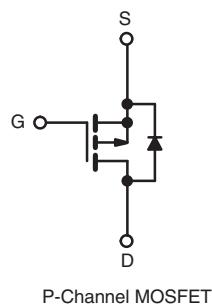
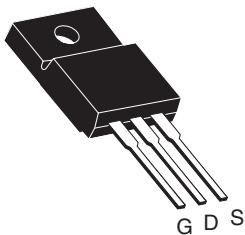


Power MOSFET

PRODUCT SUMMARY		
V _{DS} (V)	-	200
R _{DS(on)} (Ω)	V _{GS} = - 10 V	3.0
Q _g (Max.) (nC)		13
Q _{gs} (nC)		3.2
Q _{gd} (nC)		7.3
Configuration		Single

TO-220 FULLPAK


FEATURES

- Isolated Package
- High Voltage Isolation = 2.5 kV_{RMS} ($t = 60$ s; $f = 60$ Hz)
- Sink to Lead Creepage Distance = 4.8 mm
- P-Channel
- Dynamic dV/dt Rating
- Low Thermal Resistance
- Lead (Pb)-free Available



DESCRIPTION

Third generation Power MOSFETs from Vishay provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The TO-220 FULLPAK eliminates the need for additional insulating hardware in commercial-industrial applications. The moulding compound used provides a high isolation capability and a low thermal resistance between the tab and external heatsink. This isolation is equivalent to using a 100 micron mica barrier with standard TO-220 product. The FULLPAK is mounted to a heatsink using a single clip or by a single screw fixing.

ORDERING INFORMATION

Package	TO-220 FULLPAK
Lead (Pb)-free	IRFI9640GPbF SiHFI9640G-E3
SnPb	IRFI9640G SiHFI9640G

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	I _D	A
		- 2.0	
		- 1.3	
Pulsed Drain Current ^a	I _{DM}	- 8.0	
Linear Derating Factor		0.22	W/°C
Single Pulse Avalanche Energy ^b	E _{AS}	100	mJ
Repetitive Avalanche Current ^a	I _{AR}	- 2.0	A
Repetitive Avalanche Energy ^a	E _{AR}	2.7	mJ
Maximum Power Dissipation	P _D	27	W
Peak Diode Recovery dV/dt ^c	dV/dt	- 11	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	
Mounting Torque	6-32 or M3 screw	10	lbf · in
		1.1	N · m

Notes

- Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).
- Starting T_J = 25 °C, L = 51 mH, R_G = 25 Ω, I_{AS} = - 2.0 A (see fig. 12).
- I_{SD} ≤ - 2.0 A, dI/dt ≤ - 250 A/μs, V_{DD} ≤ V_{DS}, T_J ≤ 150 °C.
- 1.6 mm from case.

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

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Maximum Junction-to-Ambient	R _{thJA}	-	65	°C/W
Maximum Junction-to-Case (Drain)	R _{thJC}	-	4.6	

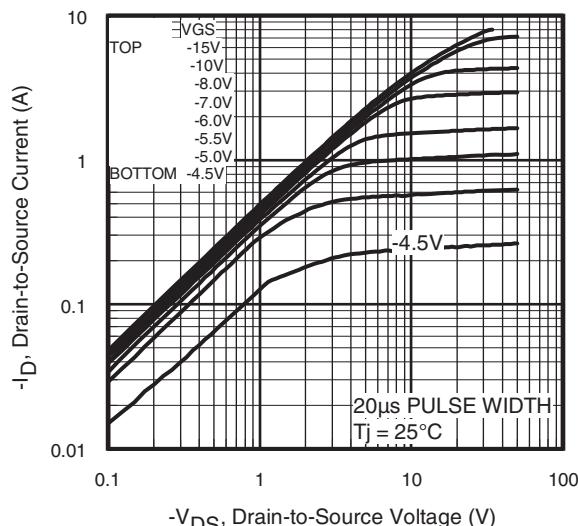
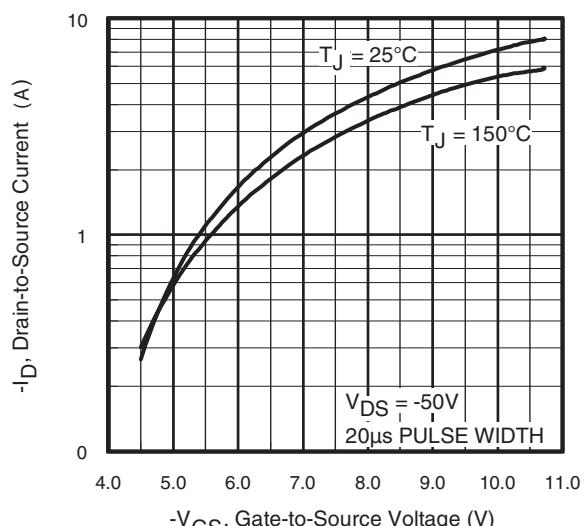
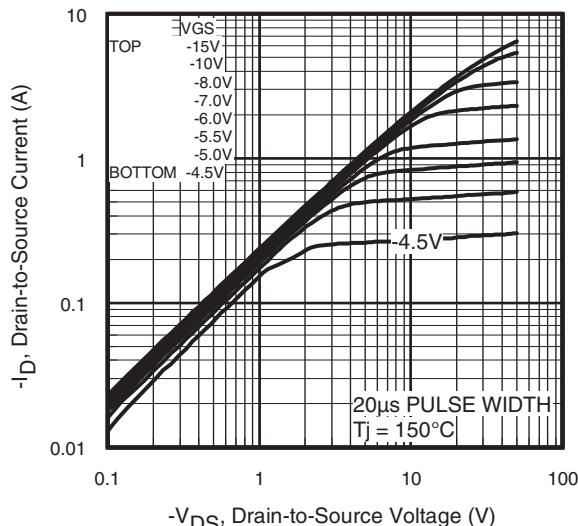
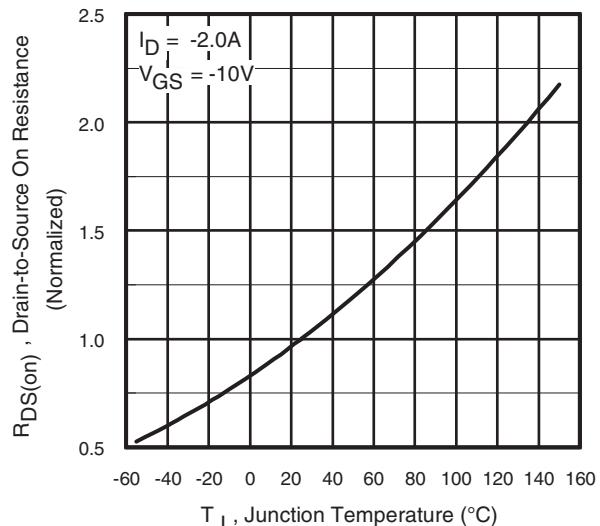
SPECIFICATIONS T_J = 25 °C, unless otherwise noted

PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static							
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = - 250 μA		- 200	-	-	V
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	Reference to 25 °C, I _D = - 1 mA		-	- 0.22	-	V/°C
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = - 250 μA		- 2.0	-	- 4.0	V
Gate-Source Leakage	I _{GSS}	V _{GS} = ± 20 V		-	-	± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = - 200 V, V _{GS} = 0 V		-	-	- 100	μA
		V _{DS} = - 160 V, V _{GS} = 0 V, T _J = 125 °C		-	-	- 500	
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} = - 10 V	I _D = - 1.2 A ^b	-	-	3.0	Ω
Forward Transconductance	g _{fs}	V _{DS} = - 50 V, I _D = - 1.2 A ^b		0.7	-	-	S
Dynamic							
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = - 25 V, f = 1.0 MHz, see fig. 5		-	180	-	pF
Output Capacitance	C _{oss}			-	66	-	
Reverse Transfer Capacitance	C _{rss}			-	12	-	
Total Gate Charge	Q _g	V _{GS} = - 10 V	I _D = - 2.0 A, V _{DS} = - 160 V, see fig. 6 and 13 ^b	-	-	13	nC
Gate-Source Charge	Q _{gs}			-	-	3.2	
Gate-Drain Charge	Q _{gd}			-	-	7.3	
Turn-On Delay Time	t _{d(on)}	V _{DD} = - 100 V, I _D = - 2.0 A, R _G = 24 Ω, V _{GS} = - 10 V, see fig. 10 ^b		-	12	-	ns
Rise Time	t _r		-	17	-		
Turn-Off Delay Time	t _{d(off)}		-	19	-		
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		-	-	- 2.0	A
Pulsed Diode Forward Current ^a	I _{SM}			-	-	- 8.0	
Body Diode Voltage	V _{SD}	T _J = 25 °C, I _S = - 2.0 A, V _{GS} = 0 V ^b		-	-	- 5.8	V
Body Diode Reverse Recovery Time	t _{rr}	T _J = 25 °C, I _F = - 2.0 A, dI/dt = 100 A/μs ^b		-	130	200	ns
Body Diode Reverse Recovery Charge	Q _{rr}			-	700	1050	μC
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. 11).

b. Pulse width ≤ 300 μs; duty cycle ≤ 2 %.

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

Fig. 1 - Typical Output Characteristics, $T_c = 25^\circ\text{C}$

Fig. 3 - Typical Transfer Characteristics

Fig. 2 - Typical Output Characteristics, $T_c = 150^\circ\text{C}$

Fig. 4 - Normalized On-Resistance vs. Temperature

IRFI9610G, SiHFI9610G

Vishay Siliconix

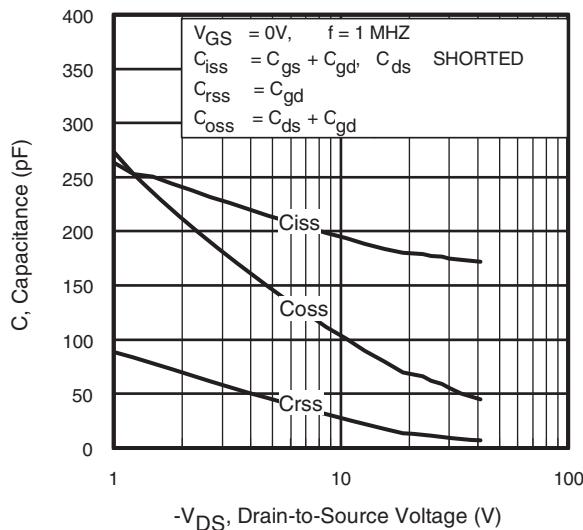


Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage

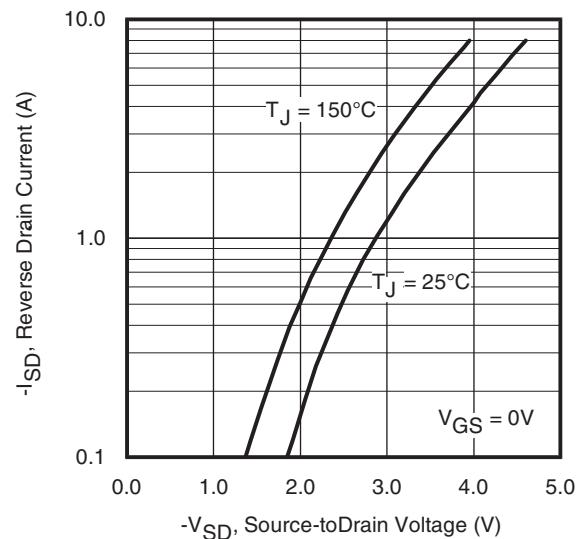


Fig. 7 - Typical Source-Drain Diode Forward Voltage

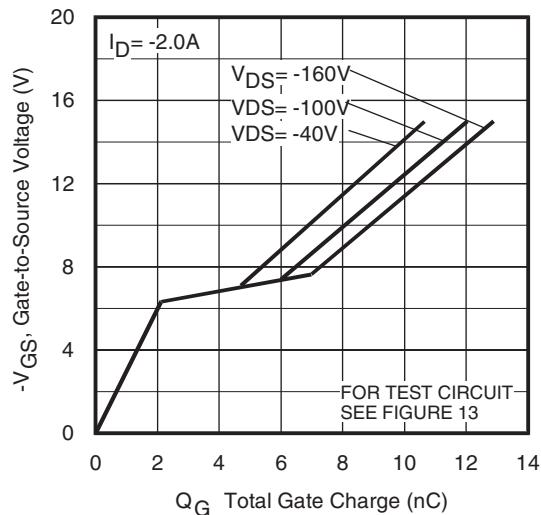


Fig. 6 - Typical Gate Charge vs. Gate-to-Source Voltage

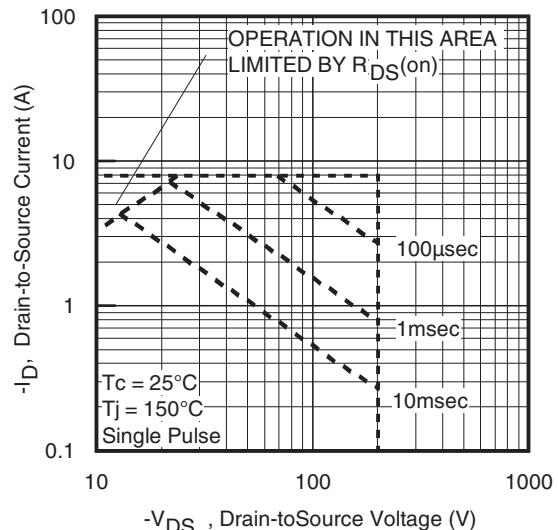


Fig. 8 - Maximum Safe Operating Area

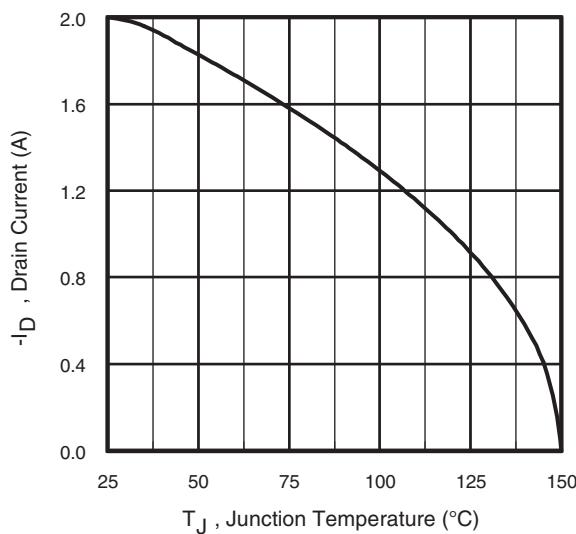


Fig. 9 - Maximum Drain Current vs. Case Temperature

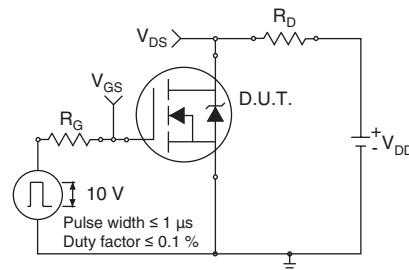


Fig. 10a - Switching Time Test Circuit

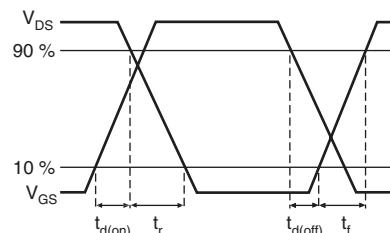


Fig. 10b - Switching Time Waveforms

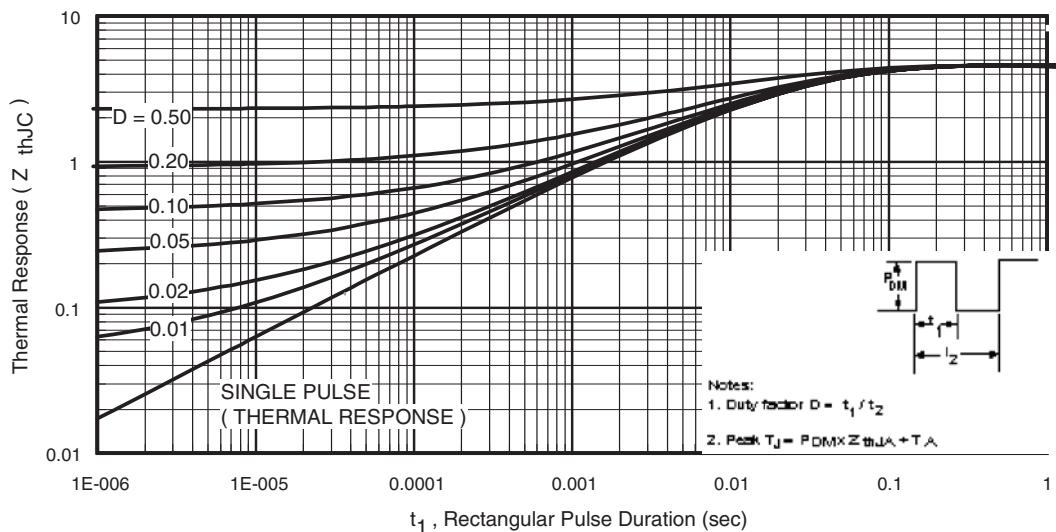


Fig. 11 - Maximum Effective Transient Thermal Impedance, Junction-to-Case

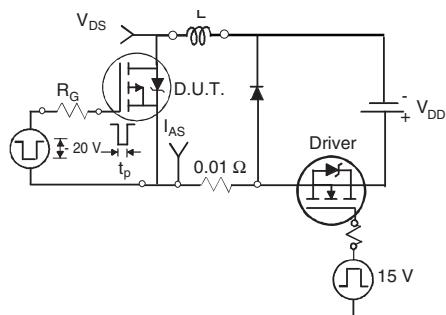


Fig. 12a - Unclamped Inductive Test Circuit

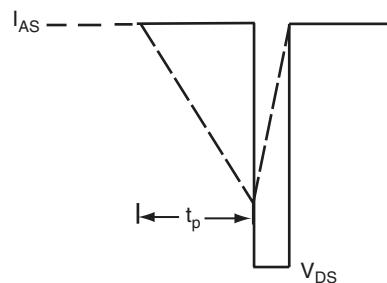


Fig. 12b - Unclamped Inductive Waveforms

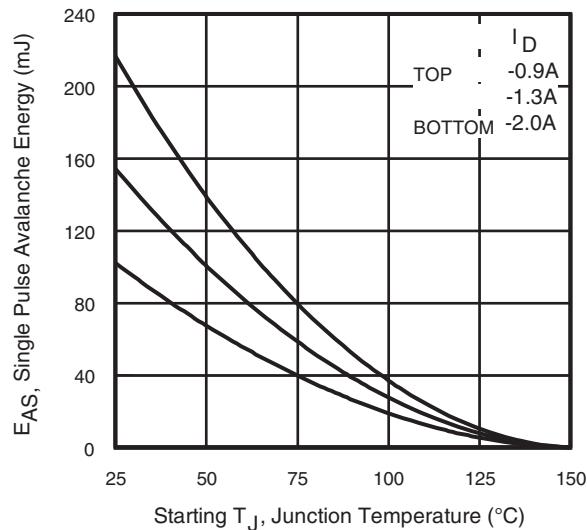


Fig. 12c - Maximum Avalanche Energy vs. Drain Current

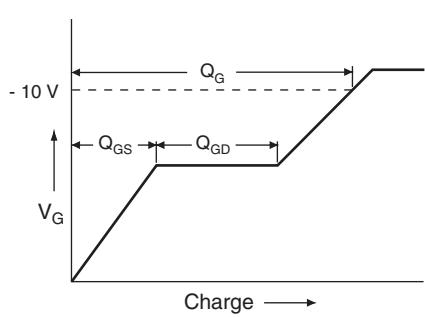


Fig. 13a - Basic Gate Charge Waveform

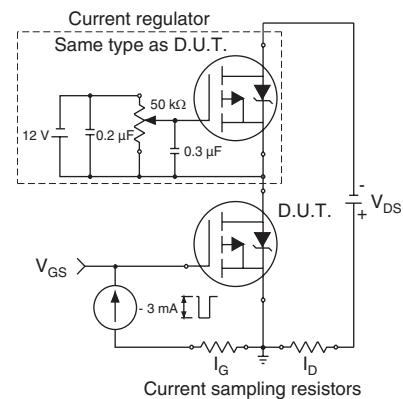
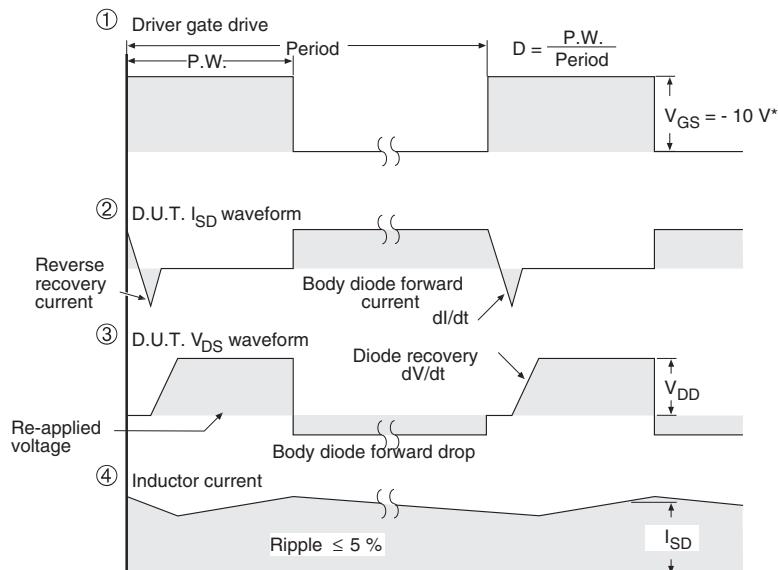
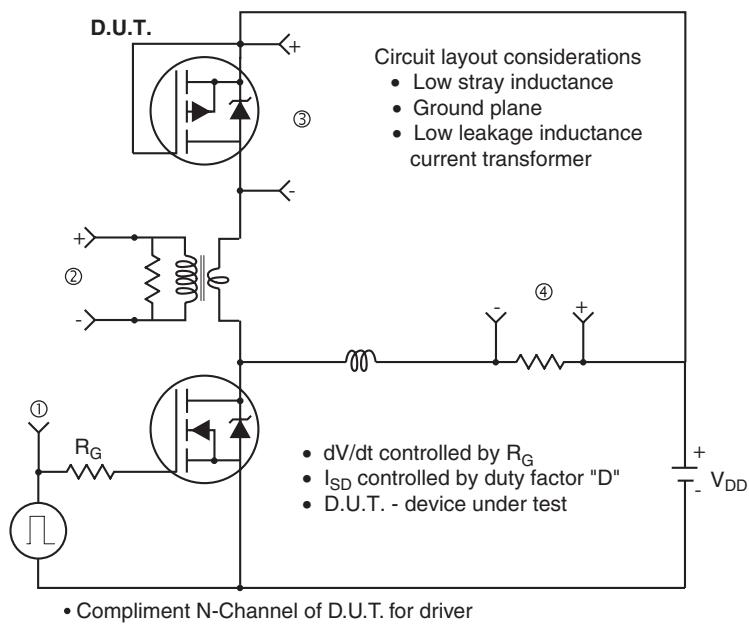


Fig. 13b - Gate Charge Test Circuit

Peak Diode Recovery dV/dt Test Circuit



* $V_{GS} = -5 \text{ V}$ for logic level and -3 V drive devices

Fig. 14 - For P-Channel



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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.



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- Поставка более 17-ти миллионов наименований электронных компонентов;
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- Техническая поддержка проекта, помошь в подборе аналогов, поставка прототипов;
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- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



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