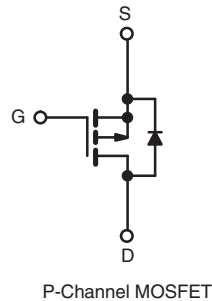
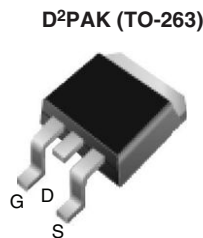


Power MOSFET

PRODUCT SUMMARY		
V_{DS} (V)	- 200	
$R_{DS(on)}$ (Ω)	$V_{GS} = - 10$ V	1.5
Q_g (Max.) (nC)	22	
Q_{gs} (nC)	12	
Q_{gd} (nC)	10	
Configuration	Single	



FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- Surface Mount
- Available in Tape and Reel
- Dynamic dV/dt Rating
- P-Channel
- Fast Switching
- Ease of Paralleling
- Simple Drive Requirements
- Compliant to RoHS Directive 2002/95/EC



RoHS*
COMPLIANT
HALOGEN
FREE
Available

DESCRIPTION

The Power MOSFETs technology is the key to Vishay's advanced line of Power MOSFET transistors. The efficient geometry and unique processing of the Power MOSFETs design achieve very low on-state resistance combined with high transconductance and extreme device ruggedness. The D²PAK (TO-263) is a surface mount power package capable of accommodating die sizes up to HEX-4. It provides the highest power capability and the lowest possible on-resistance in any existing surface mount package. The D²PAK (TO-263) is suitable for high current applications because of its low internal connection resistance and can dissipate up to 2.0 W in a typical surface mount application.

ORDERING INFORMATION		
Package	D ² PAK (TO-263)	D ² PAK (TO-263)
Lead (Pb)-free and Halogen-free	SiHF9620S-GE3	SiHF9620STRL-GE3 ^a
Lead (Pb)-free	IRF9620SPbF	IRF9620STRLPbF ^a
	SiHF9620S-E3	SiHF9620STL-E3 ^a

Note

- a. See device orientation.

ABSOLUTE MAXIMUM RATINGS ($T_C = 25$ °C, unless otherwise noted)				
PARAMETER	SYMBOL	LIMIT	UNIT	
Drain-Source Voltage	V_{DS}	- 200	V	
Gate-Source Voltage	V_{GS}	± 20		
Continuous Drain Current	V_{GS} at - 10 V	$T_C = 25$ °C	- 3.5	A
		$T_C = 100$ °C	- 2.0	
Pulsed Drain Current ^a		I_{DM}	- 14	W/°C
Linear Derating Factor			0.32	
Linear Derating Factor (PCB Mount) ^e			0.025	
Inductive Current, Clamp		I_{LM}	- 14	A
Maximum Power Dissipation	$T_C = 25$ °C	P_D	40	W
Maximum Power Dissipation (PCB Mount) ^e	$T_A = 25$ °C		3.0	
Peak Diode Recovery dV/dt^c		dV/dt	- 5.0	V/ns
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to + 150	°C
Soldering Recommendations (Peak Temperature)	for 10 s		300 ^d	

Notes



- Repetitive rating; pulse width limited by maximum junction temperature (see fig. 5).
- Not Applicable
- $I_{SD} \leq - 3.5$ A, $dI/dt \leq 95$ A/ μ s, $V_{DD} \leq V_{DS}$, $T_J \leq 150$ °C.
- 1.6 mm from case.
- When mounted on 1" square PCB (FR-4 or G-10 material).

* Pb containing terminations are not RoHS compliant, exemptions may apply

THERMAL RESISTANCE RATINGS						
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	
Maximum Junction-to-Ambient	R_{thJA}	-	-	62	°C/W	
Maximum Junction-to-Ambient (PCB Mount) ^a	R_{thJA}	-	-	40		
Maximum Junction-to-Case (Drain)	R_{thJC}	-	-	3.1		

Note

a. When mounted on 1" square PCB (FR-4 or G-10 material).

SPECIFICATIONS ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static							
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0, I_D = -250\text{ }\mu\text{A}$		-200	-	-	V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	Reference to $25\text{ }^\circ\text{C}$, $I_D = -1\text{ mA}$		-	-0.22	-	V/°C
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$		-2.0	-	-4.0	V
Gate-Source Leakage	I_{GSS}	$V_{GS} = \pm 20\text{ V}$		-	-	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -200\text{ V}, V_{GS} = 0\text{ V}$		-	-	-100	μA
		$V_{DS} = -160\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$		-	-	-500	
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS} = -10\text{ V}$	$I_D = -1.5\text{ A}^b$	-	-	1.5	Ω
Forward Transconductance	g_{fs}	$V_{DS} = -50\text{ V}, I_D = -1.5\text{ A}$		1.0	-	-	S
Dynamic							
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V},$ $V_{DS} = -25\text{ V},$ $f = 1.0\text{ MHz}$, see fig. 10		-	350	-	pF
Output Capacitance	C_{oss}			-	100	-	
Reverse Transfer Capacitance	C_{rss}			-	30	-	
Total Gate Charge	Q_g	$V_{GS} = -10\text{ V}$	$I_D = -4.0\text{ A}, V_{DS} = -160\text{ V},$ see fig. 11 and 18 ^b	-	-	22	nC
Gate-Source Charge	Q_{gs}			-	-	12	
Gate-Drain Charge	Q_{gd}			-	-	10	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -100\text{ V}, I_D = -1.5\text{ A},$ $R_G = 50\text{ }\Omega, R_D = 67\text{ }\Omega$, see fig. 17 ^b		-	15	-	ns
Rise Time	t_r			-	25	-	
Turn-Off Delay Time	$t_{d(off)}$			-	20	-	
Fall Time	t_f			-	15	-	
Internal Drain Inductance	L_D	Between lead, 6 mm (0.25") from package and center of die contact 		-	4.5	-	nH
Internal Source Inductance	L_S			-	7.5	-	
Drain-Source Body Diode Characteristics							
Continuous Source-Drain Diode Current	I_S	MOSFET symbol showing the integral reverse p - n junction diode 		-	-	-3.5	A
Pulsed Diode Forward Current ^a	I_{SM}			-	-	-14	
Body Diode Voltage	V_{SD}	$T_J = 25\text{ }^\circ\text{C}, I_S = -3.5\text{ A}, V_{GS} = 0\text{ V}^b$		-	-	-7.0	V
Body Diode Reverse Recovery Time	t_{rr}	$T_J = 25\text{ }^\circ\text{C}, I_F = -3.5\text{ A}, dI/dt = 100\text{ A}/\mu\text{s}^b$		-	300	450	ns
Body Diode Reverse Recovery Charge	Q_{rr}			-	1.9	2.9	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by L_S and L_D)					

Notes

- a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 5).
 b. Pulse width $\leq 300\text{ }\mu\text{s}$; duty cycle $\leq 2\%$.

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

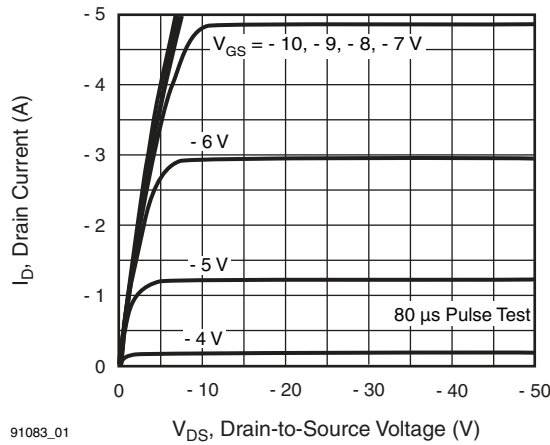


Fig. 1 - Typical Output Characteristics

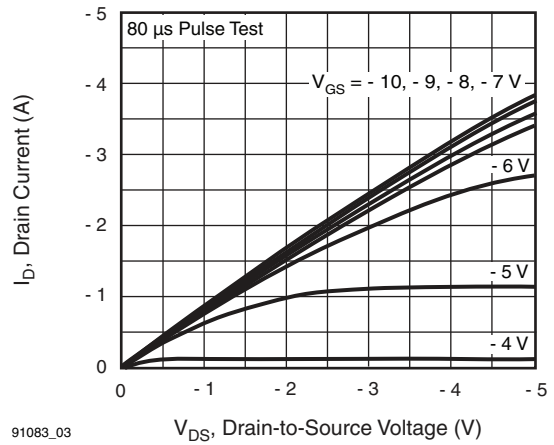


Fig. 3 - Typical Saturation Characteristics

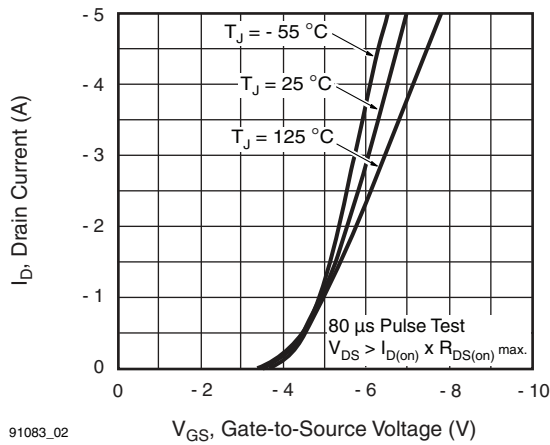


Fig. 2 - Typical Transfer Characteristics

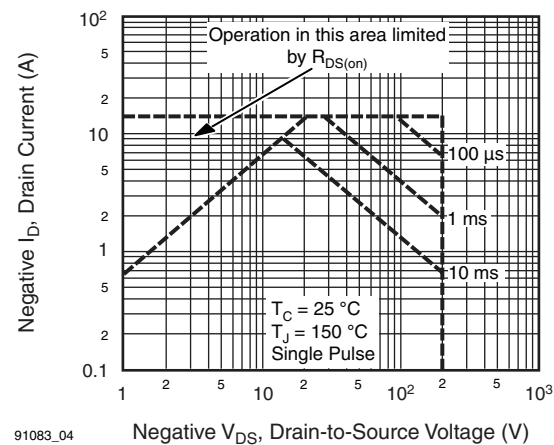


Fig. 4 - Maximum Safe Operating Area

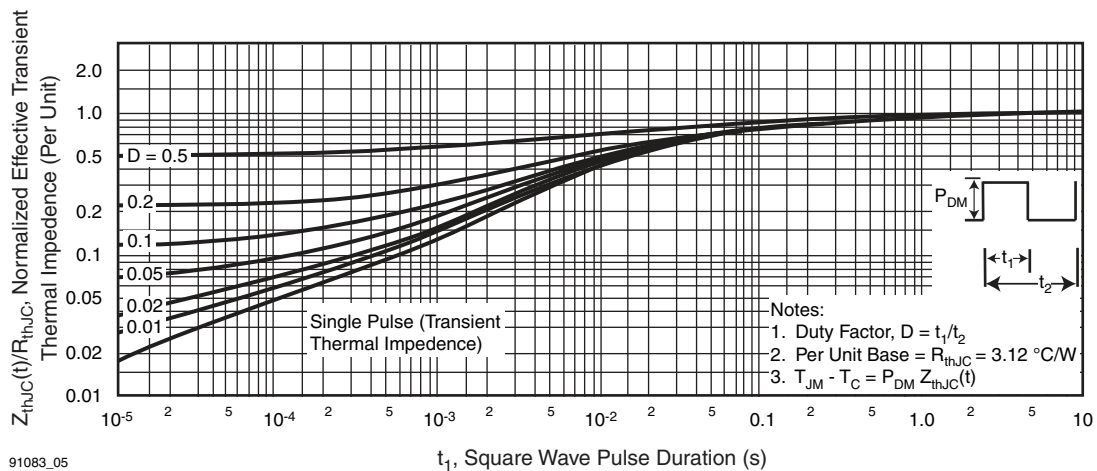
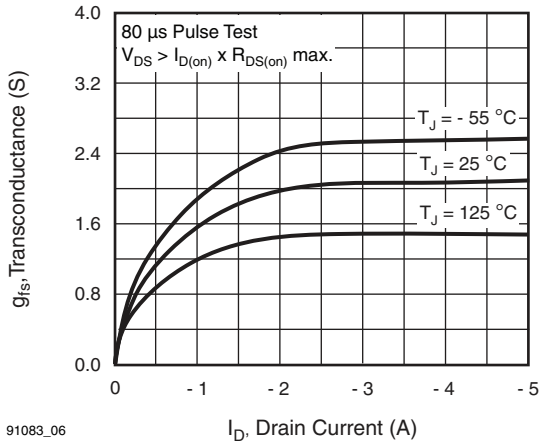
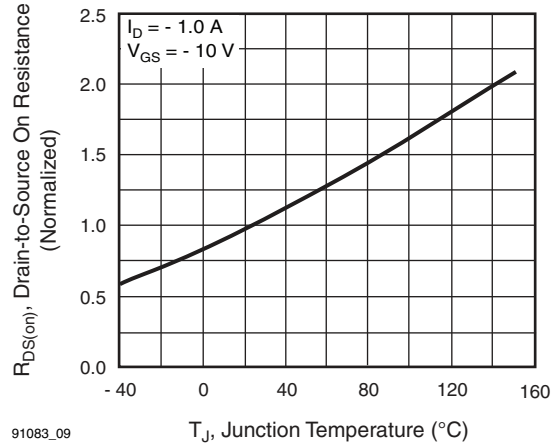


Fig. 5 - Maximum Effective Transient Thermal Impedance, Junction-to-Case vs. Pulse Duration



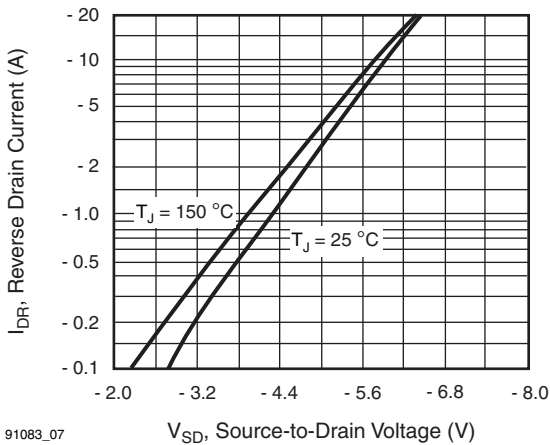
91083_06

Fig. 6 - Typical Transconductance vs. Drain Current



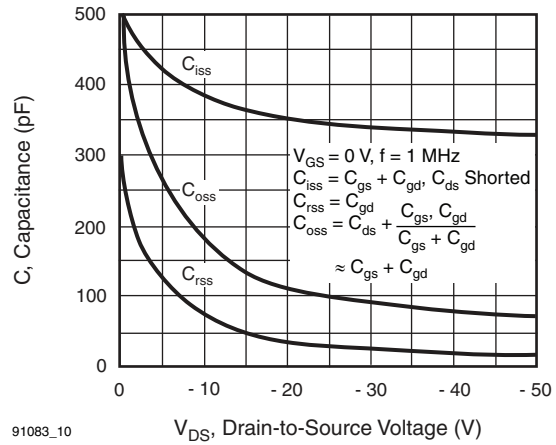
91083_09

Fig. 9 - Normalized On-Resistance vs. Temperature



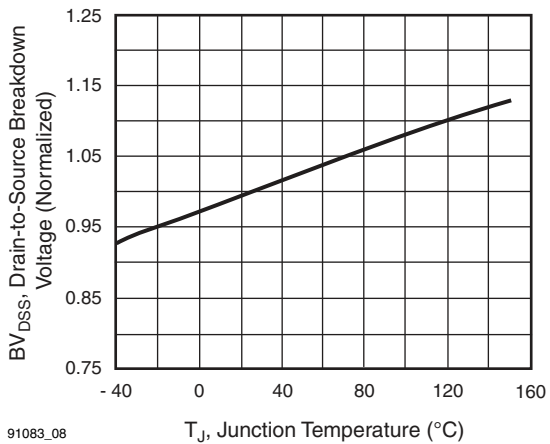
91083_07

Fig. 7 - Typical Source-Drain Diode Forward Voltage



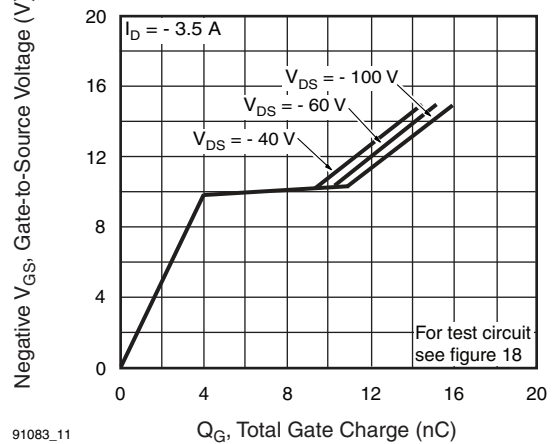
91083_10

Fig. 10 - Typical Capacitance vs. Drain-to-Source Voltage



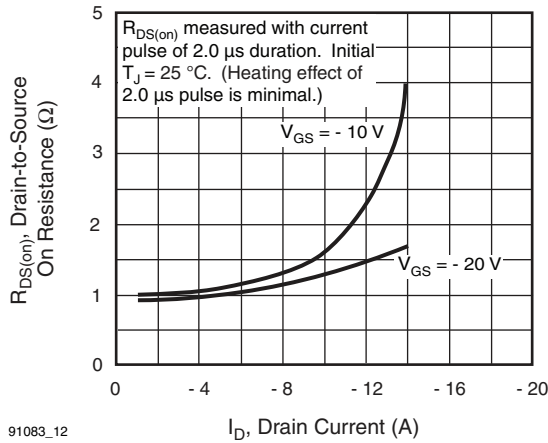
91083_08

Fig. 8 - Breakdown Voltage vs. Temperature



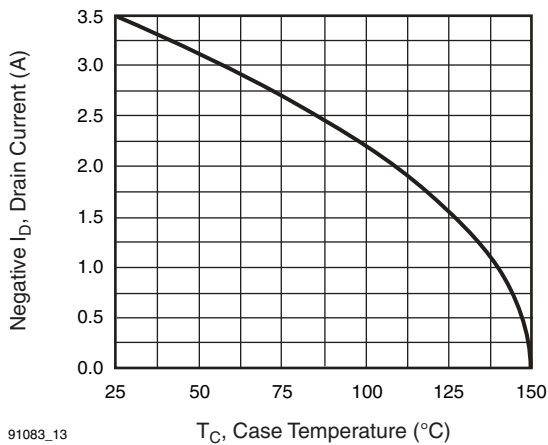
91083_11

Fig. 11 - Typical Gate Charge vs. Gate-to-Source Voltage



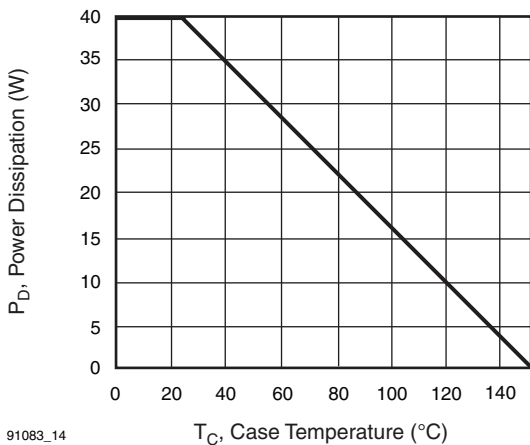
91083_12

Fig. 12 - Typical On-Resistance vs. Drain Current



91083_13

Fig. 13 - Maximum Drain Current vs. Case Temperature



91083_14

Fig. 14 - Power vs. Temperature Derating Curve

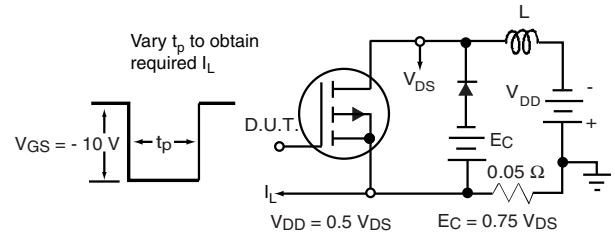


Fig. 15 - Clamped Inductive Test Circuit

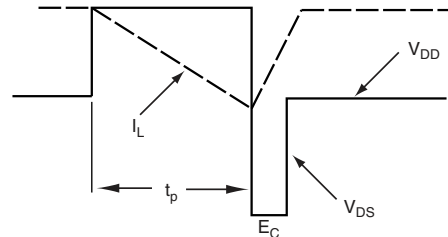


Fig. 16 - Clamped Inductive Waveforms

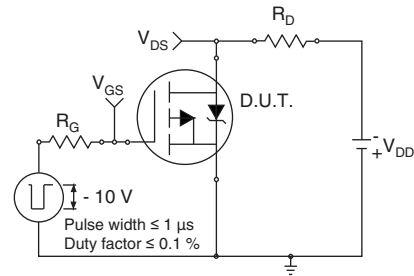


Fig. 17a - Switching Time Test Circuit

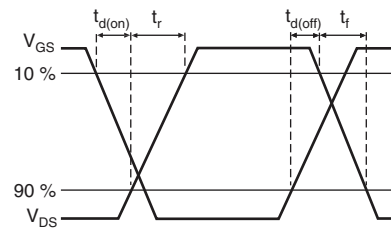


Fig. 17b - Switching Time Waveforms

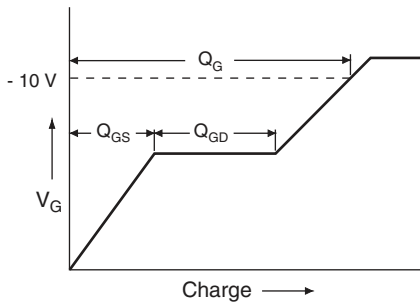


Fig. 18a - Basic Gate Charge Waveform

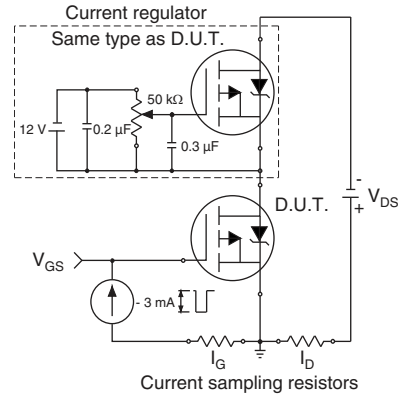
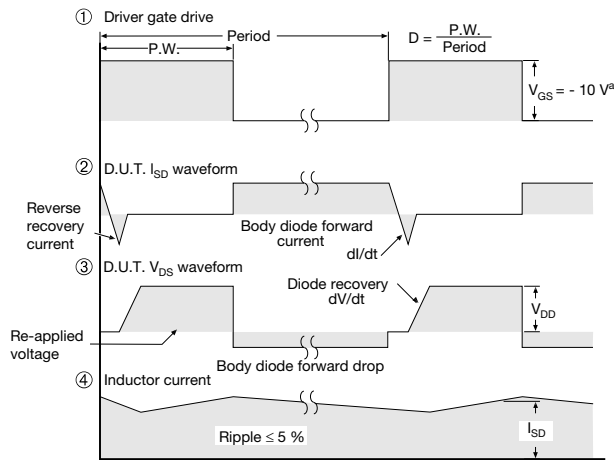
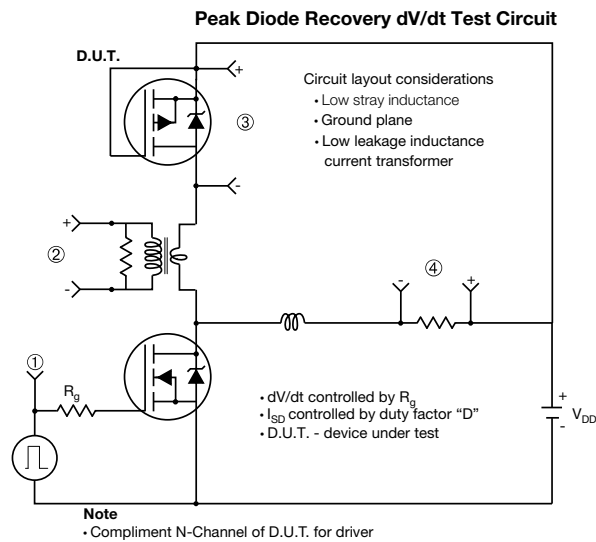


Fig. 18b - Gate Charge Test Circuit

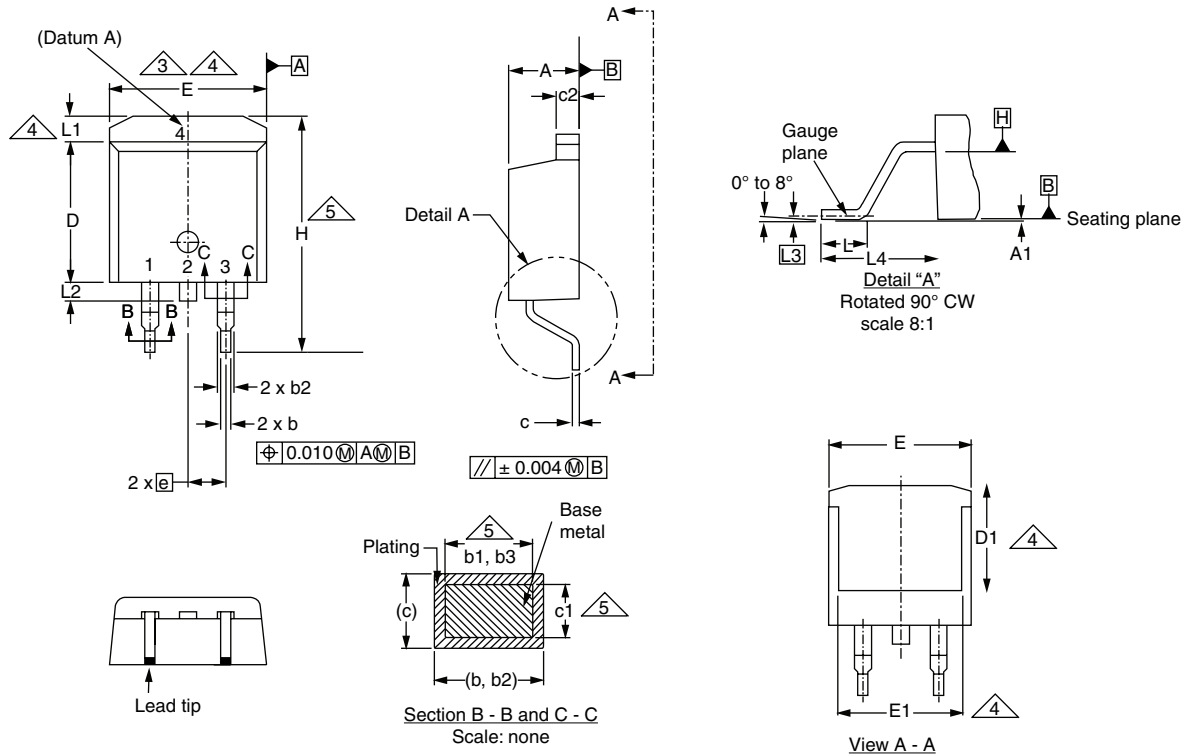


Note
a. $V_{GS} = -5V$ for logic level and $-3V$ drive devices

Fig. 19 - For P-Channel

Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see www.vishay.com/ppg291083.

TO-263AB (HIGH VOLTAGE)



DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.06	4.83	0.160	0.190
A1	0.00	0.25	0.000	0.010
b	0.51	0.99	0.020	0.039
b1	0.51	0.89	0.020	0.035
b2	1.14	1.78	0.045	0.070
b3	1.14	1.73	0.045	0.068
c	0.38	0.74	0.015	0.029
c1	0.38	0.58	0.015	0.023
c2	1.14	1.65	0.045	0.065
D	8.38	9.65	0.330	0.380

DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
D1	6.86	-	0.270	-
E	9.65	10.67	0.380	0.420
E1	6.22	-	0.245	-
e	2.54 BSC		0.100 BSC	
H	14.61	15.88	0.575	0.625
L	1.78	2.79	0.070	0.110
L1	-	1.65	-	0.066
L2	-	1.78	-	0.070
L3	0.25 BSC		0.010 BSC	
L4	4.78	5.28	0.188	0.208

ECN: S-82110-Rev. A, 15-Sep-08
DWG: 5970

Notes

1. Dimensioning and tolerancing per ASME Y14.5M-1994.
2. Dimensions are shown in millimeters (inches).
3. Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outmost extremes of the plastic body at datum A.
4. Thermal PAD contour optional within dimension E, L1, D1 and E1.
5. Dimension b1 and c1 apply to base metal only.
6. Datum A and B to be determined at datum plane H.
7. Outline conforms to JEDEC outline to TO-263AB.

RECOMMENDED MINIMUM PADS FOR D²PAK: 3-Lead



Recommended Minimum Pads
Dimensions in Inches/(mm)

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Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.

Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.



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Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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Факс: 8 (812) 320-02-42

Электронная почта: org@eplast1.ru

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