

## Power MOSFET

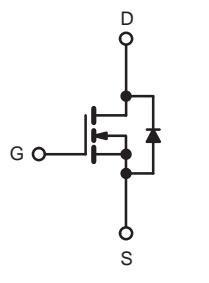
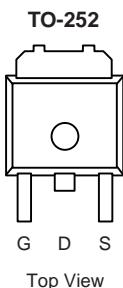
PRODUCT SUMMARY	
$V_{DS}$ (V)	600
$R_{DS(on)}$ ( $\Omega$ )	$V_{GS} = 10$ V
$Q_g$ (Max.) (nC)	18
$Q_{gs}$ (nC)	3.0
$Q_{gd}$ (nC)	8.9
Configuration	Single

### FEATURES

- Halogen-free According to IEC 61249-2-21
- **Definition**
- Dynamic dV/dt Rating
- Repetitive Avalanche Rated
- Available in Tape and Reel
- Fast Switching
- Ease of Paralleling
- Compliant to RoHS Directive 2002/95/EC



**RoHS\***  
COMPLIANT  
HALOGEN  
**FREE**  
Available



ABSOLUTE MAXIMUM RATINGS $T_C = 25$ °C, unless otherwise noted			
PARAMETER		SYMBOL	UNIT
Drain-Source Voltage		$V_{DS}$	600
Gate-Source Voltage		$V_{GS}$	$\pm 20$
Continuous Drain Current	$V_{GS}$ at 10 V	$I_D$	1.0
	$T_C = 25$ °C		1.0
	$T_C = 100$ °C		
Pulsed Drain Current <sup>a</sup>		$I_{DM}$	1.0
Linear Derating Factor			0.33
Linear Derating Factor (PCB Mount) <sup>e</sup>			0.020
Single Pulse Avalanche Energy <sup>b</sup>		$E_{AS}$	mJ
Repetitive Avalanche Current <sup>a</sup>		$I_{AR}$	A
Repetitive Avalanche Energy <sup>a</sup>		$E_{AR}$	mJ
Maximum Power Dissipation	$T_C = 25$ °C	$P_D$	42
Maximum Power Dissipation (PCB Mount) <sup>e</sup>	$T_A = 25$ °C		2.5
Peak Diode Recovery dV/dt <sup>c</sup>		dV/dt	V/ns
Operating Junction and Storage Temperature Range		$T_J, T_{stg}$	- 55 to + 150
Soldering Recommendations (Peak Temperature)	for 10 s		260 <sup>d</sup>

#### Notes

- Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).
- $V_{DD} = 50$  V, starting  $T_J = 25$  °C,  $L = 37$  mH,  $R_g = 25$   $\Omega$ ,  $I_{AS} = 2.0$  A (see fig. 12).
- $I_{SD} \leq 2.0$  A,  $dI/dt \leq 40$  A/ $\mu$ 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

服务热线 : 400-655-8788

**THERMAL RESISTANCE RATINGS**

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Maximum Junction-to-Ambient	$R_{thJA}$	-	-	110	°C/W
Maximum Junction-to-Ambient (PCB Mount) <sup>a</sup>	$R_{thJA}$	-	-	50	
Maximum Junction-to-Case (Drain)	$R_{thJC}$	-	-	3.0	

**Note**

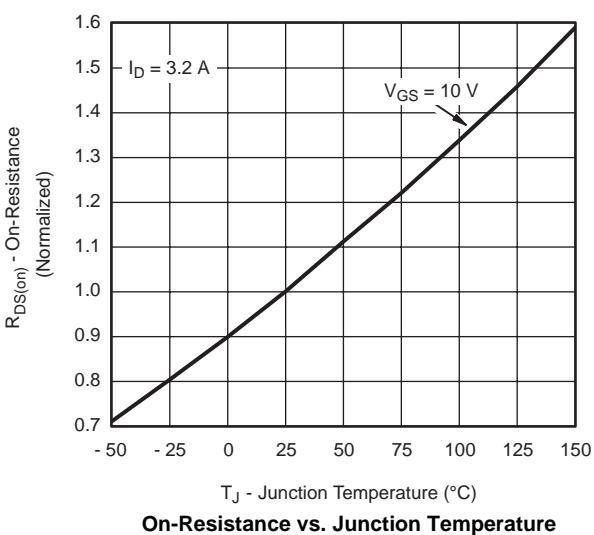
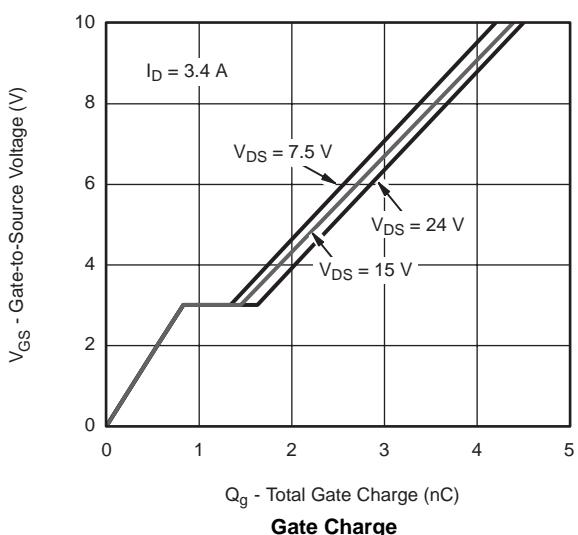
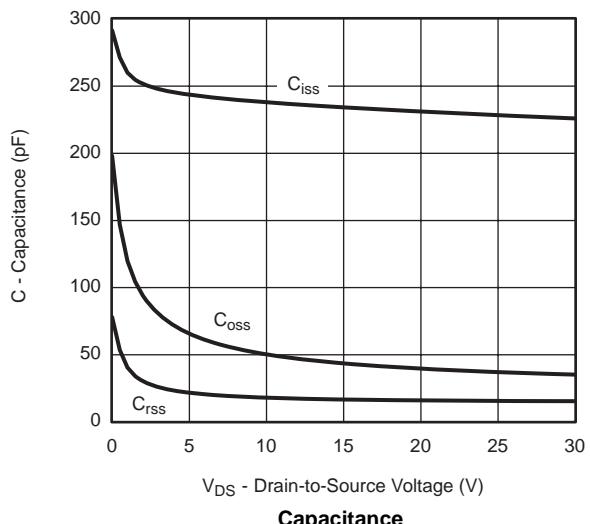
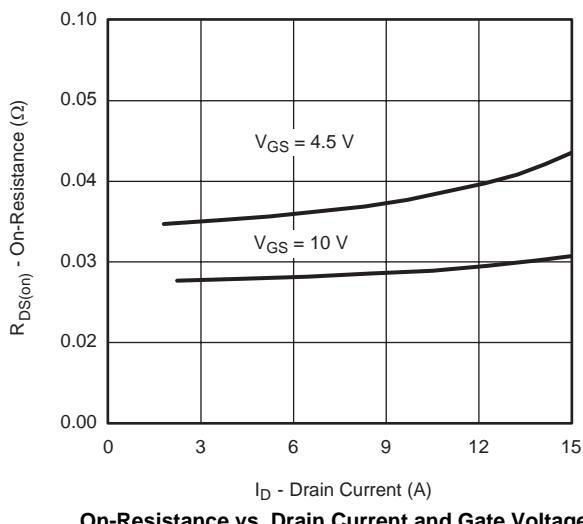
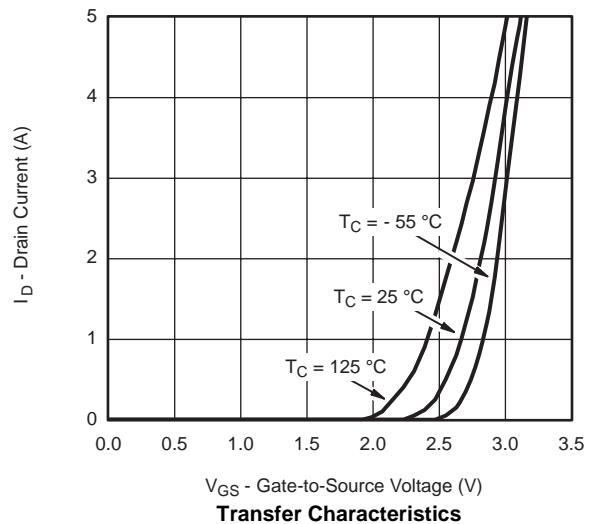
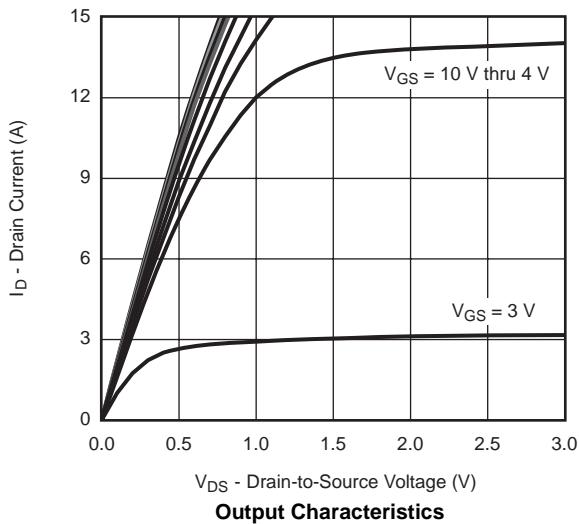
a. When mounted on 1" square PCB (FR-4 or G-10 material).

**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		600	-	-	V
$V_{DS}$ Temperature Coefficient	$\Delta V_{DS}/T_J$	Reference to 25 °C, $I_D = 1$ mA		-	0.88	-	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	$I_{DSS}$	$V_{DS} = 600$ V, $V_{GS} = 0$ V		-	-	100	$\mu$ A
		$V_{DS} = 480$ 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 <sup>b</sup>	--	8	-	$\Omega$
Forward Transconductance	$g_{fs}$	$V_{DS} = 50$ V, $I_D = 1.2$ A		1.4	-	-	S
<b>Dynamic</b>							
Input Capacitance	$C_{iss}$	$V_{GS} = 0$ V, $V_{DS} = -25$ V, $f = 1.0$ MHz, see fig. 5		-	350	-	pF
Output Capacitance	$C_{oss}$			-	48	-	
Reverse Transfer Capacitance	$C_{rss}$			-	8.6	-	
Total Gate Charge	$Q_g$	$V_{GS} = 10$ V	$I_D = 2.0$ A, $V_{DS} = 360$ V, see fig. 6 and 13 <sup>b</sup>	-	-	18	nC
Gate-Source Charge	$Q_{gs}$			-	-	3.0	
Gate-Drain Charge	$Q_{gd}$			-	-	8.9	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 300$ V, $I_D = 2.0$ A, $R_g = 18$ $\Omega$ , $R_D = 135$ $\Omega$ , see fig. 10 <sup>b</sup>		-	10	-	ns
Rise Time	$t_r$		-	23	-		
Turn-Off Delay Time	$t_{d(off)}$		-	30	-		
Fall Time	$t_f$		-	25	-		
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		-	-	2.0	A
Pulsed Diode Forward Current <sup>a</sup>	$I_{SM}$			-	-	8.0	
Body Diode Voltage	$V_{SD}$	$T_J = 25$ °C, $I_S = 2.0$ A, $V_{GS} = 0$ V <sup>b</sup>		-	-	1.6	V
Body Diode Reverse Recovery Time	$t_{rr}$	$T_J = 25$ °C, $I_F = 2.0$ A, $dI/dt = 100$ A/ $\mu$ s <sup>b</sup>		-	290	580	ns
Body Diode Reverse Recovery Charge	$Q_{rr}$			-	0.67	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


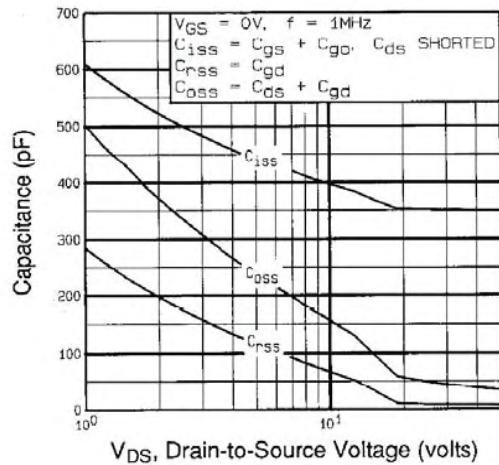


Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage

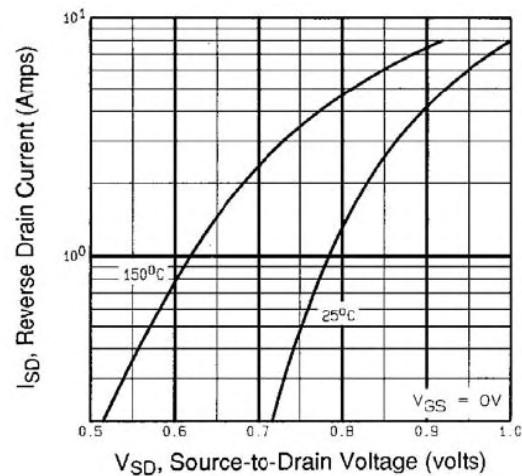


Fig. 7 - Typical Source-Drain Diode Forward Voltage

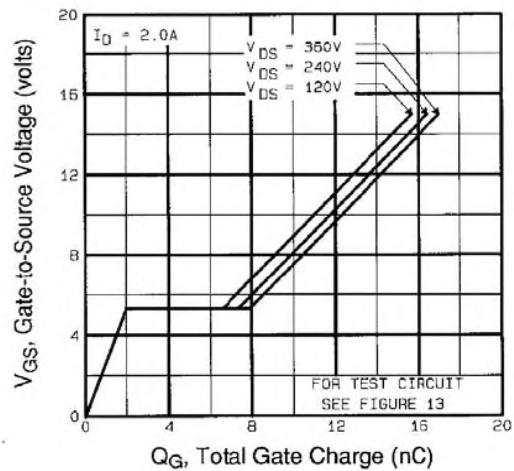


Fig. 6 - Typical Gate Charge vs. Gate-to-Source Voltage

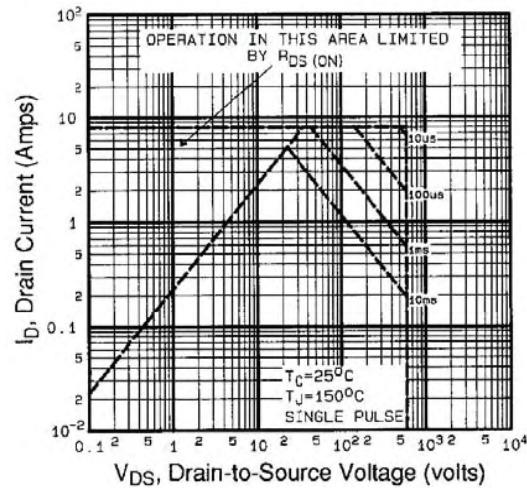


Fig. 8 - Maximum Safe Operating Area

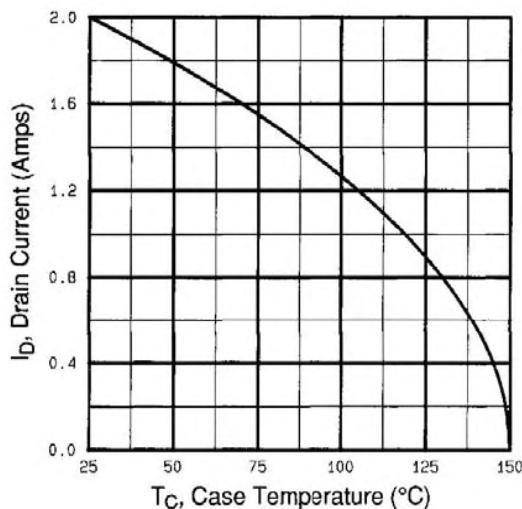


Fig. 9 - Maximum Drain Current vs. Case Temperature

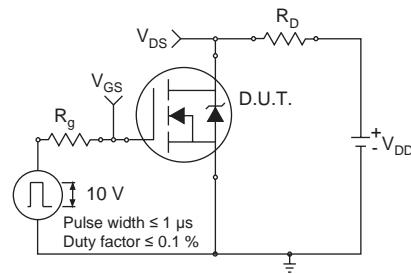


Fig. 10a - Switching Time Test Circuit

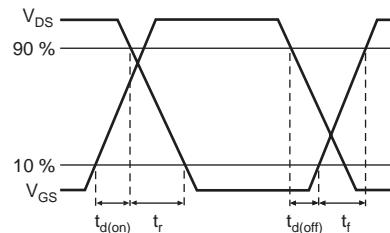


Fig. 10b - Switching Time Waveforms

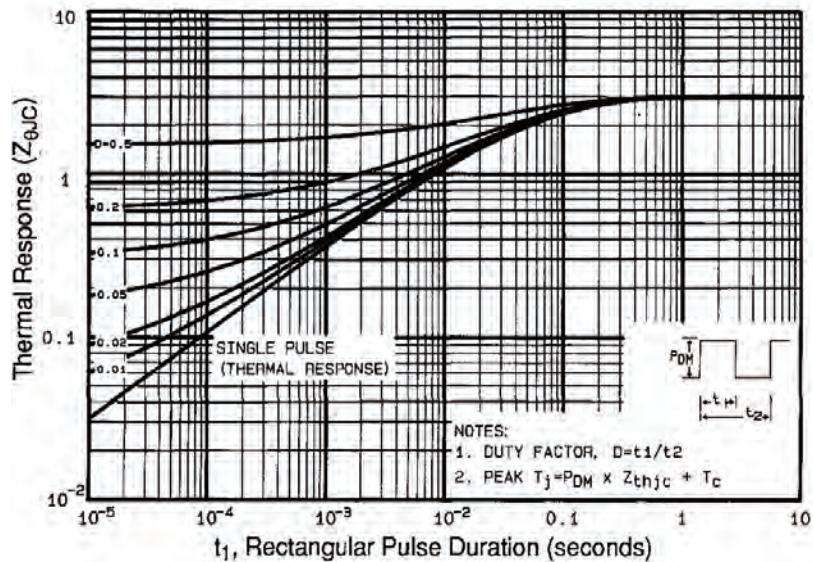


Fig. 11 - Maximum Effective Transient Thermal Impedance, Junction-to-Case

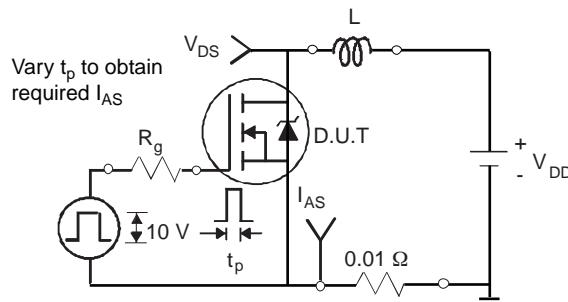


Fig. 12a - Unclamped Inductive Test Circuit

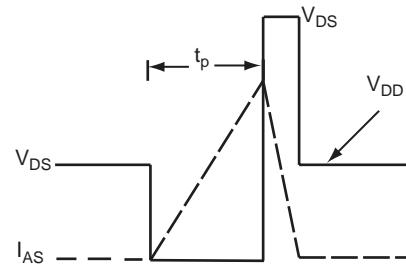


Fig. 12b - Unclamped Inductive Waveforms

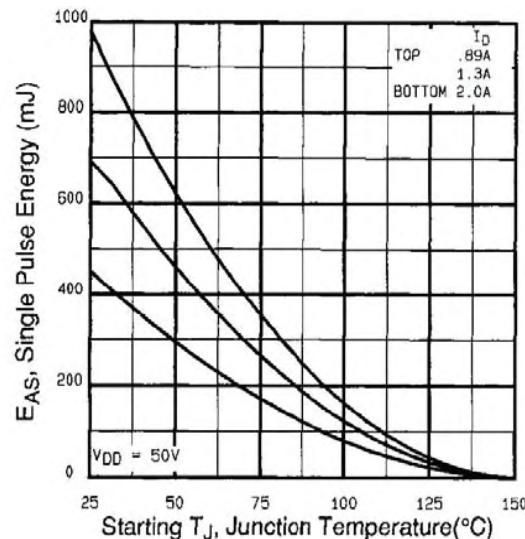


Fig. 12c - Maximum Avalanche Energy vs. Drain Current

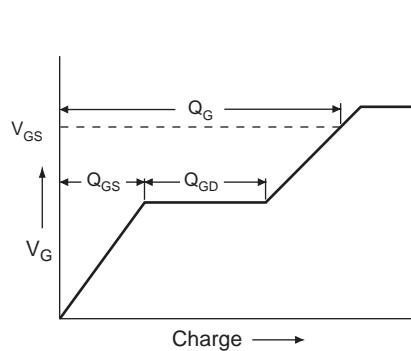


Fig. 13a - Basic Gate Charge Waveform

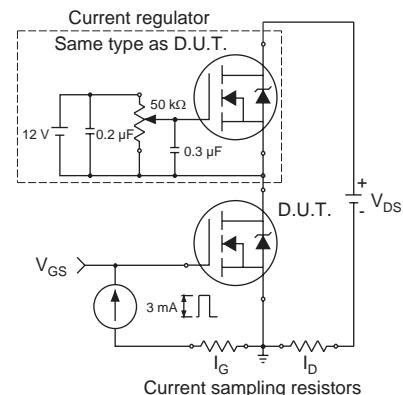


Fig. 13b - Gate Charge Test Circuit

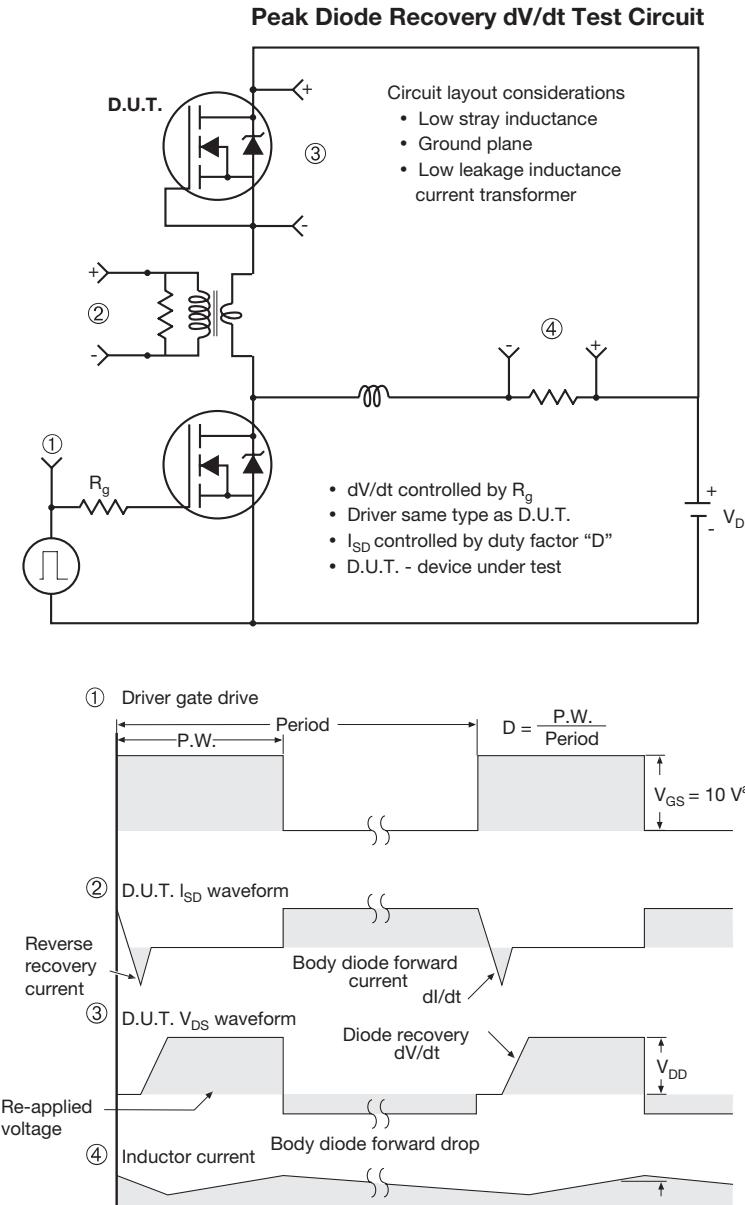
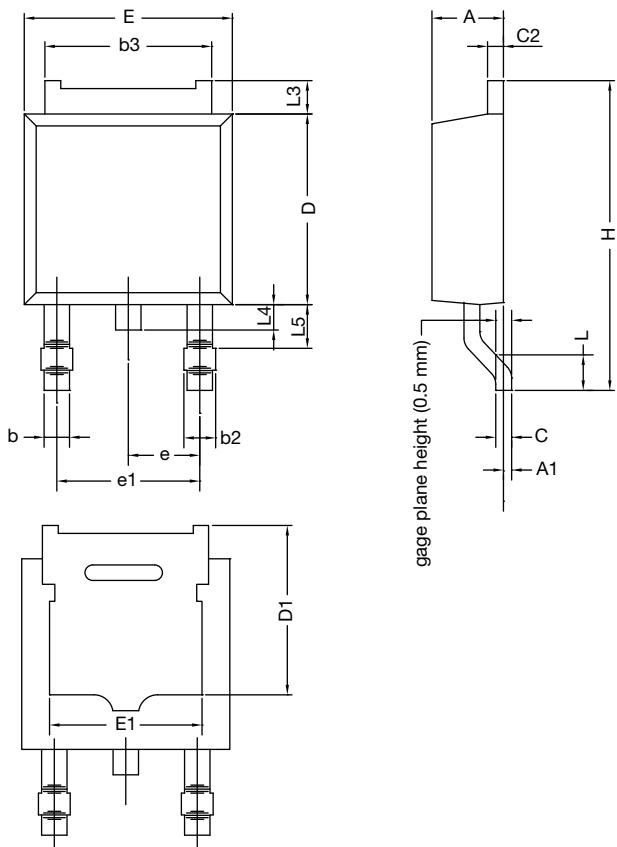


Fig. 14 - For N-Channel

## TO-252AA CASE OUTLINE



DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.18	2.38	0.086	0.094
A1	-	0.127	-	0.005
b	0.64	0.88	0.025	0.035
b2	0.76	1.14	0.030	0.045
b3	4.95	5.46	0.195	0.215
C	0.46	0.61	0.018	0.024
C2	0.46	0.89	0.018	0.035
D	5.97	6.22	0.235	0.245
D1	5.21	-	0.205	-
E	6.35	6.73	0.250	0.265
E1	4.32	-	0.170	-
H	9.40	10.41	0.370	0.410
e	2.28 BSC		0.090 BSC	
e1	4.56 BSC		0.180 BSC	
L	1.40	1.78	0.055	0.070
L3	0.89	1.27	0.035	0.050
L4	-	1.02	-	0.040
L5	1.14	1.52	0.045	0.060

ECN: X12-0247-Rev. M, 24-Dec-12  
 DWG: 5347

### Note

- Dimension L3 is for reference only.

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