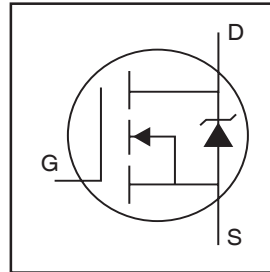


Features

- Advanced Process Technology
- Ultra Low On-Resistance
- Dynamic dv/dt Rating
- 175°C Operating Temperature
- Fast Switching
- Repetitive Avalanche Allowed up to Tjmax
- Lead-Free

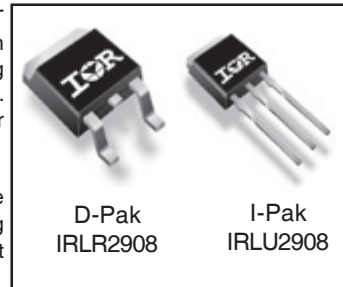


$V_{DSS} = 80V$
$R_{DS(on)} = 28m\Omega$
$I_D = 30A$

Description

Specifically designed for Automotive applications, this HEXFET® Power MOSFET utilizes the latest processing techniques to achieve extremely low on-resistance per silicon area. Additional features of this HEXFET power MOSFET are a 175°C junction operating temperature, low RθJC, fast switching speed and improved repetitive avalanche rating. These features combine to make this design an extremely efficient and reliable device for use in Automotive applications and a wide variety of other applications.

The D-Pak is designed for surface mounting using vapor phase, infrared, or wave soldering techniques. The straight lead version (IRFU series) is for through-hole mounting applications. Power dissipation levels up to 1.5 watts are possible in typical surface mount applications.



Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$ (Silicon Limited)	39	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$ (See Fig. 9)	28	
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$ (Package Limited)	30	
I_{DM}	Pulsed Drain Current ①	150	
$P_D @ T_C = 25^\circ C$	Maximum Power Dissipation	120	W
	Linear Derating Factor	0.77	W/°C
V_{GS}	Gate-to-Source Voltage	± 16	V
E_{AS}	Single Pulse Avalanche Energy (Thermally Limited) ②	180	mJ
$E_{AS} (tested)$	Single Pulse Avalanche Energy Tested Value ②	250	
I_{AR}	Avalanche Current ①	See Fig.12a,12b,15,16	A
E_{AR}	Repetitive Avalanche Energy ③		mJ
dv/dt	Peak Diode Recovery dv/dt ③	2.3	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

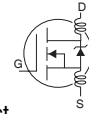
	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	—	1.3	°C/W
$R_{\theta JA}$	Junction-to-Ambient (PCB Mount) ③	—	40	
$R_{\theta JA}$	Junction-to-Ambient	—	110	

IRLR/U2908PbF

International
IR Rectifier

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	80	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.085	—	V/°C	Reference to $25^\circ\text{C}, I_D = 1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	22.5	28	mΩ	$V_{GS} = 10V, I_D = 23A$ ④
		—	25	30		$V_{GS} = 4.5V, I_D = 20A$ ④
$V_{GS(th)}$	Gate Threshold Voltage	1.0	—	2.5	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
gfs	Forward Transconductance	35	—	—	S	$V_{DS} = 25V, I_D = 23A$
I_{DSS}	Drain-to-Source Leakage Current	—	—	20	μA	$V_{DS} = 80V, V_{GS} = 0V$
		—	—	250		$V_{DS} = 80V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	200	nA	$V_{GS} = 16V$
	Gate-to-Source Reverse Leakage	—	—	-200		$V_{GS} = -16V$
Q_g	Total Gate Charge	—	22	33	nC	$I_D = 23A$
Q_{gs}	Gate-to-Source Charge	—	6.0	9.1		$V_{DS} = 64V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	11	17		$V_{GS} = 4.5V$
$t_{d(on)}$	Turn-On Delay Time	—	12	—	ns	$V_{DD} = 40V$
t_r	Rise Time	—	95	—		$I_D = 23A$
$t_{d(off)}$	Turn-Off Delay Time	—	36	—		$R_G = 8.3\Omega$
t_f	Fall Time	—	55	—		$V_{GS} = 4.5V$ ④
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	—	1890	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	260	—		$V_{DS} = 25V$
C_{riss}	Reverse Transfer Capacitance	—	35	—		$f = 1.0\text{MHz}$, See Fig. 5
C_{oss}	Output Capacitance	—	1920	—		$V_{GS} = 0V, V_{DS} = 1.0V, f = 1.0\text{MHz}$
C_{oss}	Output Capacitance	—	170	—		$V_{GS} = 0V, V_{DS} = 64V, f = 1.0\text{MHz}$
$C_{oss\ eff.}$	Effective Output Capacitance	—	310	—		$V_{GS} = 0V, V_{DS} = 0V \text{ to } 64V$



Diode Characteristics

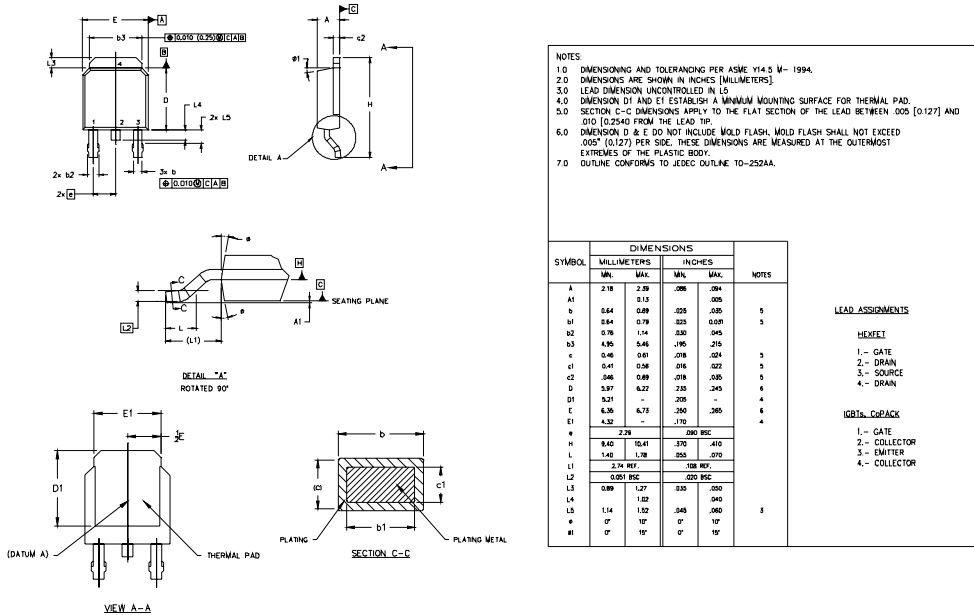
	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	39	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	150		
V_{SD}	Diode Forward Voltage	—	—	1.3	V	$T_J = 25^\circ\text{C}, I_S = 23A, V_{GS} = 0V$ ④
t_{rr}	Reverse Recovery Time	—	75	110	ns	$T_J = 25^\circ\text{C}, I_F = 23A, V_{DD} = 25V$
Q_{rr}	Reverse Recovery Charge	—	210	310	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 through ④ are on page 11

HEXFET® is a registered trademark of International Rectifier.

D-Pak (TO-252AA) Package Outline

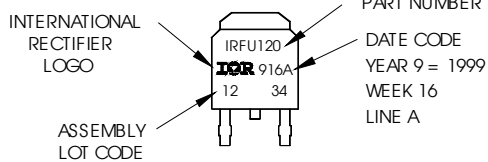
Dimensions are shown in millimeters (inches)



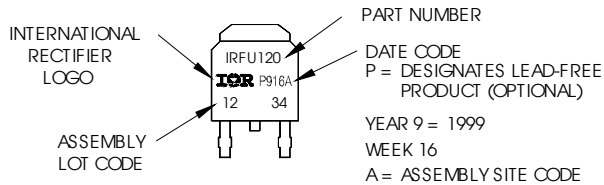
D-Pak (TO-252AA) Part Marking Information

EXAMPLE: THIS IS AN IRFU120
WITH ASSEMBLY
LOT CODE 1234
ASSEMBLED ON WW 16, 1999
IN THE ASSEMBLY LINE "A"

Note: "P" in assembly line position
indicates "Lead-Free"

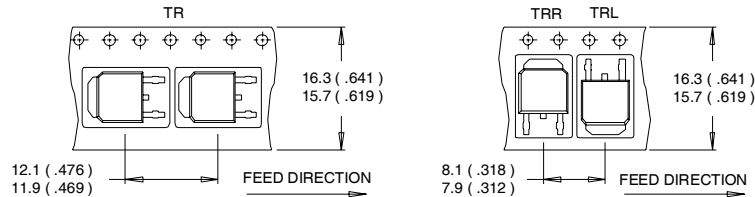


OR

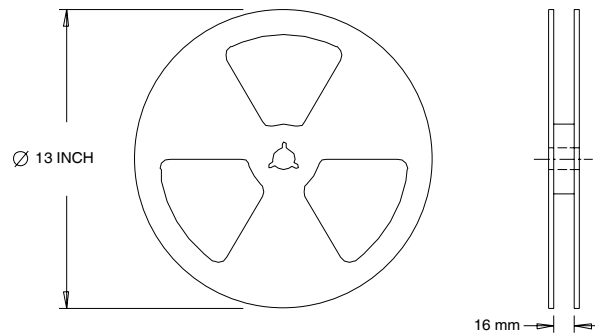


D-Pak (TO-252AA) Tape & Reel Information

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.

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11).
- ② Limited by T_{Jmax} , starting $T_J = 25^\circ C$, $L = 0.71mH$, $R_G = 25\Omega$, $I_{AS} = 23A$, $V_{GS} = 10V$. Part not recommended for use above this value.
- ③ $I_{SD} \leq 23A$, $di/dt \leq 400A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq 175^\circ C$.
- ④ Pulse width $\leq 1.0ms$; duty cycle $\leq 2\%$.
- ⑤ C_{oss} eff. is a fixed capacitance that gives the same charging time as C_{oss} while V_{DS} is rising from 0 to 80% V_{DSS} .
- ⑥ Limited by T_{Jmax} , see Fig.12a, 12b, 15, 16 for typical repetitive avalanche performance.
- ⑦ This value determined from sample failure population. 100% tested to this value in production.
- ⑧ When mounted on 1" square PCB (FR-4 or G-10 Material). For recommended footprint and soldering techniques refer to application note #AN-994.

Data and specifications subject to change without notice.
 This product has been designed and qualified for the Automotive [Q101] market.