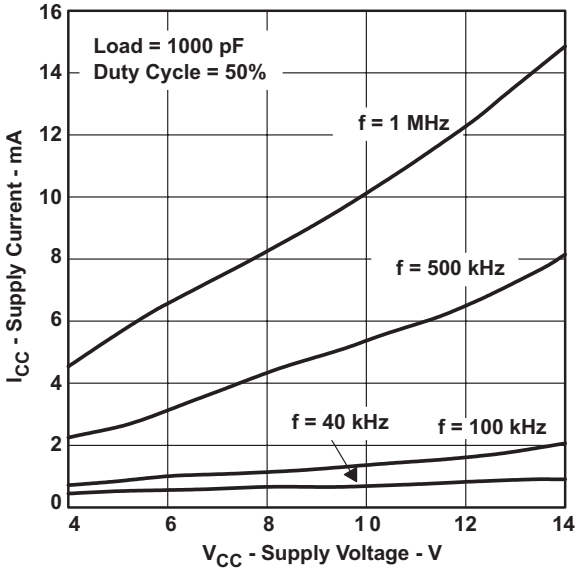


Figure 12.

SUPPLY CURRENT vs LOAD CAPACITANCE

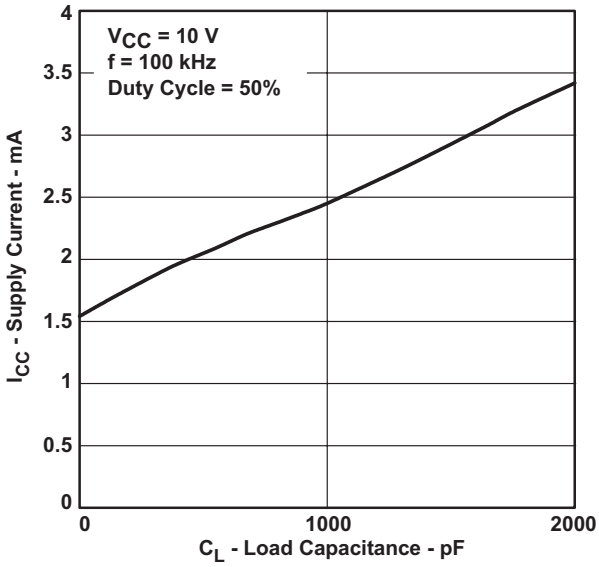


Figure 13.

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SUPPLY CURRENT vs AMBIENT TEMPERATURE

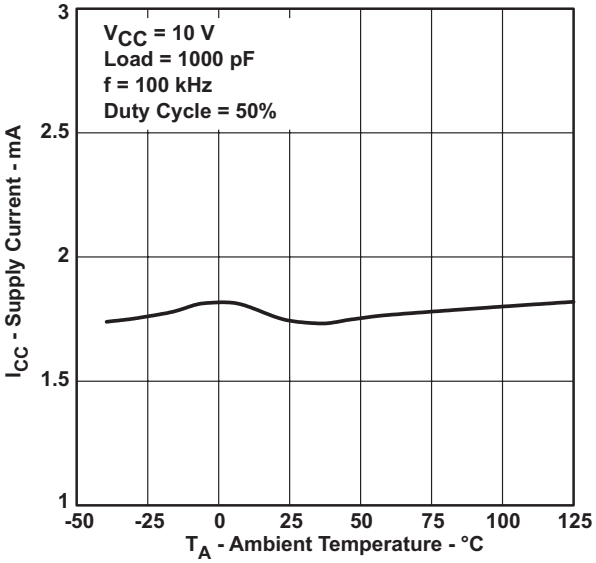


Figure 14.

INPUT THRESHOLD VOLTAGE vs SUPPLY VOLTAGE

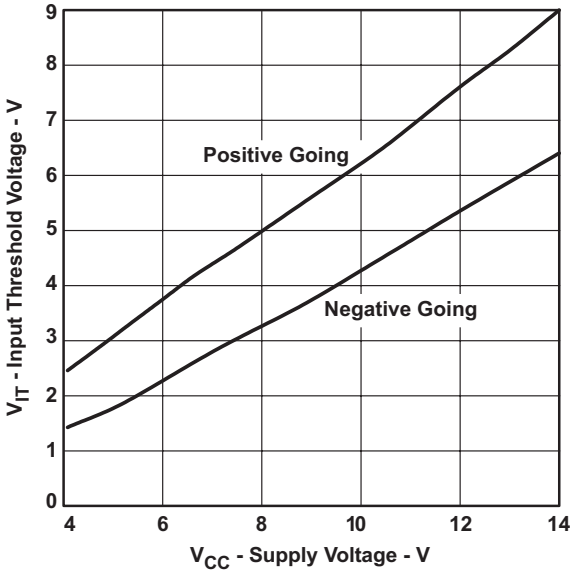


Figure 15.

REGULATOR OUTPUT VOLTAGE vs REGULATOR SUPPLY VOLTAGE

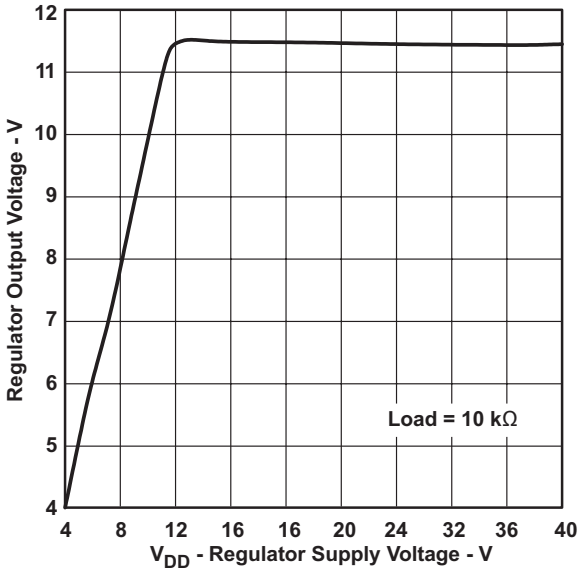


Figure 16.

REGULATOR QUIESCENT CURRENT vs REGULATOR SUPPLY VOLTAGE

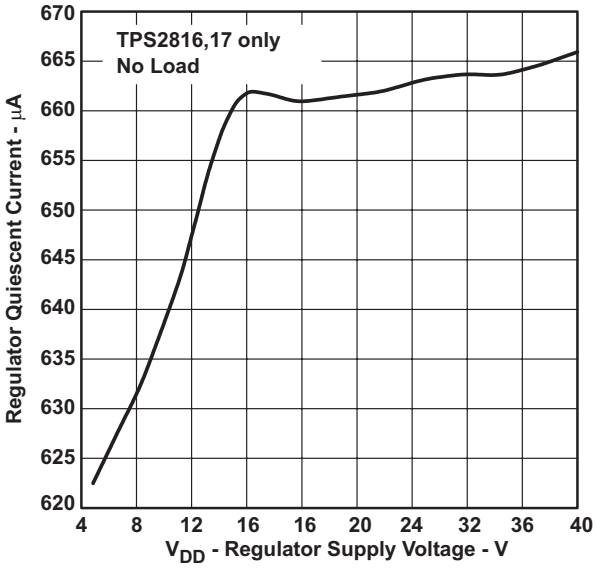


Figure 17.

SHOOT-THROUGH CURRENT
vs
INPUT VOLTAGE LOW-TO-HIGH

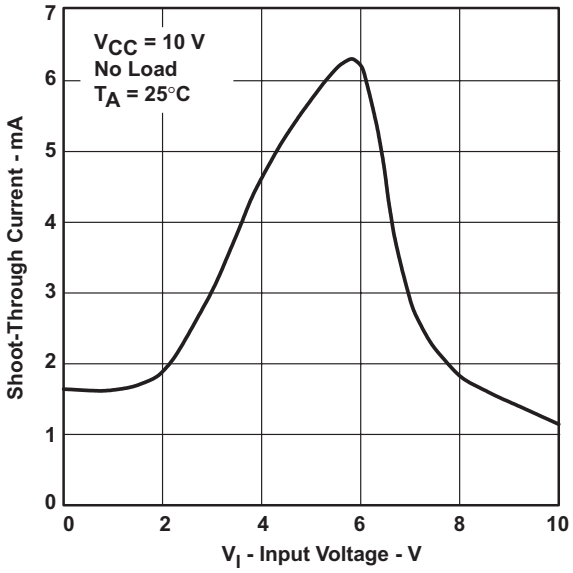


Figure 18.

SHOOT-THROUGH CURRENT
vs
INPUT VOLTAGE HIGH-TO-LOW

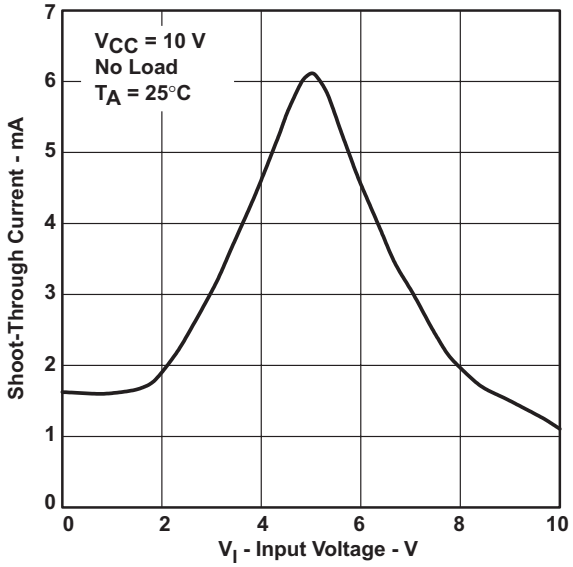


Figure 19.

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APPLICATION INFORMATION

MOSFETs are voltage-driven devices that require very little steady-state drive current. However, the large input capacitance (200 pF to 3000 pF or greater) of these devices requires large current surges to reduce the turn-on and turn-off times. The TPS2816 series of high-speed drivers can supply up to 2 A to a MOSFET, greatly reducing the switching times. The fast rise times and fall times and short propagation delays allow for operation in today's high-frequency switching converters.

In addition, MOSFETs have a limited gate-bias voltage range, usually less than 20 V. The TPS2816 series of drivers extends this operating range by incorporating an on-board series regulator with an input range up to 40 V. This regulator can be used to power the drivers, the PWM chip, and other circuitry, providing the power dissipation rating is not exceeded.

When using these devices, care should be exercised in the proper placement of the driver, the switching MOSFET, and the bypass capacitor. Because of the large input capacitance of the MOSFET, the driver should be placed close to the gate to eliminate the possibility of oscillations caused by trace inductance ringing with the gate capacitance of the MOSFET. When the driver output path is longer than approximately 2 in, a resistor in the range of 10 Ω should be placed in series with the gate drive as close as possible to the MOSFET. A ceramic bypass capacitor also is recommended to provide a source for the high-speed current transients that the MOSFET requires. This capacitor should be placed between V_{CC} and GND of the driver (see Figure 20 and Figure 21).

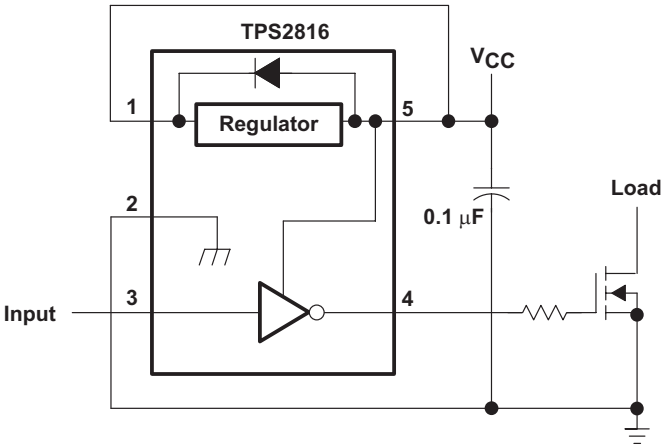


Figure 20. V_{CC} < 14 V

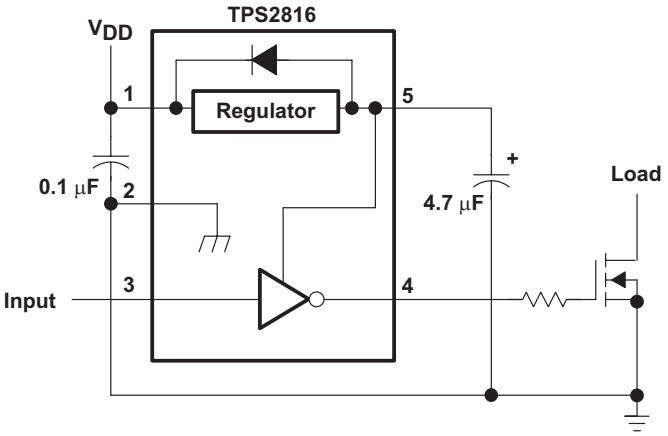


Figure 21. V_{CC} > 14 V

The on-board series regulator supplies approximately 20 mA of current at 11.5 V, some of which can be used for external circuitry, if the power dissipation rating for the driver is not exceeded. When using the onboard series regulator, an electrolytic output capacitor of 4.7 µF or larger is recommended. Although not required, a 0.1-µF ceramic capacitor on the input of the regulator can help suppress transient currents (see). When not used, the regulator should be connected to V_{CC}. Grounding V_{DD} results in destruction of the regulator.

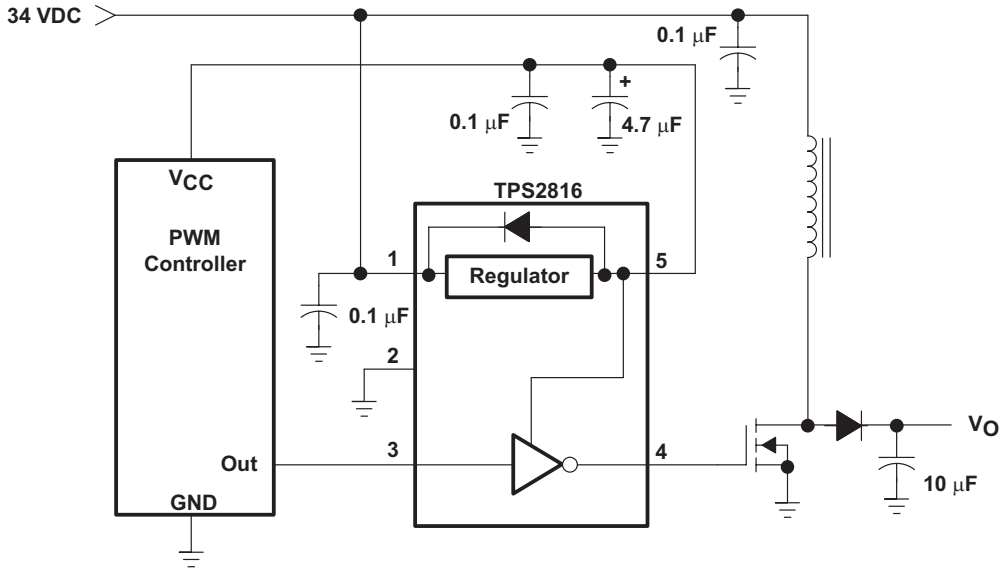


Figure 22. Boost Application

The TPS2816 and TPS2818 drivers include active pullup circuits on the inputs to eliminate the need for external pullup resistors when using controllers with open-collector outputs (such as the TL5001). The TPS2817 and TPS2819 drivers have standard CMOS inputs, providing a total device operating current of less than 50 µA. All devices switch at standard CMOS logic levels of approximately two-thirds V_{CC} with positive-going input levels, and approximately one-third V_{CC} with negative-going input levels. Being CMOS drivers, these devices draw relatively large amounts of current (approximately 5 mA) when the inputs are in the range of one-half of the supply voltage. In normal operation, the driver input is in this range for a very short time. Care should be taken to avoid use of very low slew-rate inputs, used under normal operating conditions. Although not destructive to the device, slew rates slower than 0.1 V/µs are not recommended.

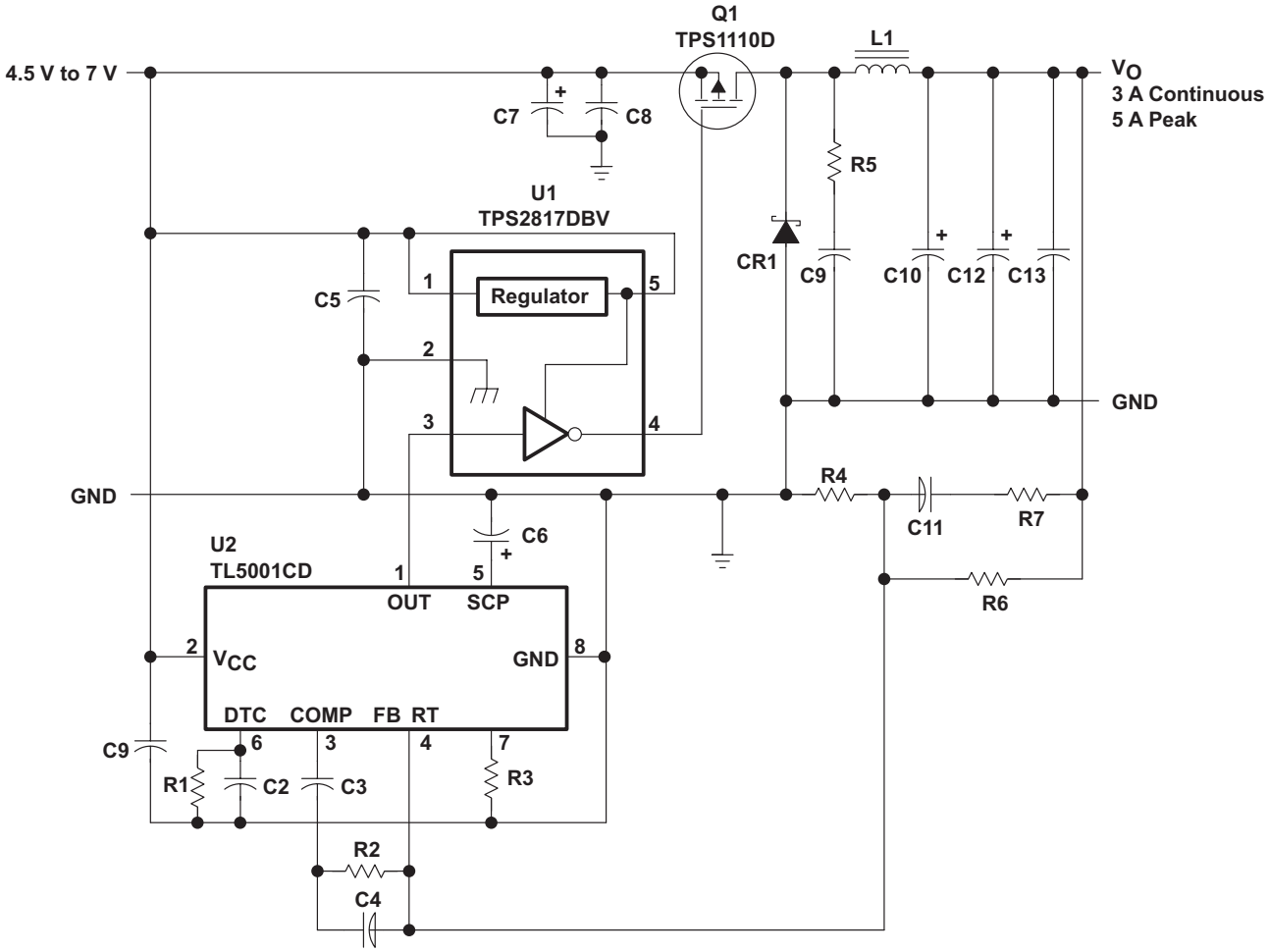
The BiCMOS output stage provides high instantaneous drive current to rapidly toggle the power switch and very low drop to each rail to ensure proper operation at voltage extremes.

Low-voltage circuits (less than 14 V) that require very low quiescent currents can use the TPS2828 and TPS2829 drivers. These drivers use typically 0.2 µA of quiescent current (with inputs high or low). They do not have the internal regulator or the active pullup circuit, but all other specifications are the same as for the rest of the family.

2.5-V/3.3-V, 3-A APPLICATION

Figure 23 illustrates the use of the TPS2817 with a TL5001 PWM controller and a TPS1110 in a simple step-down converter application. The converter operates at 275 kHz and delivers either 2.5 V or 3.3 V (determined by the value of R6) at 3 A (5 A peak) from a 5-V supply. The bill of materials is provided in Table 1.

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NOTE: If the parasitics of the external circuit cause the voltage to violate the Absolute Maximum Rating for the output pins, Schottky diodes should be added from ground to output and from output to V_{CC}.

Figure 23. Step-Down Application

Table 1. Bill of Materials

REF DES	PART NO.	DESCRIPTION	MFR
U1	TPS2817DBV	IC, MOSFET driver, single noninverting	TI
U2	TL5001CD	IC, PWM controller	TI
Q1	TPS1110D	MOSFET, p-channel, 6 A, 7 V, 75 mΩ	TI
C1, C2, C3, C8		Capacitor, ceramic, 0.1 µF, 50 V, X7R, 1206	
C3		Capacitor, ceramic, 0.033 µF, 50 V, X7R, 1206	
C4		Capacitor, ceramic, 2200 pF, 50 V, X7R, 0805	
C6	ECS-T1CY105R	Capacitor, tantalum, 1.0 µF, 16 V, A case	Panasonic
C7	10SC47M	Capacitor, OS-Con, 47 µF, 10 V	Sanyo
C9		Capacitor, ceramic, 1000 pF, 50 V, X7R, 0805	
C10, C12	10SA220M	Capacitor, OS-Con, 220 µF, 10 V	Sanyo
C11		Capacitor, ceramic, 0.022 µF, 50 V, X7R, 0805	
C13		Capacitor, ceramic, 47 µF, 50 V, X7R	
CR1	50WQ03F	Diode, Schottky, D-pak, 5 A, 30 V	IR
L1	SML3723	Inductor, 27 µH, ±20%, 3 A	Nova Magnetics

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Table 1. Bill of Materials (continued)

REF DES	PART NO.	DESCRIPTION	MFR
R1		Resistor, CF, 47 kΩ, 1/10 W, 5%, 0805	
R2		Resistor, CF, 1.5 kΩ, 1/10 W, 5%, 0805	
R3		Resistor, MF, 30.1 kΩ, 1/10 W, 1%, 0805	
R4		Resistor, MF, 1.00 kΩ, 1/10 W, 1%, 0805	
R5		Resistor, CF, 47 Ω, 1/10 W, 5%, 0805	
R6(3.3-V)		Resistor, MF, 2.32 kΩ, 1/10 W, 1%, 0805	
R6 (2.5-V)		Resistor, MF, 1.50 kΩ, 1/10 W, 1%, 0805	
R7		Resistor, CF, 100 W, 1/10 W, 5%, 0805	

As shown in Figure 24 and Figure 25, the TPS2817 turns on the TPS1110 power switch in less than 20 ns and off in 25 ns.

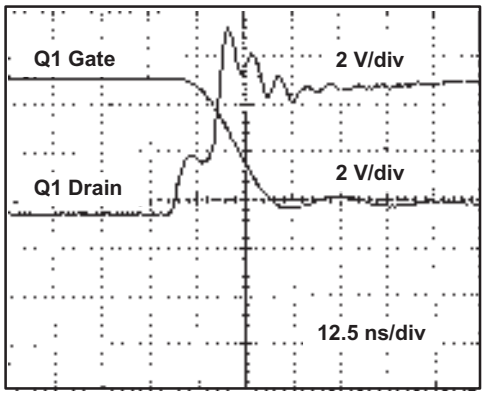


Figure 24. Q1 Turn-On Waveform

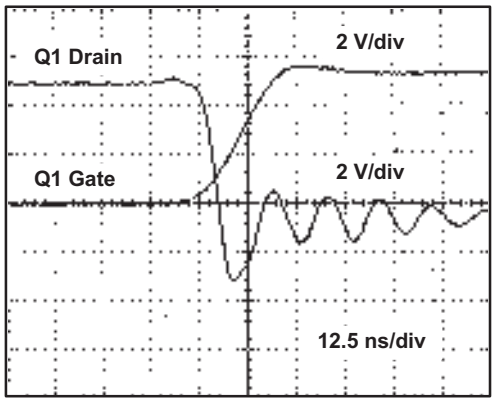


Figure 25. Q1 Turn-Off Waveform

The efficiency for various output currents, with a 5.25-V input, is shown in Figure 26. For a 3.3-V output, the efficiency is greater than 90% for loads up to 2 A – exceptional for a simple, inexpensive design.

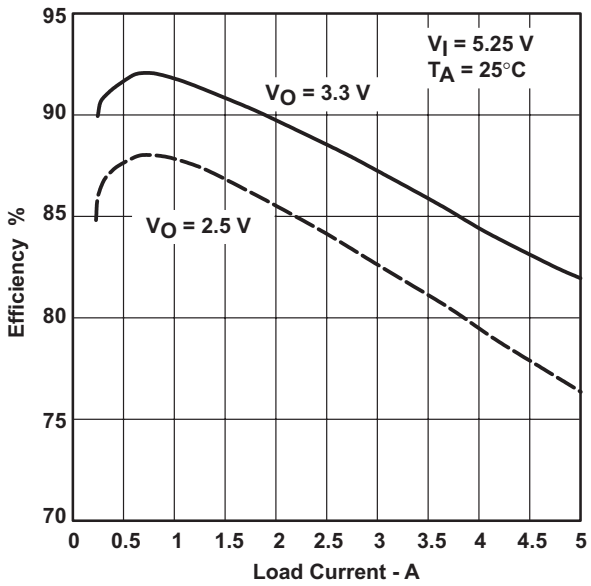


Figure 26. Converter Efficiency

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REVISION HISTORY

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Revision A (September 2005) to Revision B	Page
• Changed datasheet to XML	1
• Added top-side marking for TPS2819QDBVRQ1	2
• Added ESD Ratings table	3
• Added table note for input capacitance	4
• Added typical high-level output voltage of 7 V across temperature range	4
• Added maximum supply current into V_{CC} of 60 µA across temperature range	4

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PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
TPS2819QDBVRQ1	ACTIVE	SOT-23	DBV	5	3000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	PAYI	Samples
TPS2829QDBVRQ1	ACTIVE	SOT-23	DBV	5	3000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	PAYQ	Samples

(1) The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
PREVIEW: Device has been announced but is not in production. Samples may or may not be available.
OBSOLETE: TI has discontinued the production of the device.

(2) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".
RoHS Exempt: TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.
Green: TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead finish/Ball material - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

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OTHER QUALIFIED VERSIONS OF TPS2819-Q1, TPS2829-Q1 :

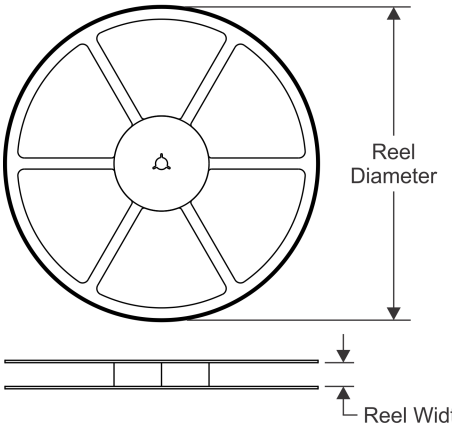
- Catalog: TPS2819, TPS2829
- Enhanced Product: TPS2819-EP

NOTE: Qualified Version Definitions:

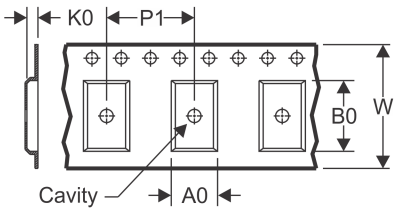
- Catalog - TI's standard catalog product
- Enhanced Product - Supports Defense, Aerospace and Medical Applications

TAPE AND REEL INFORMATION

REEL DIMENSIONS

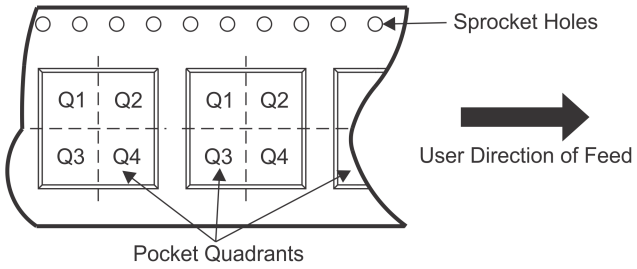


TAPE DIMENSIONS



A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

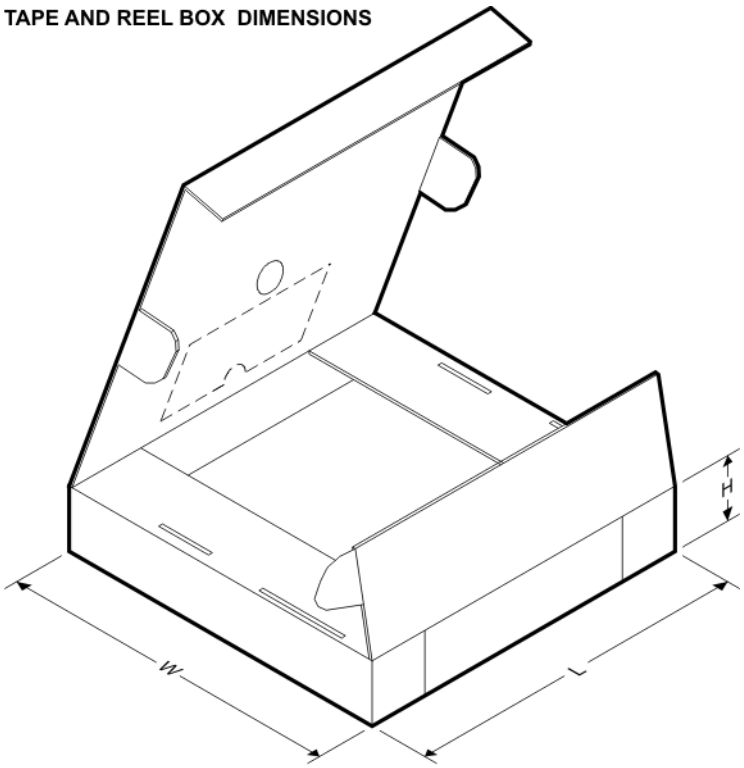
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
TPS2819QDBVRQ1	SOT-23	DBV	5	3000	178.0	9.0	3.23	3.17	1.37	4.0	8.0	Q3
TPS2829QDBVRQ1	SOT-23	DBV	5	3000	179.0	8.4	3.2	3.2	1.4	4.0	8.0	Q3

TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

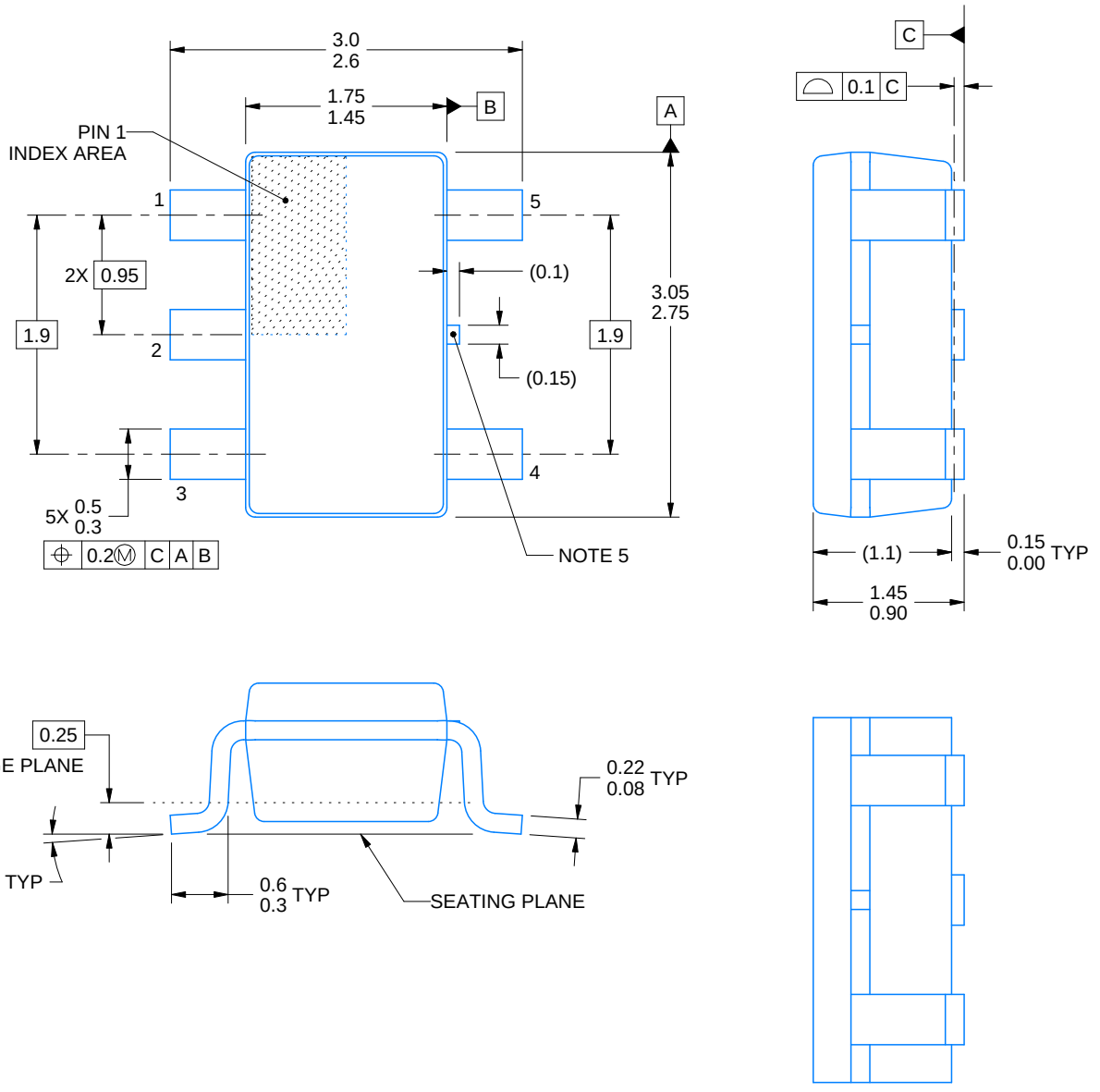
Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
TPS2819QDBVRQ1	SOT-23	DBV	5	3000	180.0	180.0	18.0
TPS2829QDBVRQ1	SOT-23	DBV	5	3000	200.0	183.0	25.0

PACKAGE OUTLINE

DBV0005A

SOT-23 - 1.45 mm max height

SMALL OUTLINE TRANSISTOR

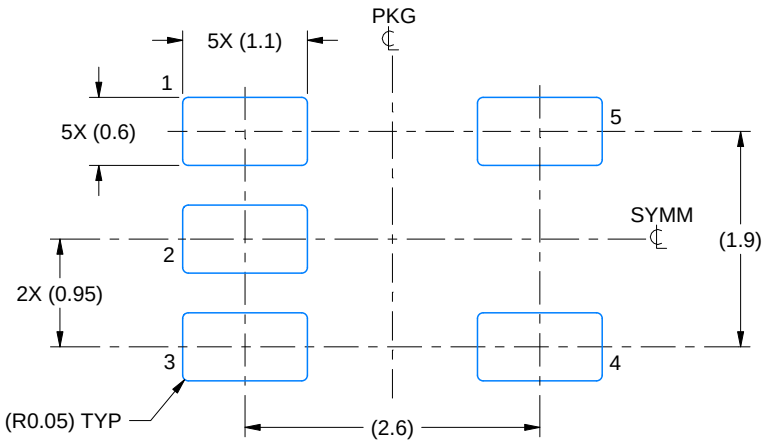


ALTERNATIVE PACKAGE SINGULATION VIEW

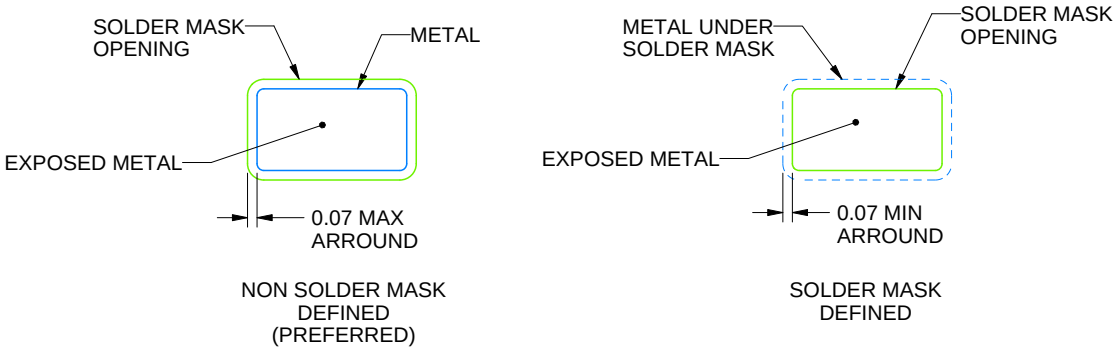
4214839/J 02/2024

NOTES:

1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. Refernce JEDEC MO-178.
4. Body dimensions do not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.25 mm per side.
5. Support pin may differ or may not be present.



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE:15X

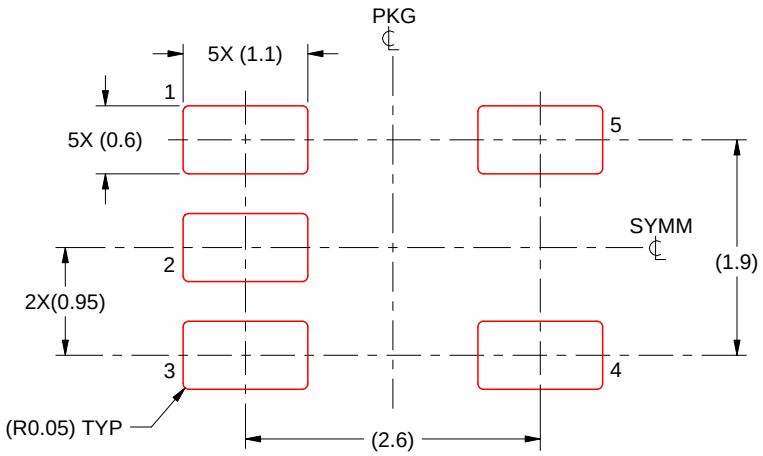


SOLDER MASK DETAILS

4214839/J 02/2024

NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE:15X

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NOTES: (continued)

8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

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