

# IRFZ34NSPbF IRFZ34NLPbF

HEXFET® Power MOSFET

- Advanced Process Technology
- Surface Mount (IRFZ34NS)
- Low-profile through-hole (IRFZ34NL)
- 175°C Operating Temperature
- Fast Switching
- Fully Avalanche Rated
- Lead-Free

## Description

Fifth Generation HEXFETs from International Rectifier utilize advanced processing techniques to achieve extremely 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 a wide variety of applications.

The D<sup>2</sup>Pak is a surface mount power package capable of accommodating die sizes up to HEX-4. It provides the highest power capability and the lowest possible on-resistance in any existing surface mount package. The D<sup>2</sup>Pak is suitable for high current applications because of its low internal connection resistance and can dissipate up to 2.0W in a typical surface mount application.

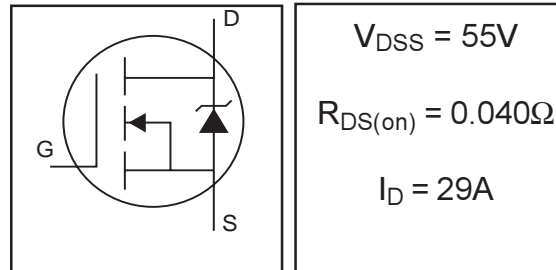
The through-hole version (IRFZ34NL) is available for low-profile applications.

## Absolute Maximum Ratings

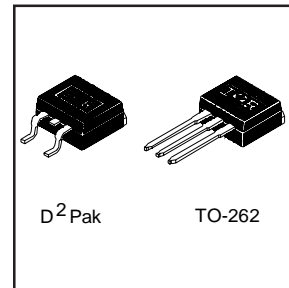
	Parameter	Max.	Units
$I_D @ T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V} \textcircled{5}$	29	A
$I_D @ T_C = 100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V} \textcircled{5}$	20	
$I_{DM}$	Pulsed Drain Current $\textcircled{1} \textcircled{5}$	100	
$P_D @ T_A = 25^\circ\text{C}$	Power Dissipation	3.8	W
$P_D @ T_C = 25^\circ\text{C}$	Power Dissipation	68	W
	Linear Derating Factor	0.45	W/°C
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$E_{AS}$	Single Pulse Avalanche Energy $\textcircled{2} \textcircled{5}$	130	mJ
$I_{AR}$	Avalanche Current $\textcircled{4}$	16	A
$E_{AR}$	Repetitive Avalanche Energy $\textcircled{4}$	5.6	mJ
$dv/dt$	Peak Diode Recovery $dv/dt \textcircled{3} \textcircled{5}$	5.0	V/ns
$T_J$	Operating Junction and	-55 to + 175	°C
$T_{STG}$	Storage Temperature Range		
	Soldering Temperature, for 10 seconds	300 (1.6mm from case )	

## Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	---	2.2	°C/W
$R_{\theta JA}$	Junction-to-Ambient (PCB mount) **	---	40	



$V_{DSS} = 55\text{V}$   
 $R_{DS(on)} = 0.040\Omega$   
 $I_D = 29\text{A}$



D<sup>2</sup>Pak

TO-262

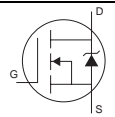
# IRFZ34NS/LPbF

International  
 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	—	0.052	—	V/°C	Reference to $25^\circ\text{C}$ , $I_D = 1\text{mA}$ Ⓞ
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	—	—	0.040	$\Omega$	$V_{GS} = 10V, I_D = 16A$ Ⓞ
$V_{GS(th)}$	Gate Threshold Voltage	2.0	—	4.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
$g_{fs}$	Forward Transconductance	6.5	—	—	S	$V_{DS} = 25V, I_D = 16A$
$I_{DSS}$	Drain-to-Source Leakage Current	—	—	25	$\mu A$	$V_{DS} = 55V, V_{GS} = 0V$
		—	—	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	—	—	34	nC	$I_D = 16A$
$Q_{gs}$	Gate-to-Source Charge	—	—	6.8		$V_{DS} = 44V$
$Q_{gd}$	Gate-to-Drain ("Miller") Charge	—	—	14		$V_{GS} = 10V$ , See Fig. 6 and 13 ⓄⓅ
$t_{d(on)}$	Turn-On Delay Time	—	7.0	—	ns	$V_{DD} = 28V$
$t_r$	Rise Time	—	49	—		$I_D = 16A$
$t_{d(off)}$	Turn-Off Delay Time	—	31	—		$R_G = 18\Omega$
$t_f$	Fall Time	—	40	—		$R_D = 1.8\Omega$ , See Fig. 10 ⓄⓅ
$L_S$	Internal Source Inductance	—	7.5	—	nH	Between lead, and center of die contact
$C_{iss}$	Input Capacitance	—	700	—	pF	$V_{GS} = 0V$
$C_{oss}$	Output Capacitance	—	240	—		$V_{DS} = 25V$
$C_{rss}$	Reverse Transfer Capacitance	—	100	—		$f = 1.0\text{MHz}$ , See Fig. 5Ⓟ

## Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_S$	Continuous Source Current (Body Diode)	—	—	29	A	MOSFET symbol showing the integral reverse p-n junction diode. 
$I_{SM}$	Pulsed Source Current (Body Diode) Ⓛ	—	—	100		
$V_{SD}$	Diode Forward Voltage	—	—	1.6	V	$T_J = 25^\circ\text{C}, I_S = 16A, V_{GS} = 0V$ Ⓞ
$t_{rr}$	Reverse Recovery Time	—	57	86	ns	$T_J = 25^\circ\text{C}, I_F = 16A$
$Q_{rr}$	Reverse Recovery Charge	—	130	200	nC	$di/dt = 100A/\mu s$ ⓄⓅ
$t_{on}$	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by $L_S+L_D$ )				

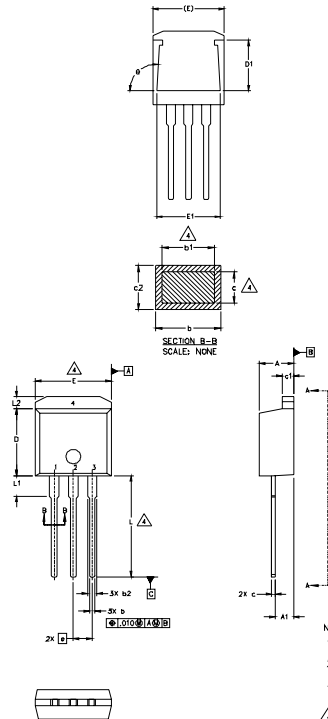
### Notes:

- Ⓛ Repetitive rating; pulse width limited by max. junction temperature. ( See fig. 11 )
- Ⓞ  $V_{DD} = 25V$ , starting  $T_J = 25^\circ\text{C}$ ,  $L = 610\mu H$   
 $R_G = 25\Omega, I_{AS} = 16A$ . (See Figure 12)
- Ⓟ Uses IRFZ34N data and test conditions
- Ⓠ  $I_{SD} \leq 16A, di/dt \leq 420A/\mu s, V_{DD} \leq V_{(BR)DSS}, T_J \leq 175^\circ\text{C}$
- Ⓡ Pulse width  $\leq 300\mu s$ ; duty cycle  $\leq 2\%$ .

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

## 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	2.92	.080	.115	
b	0.51	0.99	.020	.039	
b1	0.51	0.89	.020	.035	4
b2	1.14	1.40	.045	.055	
c	0.38	0.63	.015	.025	4
c1	1.14	1.40	.045	.055	
c2	0.43	.063	.017	.029	
D	8.51	9.65	.335	.380	3
D1	5.33		.210		
E	9.65	10.67	.380	.420	3
E1	6.22		.245		
e	2.54 BSC		.100 BSC		
L	13.46	14.09	.530	.555	
L1	3.56	3.71	.140	.146	
L2		1.65		.065	

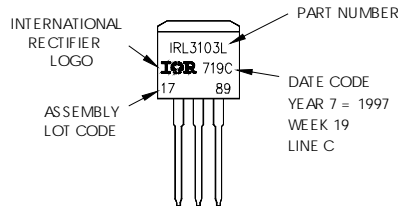
### LEAD ASSIGNMENTS

HEXFET	IGBT
1.- GATE	1 - GATE
2.- DRAIN	2 - COLLECTOR
3.- SOURCE	3 - EMITTER
4.- DRAIN	

- 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. DIMENSION b1 AND c1 APPLY TO BASE METAL ONLY.
  5. CONTROLLING DIMENSION: INCH.

## TO-262 Part Marking Information

EXAMPLE: THIS IS AN IRL3103L  
 LOT CODE 1789  
 ASSEMBLED ON WW 19, 1997  
 IN THE ASSEMBLY LINE "C"  
 Note: "P" in assembly line  
 position indicates "Lead-Free"



**OR**

