International
IOR Rectifier

PD - 95443B

IRFR3707ZPbF
IRFU3707ZPbF

HEXFET® Power MOSFET

V_{DSS}	$R_{DS(on)}$ max	Qg
30V	9.5mΩ	9.6nC

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

Benefits

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

D-Pak IRFR3707ZPbF

I-Pak IRFU3707ZPbF

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain-to-Source Voltage	30	V
V_{GS}	Gate-to-Source Voltage	± 20	
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 10V	56④	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 10V	39④	
I_{DM}	Pulsed Drain Current ①	220	
P_D @T_C = 25°C	Maximum Power Dissipation	50	W
P_D @T_C = 100°C	Maximum Power Dissipation	25	
	Linear Derating Factor	0.33	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	—	3.0	°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	30	—	—	V	V_{GS} = 0V, I_D = 250µA
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.023	—	V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	7.5	9.5	mΩ	V_{GS} = 10V, I_D = 15A ③
		—	10	12.5		V_{GS} = 4.5V, I_D = 12A ③
$V_{GS(th)}$	Gate Threshold Voltage	1.35	1.80	2.25	V	V_{DS} = V_{GS}, I_D = 25µA
$\Delta V_{GS(th)}/\Delta T_J$	Gate Threshold Voltage Coefficient	—	-5.0	—	mV/°C	
I_{DSS}	Drain-to-Source Leakage Current	—	—	1.0	µA	V_{DS} = 24V, V_{GS} = 0V
		—	—	150		V_{DS} = 24V, 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	71	—	—	S	V_{DS} = 15V, I_D = 12A
Q_g	Total Gate Charge	—	9.6	14		
Q_{gs1}	Pre-Vth Gate-to-Source Charge	—	2.6	—		V_{DS} = 15V
Q_{gs2}	Post-Vth Gate-to-Source Charge	—	0.90	—	nC	V_{GS} = 4.5V
Q_{gd}	Gate-to-Drain Charge	—	3.5	—		I_D = 12A
Q_{godr}	Gate Charge Overdrive	—	2.6	—		See Fig. 16
Q_{sw}	Switch Charge (Q_{gs2} + Q_{gd})	—	4.4	—		
Q_{oss}	Output Charge	—	5.8	—	nC	V_{DS} = 15V, V_{GS} = 0V
$t_{d(on)}$	Turn-On Delay Time	—	8.0	—		V_{DD} = 16V, V_{GS} = 4.5V ③
t_r	Rise Time	—	11	—		I_D = 12A
$t_{d(off)}$	Turn-Off Delay Time	—	12	—	ns	Clamped Inductive Load
t_f	Fall Time	—	3.3	—		
C_{iss}	Input Capacitance	—	1150	—		V_{GS} = 0V
C_{oss}	Output Capacitance	—	260	—	pF	V_{DS} = 15V
C_{rss}	Reverse Transfer Capacitance	—	120	—		f = 1.0MHz

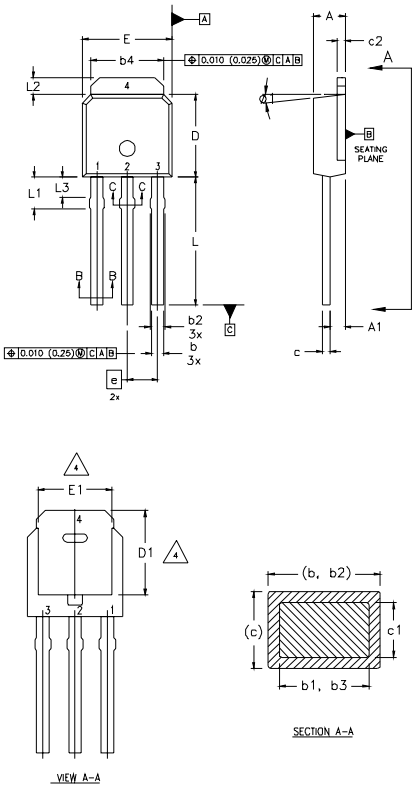
Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy②	—	42	mJ
I_{AR}	Avalanche Current ①	—	12	A
E_{AR}	Repetitive Avalanche Energy ①	—	5.0	mJ

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	56④	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	220		
V_{SD}	Diode Forward Voltage	—	—	1.0	V	T_J = 25°C, I_S = 12A, V_{GS} = 0V ③
t_{rr}	Reverse Recovery Time	—	25	38	ns	T_J = 25°C, I_F = 12A, V_{DD} = 15V
Q_{rr}	Reverse Recovery Charge	—	17	26	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)				

I-Pak (TO-251AA) Package Outline (Dimensions are shown in millimeters (inches)



NOTES:

1 DIMENSIONING AND TOLERANCING PER ASME Y14.5 M- 1994.
2 DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
3 DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.005" (0.127) PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
4 THERMAL PAD CONTOUR OPTION WITHIN DIMENSION b4, L2, E1 & D1.
5 LEAD DIMENSION UNCONTROLLED IN L3.
△6 DIMENSION b1, b3 APPLY TO BASE METAL ONLY.
7 OUTLINE CONFORMS TO JEDEC OUTLINE TO-251AA.
8 CONTROLLING DIMENSION : INCHES.

SYMBOL	DIMENSIONS				NOTES
	MILLIMETERS		INCHES		
	MIN.	MAX.	MIN.	MAX.	
A	2.18	2.39	0.086	.094	
A1	0.89	1.14	0.035	0.045	
b	0.64	0.89	0.025	0.035	
b1	0.64	0.79	0.025	0.031	4
b2	0.76	1.14	0.030	0.045	
b3	0.76	1.04	0.030	0.041	
b4	5.00	5.46	0.195	0.215	4
c	0.46	0.61	0.018	0.024	
c1	0.41	0.56	0.016	0.022	
c2	.046	0.86	0.018	0.035	
D	5.97	6.22	0.235	0.245	3, 4
D1	5.21	-	0.205	-	4
E	6.35	6.73	0.250	0.265	3, 4
E1	4.32	-	0.170	-	4
e	2.29		0.090 BSC		
L	8.89	9.60	0.350	0.380	
L1	1.91	2.29	0.075	0.090	
L2	0.89	1.27	0.035	0.050	4
L3	1.14	1.52	0.045	0.060	5
ø1	0°	15°	0°	15°	

LEAD ASSIGNMENTS

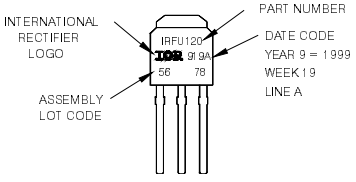
HEXFET

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

I-Pak (TO-251AA) Part Marking Information

EXAMPLE: THIS IS AN IRFU120
WITH ASSEMBLY
LOT CODE 5678
ASSEMBLED ON WW 19, 1999
IN THE ASSEMBLY LINE "A"

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



OR