

Applications

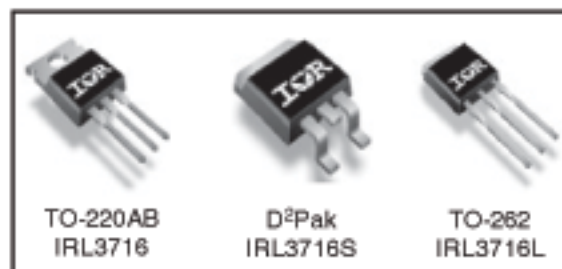
- High Frequency Isolated DC-DC Converters with Synchronous Rectification for Telecom and Industrial Use
- High Frequency Buck Converters for Computer Processor Power
- Active Oring
- Lead-Free

Benefits

- Ultra-Low Gate Impedance
- Very Low $R_{DS(on)}$ at 4.5V V_{GS}
- Fully Characterized Avalanche Voltage and Current

HEXFET® Power MOSFET

V_{DSS}	$R_{DS(on)}$ max	I_D
20V	4.0m Ω	180A ^⑤



Absolute Maximum Ratings

Symbol	Parameter	Max.	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-to-Source Voltage	± 20	V
$I_D @ T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$	180 ^⑤	A
$I_D @ T_C = 100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$	130	
I_{DM}	Pulsed Drain Current ^①	720	
$P_D @ T_C = 25^\circ\text{C}$	Maximum Power Dissipation ^②	210	W
$P_D @ T_C = 100^\circ\text{C}$	Maximum Power Dissipation ^②	100	W
	Linear Derating Factor	1.4	W/°C
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to + 175	°C

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	—	0.72	°C/W
$R_{\theta CS}$	Case-to-Sink, Flat, Greased Surface ^③	0.50	—	
$R_{\theta JA}$	Junction-to-Ambient ^④	—	62	
$R_{\theta JA}$	Junction-to-Ambient (PCB mount) ^⑤	—	40	

Notes ① through ⑤ are on page 11

IRL3716/3716S/3716LPbF

International
IGR Rectifier

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(DR)DS}$	Drain-to-Source Breakdown Voltage	20	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.021	—	V/°C	Reference to $25^\circ\text{C}, I_D = 1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	3.0	4.0	m Ω	$V_{GS} = 10V, I_D = 90A$ Ⓞ
		—	4.0	4.8		$V_{GS} = 4.5V, I_D = 72A$ Ⓞ
$V_{GS(th)}$	Gate Threshold Voltage	1.0	—	3.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
I_{DSS}	Drain-to-Source Leakage Current	—	—	20	μA	$V_{DS} = 16V, V_{GS} = 0V$
		—	—	250		$V_{DS} = 16V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	200	nA	$V_{DS} = 16V$
	Gate-to-Source Reverse Leakage	—	—	-200		$V_{DS} = -16V$


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

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
g_{fs}	Forward Transconductance	100	—	—	S	$V_{DS} = 10V, I_D = 72A$
Q_g	Total Gate Charge	—	53	79	nC	$I_D = 72A$
Q_{gs}	Gate-to-Source Charge	—	17	26		$V_{DS} = 16V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	24	35		$V_{GS} = 4.5V$
Q_{oss}	Output Gate Charge	—	50	75		$V_{GS} = 0V, V_{DS} = 10V$
$t_{d(on)}$	Turn-On Delay Time	—	18	—	ns	$V_{DD} = 10V$
t_r	Rise Time	—	140	—		$I_D = 72A$
$t_{d(off)}$	Turn-Off Delay Time	—	38	—		$R_{\theta} = 3.9\Omega$
t_f	Fall Time	—	36	—		$V_{GS} = 4.5V$ Ⓞ
C_{iss}	Input Capacitance	—	5090	—	pF	$V_{DS} = 0V$
C_{oss}	Output Capacitance	—	3440	—		$V_{DS} = 10V$
C_{rss}	Reverse Transfer Capacitance	—	560	—		$f = 1.0\text{MHz}$

Avalanche Characteristics

Symbol	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche EnergyⓄ	—	640	mJ
I_{AR}	Avalanche CurrentⓄ	—	72	A

Diode Characteristics

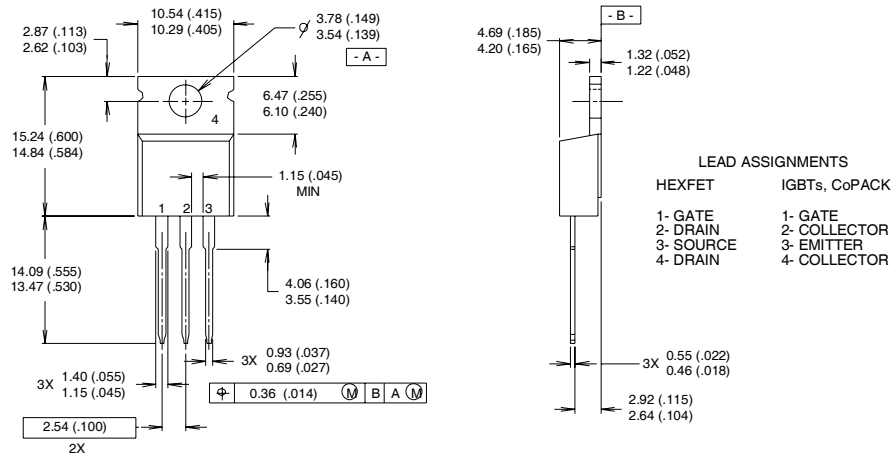
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	180	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) Ⓞ	—	—	720		
V_{SD}	Diode Forward Voltage	—	0.93	1.3	V	$T_J = 25^\circ\text{C}, I_S = 72A, V_{GS} = 0V$ Ⓞ
		—	0.80	—		$T_J = 125^\circ\text{C}, I_S = 72A, V_{GS} = 0V$ Ⓞ
t_{rr}	Reverse Recovery Time	—	180	280	ns	$T_J = 25^\circ\text{C}, I_F = 72A, V_{RR} = 20V$
Q_{rr}	Reverse Recovery Charge	—	87	130	nC	$di/dt = 100A/\mu s$ Ⓞ
t_{rr}	Reverse Recovery Time	—	190	280	ns	$T_J = 125^\circ\text{C}, I_F = 72A, V_{RR} = 20V$
Q_{rr}	Reverse Recovery Charge	—	85	130	nC	$di/dt = 100A/\mu s$ Ⓞ

IRL3716/3716S/3716LPbF



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"

