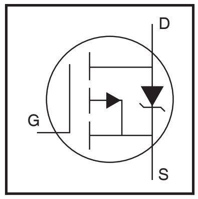
International
IOR Rectifier

AUTOMOTIVE GRADE

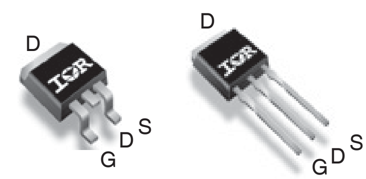
AUIRF6218S
AUIRF6218L

HEXFET® Power MOSFET

Features
- Advanced Planar Technology
- Low On-Resistance
- P-Channel
- Dynamic dV/dT Rating
- 175°C Operating Temperature
- Fast Switching
- Fully Avalanche Rated
- Repetitive Avalanche Allowed up to Tjmax
- Lead-Free, RoHS Compliant
- Automotive Qualified *



$V_{(BR)DSS}$	-150V
$R_{DS(on)}$ max	150mΩ
I_D	-27A



D^2Pak
AUIRF6218S

TO-262
AUIRF6218L

G	D	S
Gate	Drain	Source

Description
Specifically designed for Automotive applications, this cellular design of HEXFET® Power MOSFETs utilizes the latest processing techniques to achieve low on-resistance per silicon area. This benefit combined with the fast switching speed and ruggedized device design that HEXFET power MOSFETs are well known for, provides the designer with an extremely efficient and reliable device for use in Automotive and a wide variety of other applications.

Absolute Maximum Ratings
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only; and functional operation of the device at these or any other condition beyond those indicated in the specifications is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability. The thermal resistance and power dissipation ratings are measured under board mounted and still air conditions. Ambient temperature (T_A) is 25°C, unless otherwise specified.

	Parameter	Max.	Units
V_{DS}	Drain-to-Source Voltage	-150	V
V_{GS}	Gate-to-Source Voltage	± 20	
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 10V	-27	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 10V	-19	
I_{DM}	Pulsed Drain Current ①	-110	
P_D @T_C = 25°C	Maximum Power Dissipation	250	W
	Linear Derating Factor	1.6	W/°C
E_{AS}	Single Pulse Avalanche Energy (Thermally Limited) ②	210	mJ
I_{AR}	Avalanche Current ①	-16	A
dv/dt	Peak Diode Recovery dv/dt ③	8.2	V/ns
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 175	°C
	Soldering Temperature, for 10 seconds (1.6mm from cas	300	
	Mounting torque, 6-32 or M3 screw	10 lbf•in (1.1N•m)	

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case ⑤	——	0.61	°C/W
$R_{\theta JA}$	Junction-to-Ambient (PCB Mounted, steady state)⑥	——	40	

08/20/2012

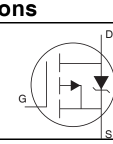
Static Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	-150	–––	–––	V	V_{GS} = 0V, I_D = -250µA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	–––	-0.17	–––	V/°C	Reference to 25°C, I_D = -1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	–––	120	150	mΩ	V_{GS} = -10V, I_D = -16A ④
$V_{GS(th)}$	Gate Threshold Voltage	-3.0	–––	-5.0	V	V_{DS} = V_{GS}, I_D = -250µA
gfs	Forward Transconductance	11	–––	–––	S	V_{DS} = -50V, I_D = -16A
I_{DSS}	Drain-to-Source Leakage Current	–––	–––	-25	µA	V_{DS} = -120V, V_{GS} = 0V
		–––	–––	-250		V_{DS} = -120V, V_{GS} = 0V, T_J = 150°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°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
Q_g	Total Gate Charge	–––	71	110	nC	I_D = -16A
Q_{gs}	Gate-to-Source Charge	–––	21	–––		V_{DS} = -120V
Q_{gd}	Gate-to-Drain ("Miller") Charge	–––	32	–––		V_{GS} = -10V ④
$t_{d(on)}$	Turn-On Delay Time	–––	21	–––	ns	V_{DD} = -75V
t_r	Rise Time	–––	70	–––		I_D = -16A
$t_{d(off)}$	Turn-Off Delay Time	–––	35	–––		R_G = 3.9Ω
t_f	Fall Time	–––	30	–––		V_{GS} = -10V ④
C_{iss}	Input Capacitance	–––	2210	–––	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	–––	370	–––		V_{DS} = -25V
C_{rss}	Reverse Transfer Capacitance	–––	89	–––		ƒ = 1.0MHz
C_{oss}	Output Capacitance	–––	2220	–––		V_{GS} = 0V, V_{DS} = -1.0V, ƒ = 1.0MHz
C_{oss}	Output Capacitance	–––	170	–––		V_{GS} = 0V, V_{DS} = -120V, ƒ = 1.0MHz
C_{oss} eff.	Effective Output Capacitance	–––	340	–––		V_{GS} = 0V, V_{DS} = 0V to -120V

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	–––	–––	-27	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	–––	–––	-110		
V_{SD}	Diode Forward Voltage	–––	–––	-1.6	V	T_J = 25°C, I_S = -16A, V_{GS} = 0V ④
t_{rr}	Reverse Recovery Time	–––	150	–––	ns	T_J = 25°C, I_F = -16A, V_{DD} = -25V
Q_{rr}	Reverse Recovery Charge	–––	860	–––	nC	di/dt = -100A/µs ④

Notes:

① Repetitive rating; pulse width limited by max. junction temperature.

② Starting T_J = 25°C, L = 1.6mH, R_G = 25Ω, I_{AS} = -17A.

③ $I_{SD} \leq$ -17A, di/dt $\leq$ -520A/µs, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq$ 175°C.

④ Pulse width $\leq$ 300µs; duty cycle $\leq$ 2%.

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

⑥ When mounted on 1" square PCB (FR-4 or G-10 Material). For recommended footprint and soldering techniques refer to application note #AN-994.

Qualification Information†

<table>
<tr><td rowspan="2">Qualification Level</td><td colspan="3">Automotive
(per AEC-Q101)</td></tr>
<tr><td colspan="3">Comments: This part number(s) passed Automotive qualification. IR's Industrial and Consumer qualification level is granted by extension of the higher Automotive level.</td></tr>
<tr><td rowspan="2">Moisture Sensitivity Level</td><td>TO-262</td><td colspan="2">N/A</td></tr>
<tr><td>D²Pak</td><td colspan="2">MSL1</td></tr>
</table>

ESD	Machine Model	Class M4 (+/- 600V)†† AEC-Q101-002
	Human Body Model	Class H2 (+/- 3000V)†† AEC-Q101-001
	Charged Device Model	Class C5 (+/- 2000V)†† AEC-Q101-005
RoHS Compliant		Yes

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

†† Highest passing voltage.

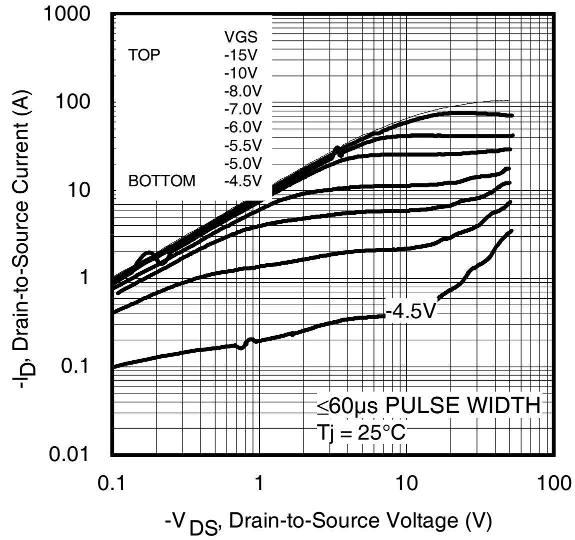


Fig 1. Typical Output Characteristics

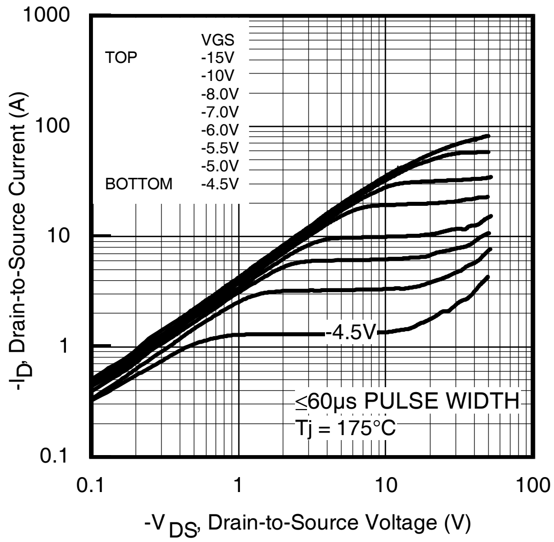


Fig 2. Typical Output Characteristics

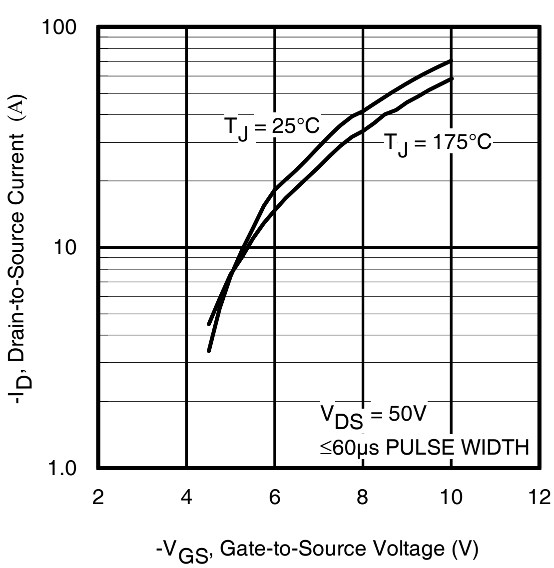


Fig 3. Typical Transfer Characteristics

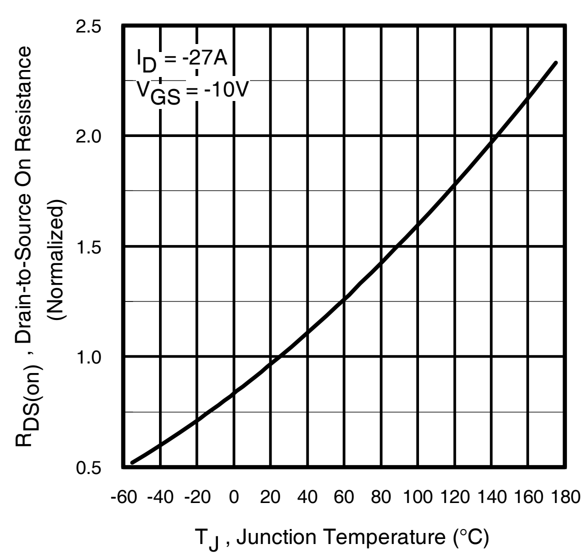


Fig 4. Normalized On-Resistance vs. Temperature

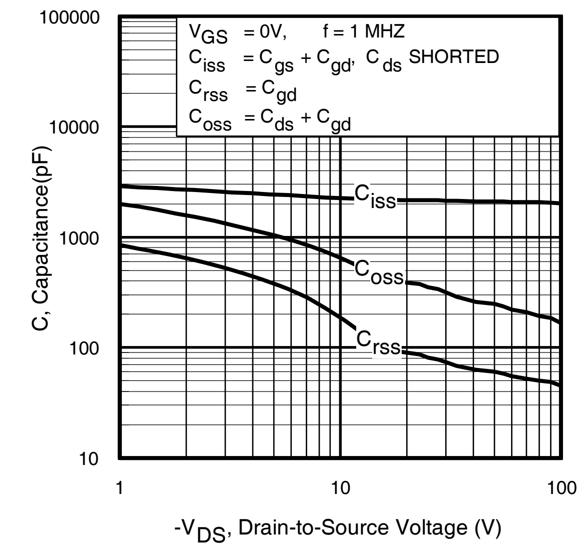


Fig 5. Typical Capacitance vs. Drain-to-Source Voltage

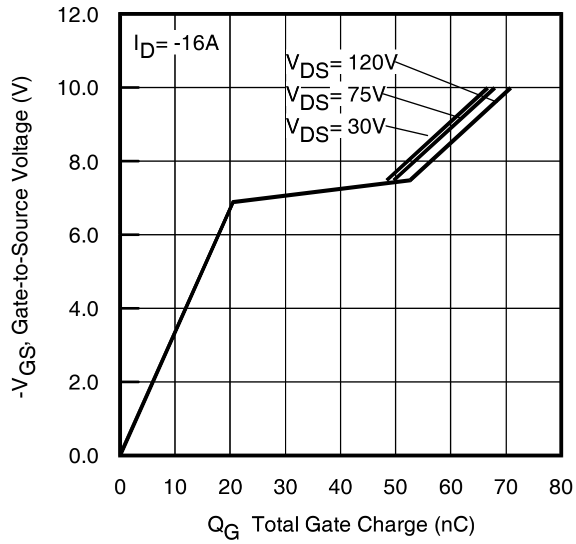


Fig 6. Typical Gate Charge vs. Gate-to-Source Voltage

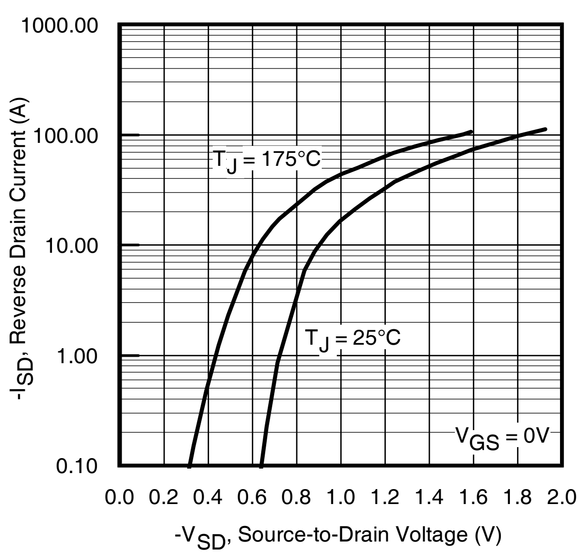


Fig 7. Typical Source-Drain Diode Forward Voltage

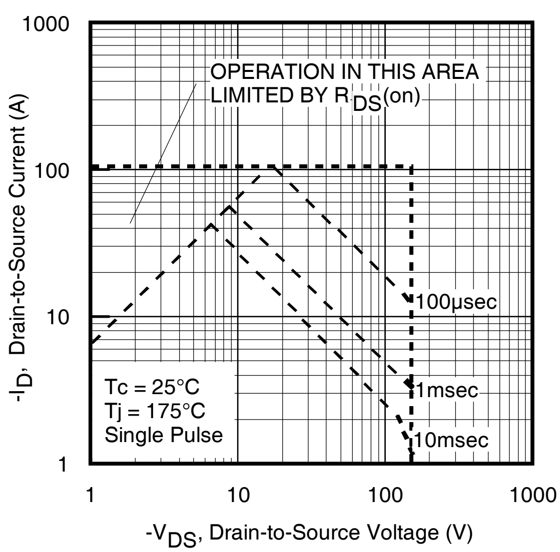


Fig 8. Maximum Safe Operating Area

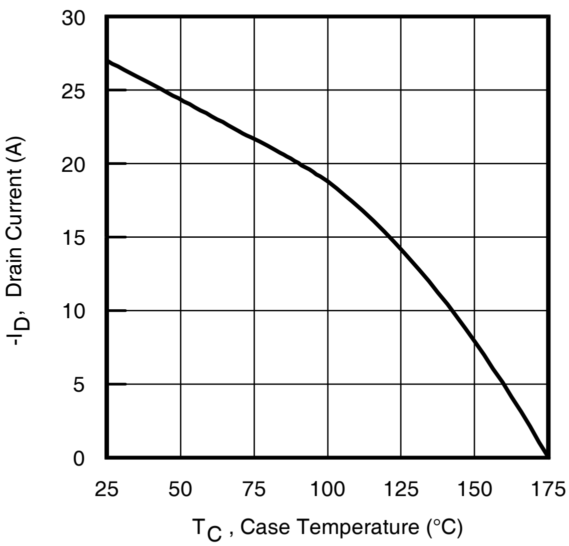


Fig 9. Maximum Drain Current vs. Ambient Temperature

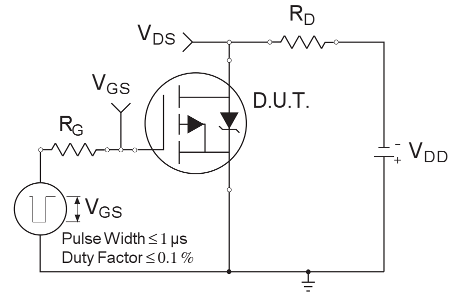


Fig 10a. Switching Time Test Circuit

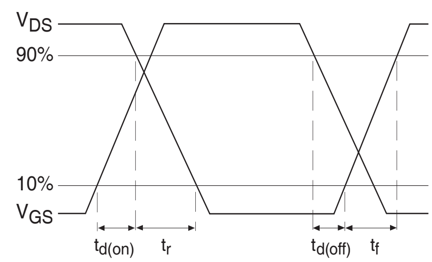


Fig 10b. Switching Time Waveforms

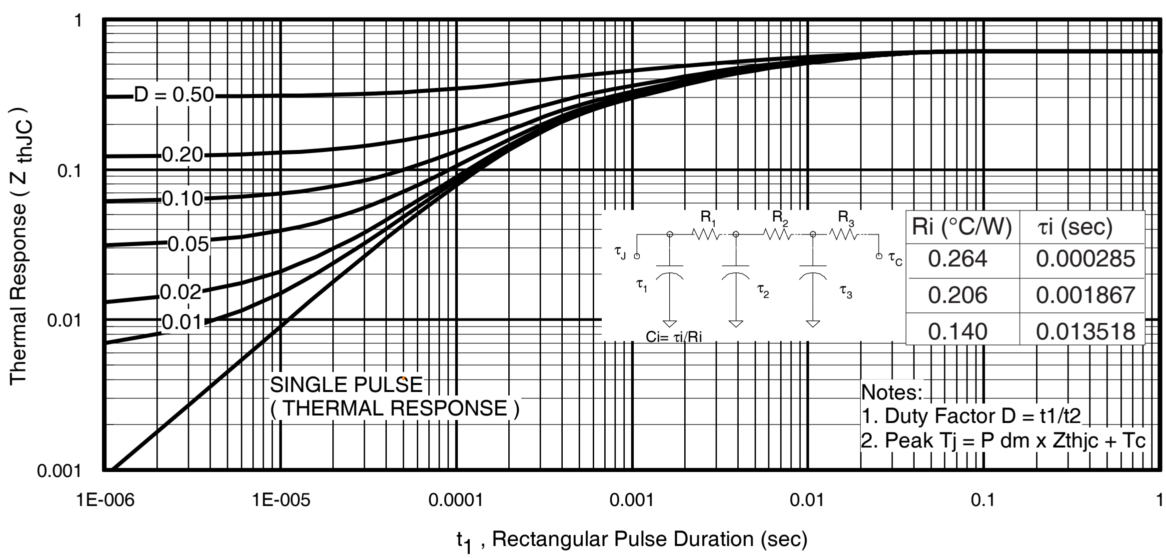


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

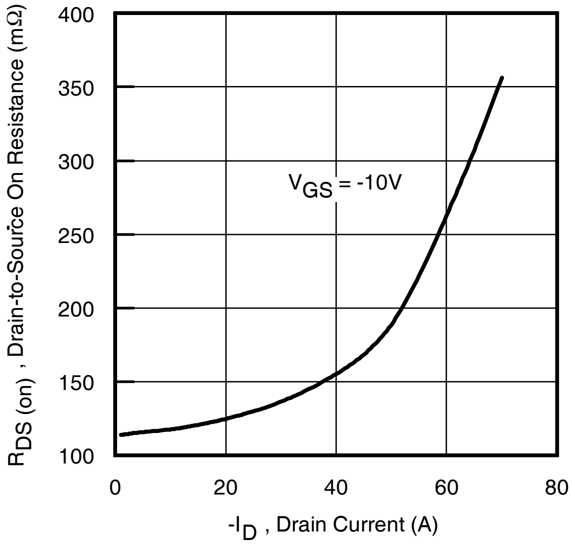


Fig 12. On-Resistance vs. Drain Current

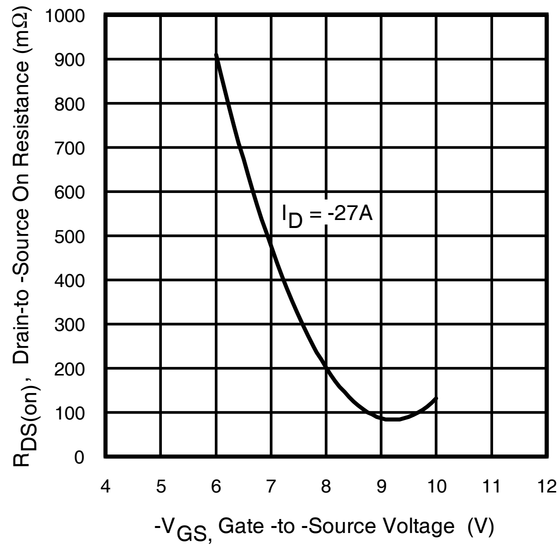


Fig 13. On-Resistance vs. Gate Voltage

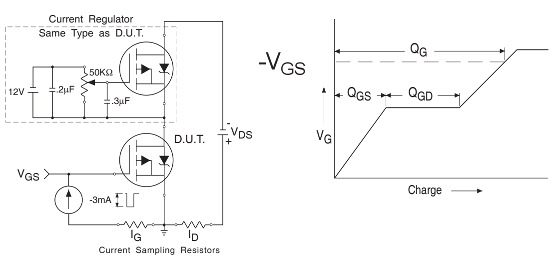


Fig 14a&b. Basic Gate Charge Test Circuit and Waveform

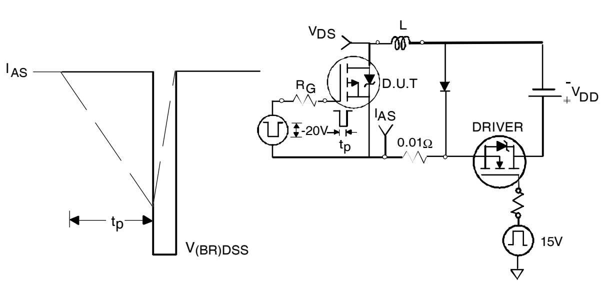


Fig 15a&b. Unclamped Inductive Test circuit and Waveforms

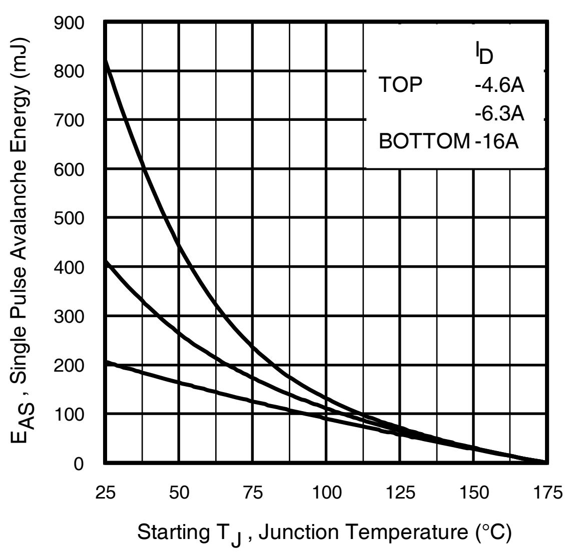
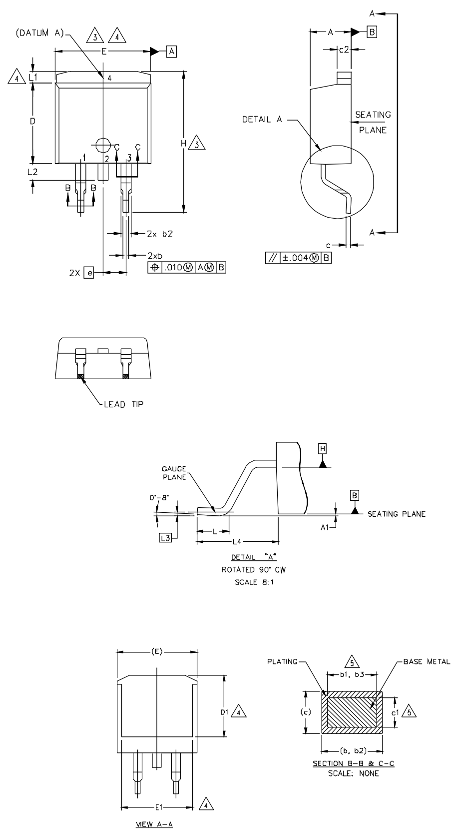


Fig 15c. Maximum Avalanche Energy vs. Drain Current

D^2Pak Package Outline

(Dimensions are shown in millimeters (inches))



NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994
2. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
3. DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.127 [.005"] PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTMOST EXTREMES OF THE PLASTIC BODY AT DATUM H.
4. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSION E, L1, D1 & E1.
5. DIMENSION b1 AND c1 APPLY TO BASE METAL ONLY.
6. DATUM A & B TO BE DETERMINED AT DATUM PLANE H.
7. CONTROLLING DIMENSION: INCH.
8. OUTLINE CONFORMS TO JEDEC OUTLINE TO-263AB.

SYMBOL	DIMENSIONS				NOTES
	MILLIMETERS		INCHES		
	MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	.160	.190	
A1	0.00	0.254	.000	.010	
b	0.51	0.99	.020	.039	
b1	0.51	0.89	.020	.035	5
b2	1.14	1.78	.045	.070	
b3	1.14	1.73	.045	.068	5
c	0.38	0.74	.015	.029	
c1	0.38	0.58	.015	.023	5
c2	1.14	1.65	.045	.065	
D	8.38	9.65	.330	.380	3
D1	6.86	–	.270		4
E	9.65	10.67	.380	.420	3,4
E1	6.22	–	.245		4
e	2.54 BSC		.100 BSC		
H	14.61	15.88	.575	.625	
L	1.78	2.79	.070	.110	
L1	–	1.65	–	.066	4
L2	1.27	1.78	–	.070	
L3	0.25 BSC		.010 BSC		
L4	4.78	5.28	.188	.208	

LEAD ASSIGNMENTS

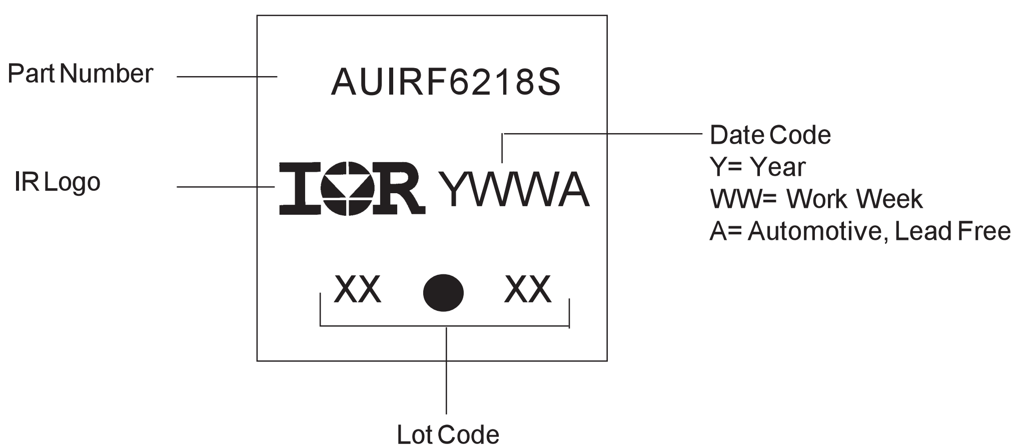
HEXFET
1.– GATE
2, 4.– DRAIN
3.– SOURCE

IGBTs, CoPACK
1.– GATE
2, 4.– COLLECTOR
3.– EMITTER

DIODES
1.– ANODE *
2, 4.– CATHODE
3.– ANODE

* PART DEPENDENT.

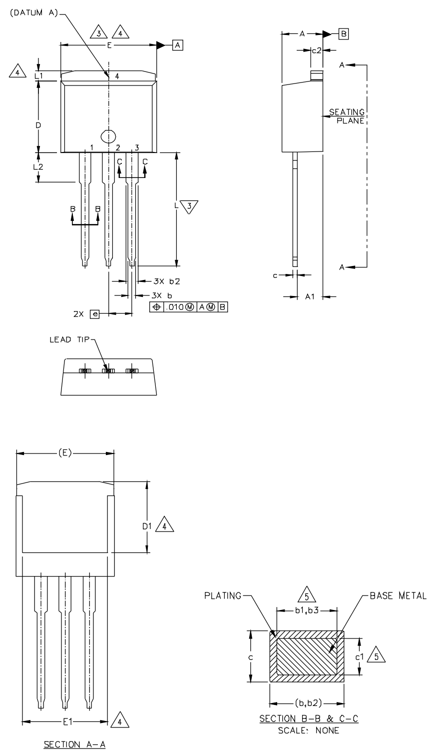
D^2Pak Part Marking Information



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

TO-262 Package Outline

Dimensions are shown in millimeters (inches)



SYMBOL	DIMENSIONS				NOTES
	MILLIMETERS		INCHES		
	MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	.160	.190	
A1	2.03	3.02	.080	.119	
b	0.51	0.99	.020	.039	
b1	0.51	0.89	.020	.035	5
b2	1.14	1.78	.045	.070	
b3	1.14	1.73	.045	.068	5
c	0.38	0.74	.015	.029	
c1	0.38	0.58	.015	.023	5
c2	1.14	1.65	.045	.065	
D	8.38	9.65	.330	.380	3
D1	6.86	—	.270	—	4
E	9.65	10.67	.380	.420	3,4
E1	6.22	—	.245		4
e	2.54 BSC		.100 BSC		
L	13.46	14.10	.530	.555	
L1	—	1.65	—	.065	4
L2	3.56	3.71	.140	.146	

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994
2. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
3. DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.127 [.005"] PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTMOST EXTREMES OF THE PLASTIC BODY.
4. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSION E, L1, D1 & E1.
5. DIMENSION b1 AND c1 APPLY TO BASE METAL ONLY.
6. CONTROLLING DIMENSION: INCH.
7.- OUTLINE CONFORM TO JEDEC TO-262 EXCEPT A1(max.), b(min.) AND D1(min.) WHERE DIMENSIONS DERIVED THE ACTUAL PACKAGE OUTLINE.

LEAD ASSIGNMENTS

IGBTs, CoPACK

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

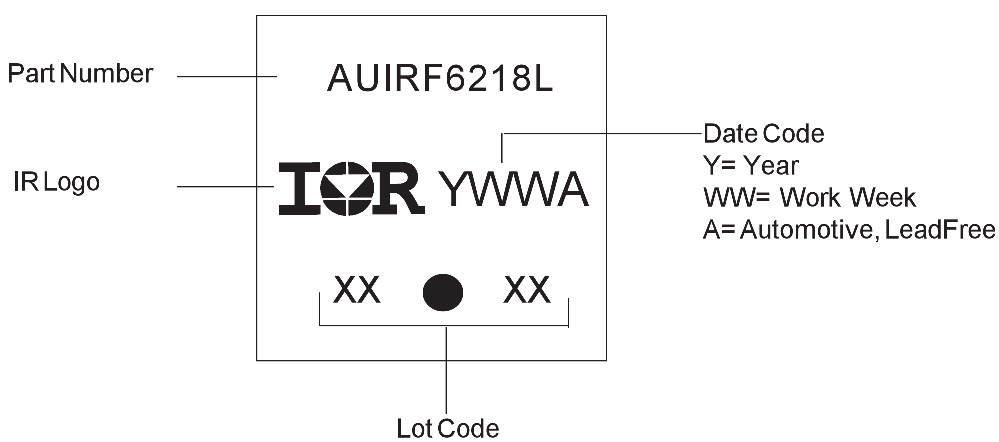
HEXFET

1.- GATE
2.- DRAIN
3.- SOURCE
4.- DRAIN

DIODES

1.- ANODE (TWO DIE) / OPEN (ONE DIE)
2, 4.- CATHODE
3.- ANODE

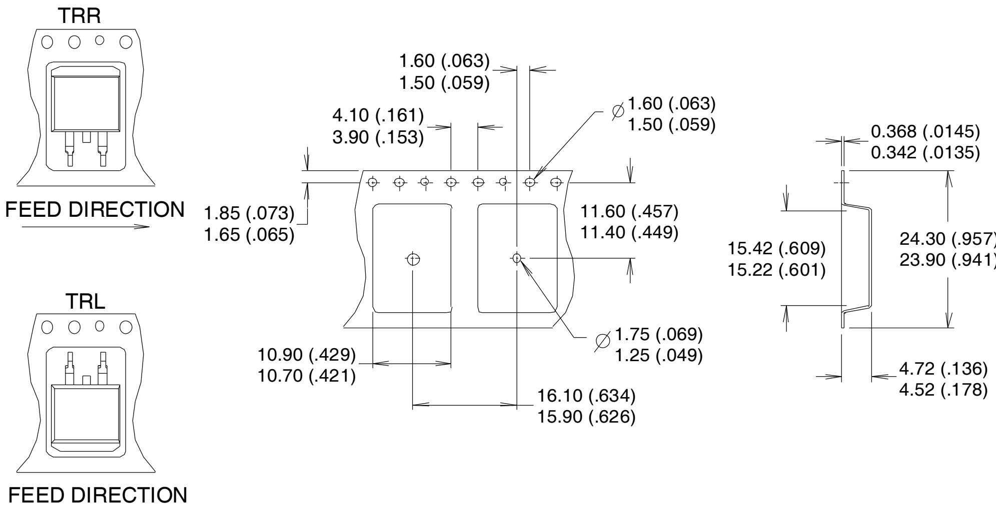
TO-262 Part Marking Information

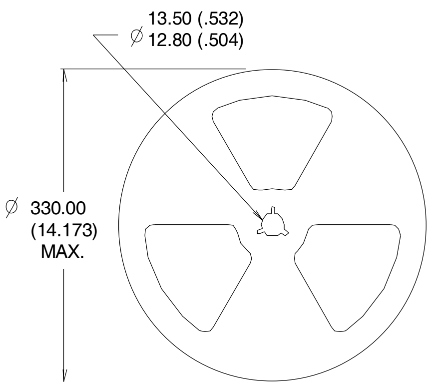


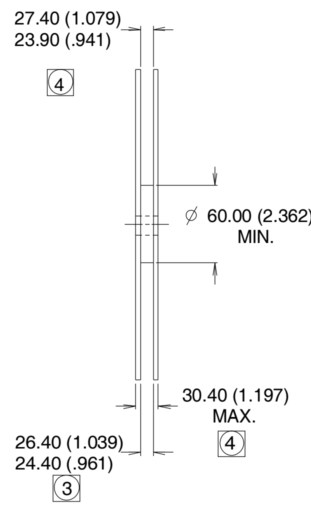
Note: For the most current drawing please refer to IR website at http://www.irf.com/package/

D^2Pak Tape & Reel Information

Dimensions are shown in millimeters (inches)







NOTES :
1. COMFORMS TO EIA-418.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION MEASURED @ HUB.
4. INCLUDES FLANGE DISTORTION @ OUTER EDGE.

Ordering Information

Base part number	Package Type	Standard Pack		Complete Part Number
		Form	Quantity	
AUIRF6218L	TO-262	Tube	50	AUIRF6218L
AUIRF6218S	D2Pak	Tube	50	AUIRF6218S
		Tape and Reel Left	800	AUIRF6218STRL
		Tape and Reel Right	800	AUIRF6218STRR

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For technical support, please contact IR's Technical Assistance Center
http://www.irf.com/technical-info/

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Tel: (310) 252-7105

08/20/2012