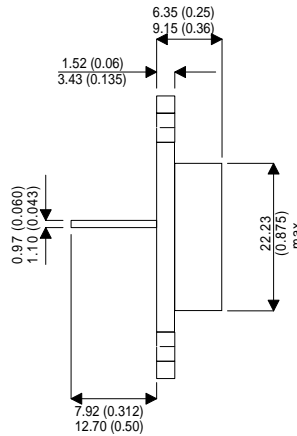
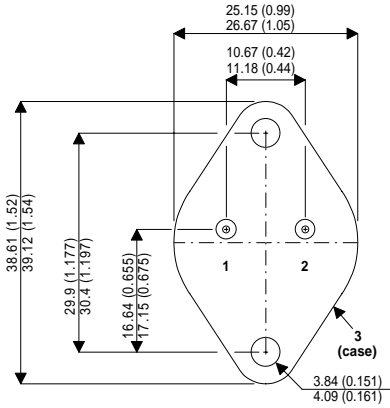
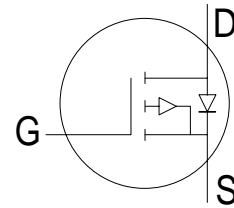


**MECHANICAL DATA**



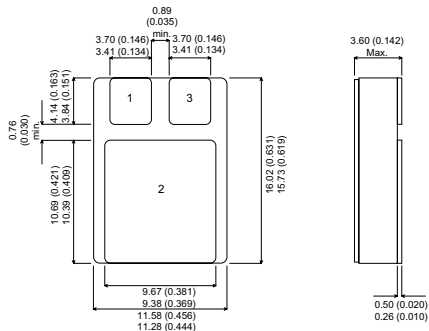
**P-CHANNEL  
POWER MOSFET**



TO-3 Package  
Pin 1 – Gate      Pin 2 – Source      Pin 3 – Drain

**FEATURES**

- P-CHANNEL POWER MOSFET
- HIGH VOLTAGE
- INTEGRAL PROTECTION DIODE
- AVAILABLE IN TO-3 (TO-204AA) AND CERAMIC SURFACE MOUNT PACKAGES



SMD1  
Pin 1 – Gate      Pin 2 – Source      Pin 3 – Drain

**Note:** IRFNxxxx also available with pins 1 and 3 reversed.

**TO-3** — TO-3 (TO-204AA) Metal Package  
**TO-220 SM** — TO-220 Ceramic Surface Mount Package

**ABSOLUTE MAXIMUM RATINGS** ( $T_{case} = 25^{\circ}C$  unless otherwise stated)

$V_{DSS}$	Drain – Source Voltage	-200V
$V_{DGR}$	Drain – Gate Voltage ( $R_{GS} = 20K\Omega$ )	-200V
$V_{GS}$	Gate – Source Voltage	$\pm 20V$
$I_D$	Continuous Drain Current	@ $T_{case} = 25^{\circ}C$ -11A @ $T_{case} = 100^{\circ}C$ -7.0A
$I_{DM}$	Pulsed Drain Current	-44A
$P_D$	Max. Power Dissipation	@ $T_{case} = 25^{\circ}C$ 125W
	Linear Derating Factor	(TO 3 package only) 1W / $^{\circ}C$
$I_{LM}$	Inductive Current , Clamped	-44A
$T_j$	Operating Junction and	(TO 3 package only) -55 to 150 $^{\circ}C$
$T_{stg}$	Storage Temperature Range	

**ELECTRICAL RATINGS** ( $T_{case} = 25^{\circ}C$  unless otherwise stated)

	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
$BV_{DSS}$	Drain – Source Breakdown Voltage	$V_{GS} = 0V, I_D = -250\mu A$	-200			V
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\mu A$	-2		-4	V
$I_{GSS}$	Gate – Source Leakage Current (forward)	$V_{GS} = -20V$			-100	nA
	Gate – Source Leakage Current (reverse)	$V_{GS} = 20V$			100	nA
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = \text{Max. Rating}, V_{GS} = 0V$			-250	$\mu A$
		$V_{DS} = 0.8 \times \text{Max. Rating}$ $V_{GS} = 0V, T_{case} = 125^{\circ}C$			-1000	$\mu A$
$I_{D(ON)}$	On State Drain Current <sup>1</sup>	$V_{DS} > I_{D(ON)} \times R_{DS(ON)} \text{ Max}$ $V_{GS} = -10V$	-11			A
$R_{DS(ON)}$	Static Drain – Source On-State Resistance	$V_{GS} = -10V, I_D = -6A$		0.35	0.5	$\Omega$
$g_{fs}$	Forward Transconductance <sup>1</sup>	$V_{DS} > I_{D(ON)} \times R_{DS(ON)} \text{ Max}$ $I_D = -6A$	4	6		S
$C_{iss}$	Input capacitance	$V_{GS} = 0V$		1100	1300	pF
$C_{oss}$	Output capacitance	$V_{DS} = -25V$		375	450	
$C_{rss}$	Reverse transfer capacitance	$f = 1\text{MHz}$		150	250	
$Q_g$	Total Gate Charge	$V_{GS} = -15V$		70	90	nC
$Q_{gs}$	Gate – Source Charge	$I_D = -22A$		55		
$Q_{gd}$	Gate – Drain (“Miller”) Charge	$V_{DS} = 0.8 \times \text{Max. Rating}$		15		
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = 0.5 \times BV_{DSS}$ $I_D = -6A$ $Z_O = 4.7\Omega$		20	30	ns
$t_r$	Rise Time			10	15	
$t_{d(off)}$	Turn-off Delay Time			12	18	
$t_f$	Fall Time			8	12	
$L_D$	Internal Drain Inductance			5.0		nH
$L_S$	Internal Source Inductance			12.5		nH

**THERMAL CHARACTERISTICS**

	Characteristic	Min.	Typ.	Max.	Unit
$R_{\theta JC}$	Junction to Case (TO-3 package only)			1.0	$^{\circ}C/W$
$R_{\theta CS}$	Case to Sink (TO-3 package only)		0.1		$^{\circ}C/W$
$R_{\theta JA}$	Junction to Ambient			30	$^{\circ}C/W$
$T_L$	Max. Lead Temperature 0.063” from case for 10 sec. (TO-3 package only)		300		$^{\circ}C$

**SOURCE – DRAIN DIODE RATINGS AND CHARACTERISTICS**

	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current (Body Diode)				-11	A
$I_{SM}$	Pulsed Source Current <sup>1</sup> (Body Diode)				-44	
$V_{SD}$	Diode Forward Voltage <sup>2</sup>	$V_{GS} = 0V, I_S = -11A$ $T_{case} = 25^{\circ}C$			-4.6	V
$t_{rr}$	Reverse Recovery Time	$I_F = -11A, di_F / dt = 100A/\mu s$ $T_j = 150^{\circ}C$		270		ns
$Q_{rr}$	Reverse Recovery Charge	$I_F = -11A, di_F / dt = 100A/\mu s$ $T_j = 150^{\circ}C$		2.0		$\mu C$

1) Pulse Test: Pulse Width < 300 $\mu s$ , Duty Cycle  $\leq 2\%$

2) Repetitive Rating: Pulse Width limited by maximum junction temperature.