

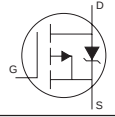
IRF9Z24NS/L

International
IR Rectifier

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	-55	—	—	V	$V_{GS} = 0V$, $I_D = -250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	-0.05	—	V/ $^\circ\text{C}$	Reference to 25°C , $I_D = -1mA$ ⑤
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.175	Ω	$V_{GS} = -10V$, $I_D = -7.2A$ ④
$V_{GS(th)}$	Gate Threshold Voltage	-2.0	—	-4.0	V	$V_{DS} = V_{GS}$, $I_D = -250\mu A$
g_{fs}	Forward Transconductance	2.5	—	—	S	$V_{DS} = -25V$, $I_D = -7.2A$
I_{DSS}	Drain-to-Source Leakage Current	—	—	-25	μA	$V_{DS} = -55V$, $V_{GS} = 0V$
		—	—	-250		$V_{DS} = -44V$, $V_{GS} = 0V$, $T_J = 150^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{GS} = 20V$
	Gate-to-Source Reverse Leakage	—	—	-100		$V_{GS} = -20V$
Q_g	Total Gate Charge	—	—	19	nC	$I_D = -7.2A$
Q_{gs}	Gate-to-Source Charge	—	—	5.1		$V_{DS} = -44V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	—	10		$V_{GS} = -10V$, See Fig. 6 and 13 ④⑤
$t_{d(on)}$	Turn-On Delay Time	—	13	—	ns	$V_{DD} = -28V$
t_r	Rise Time	—	55	—		$I_D = -7.2A$
$t_{d(off)}$	Turn-Off Delay Time	—	23	—		$R_G = 24\Omega$
t_f	Fall Time	—	37	—		$R_D = 3.7\Omega$, See Fig. 10 ④⑤
L_S	Internal Source Inductance	—	7.5	—	nH	Between lead, and center of die contact
C_{iss}	Input Capacitance	—	350	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	170	—		$V_{DS} = -25V$
C_{rss}	Reverse Transfer Capacitance	—	92	—		$f = 1.0MHz$, See Fig. 5⑤

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	-12	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) •	—	—	-48		
V_{SD}	Diode Forward Voltage	—	—	-1.6	V	$T_J = 25^\circ\text{C}$, $I_S = -7.2A$, $V_{GS} = 0V$ ④
t_{rr}	Reverse Recovery Time	—	47	71	ns	$T_J = 25^\circ\text{C}$, $I_F = -7.2A$
Q_{rr}	Reverse Recovery Charge	—	84	130	nC	$di/dt = -100A/\mu s$ ④⑤
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)

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

② Starting $T_J = 25^\circ\text{C}$, $L = 3.7mH$
 $R_G = 25\Omega$, $I_{AS} = -7.2A$. (See Figure 12)

⑤ Uses IRF9Z24N data and test conditions

③ $I_{SD} \leq -7.2A$, $di/dt \leq -280A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$,
 $T_J \leq 175^\circ\text{C}$

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

For recommended footprint and soldering techniques refer to application note #AN-994.

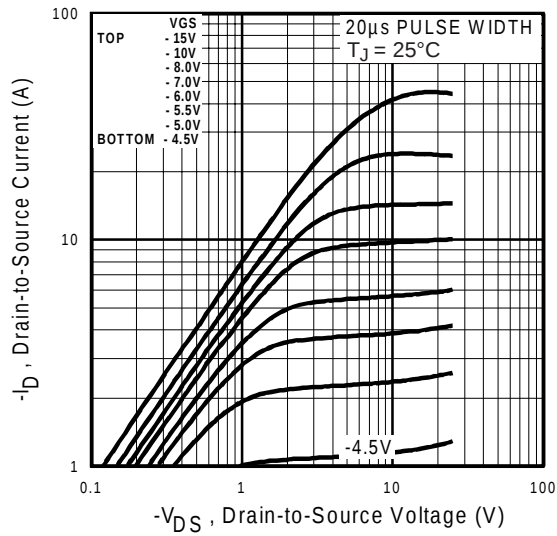


Fig 1. Typical Output Characteristics

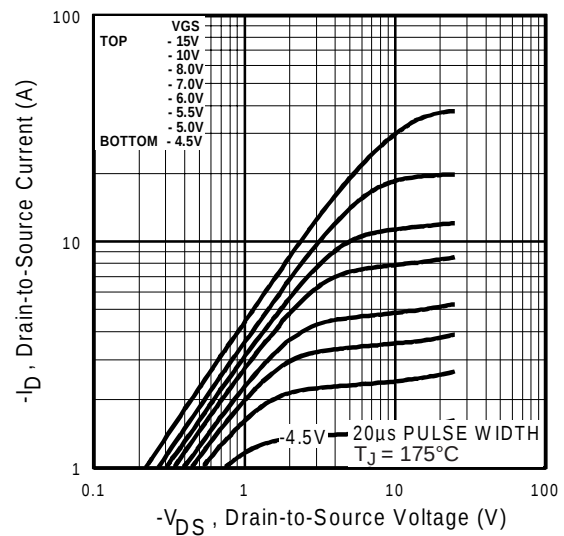


Fig 2. Typical Output Characteristics

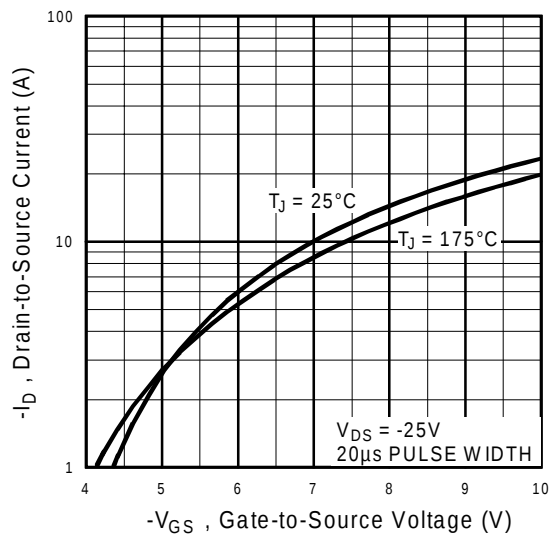


Fig 3. Typical Transfer Characteristics

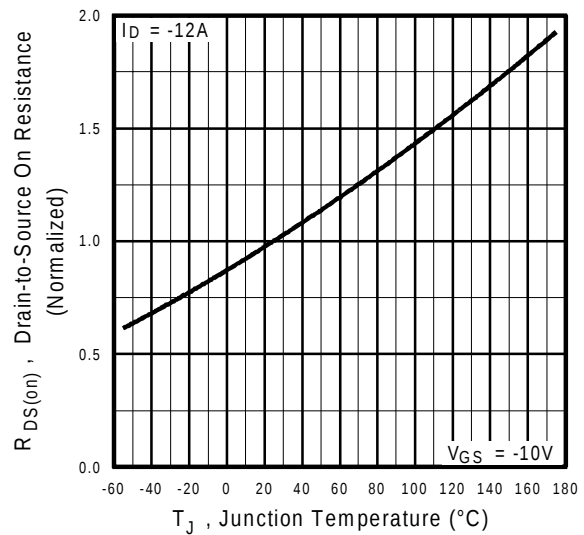
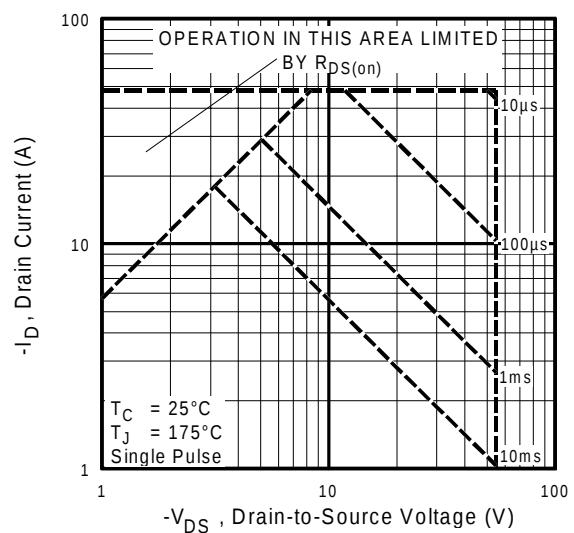
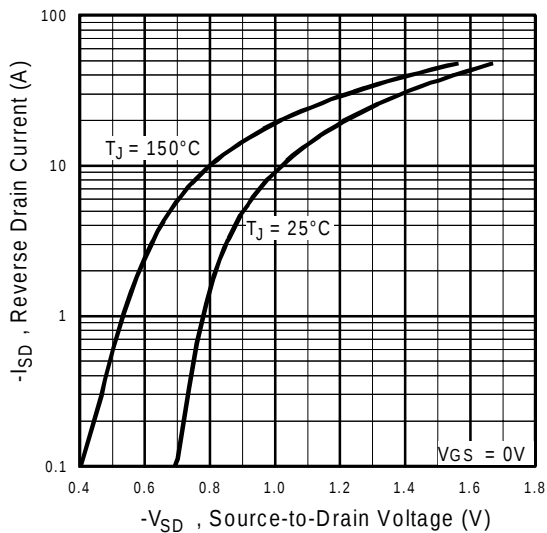
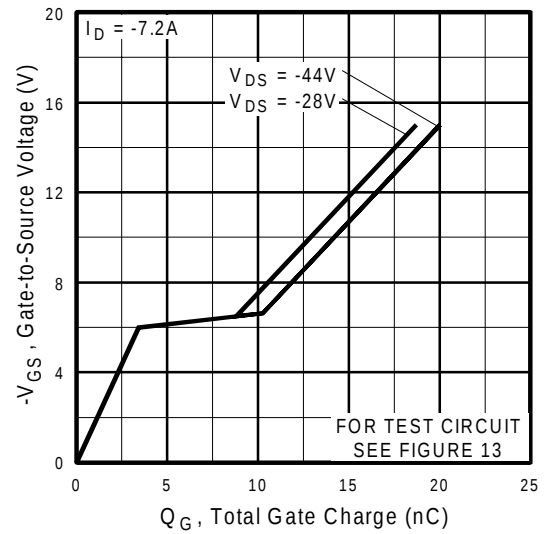
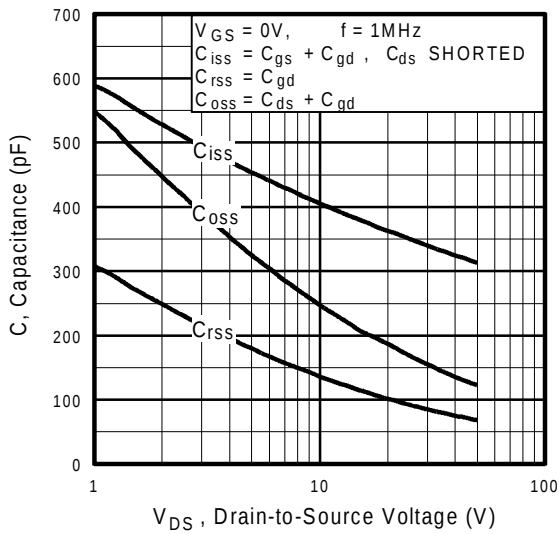


Fig 4. Normalized On-Resistance Vs. Temperature



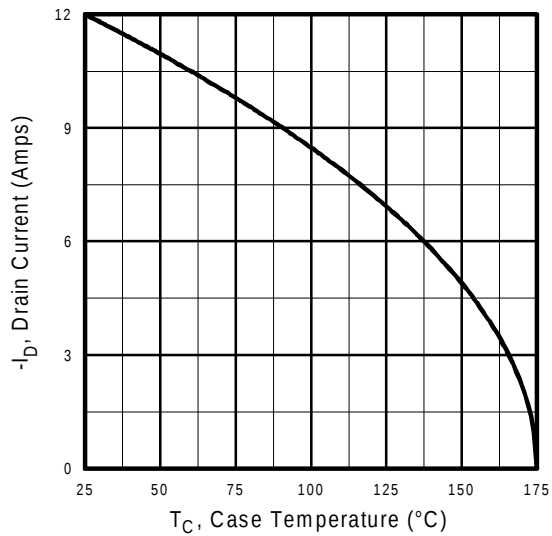


Fig 9. Maximum Drain Current Vs. Case Temperature

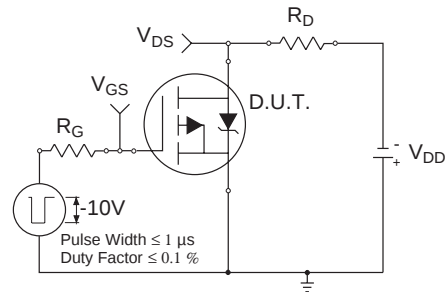


Fig 10a. Switching Time Test Circuit

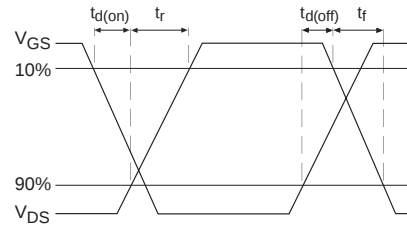


Fig 10b. Switching Time Waveforms

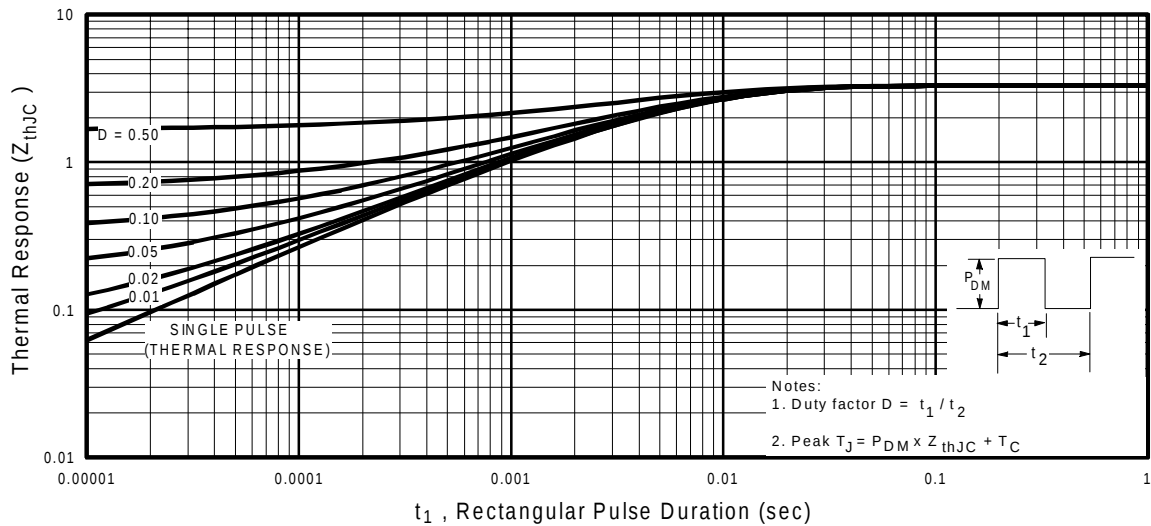


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

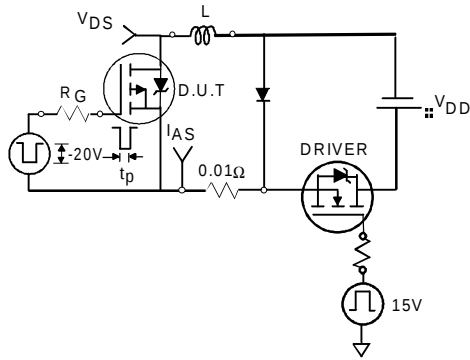


Fig 12a. Unclamped Inductive Test Circuit

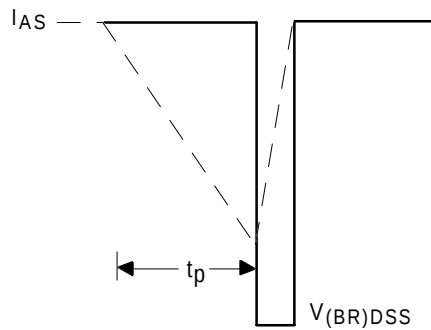


Fig 12b. Unclamped Inductive Waveforms

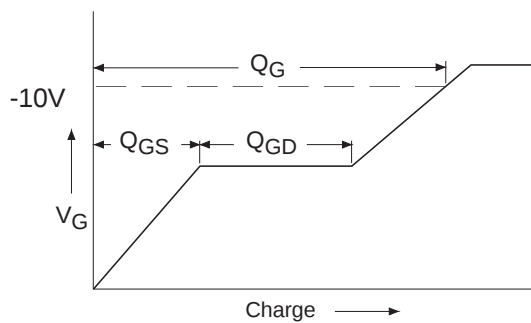


Fig 13a. Basic Gate Charge Waveform

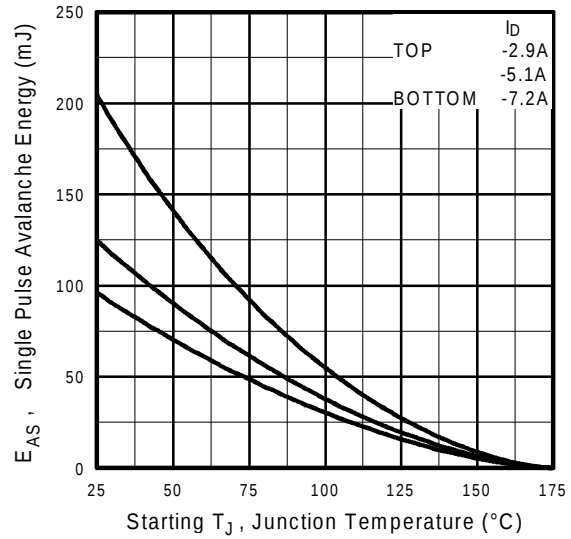


Fig 12c. Maximum Avalanche Energy Vs. Drain Current

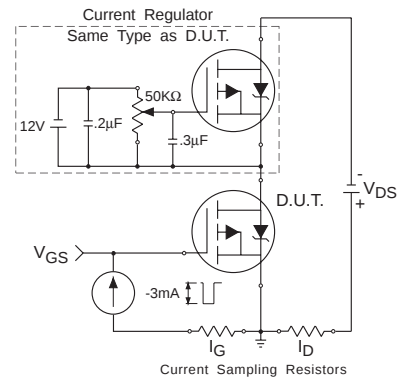
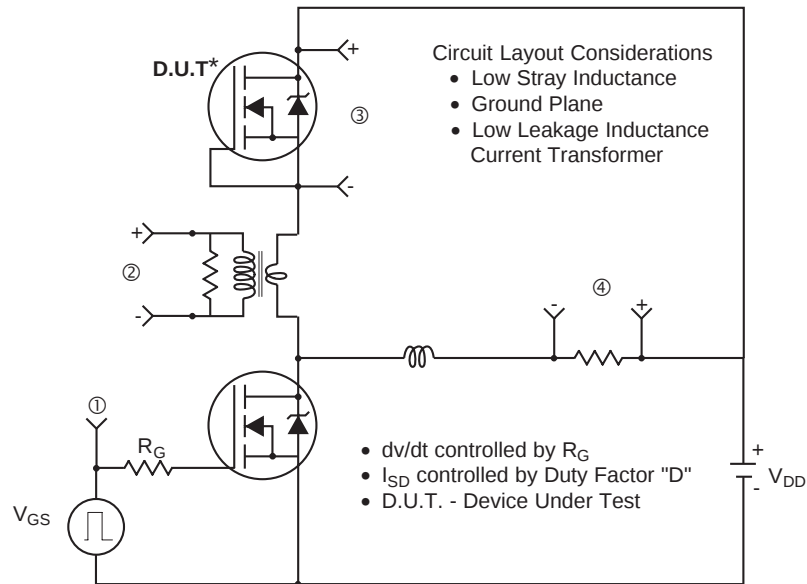
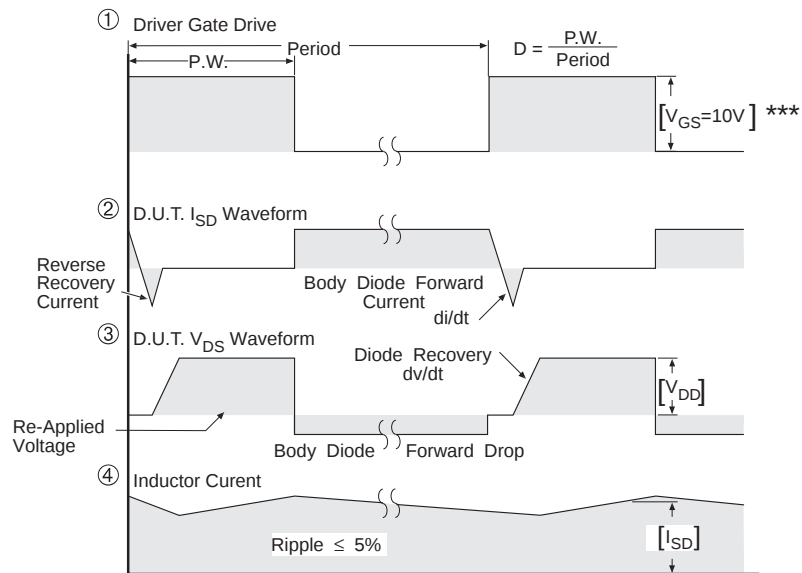


Fig 13b. Gate Charge Test Circuit

Peak Diode Recovery dv/dt Test Circuit



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



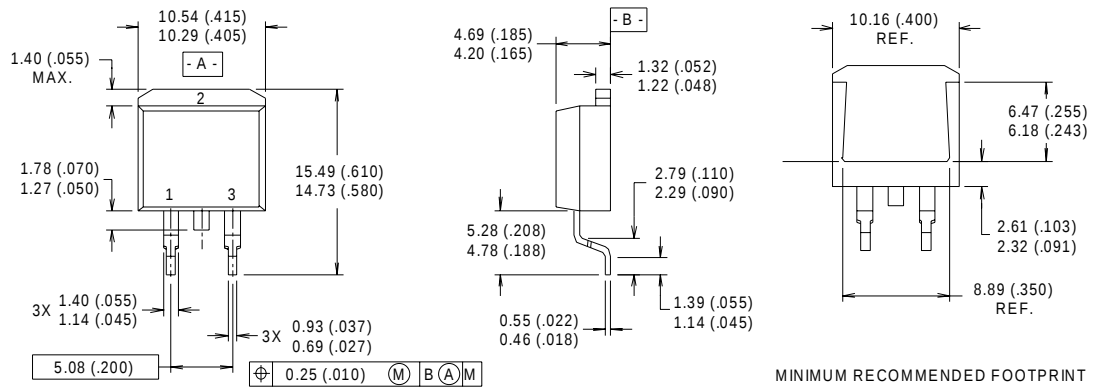
*** $V_{GS} = 5.0V$ for Logic Level and 3V Drive Devices

Fig 14. For P-Channel HEXFETS

IRF9Z24NS/L

International
IR Rectifier

D²Pak Package Outline



NOTES:

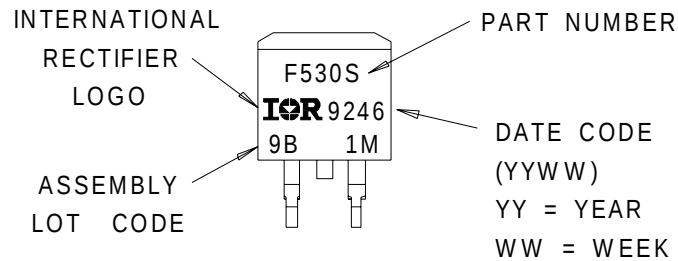
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- 2 DIMENSIONING & TOLERANCING PER ANSI Y14.5M, 1982.
- 3 CONTROLLING DIMENSION : INCH.
- 4 HEATSINK & LEAD DIMENSIONS DO NOT INCLUDE BURRS.

LEAD ASSIGNMENTS

- 1 - GATE
- 2 - DRAIN
- 3 - SOURCE

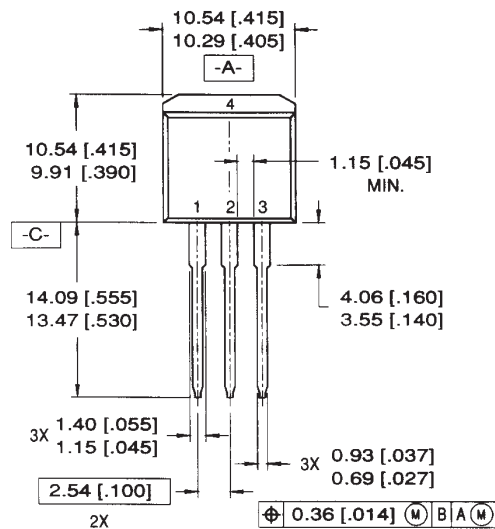
Part Marking Information

D²Pak



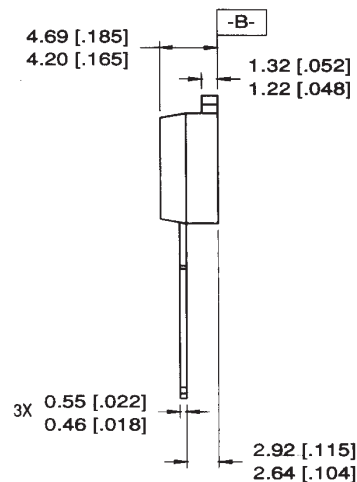
Package Outline

TO-262 Outline



LEAD ASSIGNMENTS

1 = GATE 3 = SOURCE
2 = DRAIN 4 = DRAIN



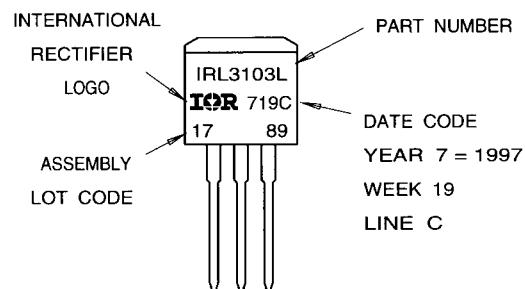
NOTES:

1. DIMENSIONING & TOLERANCING PER ANSI Y14.5M-1982
2. CONTROLLING DIMENSION: INCH.
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. HEATSINK & LEAD DIMENSIONS DO NOT INCLUDE BURRS.

Part Marking Information

TO-262

EXAMPLE: THIS IS AN IRL3103L
LOT CODE 1789
ASSEMBLED ON WW 19, 1997
IN THE ASSEMBLY LINE "C"

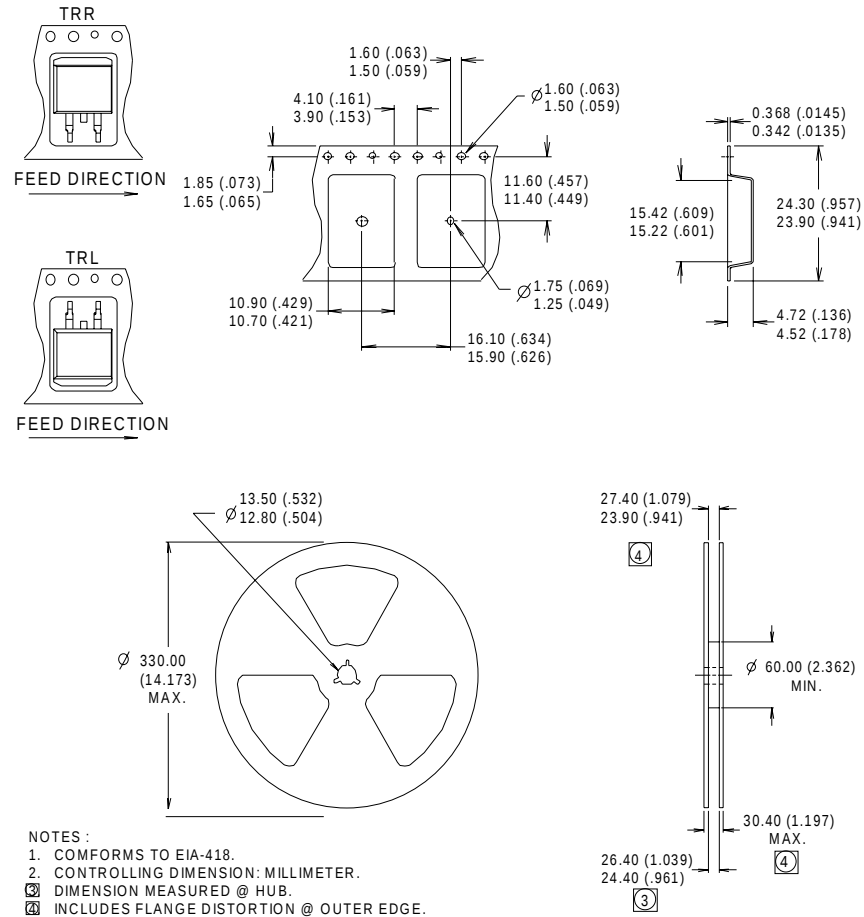


IRF9Z24NS/L

International
IR Rectifier

Tape & Reel Information

D²Pak



International
IR Rectifier

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IR GERMANY: Saalburgstrasse 157, 61350 Bad Homburg Tel: ++ 49 6172 96590

IR ITALY: Via Liguria 49, 10071 Borgaro, Torino Tel: ++ 39 11 451 0111

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<http://www.irf.com/>

Data and specifications subject to change without notice.

7/99

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