

AUTOMOTIVE MOSFET

IRF2807ZPbF

IRF2807ZSPbF

IRF2807ZLPbF

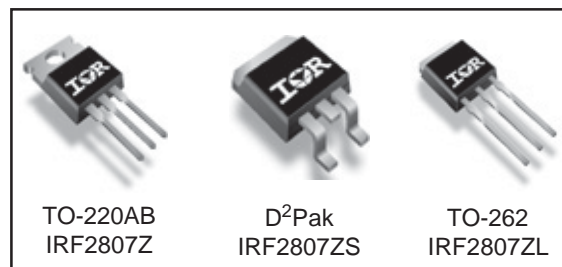
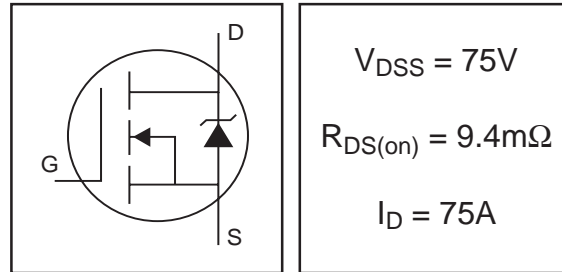
HEXFET® Power MOSFET

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

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 design are a 175°C junction operating temperature, 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.



Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D @ T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$ (Silicon Limited)	89	A
$I_D @ T_C = 100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$ (See Fig. 9)	63	
$I_D @ T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$ (Package Limited)	75	
I_{DM}	Pulsed Drain Current ①	350	
$P_D @ T_C = 25^\circ\text{C}$	Maximum Power Dissipation	170	W
	Linear Derating Factor	1.1	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy (Thermally Limited) ②	160	mJ
E_{AS} (tested)	Single Pulse Avalanche Energy Tested Value ③	200	
I_{AR}	Avalanche Current ④	See Fig.12a,12b,15,16	A
E_{AR}	Repetitive Avalanche Energy ⑤		mJ
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 175	°C
	Soldering Temperature, for 10 seconds	300 (1.6mm from case)	
	Mounting torque, 6-32 or M3 screw	10 lbf•in (1.1N•m)	

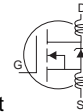
Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	—	0.90	°C/W
$R_{\theta CS}$	Case-to-Sink, Flat, Greased Surface	0.50	—	
$R_{\theta JA}$	Junction-to-Ambient	—	62	
$R_{\theta JA}$	Junction-to-Ambient (PCB Mount, steady state)⑥	—	40	

HEXFET® is a registered trademark of International Rectifier.

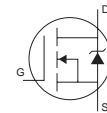
Static @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
V _{(BR)DSS}	Drain-to-Source Breakdown Voltage	75	—	—	V	V _{GS} = 0V, I _D = 250μA
ΔBV _{DSS} /ΔT _J	Breakdown Voltage Temp. Coefficient	—	0.073	—	V/°C	Reference to 25°C, I _D = 1mA
R _{DS(on)}	Static Drain-to-Source On-Resistance	—	7.5	9.4	mΩ	V _{GS} = 10V, I _D = 53A ④
V _{GS(th)}	Gate Threshold Voltage	2.0	—	4.0	V	V _{DS} = V _{GS} , I _D = 250μA
g _{fs}	Forward Transconductance	67	—	—	S	V _{DS} = 25V, I _D = 53A
I _{DSS}	Drain-to-Source Leakage Current	—	—	20	μA	V _{DS} = 75V, V _{GS} = 0V
		—	—	250		V _{DS} = 75V, V _{GS} = 0V, T _J = 125°C
I _{GSS}	Gate-to-Source Forward Leakage	—	—	200	nA	V _{GS} = 20V
	Gate-to-Source Reverse Leakage	—	—	-200		V _{GS} = -20V
Q _g	Total Gate Charge	—	71	110	nC	I _D = 53A
Q _{gs}	Gate-to-Source Charge	—	19	29		V _{DS} = 60V
Q _{gd}	Gate-to-Drain ("Miller") Charge	—	28	42		V _{GS} = 10V ④
t _{d(on)}	Turn-On Delay Time	—	18	—		V _{DD} = 38V
t _r	Rise Time	—	79	—	ns	I _D = 53A
t _{d(off)}	Turn-Off Delay Time	—	40	—		R _G = 6.2Ω
t _f	Fall Time	—	45	—		V _{GS} = 10V 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	—	3270	—	pF	V _{GS} = 0V
C _{oss}	Output Capacitance	—	420	—		V _{DS} = 25V
C _{rss}	Reverse Transfer Capacitance	—	240	—		f = 1.0MHz, See Fig. 5
C _{oss}	Output Capacitance	—	1590	—		V _{GS} = 0V, V _{DS} = 1.0V, f = 1.0MHz
C _{oss}	Output Capacitance	—	280	—		V _{GS} = 0V, V _{DS} = 60V, f = 1.0MHz
C _{oss eff.}	Effective Output Capacitance	—	440	—		V _{GS} = 0V, V _{DS} = 0V to 60V



Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I _S	Continuous Source Current (Body Diode)	—	—	89	A	MOSFET symbol showing the integral reverse p-n junction diode.
I _{SM}	Pulsed Source Current (Body Diode) ①	—	—	350		
V _{SD}	Diode Forward Voltage	—	—	1.3	V	T _J = 25°C, I _S = 53A, V _{GS} = 0V ④
t _{rr}	Reverse Recovery Time	—	46	69	ns	T _J = 25°C, I _F = 53A, V _{DD} = 25V
Q _{rr}	Reverse Recovery Charge	—	80	120	nC	di/dt = 100A/μs ④
t _{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

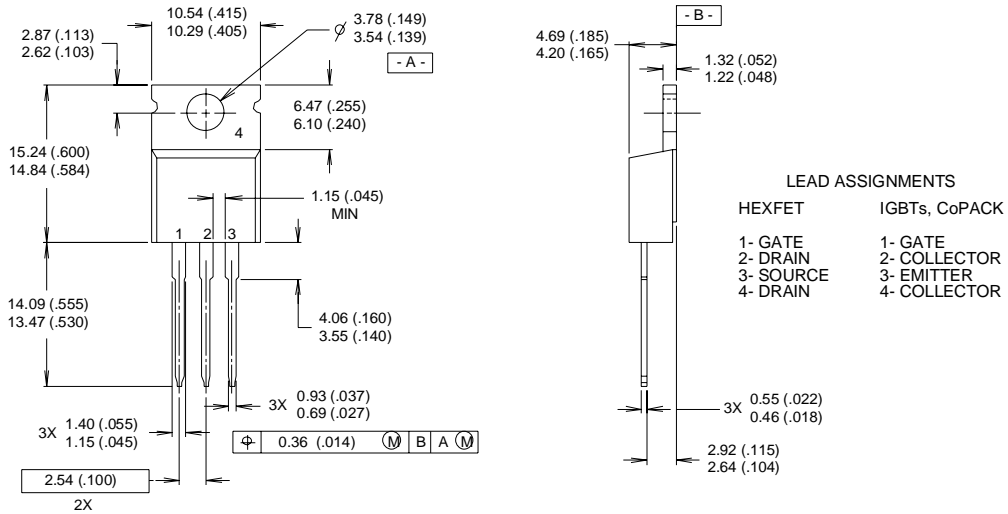


Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11).
- ② Limited by T_{Jmax}, starting T_J = 25°C, L = 0.12mH, R_G = 25Ω, I_{AS} = 53A, V_{GS} = 10V. Part not recommended for use above this value.
- ③ I_{SD} ≤ 53A, di/dt ≤ 420A/μs, V_{DD} ≤ V_{(BR)DSS}, T_J ≤ 175°C.
- ④ Pulse width ≤ 1.0ms; duty cycle ≤ 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 This is applied to D²Pak, 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-220AB Package Outline

Dimensions are shown in millimeters (inches)



NOTES:

- 1 DIMENSIONING & TOLERANCING PER ANSI Y14.5M, 1982.
- 2 CONTROLLING DIMENSION : INCH

- 3 OUTLINE CONFORMS TO JEDEC OUTLINE TO-220AB.
- 4 HEATSINK & LEAD MEASUREMENTS DO NOT INCLUDE BURRS.

TO-220AB Part Marking Information

EXAMPLE: THIS IS AN IRF1010

LOT CODE 1789

ASSEMBLED ON WW 19, 1997

IN THE ASSEMBLY LINE "C"

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

