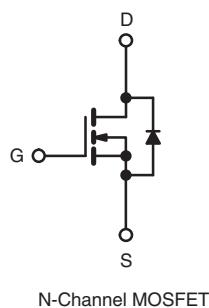
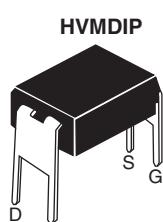


## Power MOSFET

PRODUCT SUMMARY		
$V_{DS}$ (V)	250	
$R_{DS(on)}$ ( $\Omega$ )	$V_{GS} = 10$ V	2.0
$Q_g$ (Max.) (nC)	8.2	
$Q_{gs}$ (nC)	1.8	
$Q_{gd}$ (nC)	4.5	
Configuration	Single	



### ORDERING INFORMATION

Package	HVMDIP
Lead (Pb)-free	IRFD214PbF SiHFD214-E3
SnPb	IRFD214 SiHFD214

### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25$ °C, unless otherwise noted)

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	$V_{DS}$	250	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current	$I_D$	0.45	A
		0.29	
Pulsed Drain Current <sup>a</sup>	$I_{DM}$	3.6	
Linear Derating Factor		0.0083	W/°C
Single Pulse Avalanche Energy <sup>b</sup>	$E_{AS}$	57	mJ
Avalanche Current <sup>a</sup>	$I_{AR}$	0.45	A
Repetitive Avalanche Energy <sup>a</sup>	$E_{AR}$	0.10	mJ
Maximum Power Dissipation	$P_D$	1.0	W
Peak Diode Recovery $dV/dt^c$	$dV/dt$	4.8	V/ns
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	- 55 to + 150	
Soldering Recommendations (Peak Temperature)	for 10 s	300 <sup>d</sup>	°C

#### Notes

- Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).
- $V_{DD} = 50$  V, starting  $T_J = 25$  °C,  $L = 28$  mH,  $R_g = 25$   $\Omega$ ,  $I_{AS} = 1.8$  A (see fig. 12).
- $I_{SD} \leq 2.7$  A,  $dI/dt \leq 65$  A/ $\mu$ s,  $V_{DD} \leq V_{DS}$ ,  $T_J \leq 150$  °C.
- 1.6 mm from case.

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



RoHS\*  
COMPLIANT

**THERMAL RESISTANCE RATINGS**

PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Maximum Junction-to-Ambient	$R_{thJA}$	-	120	°C/W

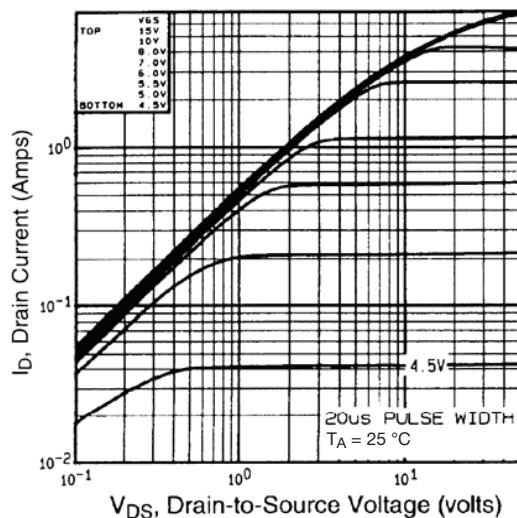
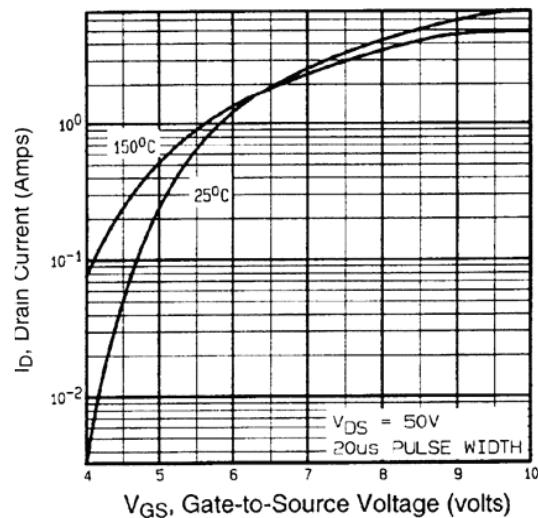
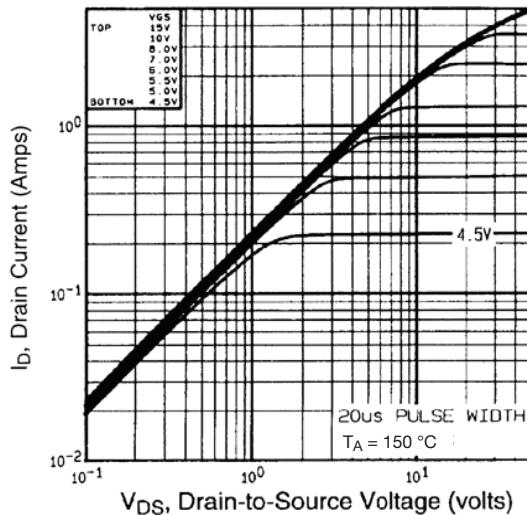
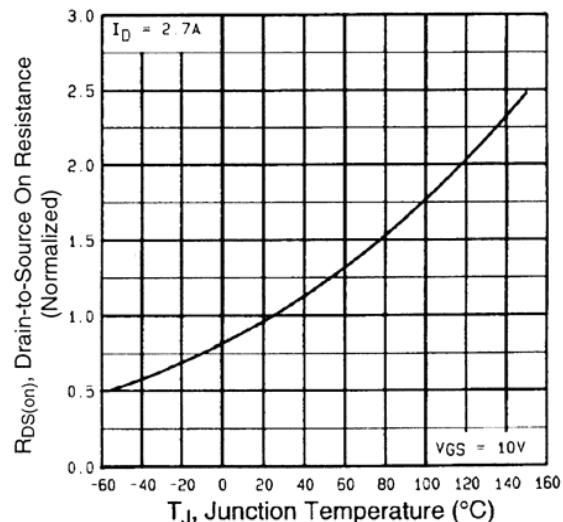
**SPECIFICATIONS** ( $T_J = 25$  °C, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT	
<b>Static</b>								
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0$ V, $I_D = 250$ $\mu$ A		250	-	-	V	
$V_{DS}$ Temperature Coefficient	$\Delta V_{DS}/T_J$	Reference to 25 °C, $I_D = 1$ mA		-	0.39	-	V/°C	
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 250$ $\mu$ A		2.0	-	4.0	V	
Gate-Source Leakage	$I_{GSS}$	$V_{GS} = \pm 20$ V		-	-	$\pm 100$	nA	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 250$ V, $V_{GS} = 0$ V		-	-	25	$\mu$ A	
		$V_{DS} = 200$ V, $V_{GS} = 0$ V, $T_J = 125$ °C		-	-	250		
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS} = 10$ V	$I_D = 0.27$ A <sup>b</sup>	-	-	2.0	$\Omega$	
Forward Transconductance	$g_{fs}$	$V_{DS} = 50$ V, $I_D = 1.6$ A		0.90	-	-	S	
<b>Dynamic</b>								
Input Capacitance	$C_{iss}$	$V_{GS} = 0$ V, $V_{DS} = 25$ V, $f = 1.0$ MHz, see fig. 5		-	140	-	pF	
Output Capacitance	$C_{oss}$			-	42	-		
Reverse Transfer Capacitance	$C_{rss}$			-	9.6	-		
Total Gate Charge	$Q_g$	$V_{GS} = 10$ V	$I_D = 2.7$ A, $V_{DS} = 200$ V, see fig. 6 and 13 <sup>b</sup>	-	-	8.2	nC	
Gate-Source Charge	$Q_{gs}$			-	-	1.8		
Gate-Drain Charge	$Q_{gd}$			-	-	4.5		
Turn-On Delay Time	$t_{d(on)}$			-	7.0	-		
Rise Time	$t_r$	$V_{DD} = 125$ V, $I_D = 2.7$ A, $R_g = 24$ $\Omega$ , $R_D = 45$ $\Omega$ , see fig. 10 <sup>b</sup>		-	7.6	-	ns	
Turn-Off Delay Time	$t_{d(off)}$			-	16	-		
Fall Time	$t_f$			-	7.0	-		
Internal Drain Inductance	$L_D$			-	4.0	-	nH	
Internal Source Inductance	$L_S$	Between lead, 6 mm (0.25") from package and center of die contact		-	6.0	-		
<b>Drain-Source Body Diode Characteristics</b>								
Continuous Source-Drain Diode Current	$I_S$	MOSFET symbol showing the integral reverse p - n junction diode		-	-	0.45	A	
Pulsed Diode Forward Current <sup>a</sup>	$I_{SM}$			-	-	3.6		
Body Diode Voltage	$V_{SD}$	$T_J = 25$ °C, $I_S = 0.45$ A, $V_{GS} = 0$ V <sup>b</sup>		-	-	2.0	V	
Body Diode Reverse Recovery Time	$t_{rr}$	$T_J = 25$ °C, $I_F = 9.2$ A, $dI/dt = 100$ A/ $\mu$ s <sup>b</sup>		-	190	390	ns	
Body Diode Reverse Recovery Charge	$Q_{rr}$			-	0.64	1.3	$\mu$ 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  $\leq 300$   $\mu$ s; duty cycle  $\leq 2$  %.

**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)

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

**Fig. 3 - Typical Transfer Characteristics**

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

**Fig. 4 - Normalized On-Resistance vs. Temperature**

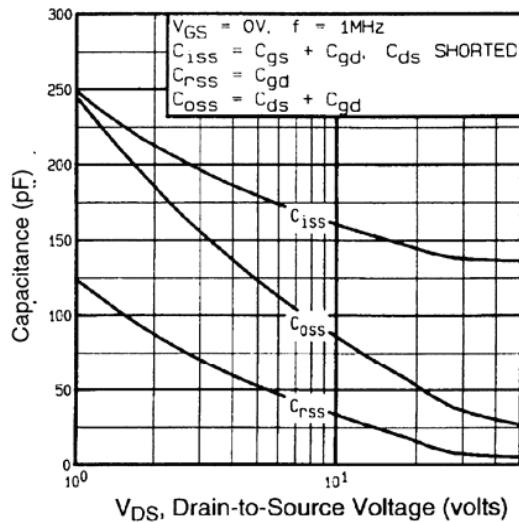


Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage

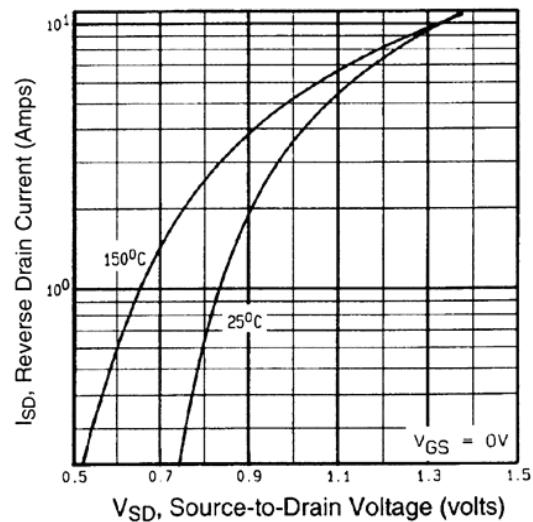


Fig. 7 - Typical Source-Drain Diode Forward Voltage

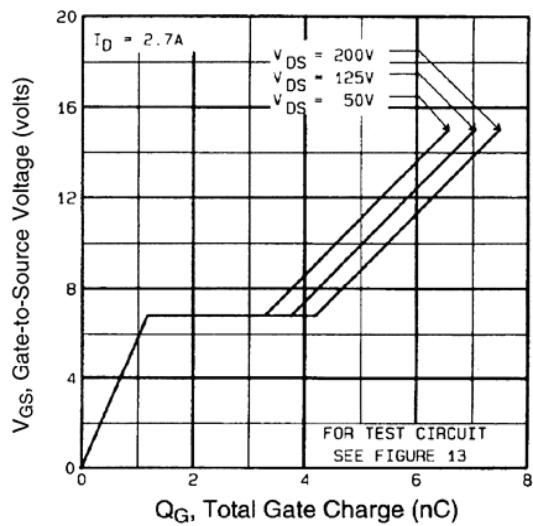


Fig. 6 - Typical Gate Charge vs. Gate-to-Source Voltage

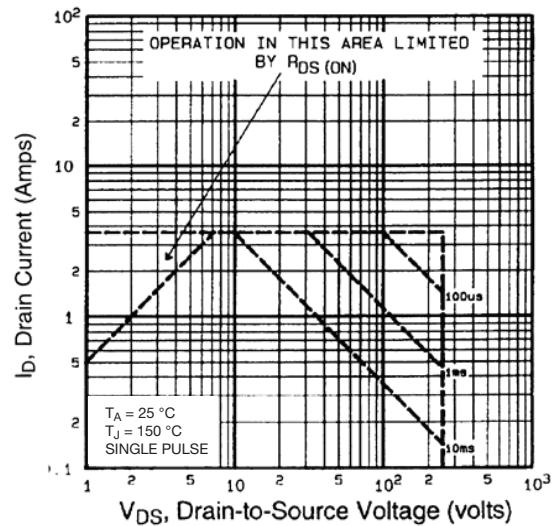


Fig. 8 - Maximum Safe Operating Area

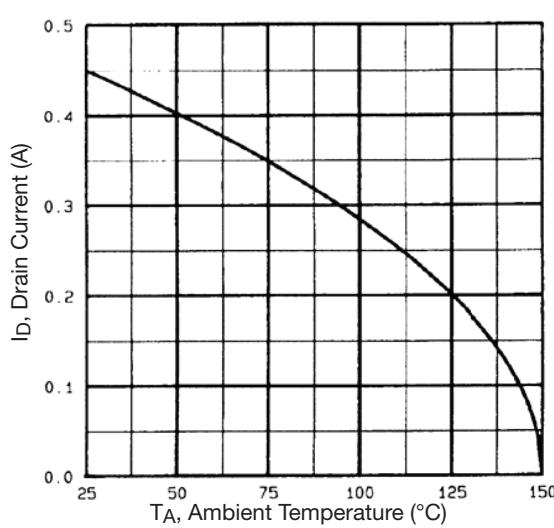


Fig. 9 - Maximum Drain Current vs. Ambient Temperature

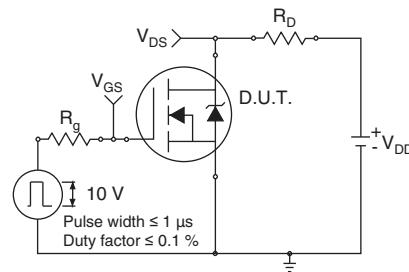


Fig. 10a - Switching Time Test Circuit

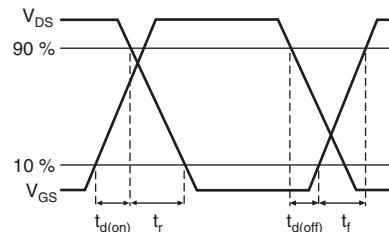


Fig. 10b - Switching Time Waveforms

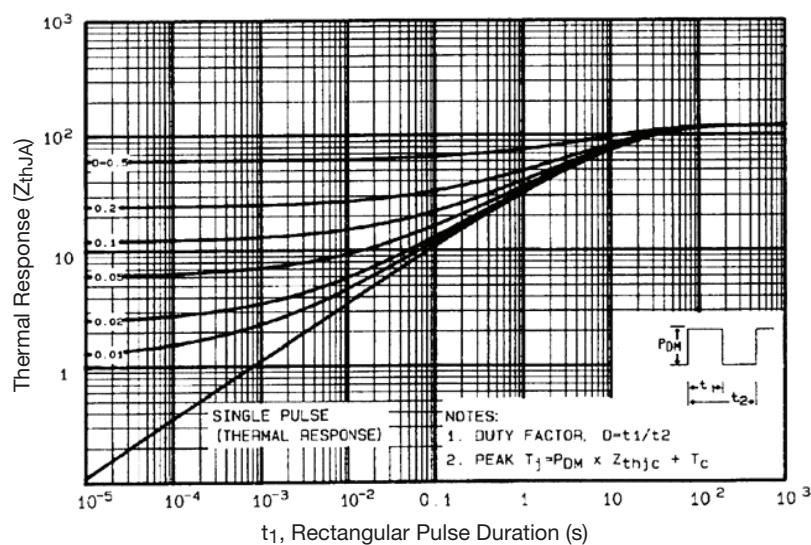


Fig. 11 - Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

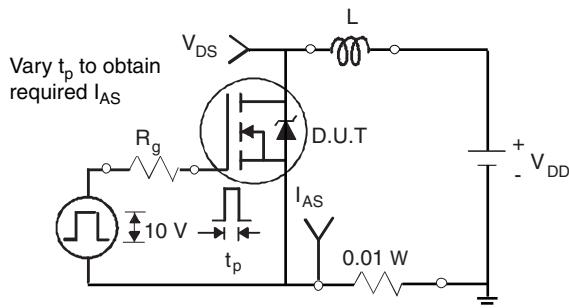


Fig. 12a - Unclamped Inductive Test Circuit

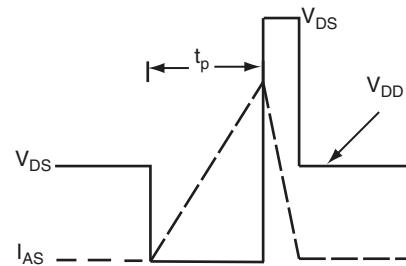


Fig. 12b - Unclamped Inductive Waveforms

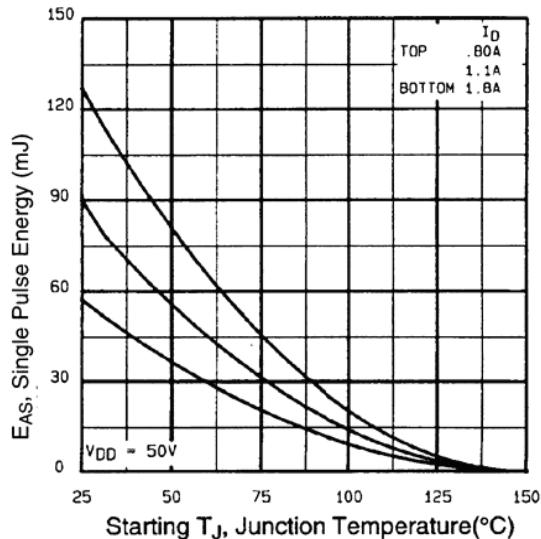


Fig. 12c - Maximum Avalanche Energy vs. Drain Current

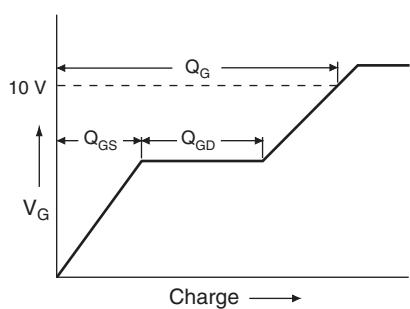


Fig. 13a - Basic Gate Charge Waveform

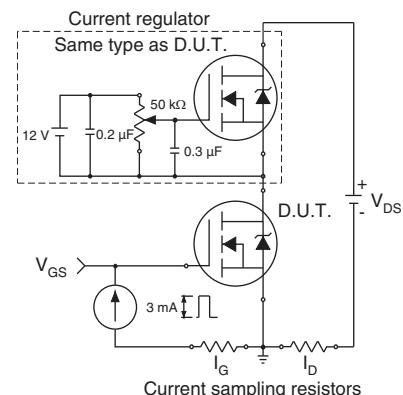
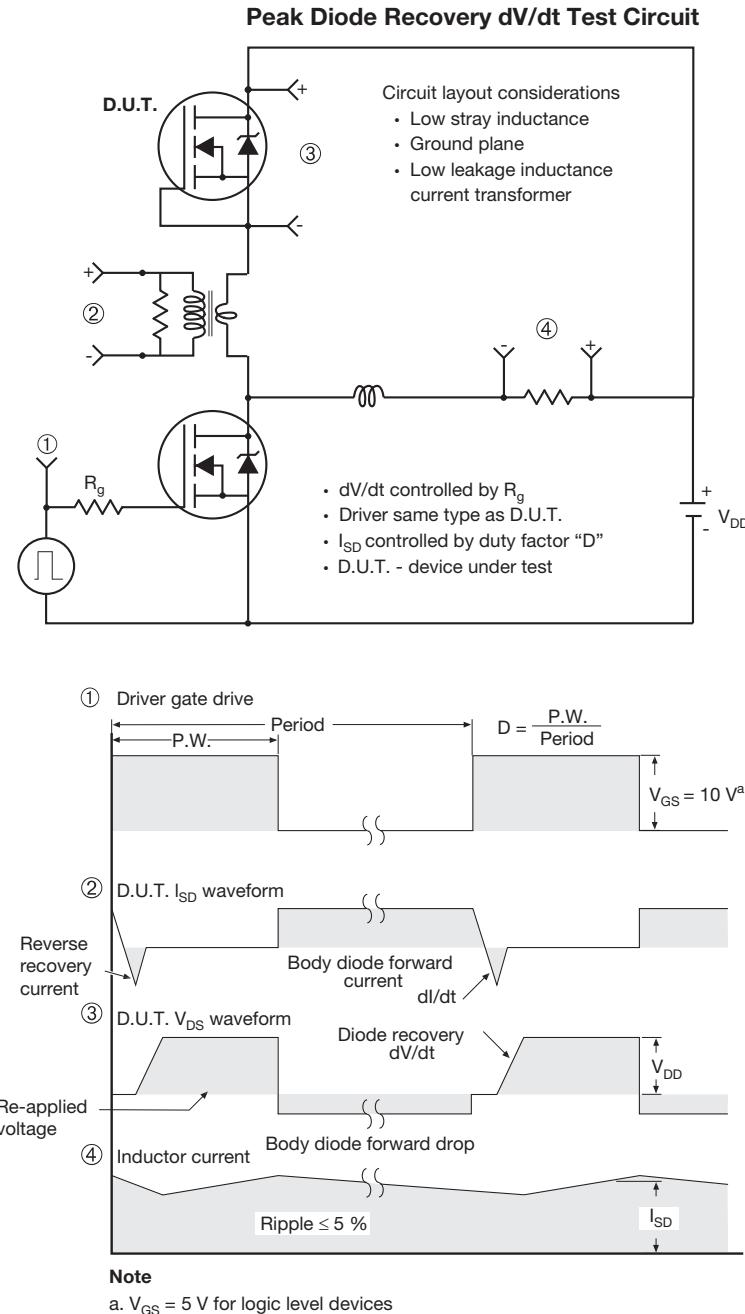
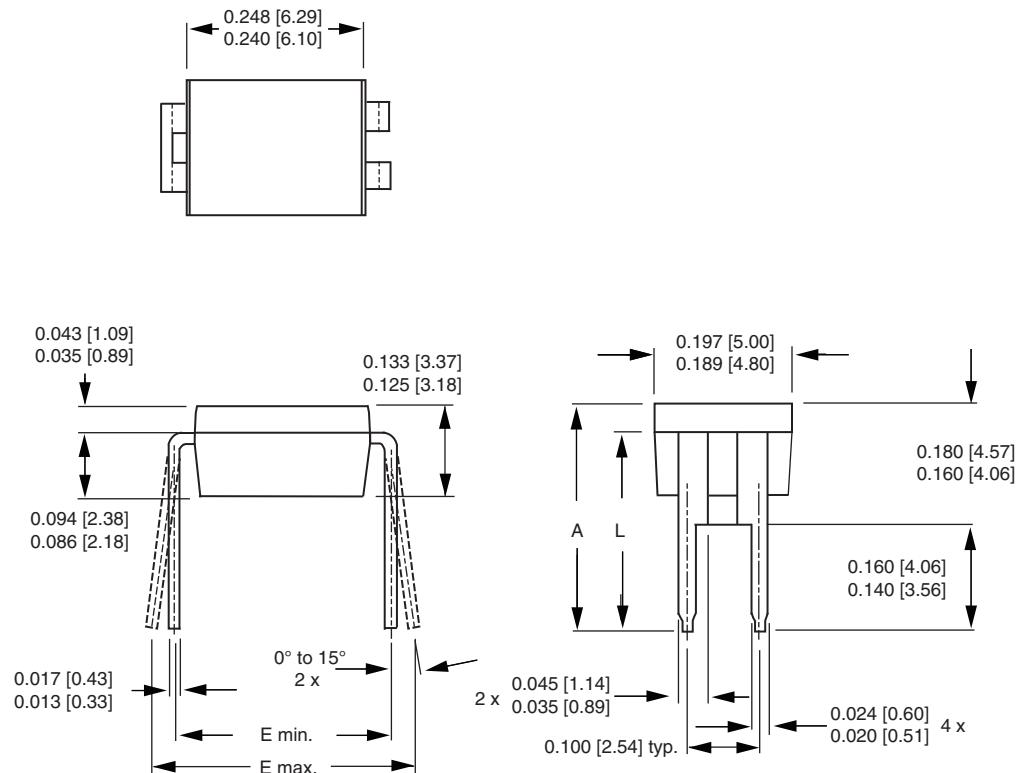


Fig. 13b - Gate Charge Test Circuit


**Fig. 14 - For N-Channel**

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### HVM DIP (High voltage)



DIM.	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	0.310	0.330	7.87	8.38
E	0.300	0.425	7.62	10.79
L	0.270	0.290	6.86	7.36

ECN: X10-0386-Rev. B, 06-Sep-10  
DWG: 5974

#### Note

1. Package length does not include mold flash, protrusions or gate burrs. Package width does not include interlead flash or protrusions.

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