PD - 95361

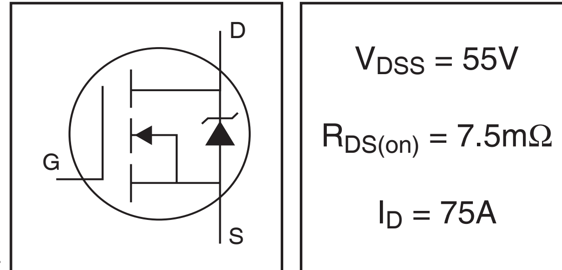
International
IOR Rectifier

AUTOMOTIVE MOSFET

IRF1010ZPbF
IRF1010ZSPbF
IRF1010ZLPbF

HEXFET® Power MOSFET

Features
- Advanced Process Technology
- Ultra Low On-Resistance
- 175°C Operating Temperature
- Fast Switching
- Repetitive Avalanche Allowed up to Tjmax
- Lead-Free

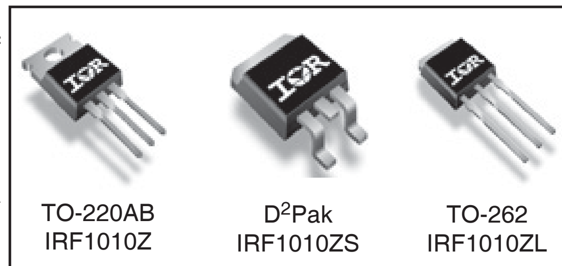


V_{DSS} = 55V

$R_{DS(on)}$ = 7.5mΩ

I_D = 75A

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.



TO-220AB IRF1010Z | D^2Pak IRF1010ZS | TO-262 IRF1010ZL

Absolute Maximum Ratings

	Parameter	Max.	Units
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 10V (Silicon Limited)	94	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 10V	66	
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 10V (Package Limited)	75	
I_{DM}	Pulsed Drain Current ①	360	
P_D @T_C = 25°C	Power Dissipation	140	W
	Linear Derating Factor	0.90	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS} (Thermally limited)	Single Pulse Avalanche Energy②	130	mJ
E_{AS} (Tested)	Single Pulse Avalanche Energy Tested Value ⑥	180	
I_{AR}	Avalanche Current ①	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 ⑦	10 lbf•in (1.1N•m)	

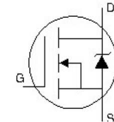
Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{θJC}$	Junction-to-Case	——	1.11	°C/W
$R_{θCS}$	Case-to-Sink, Flat Greased Surface ⑦	0.50	——	
$R_{θJA}$	Junction-to-Ambient ⑦	——	62	
$R_{θJA}$	Junction-to-Ambient (PCB Mount) ⑧	——	40	

Electrical Characteristics @ T_J = 25°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 = 250μA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.049	—	V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	5.8	7.5	mΩ	V_{GS} = 10V, I_D = 75A ③
$V_{GS(th)}$	Gate Threshold Voltage	2.0	—	4.0	V	V_{DS} = V_{GS}, I_D = 250μA
gfs	Forward Transconductance	33	—	—	S	V_{DS} = 25V, I_D = 75A
I_{DSS}	Drain-to-Source Leakage Current	—	—	20	μA	V_{DS} = 55V, V_{GS} = 0V
		—	—	250		V_{DS} = 55V, 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	—	63	95	nC	I_D = 75A
Q_{gs}	Gate-to-Source Charge	—	19	—		V_{DS} = 44V
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	24	—		V_{GS} = 10V ③
$t_{d(on)}$	Turn-On Delay Time	—	18	—	ns	V_{DD} = 28V
t_r	Rise Time	—	150	—		I_D = 75A
$t_{d(off)}$	Turn-Off Delay Time	—	36	—		R_G = 6.8 Ω
t_f	Fall Time	—	92	—		V_{GS} = 10V ③
L_D	Internal Drain Inductance	—	4.5	—	nH	Between lead, 6mm (0.25in.)
L_S	Internal Source Inductance	—	7.5	—		from package and center of die contact
C_{iss}	Input Capacitance	—	2840	—	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	—	420	—		V_{DS} = 25V
C_{rss}	Reverse Transfer Capacitance	—	250	—		f = 1.0MHz
C_{oss}	Output Capacitance	—	1630	—		V_{GS} = 0V, V_{DS} = 1.0V, f = 1.0MHz
C_{oss}	Output Capacitance	—	360	—		V_{GS} = 0V, V_{DS} = 44V, f = 1.0MHz
C_{oss} eff.	Effective Output Capacitance	—	560	—		V_{GS} = 0V, V_{DS} = 0V to 44V ④

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	75	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	360		
V_{SD}	Diode Forward Voltage	—	—	1.3	V	T_J = 25°C, I_S = 75A, V_{GS} = 0V ③
t_{rr}	Reverse Recovery Time	—	22	33	ns	T_J = 25°C, I_F = 75A, V_{DD} = 25V
Q_{rr}	Reverse Recovery Charge	—	15	23	nC	di/dt = 100A/μs ③
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

D^2Pak 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		0.127		.005	
b	0.51	0.99	.020	.039	
b1	0.51	0.89	.020	.035	4
b2	1.14	1.40	.045	.055	
c	0.43	0.63	.017	.025	
c1	0.38	0.74	.015	.029	4
c2	1.14	1.40	.045	.055	
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	14.61	15.88	.575	.625	
L1	1.78	2.79	.070	.110	
L2		1.65		.065	
L3	1.27	1.78	.050	.070	
L4	0.25 BSC		.010 BSC		
m	17.78		.700		
m1	8.89		.350		
n	11.43		.450		
o	2.08		.082		
p	3.81		.150		
θ	90°	93°	90°	93°	

LEAD ASSIGNMENTS

HEXFET
1.– GATE
2.– DRAIN
3.– SOURCE

IGBTs, CoPACK
1.– GATE
2.– COLLECTOR
3.– EMITTER

DIODES
1.– ANODE *
2.– CATHODE
3.– ANODE

* PART DEPENDENT.

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.

D^2Pak Part Marking Information (Lead-Free)

EXAMPLE: THIS IS AN IRF530S WITH LOT CODE 8024
ASSEMBLED ON WW 02, 2000
IN THE ASSEMBLY LINE "L"

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

INTERNATIONAL RECTIFIER LOGO
ASSEMBLY LOT CODE
PART NUMBER
F530S
IOR 002L
80 24
DATE CODE
YEAR 0 = 2000
WEEK 02
LINE L

OR

INTERNATIONAL RECTIFIER LOGO
ASSEMBLY LOT CODE
PART NUMBER
F530S
IOR P002A
80 24
DATE CODE
P = DESIGNATES LEAD-FREE PRODUCT (OPTIONAL)
YEAR 0 = 2000
WEEK 02
A = ASSEMBLY SITE CODE