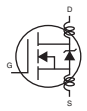
THERMAL RESISTANCE RATINGS				
PARAMETER	**SYMBOL**	**TYP.**	**MAX.**	**UNIT**
Maximum Junction-to-Ambient	R_{thJA}	-	62	°C/W
Case-to-Sink, Flat, Greased Surface	R_{thCS}	0.50	-	
Maximum Junction-to-Case (Drain)	R_{thJC}	-	1.0	

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		800	-	-	V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	Reference to 25 °C, I_D = 1 mA		-	0.9	-	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} = 800 V, V_{GS} = 0 V		-	-	100	µA
		V_{DS} = 640 V, V_{GS} = 0 V, T_J = 125 °C		-	-	500	
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS} = 10 V	I_D = 2.5 A[b]	-	-	3.0	Ω
Forward Transconductance	g_{fs}	V_{DS} = 100 V, I_D = 2.5 A[b]		2.5	-	-	S
Dynamic							
Input Capacitance	C_{iss}	V_{GS} = 0 V,		-	1300	-	pF
Output Capacitance	C_{oss}	V_{DS} = 25 V,		-	310	-	
Reverse Transfer Capacitance	C_{rss}	f = 1.0 MHz, see fig. 5		-	190	-	
Total Gate Charge	Q_g	V_{GS} = 10 V	I_D = 4.1 A, V_{DS} = 400 V, see fig. 6 and 13[b]	-	-	78	nC
Gate-Source Charge	Q_{gs}			-	-	9.6	
Gate-Drain Charge	Q_{gd}			-	-	45	
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 400 V, I_D = 4.1 A, R_g = 12 Ω, R_D = 95 Ω, see fig. 10[b]		-	12	-	ns
Rise Time	t_r			-	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	-	
Drain-Source Body Diode Characteristics							
Continuous Source-Drain Diode Current	I_S	MOSFET symbol showing the integral reverse p - n junction diode 		-	-	4.1	A
Pulsed Diode Forward Current[a]	I_{SM}			-	-	16	
Body Diode Voltage	V_{SD}	T_J = 25 °C, I_S = 4.1 A, V_{GS} = 0 V[b]		-	-	1.8	V
Body Diode Reverse Recovery Time	t_{rr}	T_J = 25 °C, I_F = 4.1 A, dI/dt = 100 A/µs[b]		-	480	720	ns
Body Diode Reverse Recovery Charge	Q_{rr}			-	1.8	2.7	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)

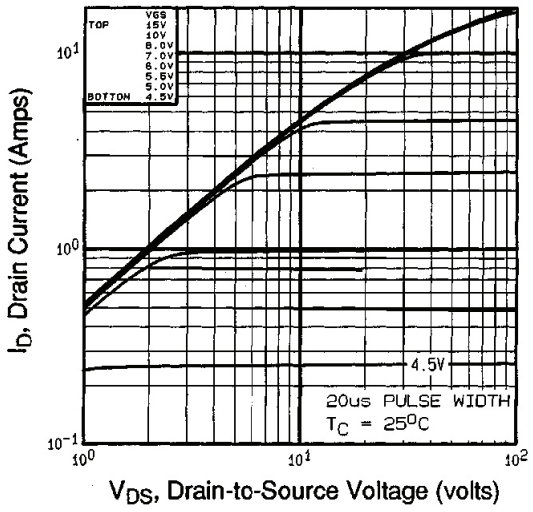


Fig. 1 - Typical Output Characteristics, T_C = 25 °C

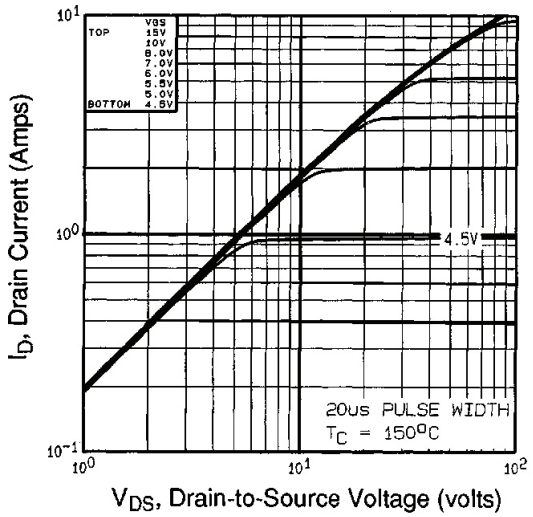


Fig. 2 - Typical Output Characteristics, T_C = 150 °C

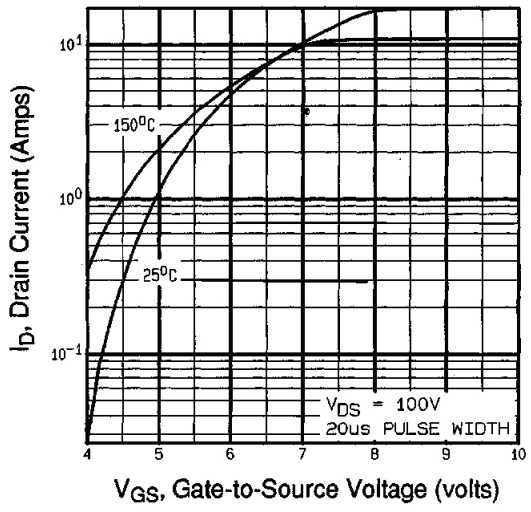


Fig. 3 - Typical Transfer Characteristics

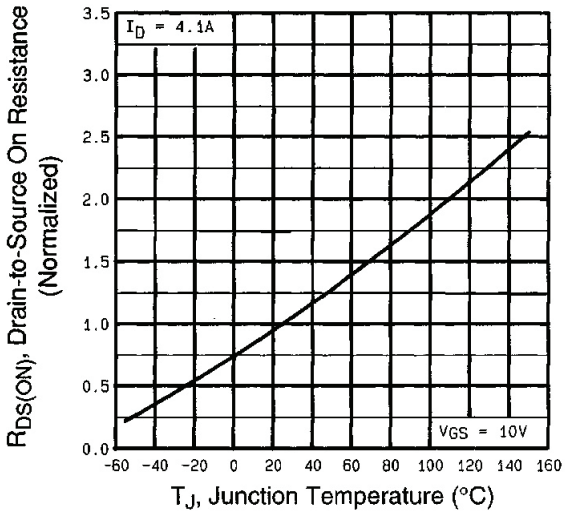


Fig. 4 - Normalized On-Resistance vs. Temperature

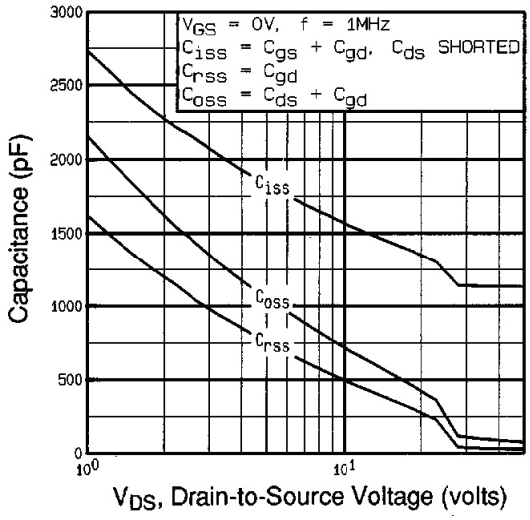


Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage

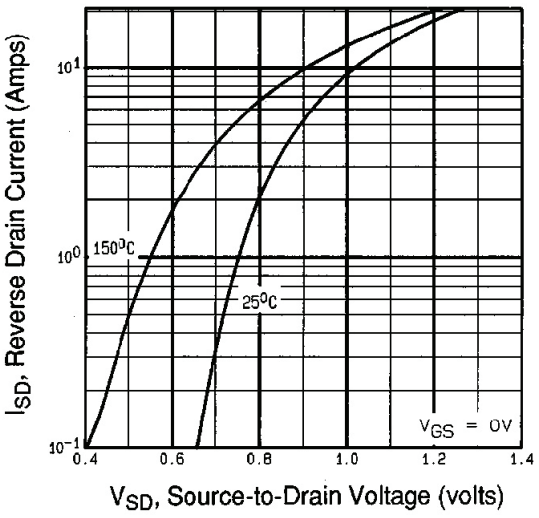


Fig. 7 - Typical Source-Drain Diode Forward Voltage

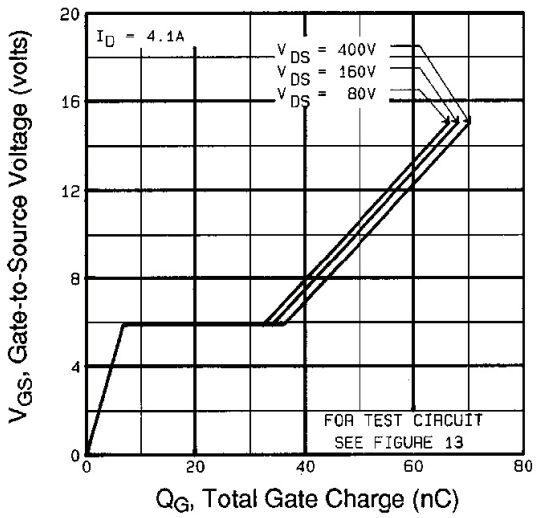


Fig. 6 - Typical Gate Charge vs. Gate-to-Source Voltage

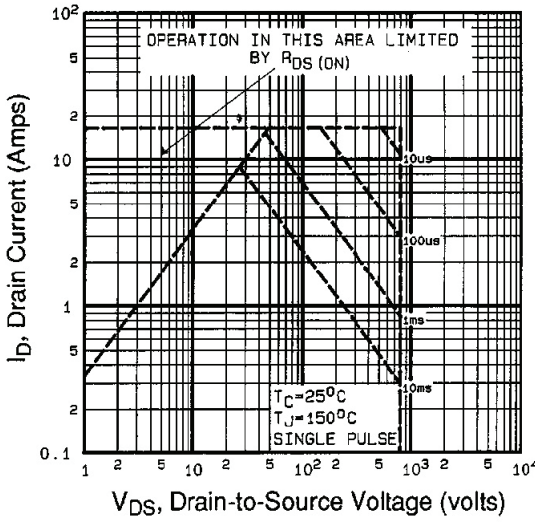


Fig. 8 - Maximum Safe Operating Area

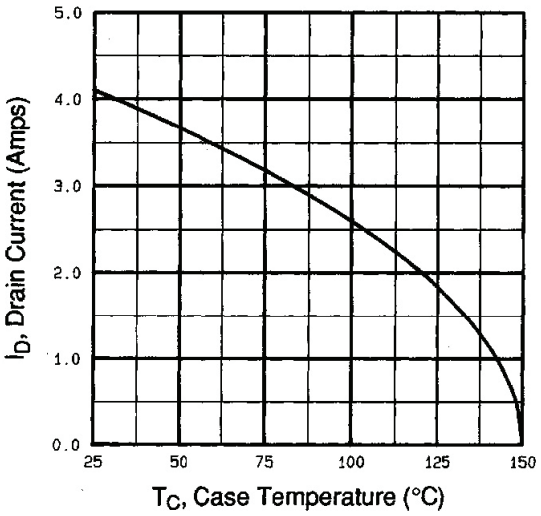


Fig. 9 - Maximum Drain Current vs. Case Temperature

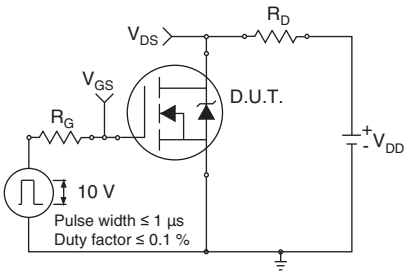


Fig. 10a - Switching Time Test Circuit

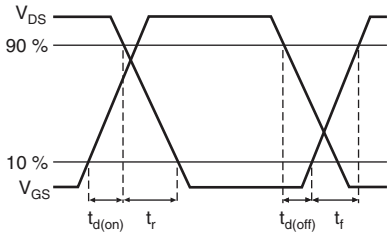


Fig. 10b - Switching Time Waveforms

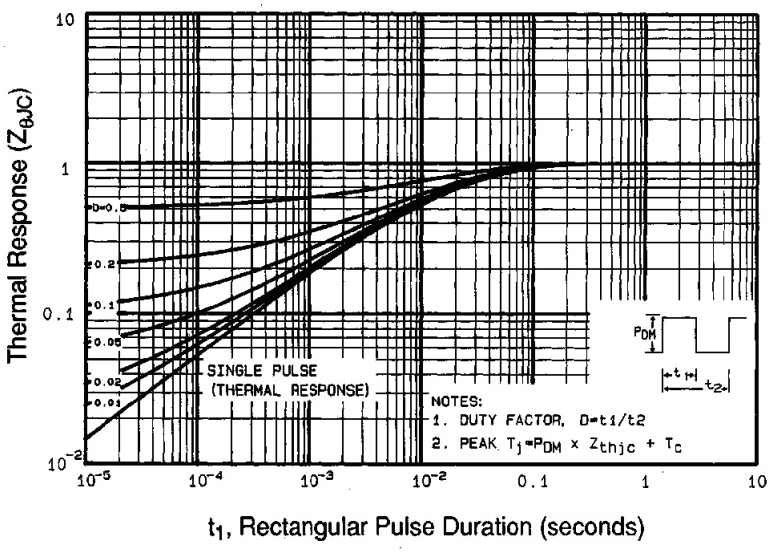


Fig. 11 - Maximum Effective Transient Thermal Impedance, Junction-to-Case

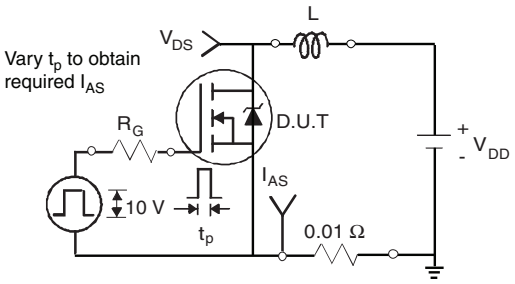


Fig. 12a - Unclamped Inductive Test Circuit

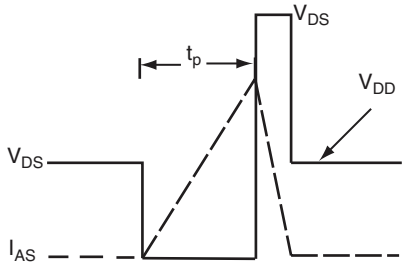


Fig. 12b - Unclamped Inductive Waveforms

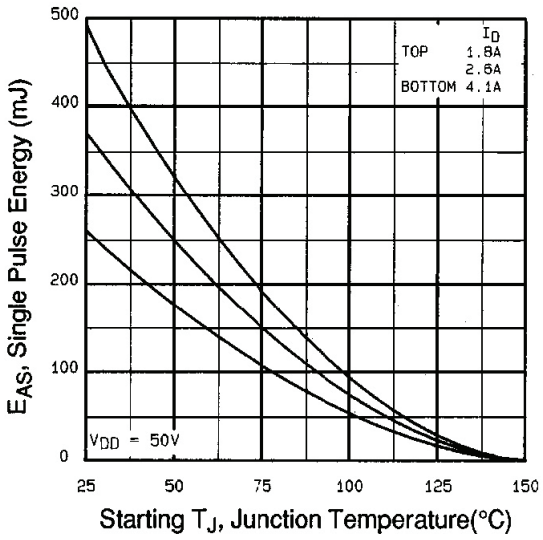


Fig. 12c - Maximum Avalanche Energy vs. Drain Current

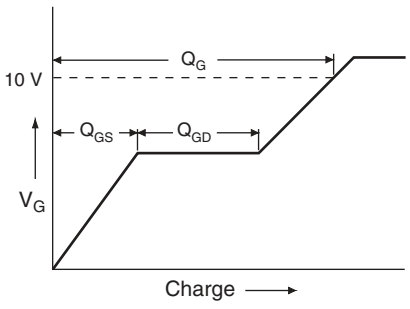


Fig. 13a - Basic Gate Charge Waveform

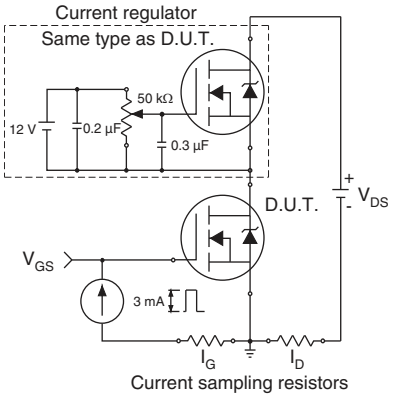
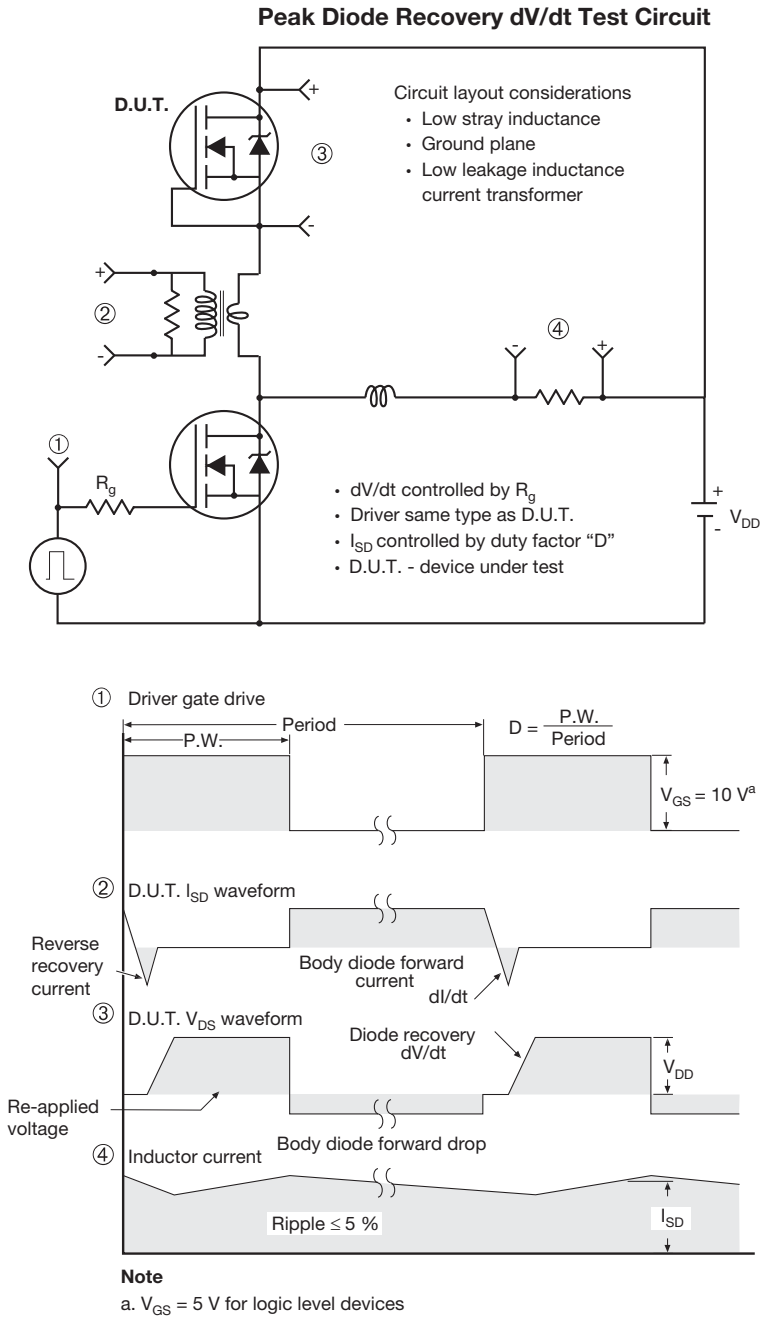


Fig. 13b - Gate Charge Test Circuit

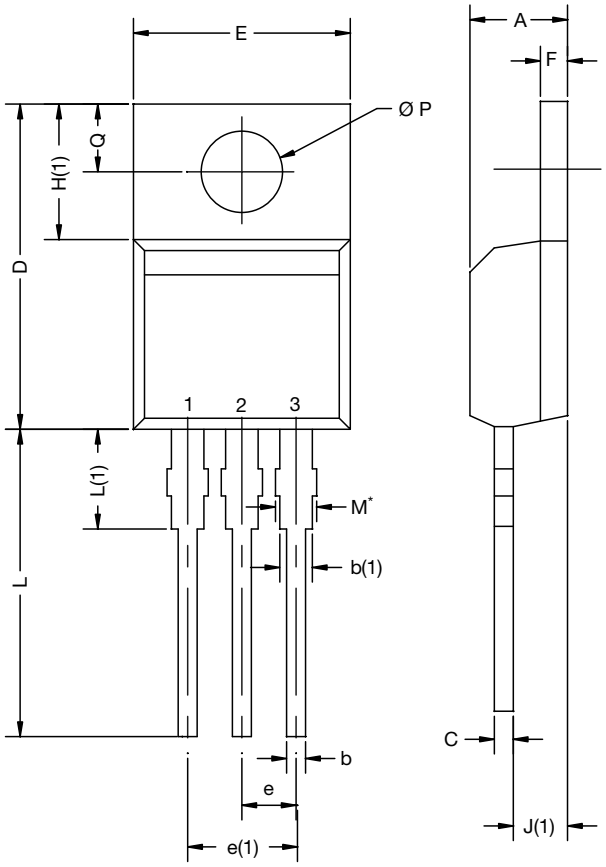


Note

a. V_{GS} = 5 V for logic level devices

Fig. 14 - For N-Channel

TO-220-1

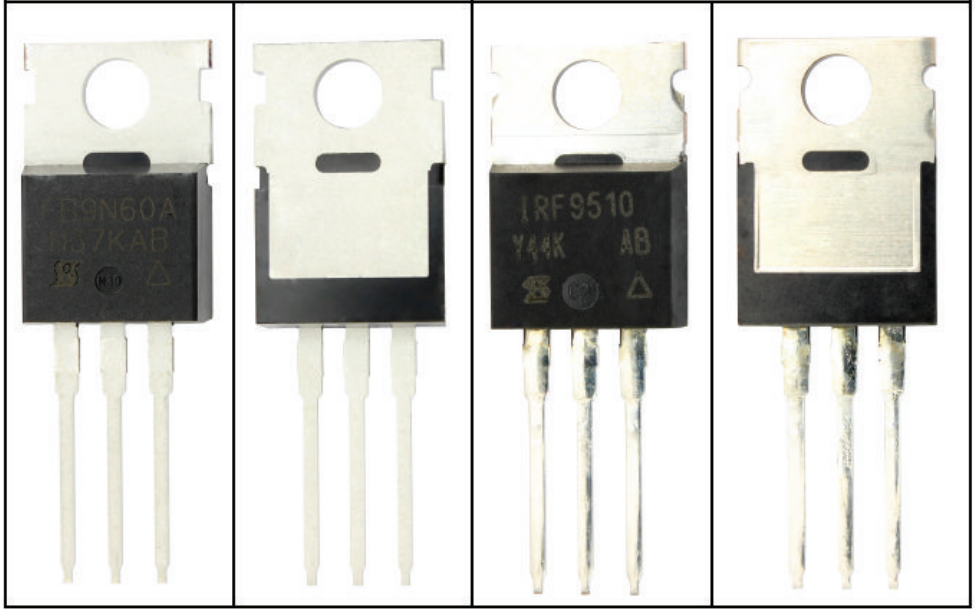


DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.24	4.65	0.167	0.183
b	0.69	1.02	0.027	0.040
b(1)	1.14	1.78	0.045	0.070
c	0.36	0.61	0.014	0.024
D	14.33	15.85	0.564	0.624
E	9.96	10.52	0.392	0.414
e	2.41	2.67	0.095	0.105
e(1)	4.88	5.28	0.192	0.208
F	1.14	1.40	0.045	0.055
H(1)	6.10	6.71	0.240	0.264
J(1)	2.41	2.92	0.095	0.115
L	13.36	14.40	0.526	0.567
L(1)	3.33	4.04	0.131	0.159
Ø P	3.53	3.94	0.139	0.155
Q	2.54	3.00	0.100	0.118
ECN: X15-0364-Rev. C, 14-Dec-15 DWG: 6031				

Note

- M* = 0.052 inches to 0.064 inches (dimension including protrusion), heatsink hole for HVM

Package Picture	
ASE	Xi'an



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