

Static Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	-150	—	—	V	$V_{GS} = 0V, I_D = -250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	-0.20	—	V/°C	Reference to 25°C , $I_D = -1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.29	Ω	$V_{GS} = -10V, I_D = -6.6A$ ④, $T_J = 25^\circ\text{C}$
		—	—	0.58		$V_{GS} = -10V, I_D = -6.6A$ ④, $T_J = 150^\circ\text{C}$
$V_{GS(th)}$	Gate Threshold Voltage	-2.0	—	-4.0	V	$V_{DS} = V_{GS}, I_D = -250\mu A$
g_{fs}	Forward Transconductance	3.6	—	—	S	$V_{DS} = -50V, I_D = -6.6A$
I_{DSS}	Drain-to-Source Leakage Current	—	—	-25	μA	$V_{DS} = -150V, V_{GS} = 0V$
		—	—	-250		$V_{DS} = -120V, V_{GS} = 0V, T_J = 150^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{GS} = 20V$
	Gate-to-Source Reverse Leakage	—	—	-100		$V_{GS} = -20V$

Dynamic Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
Q_g	Total Gate Charge	—	—	66	nC	$I_D = -6.6A$
Q_{gs}	Gate-to-Source Charge	—	—	8.1		$V_{DS} = -120V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	—	35		$V_{GS} = -10V$, See Fig. 6 & 13 ④
$t_{d(on)}$	Turn-On Delay Time	—	14	—	ns	$V_{DD} = -75V$
t_r	Rise Time	—	36	—		$I_D = -6.6A$
$t_{d(off)}$	Turn-Off Delay Time	—	53	—		$R_G = 6.8\Omega$
t_f	Fall Time	—	37	—		$R_D = 12\Omega$, See Fig. 10
L_D	Internal Drain Inductance	—	4.5	—	nH	Between lead, 6mm (0.25in.) from package and center of die contact
L_S	Internal Source Inductance	—	7.5	—		
C_{iss}	Input Capacitance	—	860	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	220	—		$V_{DS} = -25V$
C_{rss}	Reverse Transfer Capacitance	—	130	—		$f = 1.0\text{MHz}$, See Fig. 5

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	-13	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	-44		
V_{SD}	Diode Forward Voltage	—	—	-1.6	V	$T_J = 25^\circ\text{C}, I_S = -6.6A, V_{GS} = 0V$ ④
t_{rr}	Reverse Recovery Time	—	160	240	ns	$T_J = 25^\circ\text{C}, I_F = -6.6A$
Q_{rr}	Reverse Recovery Charge	—	1.2	1.7	nC	$di/dt = 100A/\mu s$ ④
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by $L_S + L_D$)				

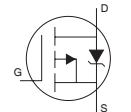
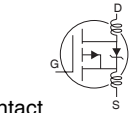
Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)
 ② Starting $T_J = 25^\circ\text{C}$, $L = 14\text{mH}$,
 $R_G = 25\Omega$, $I_{AS} = -6.6A$. (See Figure 12)

- ③ $I_{SD} \leq -6.6A$, $di/dt \leq -620A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$,
 $T_J \leq 175^\circ\text{C}$.

- ④ Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.

- ⑤ R_θ is measured at T_J approximately 90°C .



Qualification Information[†]

Qualification Level		Automotive (per AEC-Q101) ^{††}	
		Comments: This part number(s) passed Automotive qualification. IR's Industrial and Consumer qualification level is granted by extension of the higher Automotive level.	
Moisture Sensitivity Level		TO-220	N/A
ESD	Machine Model	Class M3 (400V) AEC-Q101-002	
	Human Body Model	Class H1B (1000V) AEC-Q101-001	
	Charged Device Model	Class C5 (1125V) AEC-Q101-005	
RoHS Compliant		Yes	

[†] Qualification standards can be found at International Rectifier's web site: <http://www.irf.com/>

^{††} Exceptions to AEC-Q101 requirements are noted in the qualification report.

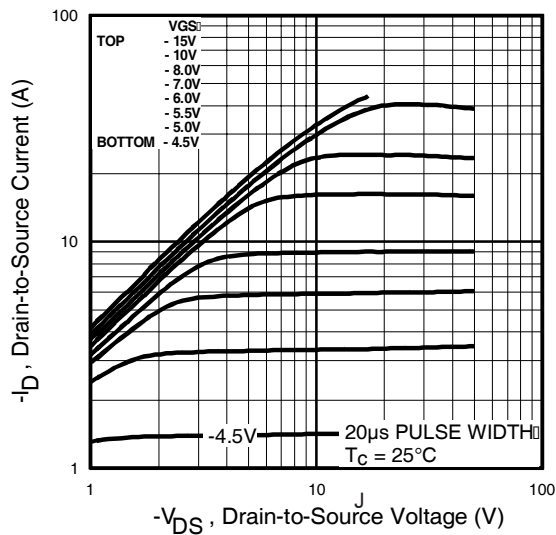


Fig 1. Typical Output Characteristics,

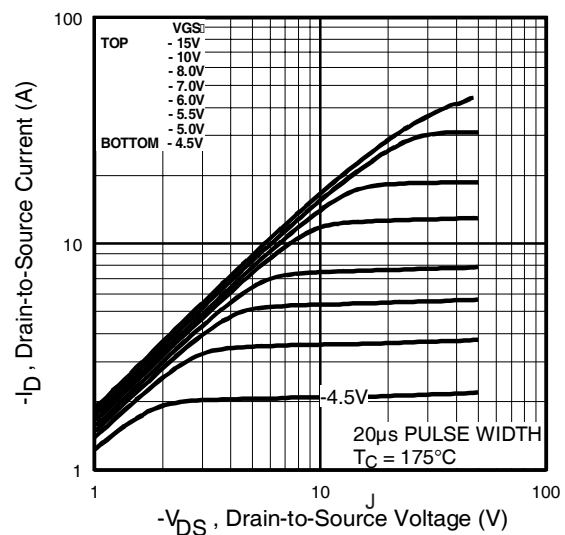


Fig 2. Typical Output Characteristics,

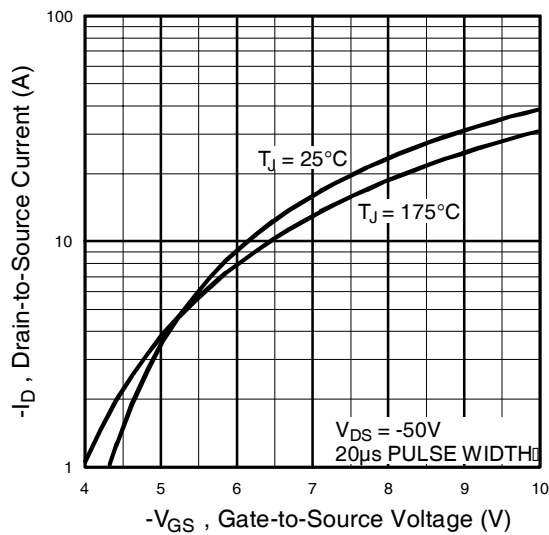


Fig 3. Typical Transfer Characteristics

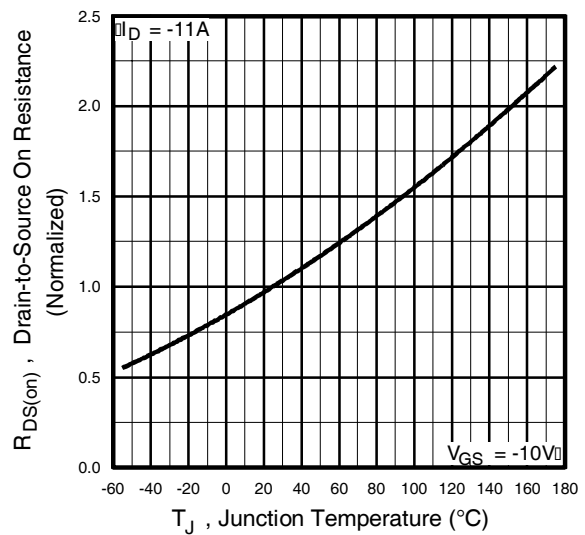


Fig 4. Normalized On-Resistance
Vs. Temperature

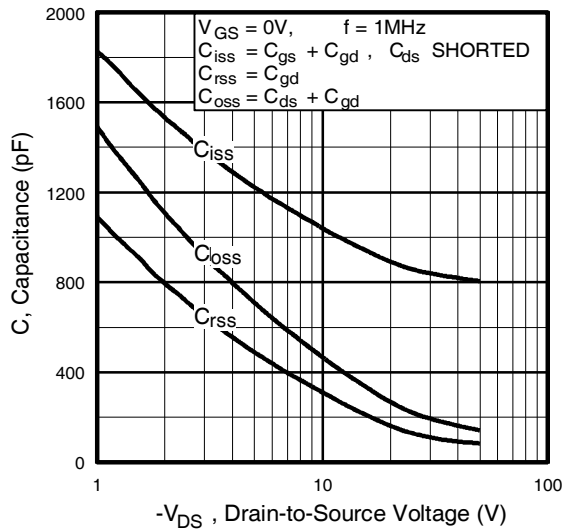


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

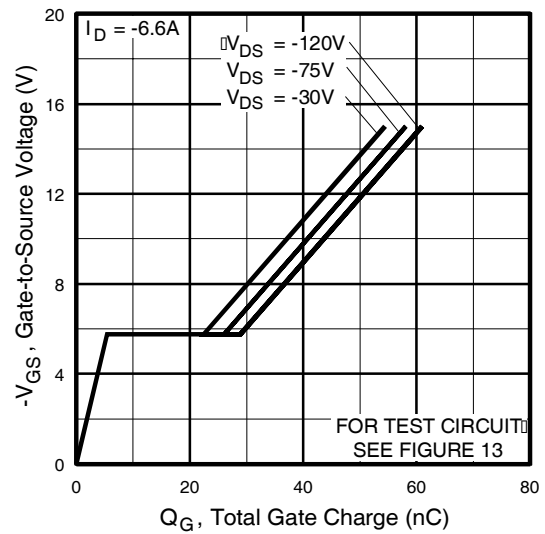


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

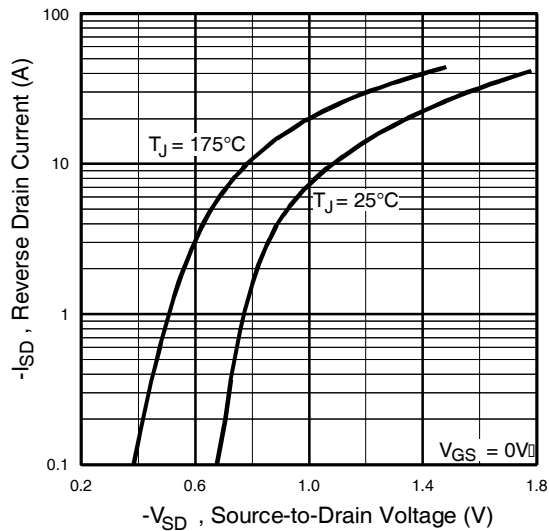


Fig 7. Typical Source-Drain Diode Forward Voltage

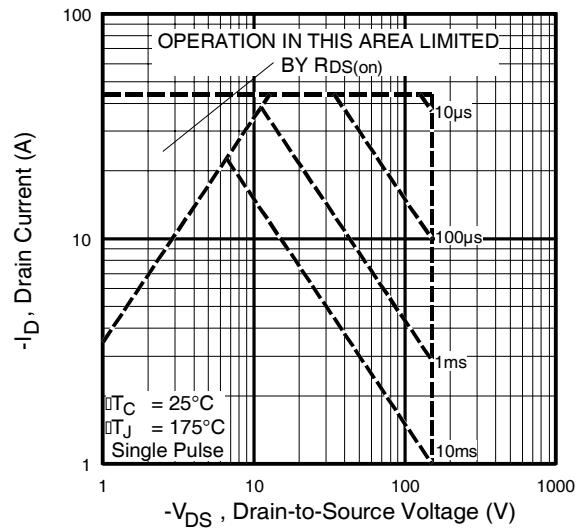


Fig 8. Maximum Safe Operating Area

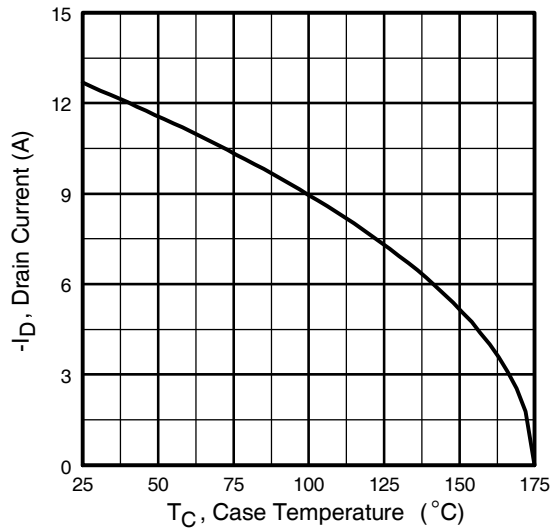


Fig 9. Maximum Drain Current Vs. Case Temperature

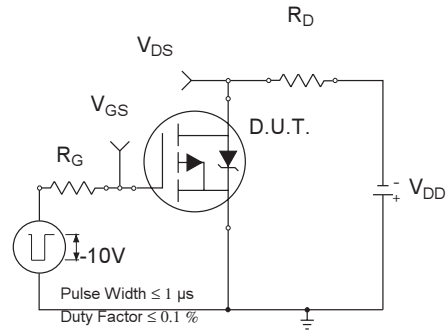


Fig 10a. Switching Time Test Circuit

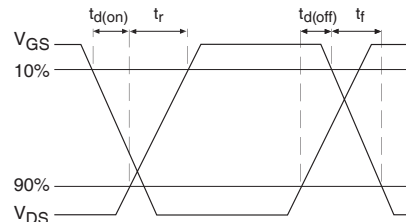


Fig 10b. Switching Time Waveforms

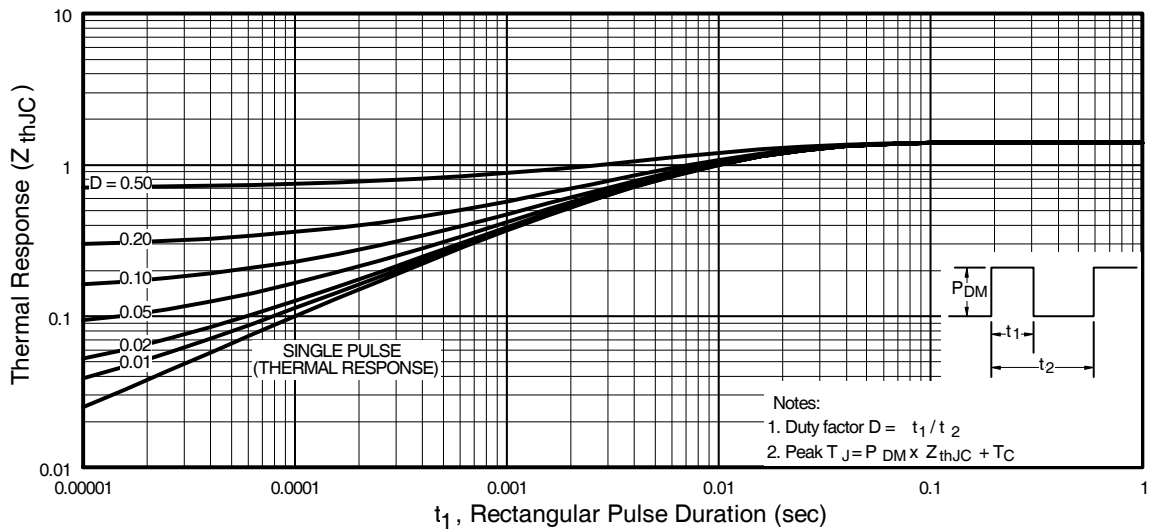


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

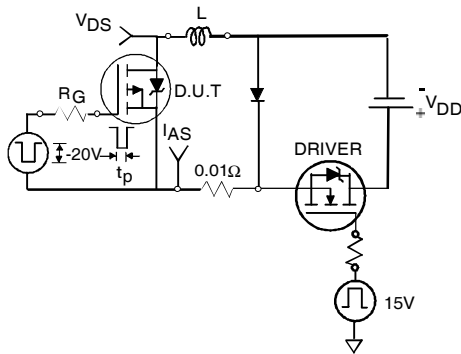


Fig 12a. Unclamped Inductive Test Circuit

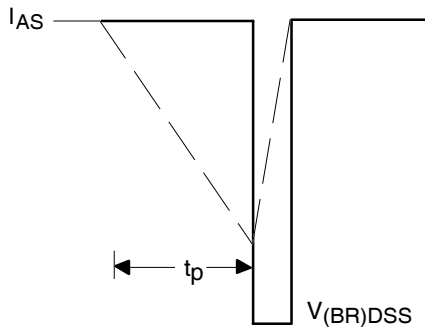


Fig 12b. Unclamped Inductive Waveforms

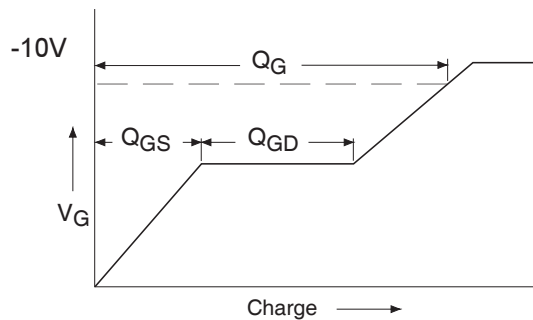


Fig 13a. Basic Gate Charge Waveform

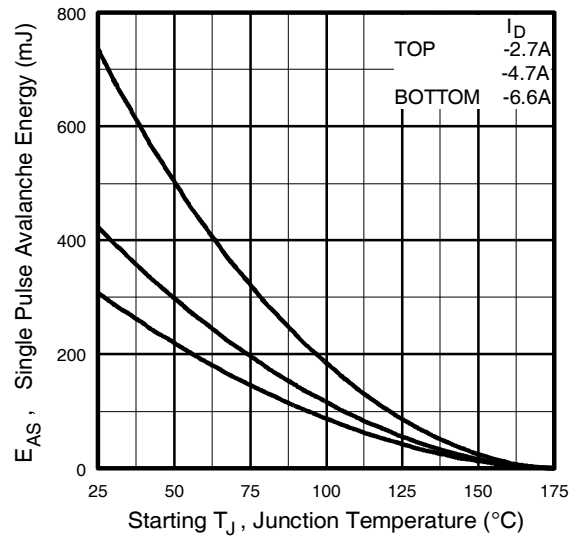


Fig 12c. Maximum Avalanche Energy Vs. Drain Current

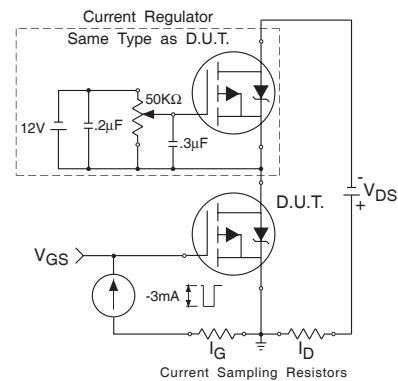
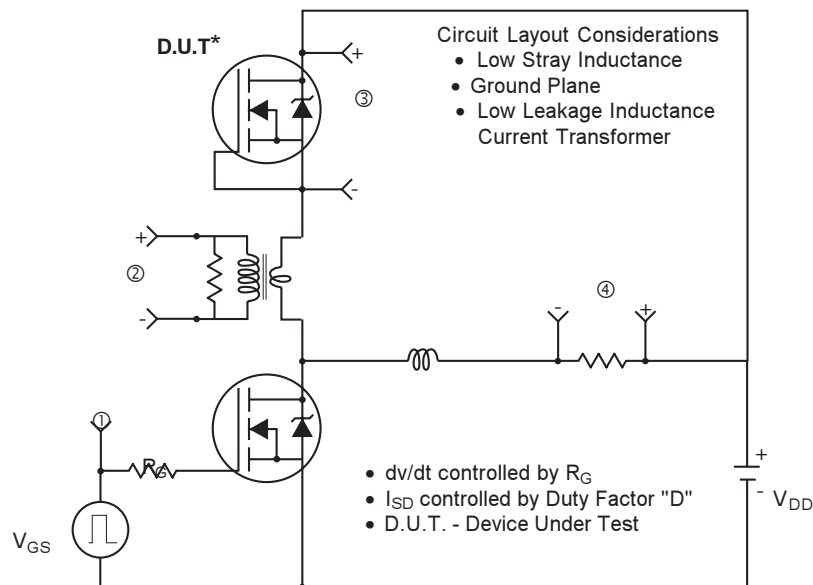
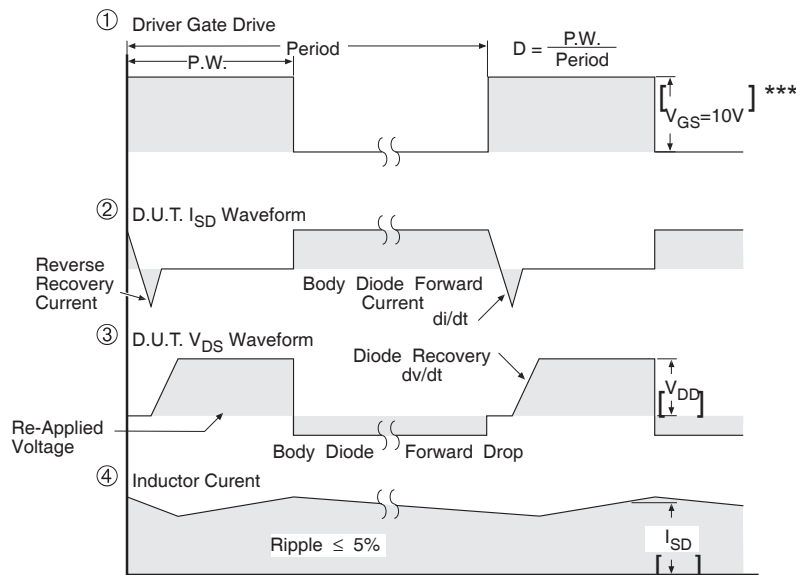


Fig 13b. Gate Charge Test Circuit

Peak Diode Recovery dv/dt Test Circuit



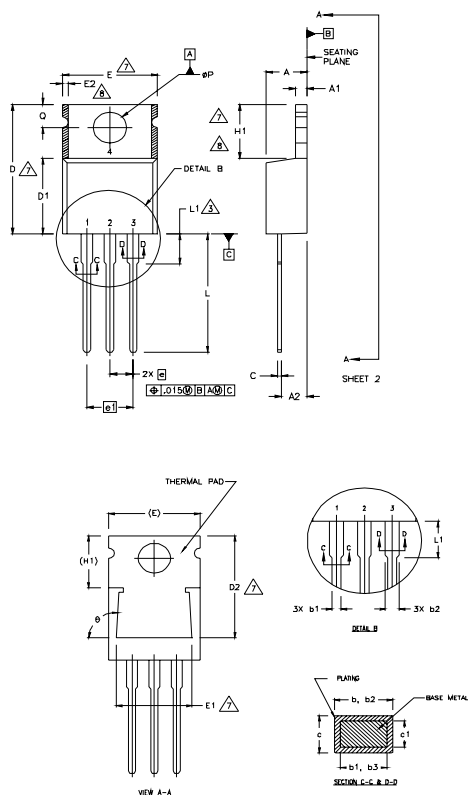
* Reverse Polarity of D.U.T for P-Channel



*** $V_{GS} = 5.0V$ for Logic Level and 3V Drive Devices

Fig 14. For P-Channel HEXFETS

Dimensions are shown in millimeters (inches)



1 DIMENSIONING AND TOLERANCING PER ASME Y14.5 M- 1994.
2 DIMENSIONS ARE SHOWN IN INCHES [MILLIMETERS].
3 LEAD DIMENSION AND FINISH UNCONTROLLED IN 1.
4 DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH
5 SHALL NOT EXCEED .005" (0.127) PER SIDE. THESE DIMENSIONS ARE
6 MEASURED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
7 DIMENSION B & C APPLY TO BASE METAL ONLY.
8 CONTROLLING DIMENSION IS 1.
9 THERMAL PAD CONTOUR OPTIONAL. WITHIN DIMENSIONS E_{H1}, D₂ & E₁
10 DIMENSION E₂ X H1 DEFINE A ZONE WHERE STAMPING
11 AND SINGULATION IRREGULARITIES ARE ALLOWED.

- 1.- GATE
- 2.- COLLECTOR
- 3.- EMITTER

1.- ANODE/OPEN
2.- CATHODE
3.- ANODE

SYMBOL	DIMENSIONS				NOTES
	MILLIMETERS		INCHES		
	MIN.	MAX.	MIN.	MAX.	
A	3.56	4.82	.140	.190	
A1	0.51	1.40	.020	.055	
A2	2.04	2.92	.080	.115	
b	0.38	1.01	.015	.040	
b1	0.38	0.96	.015	.038	5
b2	1.15	1.77	.045	.070	
b3	1.15	1.73	.045	.068	
c	0.36	0.61	.014	.024	
c1	0.36	0.56	.014	.022	5
D	14.22	16.51	.560	.650	4
D1	8.38	9.02	.330	.355	
D2	12.19	12.88	.480	.507	7
E	9.66	10.66	.380	.420	4,7
E1	8.38	8.89	.330	.350	7
e	2.54 BSC		.100 BSC		
e1	5.08		.200 BSC		
H1	5.85	6.55	.230	.270	7,8
L	12.70	14.73	.500	.580	
L1	—	6.35	—	250	3
øP	3.54	4.08	.139	.161	
Q	2.54	3.42	.100	.135	
ø	90°-93°		90°-93°		

Part Number

AUIRF6215

IR Logo

IOR YWWA

- Date Code

Y= Year

WW= Work Week

A= Automotive, Lead Free

XX ● XX

Lot Code

Note: For the most current drawing please refer to IR website at <http://www.irf.com/package/>

Ordering Information

Base part number	Package Type	Standard Pack		Complete Part Number
		Form	Quantity	
AUIRF6215	TO-220	Tube	50	AUIRF6215

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