

Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Units	Conditions
Drain-to-Source Breakdown Voltage	BV_{DSS}	30	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
Static Drain-Source On-Resistance	$R_{DS(on)}$	—	6.9	9.0	$m\Omega$	$V_{GS} = 10V, I_D = 15A$ ②
		—	7.9	10.5		$V_{GS} = 4.5V, I_D = 15A$ ②
Gate Threshold Voltage	$V_{GS(th)}$	1.0	—	3.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
Drain-to-Source Leakage Current	I_{DSS}	—	—	50	μA	$V_{DS} = 30V, V_{GS} = 0V$
		—	—	20	μA	$V_{DS} = 24V, V_{GS} = 0$
		—	—	100	μA	$V_{DS} = 24V, V_{GS} = 0, T_J = 100^\circ C$
Gate-Source Leakage Current	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 20V$
Total Gate Charge, Control FET	Q_G	—	27	—	nC	$V_{GS} = 5V, I_D = 15A, V_{DS} = 16V$
Total Gate Charge, Synch FET	Q_G	—	23	—		$V_{GS} = 5V, V_{DS} < 100mV$
Pre-Vth Gate-Source Charge	Q_{GS1}	—	4.7	—		$V_{DS} = 16V, I_D = 15A$
Post-Vth Gate-Source Charge	Q_{GS2}	—	2.0	—		
Gate to Drain Charge	Q_{GD}	—	9.7	—		
Switch Charge ($Q_{gs2} + Q_{gd}$)	Q_{SW}	—	12	—		
Output Charge	Q_{OSS}	—	29	—		$V_{DS} = 16V, V_{GS} = 0$
Gate Resistance	R_G	0.8	—	3.1	Ω	
Turn-On Delay Time	$t_{d(on)}$	—	10	—	ns	$V_{DD} = 16V$ $I_D = 15A$ $V_{GS} = 5.0V$ Clamped Inductive Load
Rise Time	t_r	—	9	—		
Turn-Off Delay Time	$t_{d(off)}$	—	24	—		
Fall Time	t_f	—	18	—		
Input Capacitance	C_{iss}	—	2672	—	pF	$V_{GS} = 16V, V_{GS}=0$
Output Capacitance	C_{oss}	—	1064	—		
Reverse Transfer Capacitance	C_{rss}	—	109	—		

Source-Drain Rating & Characteristics

Parameter	Symbol	Min	Typ	Max	Units	Conditions
Diode Forward Voltage	V_{SD}	—	0.9	1.3	V	$I_S = 15A$ ②, $V_{GS} = 0V$
Reverse Recovery Charge ④	Q_{rr}	—	103	—	nC	$di/dt \sim 700A/\mu s$ $V_{DS} = 16V, V_{GS} = 0V, I_F = 15A$
Reverse Recovery Charge (with Parallel Schottky) ④	$Q_{rr(s)}$	—	96	—	nC	$di/dt = 700A/\mu s$, (with 10BQ040) $V_{DS} = 16V, V_{GS} = 0V, I_F = 15A$

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Pulse width $\leq 400\mu s$; duty cycle $\leq 2\%$.
- ③ When mounted on 1 inch square copper board, $t < 10$ sec.
- ④ Typ = measured - Q_{oss}
- ⑤ Typical values of $R_{DS(on)}$ measured at $V_{GS} = 4.5V$, Q_G , Q_{SW} and Q_{OSS} measured at $V_{GS} = 5.0V$, $I_F = 15A$.
- ⑥ R_θ is measured at T_J approximately $90^\circ C$

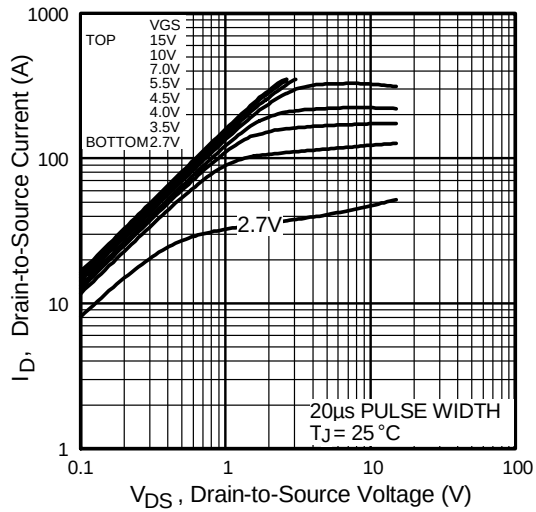


Fig 1. Typical Output Characteristics

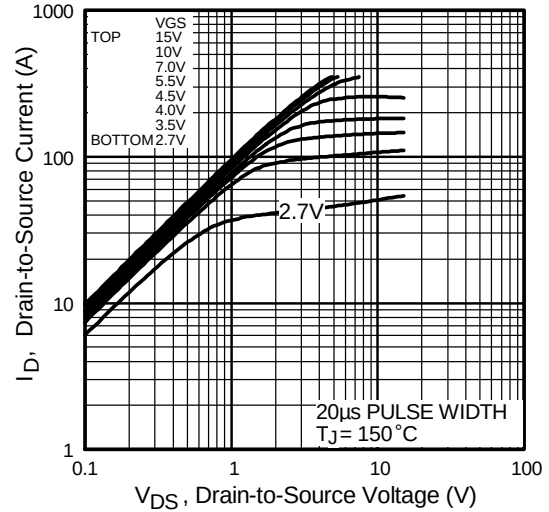


Fig 2. Typical Output Characteristics

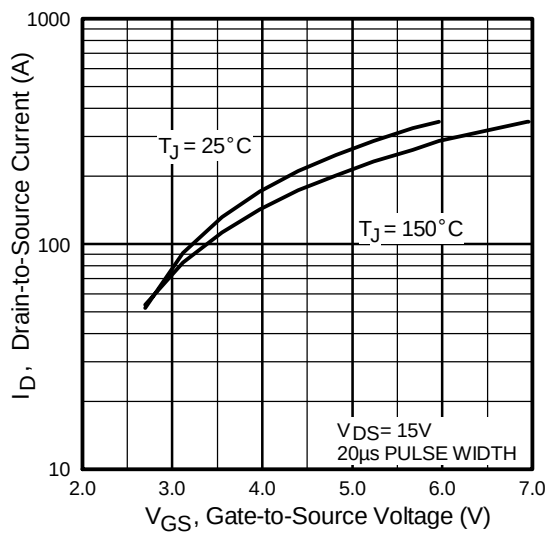


Fig 3. Typical Transfer Characteristics

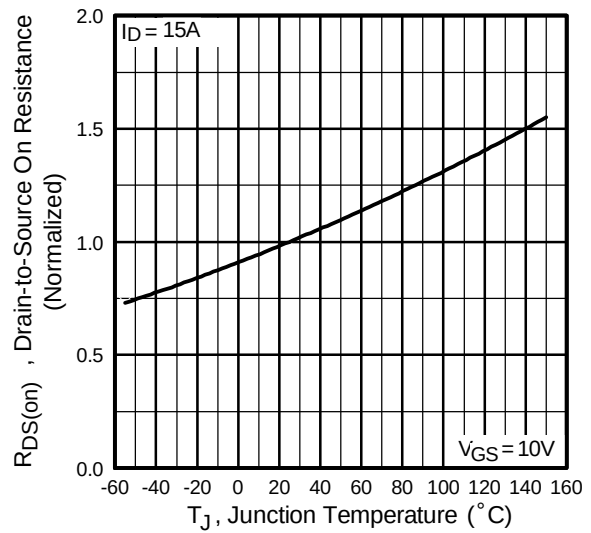


Fig 4. Normalized On-Resistance
Vs. Temperature

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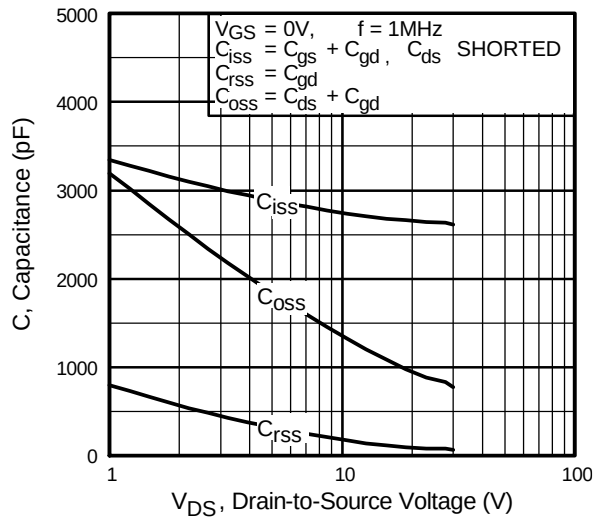


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

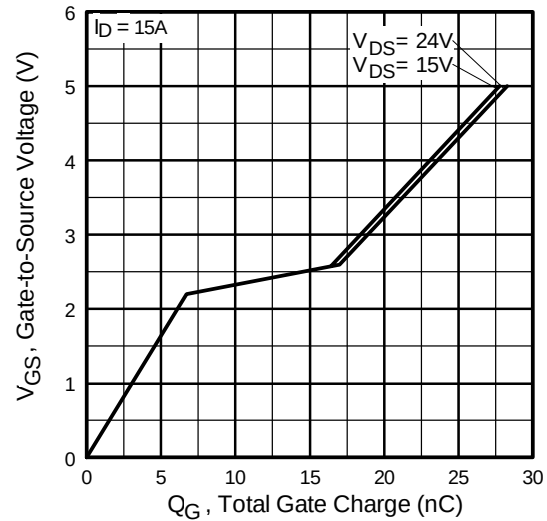


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

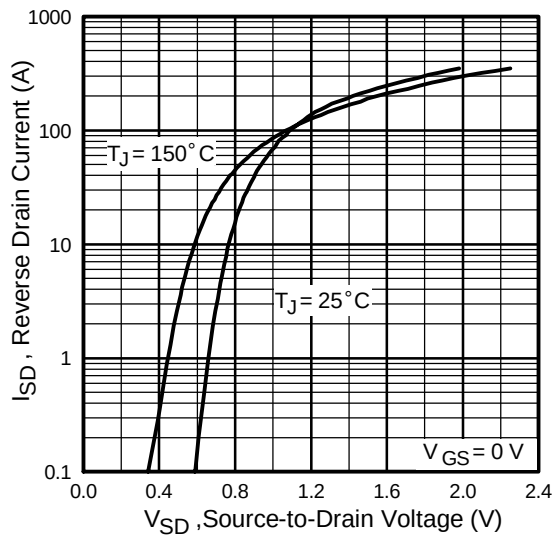


Fig 7. Typical Source-Drain Diode Forward Voltage

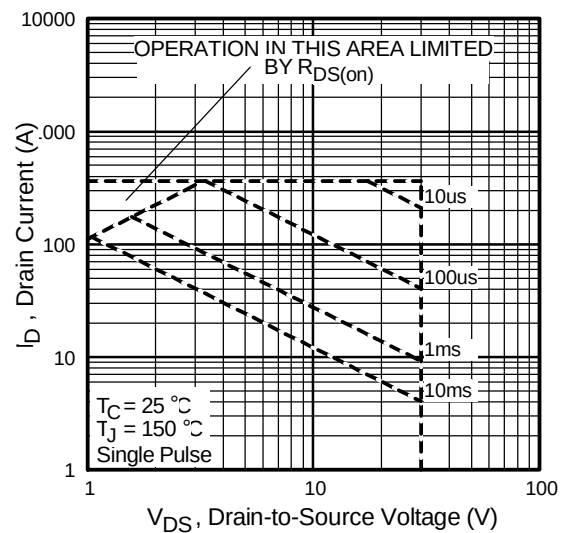


Fig 8. Maximum Safe Operating Area

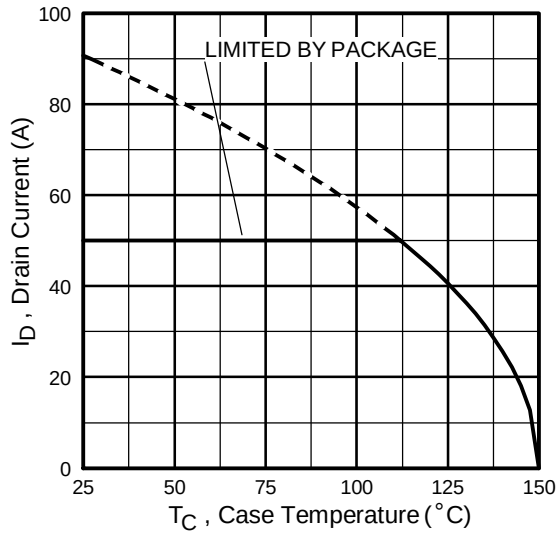


Fig 9. Maximum Drain Current Vs. Case Temperature

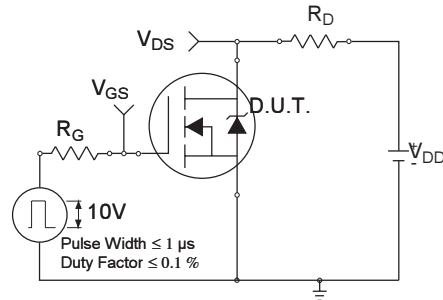


Fig 10a. Switching Time Test Circuit

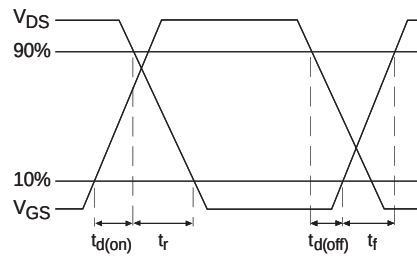


Fig 10b. Switching Time Waveforms

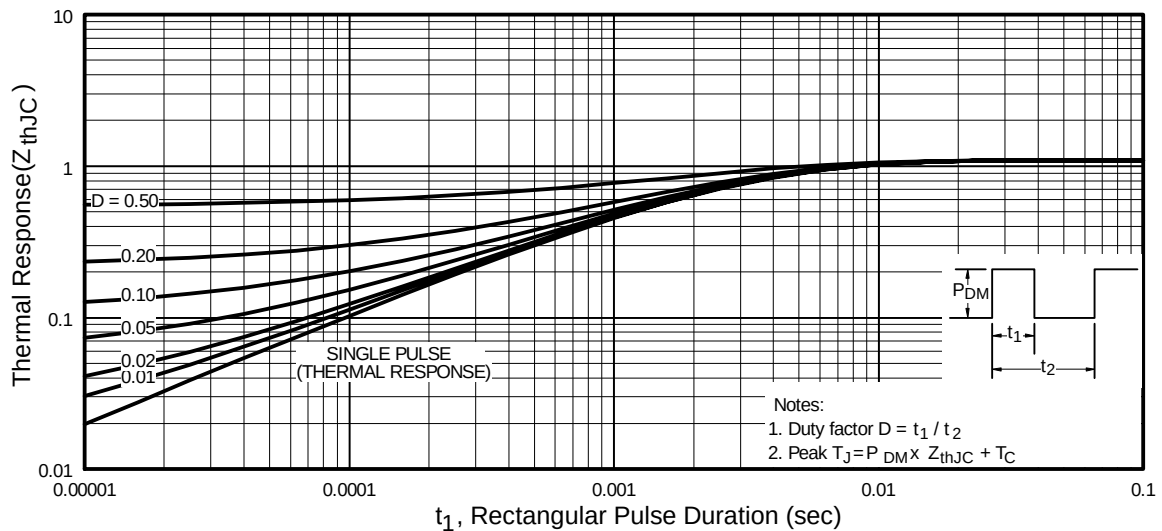


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

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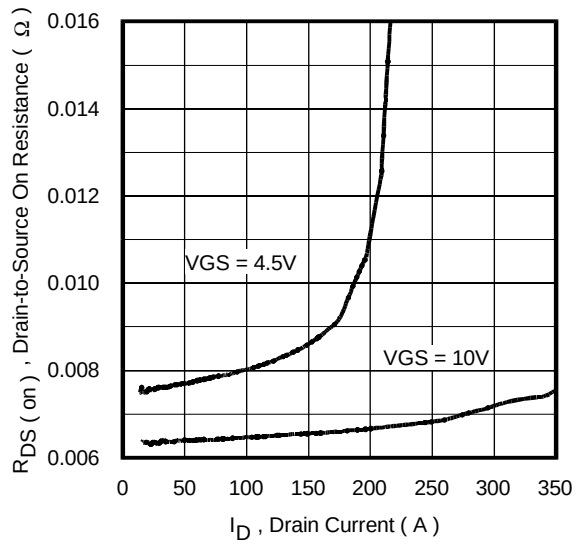


Fig 12. On-Resistance Vs. Drain Current

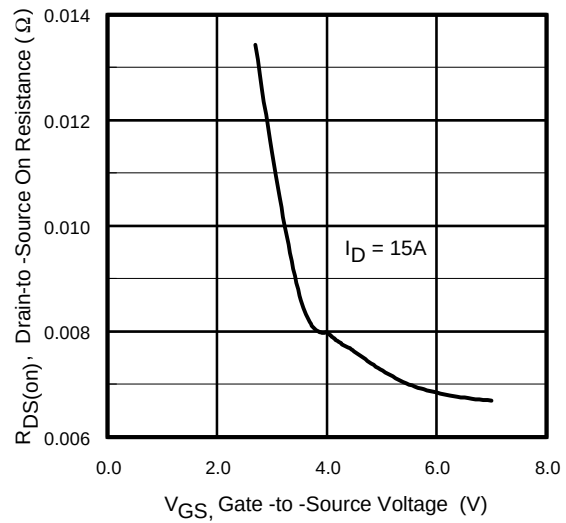


Fig 13. On-Resistance Vs. Gate Voltage

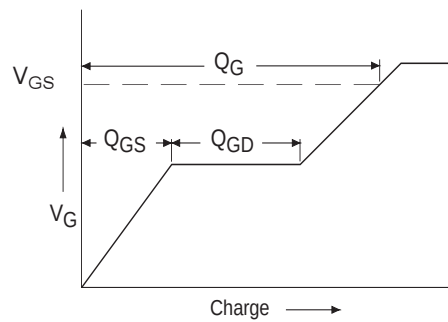
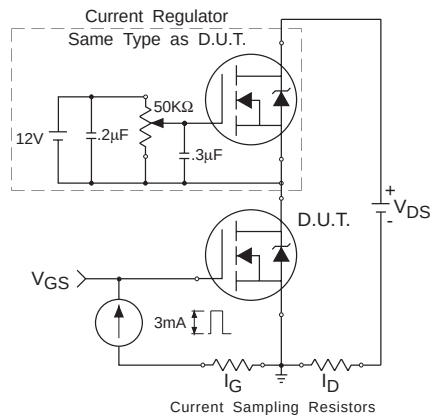
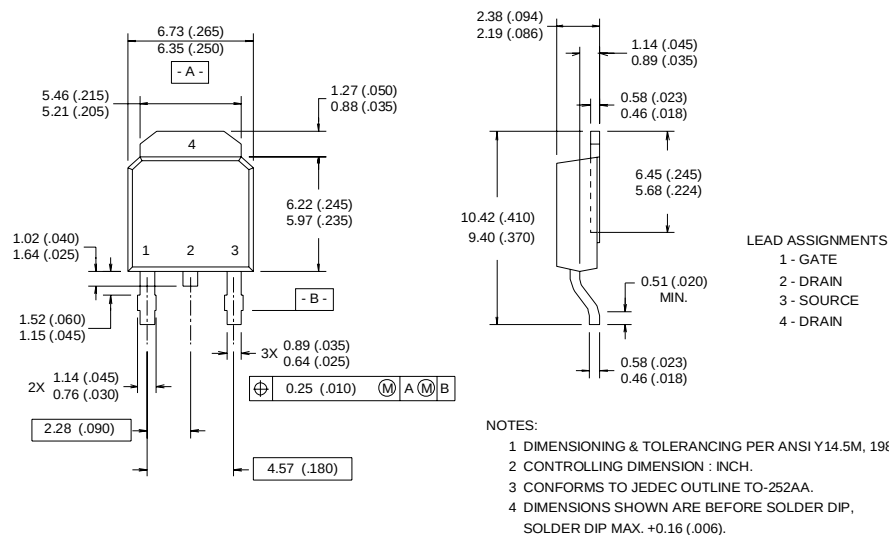


Fig 14a&b. Basic Gate Charge Test Circuit and Waveform

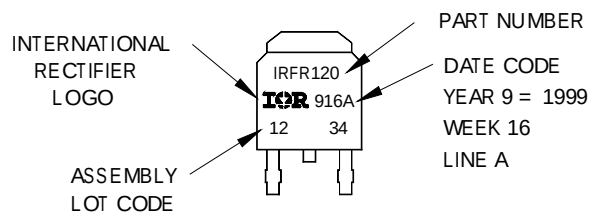
D-Pak (TO-252AA) Package Outline

Dimensions are shown in millimeters (inches)

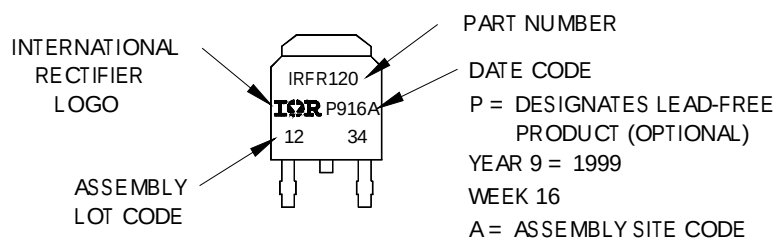


D-Pak (TO-252AA) Part Marking Information

EXAMPLE: THIS IS AN IRFR120
 WITH ASSEMBLY
 LOT CODE 1234
 ASSEMBLED ON WW 16, 1999
 IN THE ASSEMBLY LINE "A"
 Note: "P" in assembly line
 position indicates "Lead-Free"



OR

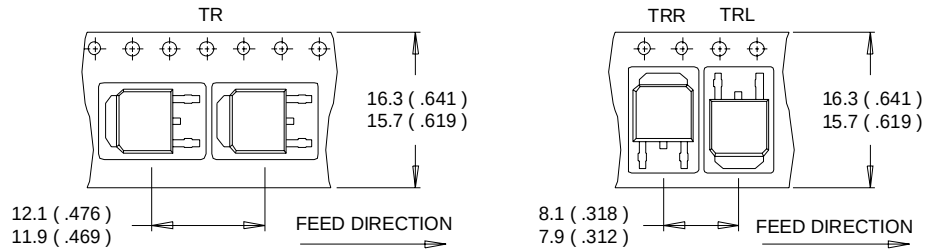


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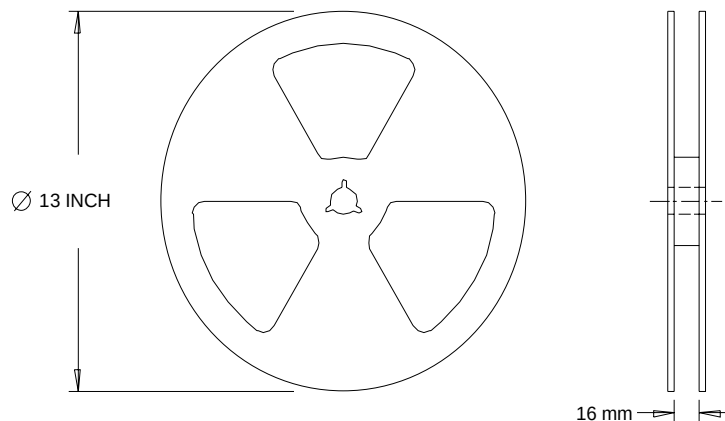
D-Pak (TO-252AA) Tape & Reel Information

Dimensions are shown in millimeters (inches)



NOTES :

1. CONTROLLING DIMENSION : MILLIMETER.
2. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
3. OUTLINE CONFORMS TO EIA-481 & EIA-541.



NOTES :

1. OUTLINE CONFORMS TO EIA-481.

Data and specifications subject to change without notice.
This product has been designed and qualified for the Industrial market.
Qualification Standards can be found on IR's Web site.

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Visit us at www.irf.com for sales contact information. 10/04

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