International
IOR Rectifier

PD - 96050

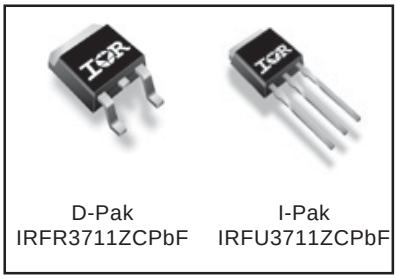
IRFR3711ZCPbF
IRFU3711ZCPbF

HEXFET® Power MOSFET

Applications

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

V_{DSS}	$R_{DS(on)}$ max	Qg
20V	5.7mΩ	18nC



D-Pak IRFR3711ZCPbF | I-Pak IRFU3711ZCPbF

Benefits

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

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain-to-Source Voltage	20	V
V_{GS}	Gate-to-Source Voltage	± 20	
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 10V	93④	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 10V	66④	
I_{DM}	Pulsed Drain Current ①	370	
P_D @T_C = 25°C	Maximum Power Dissipation ⑤	79	W
P_D @T_C = 100°C	Maximum Power Dissipation ⑤	39	
	Linear Derating Factor	0.53	W/°C
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 175	°C
	Soldering Temperature, for 10 seconds	300 (1.6mm from case)	

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	–––	1.9	°C/W
$R_{\theta JA}$	Junction-to-Ambient (PCB Mount) ⑤	–––	50	
$R_{\theta JA}$	Junction-to-Ambient	–––	110	

Notes ① through ⑤ are on page 11

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	20	—	—	V	V_{GS} = 0V, I_D = 250µA
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	13	—	mV/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	4.5	5.7	mΩ	V_{GS} = 10V, I_D = 15A ③
		—	6.2	7.8		V_{GS} = 4.5V, I_D = 12A ③
$V_{GS(th)}$	Gate Threshold Voltage	1.55	2.0	2.45	V	V_{DS} = V_{GS}, I_D = 250µA
$\Delta V_{GS(th)}/\Delta T_J$	Gate Threshold Voltage Coefficient	—	-5.4	—	mV/°C	
I_{DSS}	Drain-to-Source Leakage Current	—	—	1.0	µA	V_{DS} = 16V, V_{GS} = 0V
		—	—	150		V_{DS} = 16V, V_{GS} = 0V, T_J = 125°C
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	V_{GS} = 20V
	Gate-to-Source Reverse Leakage	—	—	-100		V_{GS} = -20V
gfs	Forward Transconductance	48	—	—	S	V_{DS} = 10V, I_D = 12A
Q_g	Total Gate Charge	—	18	27		
Q_{gs1}	Pre-Vth Gate-to-Source Charge	—	5.1	—		V_{DS} = 10V
Q_{gs2}	Post-Vth Gate-to-Source Charge	—	1.8	—	nC	V_{GS} = 4.5V
Q_{gd}	Gate-to-Drain Charge	—	6.5	—		I_D = 12A
Q_{godr}	Gate Charge Overdrive	—	4.6	—		See Fig. 16
Q_{sw}	Switch Charge (Q_{gs2} + Q_{gd})	—	8.3	—		
Q_{oss}	Output Charge	—	9.8	—	nC	V_{DS} = 10V, V_{GS} = 0V
$t_{d(on)}$	Turn-On Delay Time	—	12	—		V_{DD} = 15V, V_{GS} = 4.5V③
t_r	Rise Time	—	13	—		I_D = 12A
$t_{d(off)}$	Turn-Off Delay Time	—	15	—	ns	Clamped Inductive Load
t_f	Fall Time	—	5.2	—		
C_{iss}	Input Capacitance	—	2160	—		V_{GS} = 0V
C_{oss}	Output Capacitance	—	700	—	pF	V_{DS} = 10V
C_{rss}	Reverse Transfer Capacitance	—	360	—		f = 1.0MHz

Avalanche Characteristics

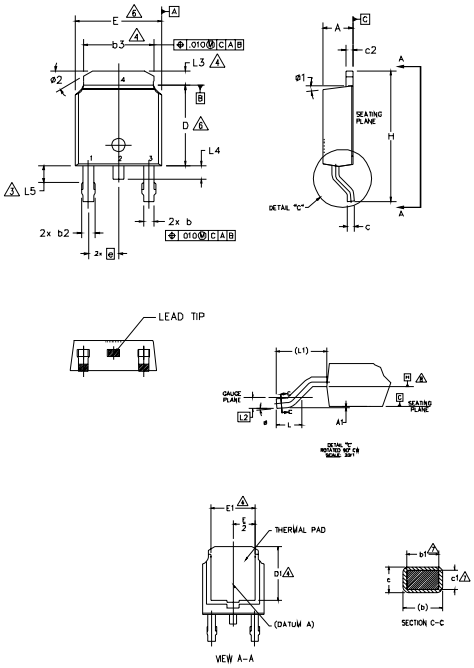
	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy②	—	140	mJ
I_{AR}	Avalanche Current ①	—	12	A
E_{AR}	Repetitive Avalanche Energy ①	—	7.9	mJ

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	93④	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	370		
V_{SD}	Diode Forward Voltage	—	—	1.0	V	T_J = 25°C, I_S = 12A, V_{GS} = 0V ③
t_{rr}	Reverse Recovery Time	—	19	28	ns	T_J = 25°C, I_F = 12A, V_{DD} = 10V
Q_{rr}	Reverse Recovery Charge	—	9.4	14	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-Pak (TO-252AA) Package Outline

Dimensions are shown in millimeters (inches)



NOTES:
1.- DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994
2.- DIMENSION ARE SHOWN IN INCHES [MILLIMETERS].
3.- LEAD DIMENSION UNCONTROLLED IN L5.
4.- DIMENSION D1, E1, L3 & b3 ESTABLISH A MINIMUM MOUNTING SURFACE FOR THERMAL PAD.
5.- SECTION C-C DIMENSIONS APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN .005 AND 0.10 [0.13 AND 0.25] FROM THE LEAD TIP.
6.- DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED .005 [0.13] PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTMOST EXTREMES OF THE PLASTIC BODY.
7.- DIMENSION b1 & c1 APPLIED TO BASE METAL ONLY.
8.- DATUM A & B TO BE DETERMINED AT DATUM PLANE H.
9.- OUTLINE CONFORMS TO JEDEC OUTLINE TO-252AA.

SYMBOL	DIMENSIONS				NOTES
	MILLIMETERS		INCHES		
	MIN.	MAX.	MIN.	MAX.	
A	2.18	2.39	.086	.094	
A1	–	0.13	–	.005	
b	0.64	0.89	.025	.035	
b1	0.65	0.79	.025	.031	7
b2	0.76	1.14	.030	.045	
b3	4.95	5.46	.195	.215	4
c	0.46	0.61	.018	.024	
c1	0.41	0.56	.016	.022	7
c2	0.46	0.89	.018	.035	
D	5.97	6.22	.235	.245	6
D1	5.21	–	.205	–	4
E	6.35	6.73	.250	.265	6
E1	4.32	–	.170	–	4
e	2.29 BSC		.090 BSC		
H	9.40	10.41	.370	.410	
L	1.40	1.78	.055	.070	
L1	2.74 BSC		.108 REF.		
L2	0.51 BSC		.020 BSC		
L3	0.89	1.27	.035	.050	4
L4	–	1.02	–	.040	
L5	1.14	1.52	.045	.060	3
ø	0°	10°	0°	10°	
ø1	0°	15°	0°	15°	
ø2	25°	35°	25°	35°	

LEAD ASSIGNMENTS

HEXFET

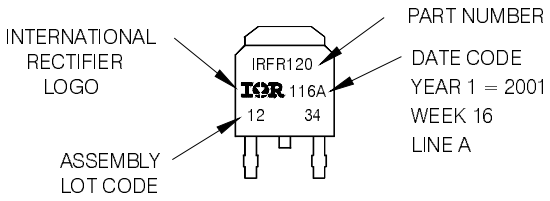
1.- GATE
2.- DRAIN
3.- SOURCE
4.- DRAIN

IGBT & CoPAK

1.- GATE
2.- COLLECTOR
3.- EMITTER
4.- COLLECTOR

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

EXAMPLE: THIS IS AN IRFR120
WITH ASSEMBLY
LOT CODE 1234
ASSEMBLED ON WW 16, 2001
IN THE ASSEMBLY LINE "A"



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

"$\overline{P}$" in assembly line position indicates "Lead-Free" qualification to the Consumer-level

OR