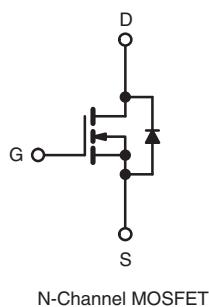
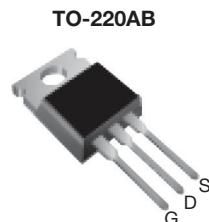


## Power MOSFET

PRODUCT SUMMARY	
V <sub>DS</sub> (V)	800
R <sub>DS(on)</sub> (Ω)	V <sub>GS</sub> = 10 V      3.0
Q <sub>g</sub> (Max.) (nC)	78
Q <sub>gs</sub> (nC)	9.6
Q <sub>gd</sub> (nC)	45
Configuration	Single



### FEATURES

- Dynamic dV/dt Rating
- Repetitive Avalanche Rated
- Fast Switching
- Ease of Paralleling
- Simple Drive Requirements
- Compliant to RoHS Directive 2002/95/EC



### 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-220AB package is universally preferred for all commercial-industrial applications at power dissipation levels to approximately 50 W. The low thermal resistance and low package cost of the TO-220AB contribute to its wide acceptance throughout the industry.

### ORDERING INFORMATION

Package	TO-220AB
Lead (Pb)-free	IRFBE30PbF SiHFBE30-E3
SnPb	IRFBE30 SiHFBE30

### ABSOLUTE MAXIMUM RATINGS (T<sub>C</sub> = 25 °C, unless otherwise noted)

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V <sub>DS</sub>	800	V
Gate-Source Voltage	V <sub>GS</sub>	± 20	
Continuous Drain Current	I <sub>D</sub>	4.1	A
		2.6	
Pulsed Drain Current <sup>a</sup>	I <sub>DM</sub>	16	
Linear Derating Factor		1.0	W/°C
Single Pulse Avalanche Energy <sup>b</sup>	E <sub>AS</sub>	260	mJ
Repetitive Avalanche Current <sup>a</sup>	I <sub>AR</sub>	4.1	A
Repetitive Avalanche Energy <sup>a</sup>	E <sub>AR</sub>	13	mJ
Maximum Power Dissipation	P <sub>D</sub>	125	W
Peak Diode Recovery dV/dt <sup>c</sup>	dV/dt	2.0	V/ns
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	- 55 to + 150	°C
Soldering Recommendations (Peak Temperature)	for 10 s	300 <sup>d</sup>	
Mounting Torque	6-32 or M3 screw	10	lbf · in
		1.1	N · m

#### Notes

a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).

b. V<sub>DD</sub> = 50 V, starting T<sub>J</sub> = 25 °C, L = 29 mH, R<sub>g</sub> = 25 Ω, I<sub>AS</sub> = 4.1 A (see fig. 12).

c. I<sub>SD</sub> ≤ 4.1 A, dI/dt ≤ 100 A/μs, V<sub>DD</sub> ≤ 600, T<sub>J</sub> ≤ 150 °C.

d. 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	$R_{thJA}$	-	62	$^{\circ}\text{C}/\text{W}$
Case-to-Sink, Flat, Greased Surface	$R_{thCS}$	0.50	-	
Maximum Junction-to-Case (Drain)	$R_{thJC}$	-	1.0	

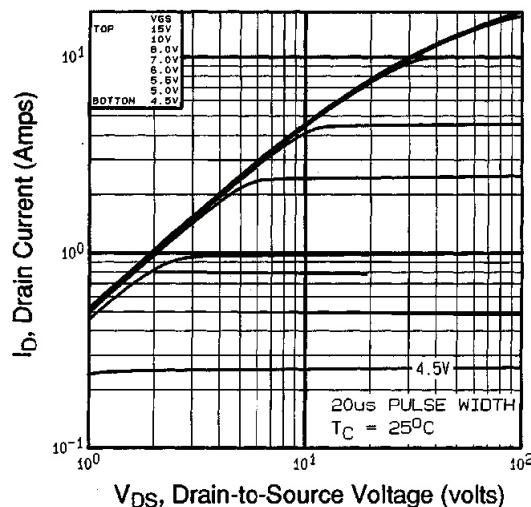
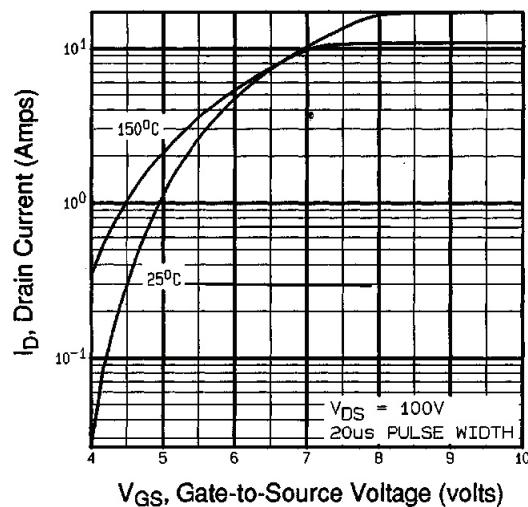
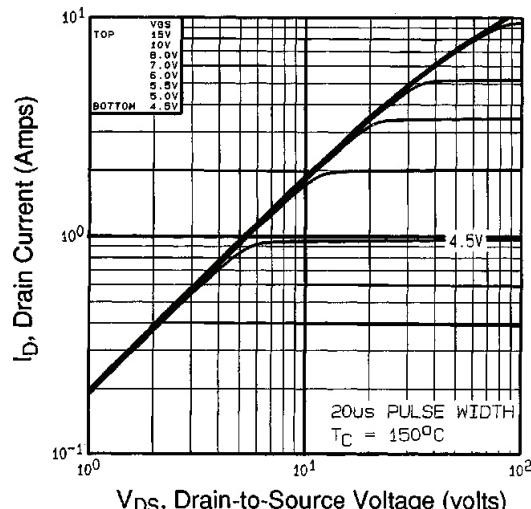
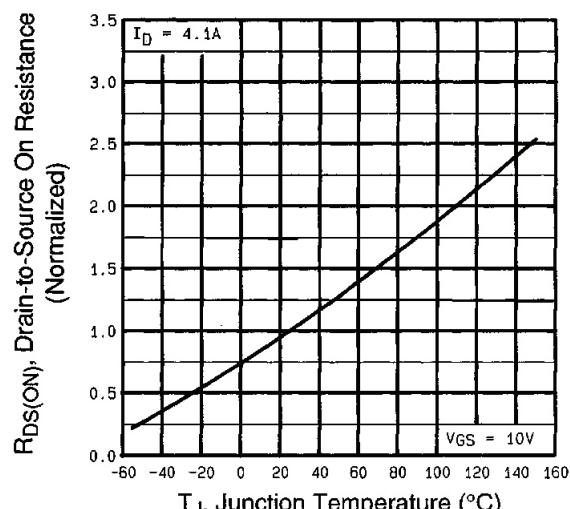
**SPECIFICATIONS** ( $T_J = 25 \text{ }^{\circ}\text{C}$ , unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
<b>Static</b>							
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0 \text{ V}$ , $I_D = 250 \mu\text{A}$		800	-	-	V
$V_{DS}$ Temperature Coefficient	$\Delta V_{DS}/T_J$	Reference to $25 \text{ }^{\circ}\text{C}$ , $I_D = 1 \text{ mA}$		-	0.9	-	$\text{V}/^{\circ}\text{C}$
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 250 \mu\text{A}$		2.0	-	4.0	V
Gate-Source Leakage	$I_{GSS}$	$V_{GS} = \pm 20 \text{ V}$		-	-	$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 800 \text{ V}$ , $V_{GS} = 0 \text{ V}$		-	-	100	$\mu\text{A}$
		$V_{DS} = 640 \text{ V}$ , $V_{GS} = 0 \text{ V}$ , $T_J = 125 \text{ }^{\circ}\text{C}$		-	-	500	
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS} = 10 \text{ V}$	$I_D = 2.5 \text{ A}^b$	-	-	3.0	$\Omega$
Forward Transconductance	$g_{fs}$	$V_{DS} = 100 \text{ V}$ , $I_D = 2.5 \text{ A}^b$		2.5	-	-	S
<b>Dynamic</b>							
Input Capacitance	$C_{iss}$	$V_{GS} = 0 \text{ V}$ , $V_{DS} = 25 \text{ V}$ , $f = 1.0 \text{ MHz}$ , see fig. 5		-	1300	-	pF
Output Capacitance	$C_{oss}$			-	310	-	
Reverse Transfer Capacitance	$C_{rss}$			-	190	-	
Total Gate Charge	$Q_g$	$V_{GS} = 10 \text{ V}$ , $I_D = 4.1 \text{ A}$ , $V_{DS} = 400 \text{ V}$ , see fig. 6 and 13 <sup>b</sup>		-	-	78	nC
Gate-Source Charge	$Q_{gs}$			-	-	9.6	
Gate-Drain Charge	$Q_{gd}$			-	-	45	
Turn-On Delay Time	$t_{d(on)}$			-	12	-	ns
Rise Time	$t_r$	$V_{DD} = 400 \text{ V}$ , $I_D = 4.1 \text{ A}$ $R_g = 12 \Omega$ , $R_D = 95 \Omega$ , see fig. 10 <sup>b</sup>		-	33	-	
Turn-Off Delay Time	$t_{d(off)}$			-	82	-	
Fall Time	$t_f$			-	30	-	
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	-	
<b>Drain-Source Body Diode Characteristics</b>							
Continuous Source-Drain Diode Current	$I_S$	MOSFET symbol showing the integral reverse p - n junction diode		-	-	4.1	A
Pulsed Diode Forward Current <sup>a</sup>	$I_{SM}$			-	-	16	
Body Diode Voltage	$V_{SD}$	$T_J = 25 \text{ }^{\circ}\text{C}$ , $I_S = 4.1 \text{ A}$ , $V_{GS} = 0 \text{ V}^b$		-	-	1.8	V
Body Diode Reverse Recovery Time	$t_{rr}$	$T_J = 25 \text{ }^{\circ}\text{C}$ , $I_F = 4.1 \text{ A}$ , $dI/dt = 100 \text{ A}/\mu\text{s}^b$		-	480	720	ns
Body Diode Reverse Recovery Charge	$Q_{rr}$			-	1.8	2.7	$\mu\text{C}$
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  $\leq 300 \mu\text{s}$ ; duty cycle  $\leq 2 \%$ .

**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**

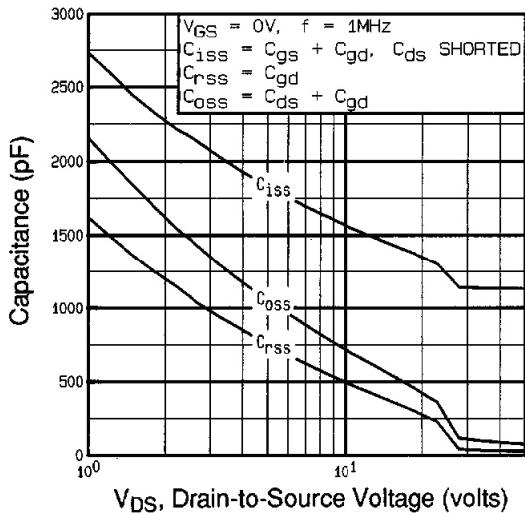


Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage

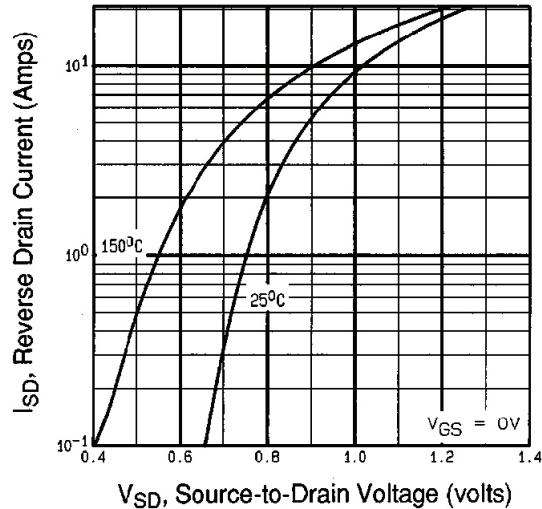


Fig. 7 - Typical Source-Drain Diode Forward Voltage

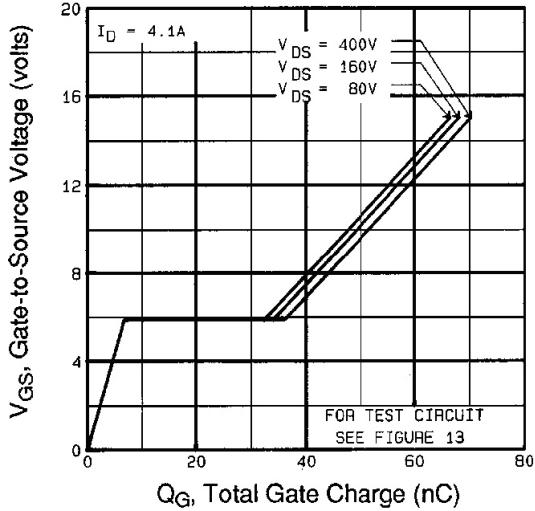


Fig. 6 - Typical Gate Charge vs. Gate-to-Source Voltage

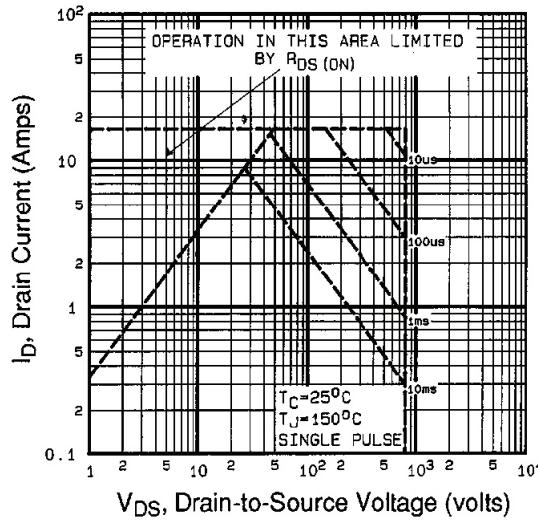


Fig. 8 - Maximum Safe Operating Area

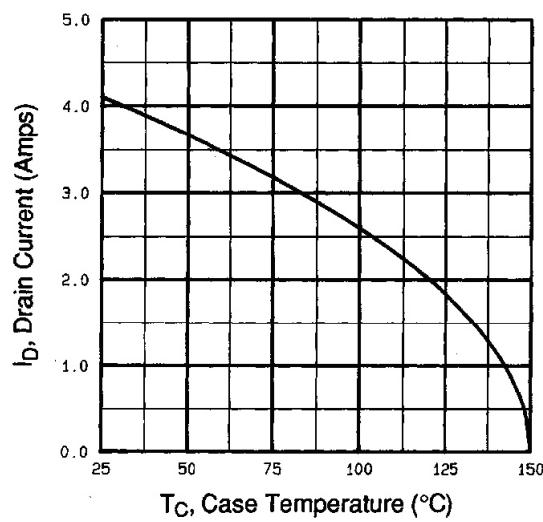


Fig. 9 - Maximum Drain Current vs. Case Temperature

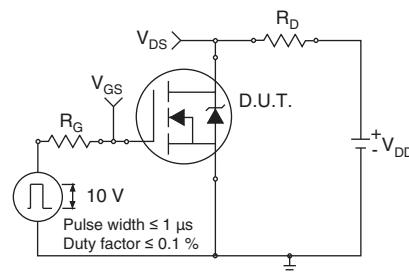


Fig. 10a - Switching Time Test Circuit

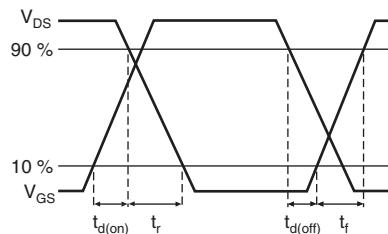


Fig. 10b - Switching Time Waveforms

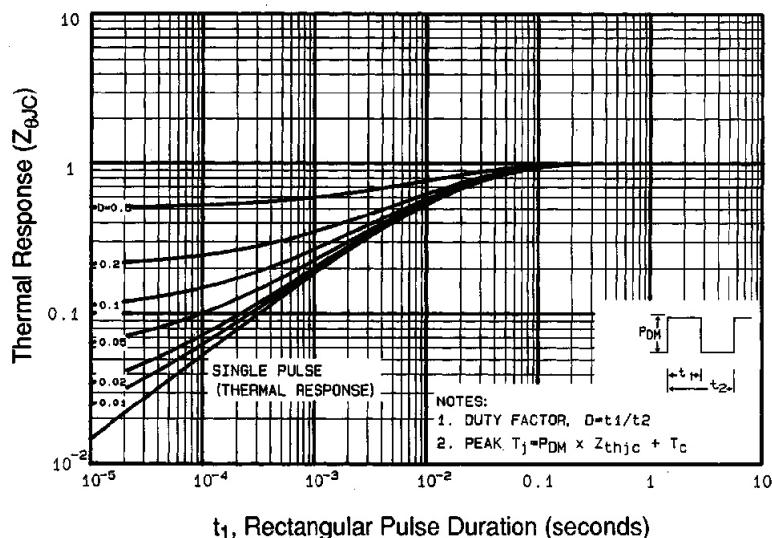


Fig. 11 - Maximum Effective Transient Thermal Impedance, Junction-to-Case

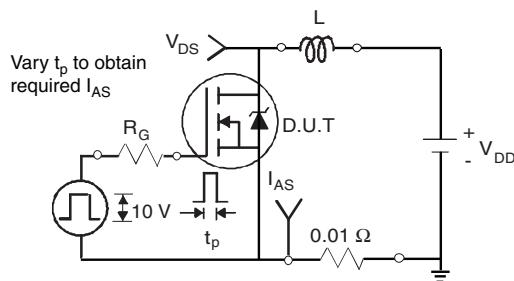


Fig. 12a - Unclamped Inductive Test Circuit

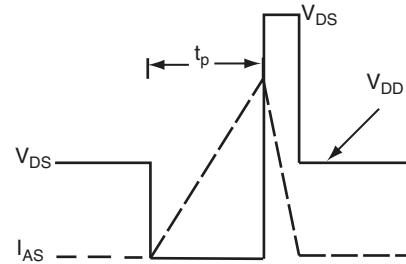


Fig. 12b - Unclamped Inductive Waveforms

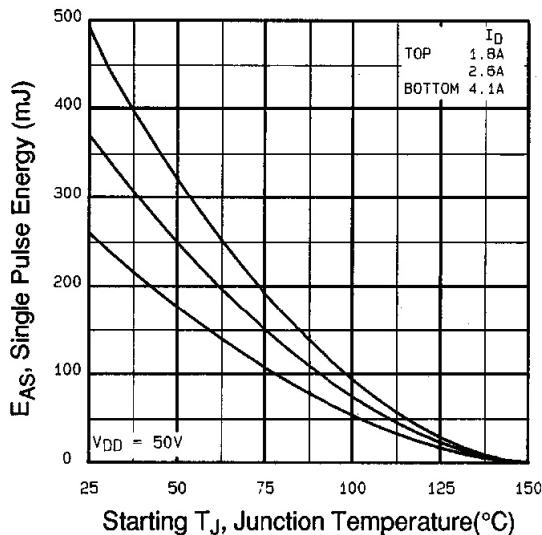


Fig. 12c - Maximum Avalanche Energy vs. Drain Current

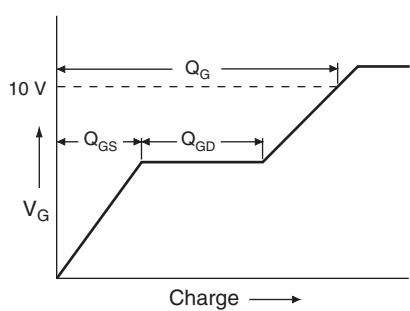


Fig. 13a - Basic Gate Charge Waveform

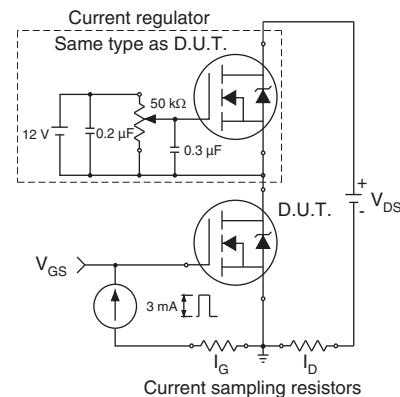
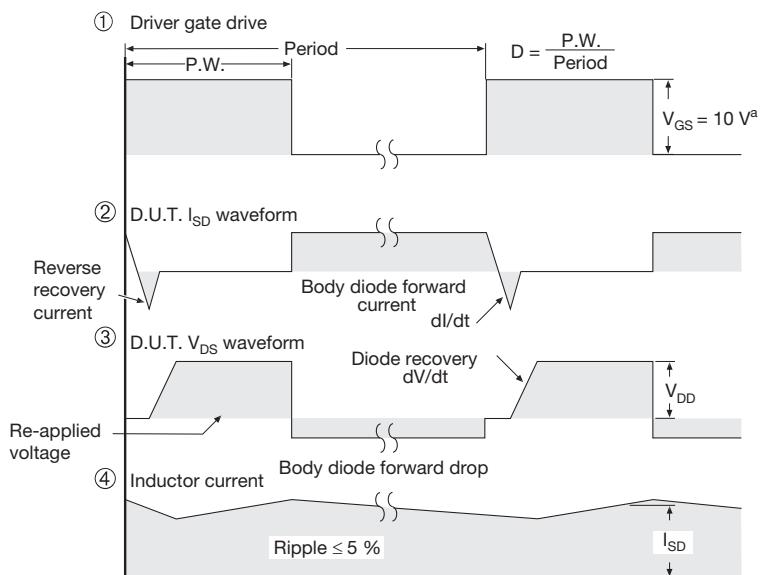
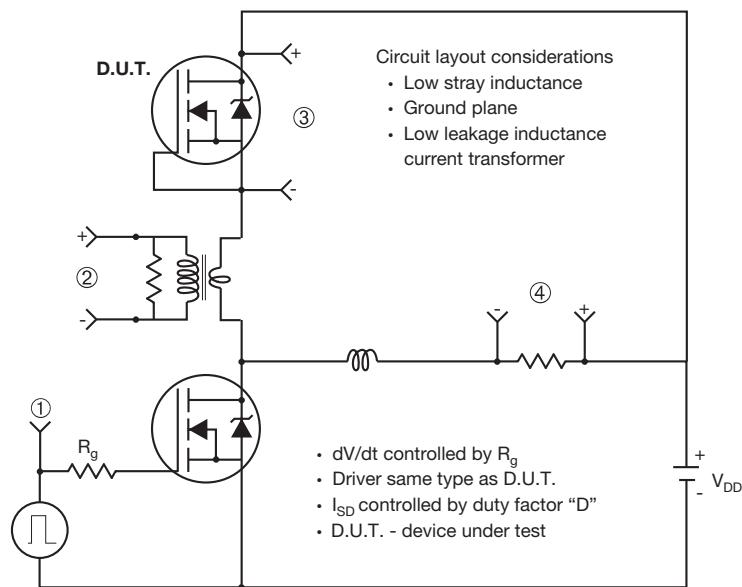
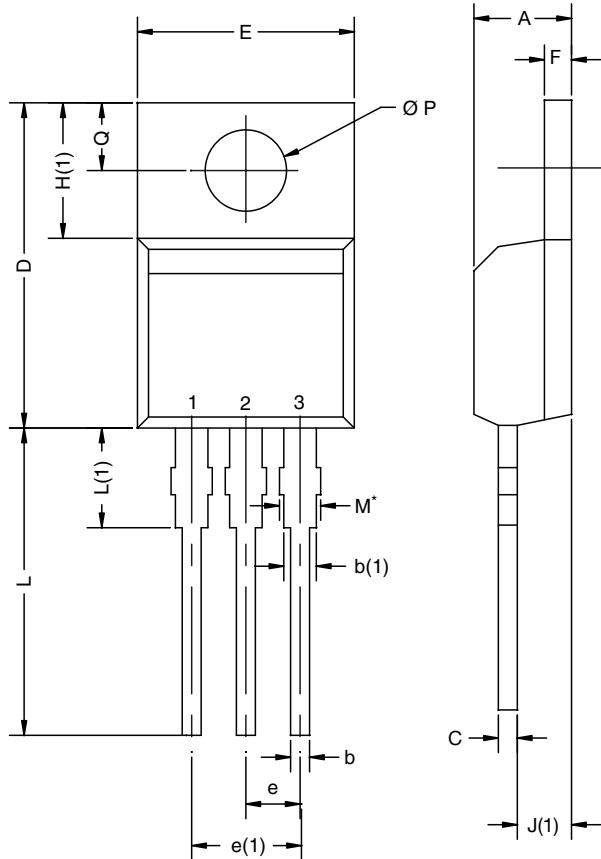


Fig. 13b - Gate Charge Test Circuit

**Peak Diode Recovery dV/dt Test Circuit**

**Fig. 14 - For N-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/ppg?91118](http://www.vishay.com/ppg?91118).

### TO-220AB



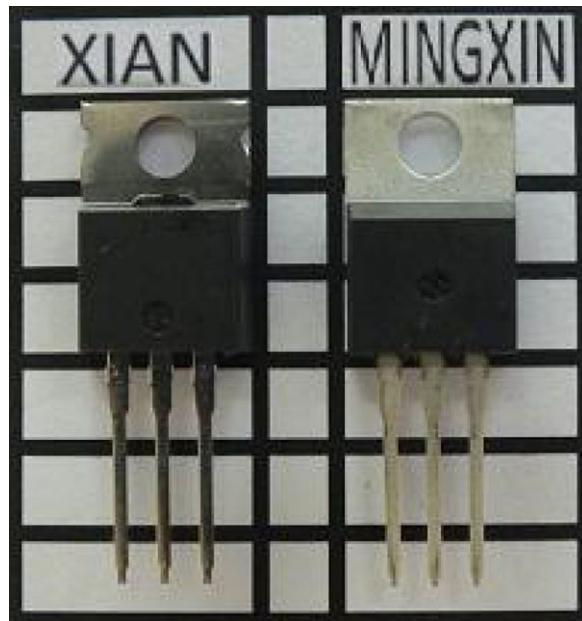
DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.25	4.65	0.167	0.183
b	0.69	1.01	0.027	0.040
b(1)	1.20	1.73	0.047	0.068
c	0.36	0.61	0.014	0.024
D	14.85	15.49	0.585	0.610
E	10.04	10.51	0.395	0.414
e	2.41	2.67	0.095	0.105
e(1)	4.88	5.28	0.192	0.208
F	1.14	1.40	0.045	0.055
H(1)	6.09	6.48	0.240	0.255
J(1)	2.41	2.92	0.095	0.115
L	13.35	14.02	0.526	0.552
L(1)	3.32	3.82	0.131	0.150
Ø P	3.54	3.94	0.139	0.155
Q	2.60	3.00	0.102	0.118

ECN: X12-0208-Rev. N, 08-Oct-12  
DWG: 5471

#### Notes

\* M = 1.32 mm to 1.62 mm (dimension including protrusion)  
Heatsink hole for HVM

- Xi'an and Mingxin actual photo





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- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помошь 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;
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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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