SMPS MOSFET

PD - 95472A

International
IOR Rectifier

IRFB18N50KPbF

HEXFET® Power MOSFET

Applications

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply
- High Speed Power Switching
- Hard Switched and High Frequency Circuits
- Lead-Free

V_{DSS}	$R_{DS(on)}$ typ.	I_D
500V	0.26Ω	17A

TO-220AB

Benefits

- Low Gate Charge Qg results in Simple Drive Requirement
- Improved Gate, Avalanche and Dynamic dv/dt Ruggedness
- Fully Characterized Capacitance and Avalanche Voltage and Current
- Low $R_{DS(on)}$

Absolute Maximum Ratings

	Parameter	Max.	Units
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 10V	17	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 10V	11	
I_{DM}	Pulsed Drain Current ①	68	
P_D @T_C = 25°C	Power Dissipation	220	W
	Linear Derating Factor	1.8	W/°C
V_{GS}	Gate-to-Source Voltage	± 30	V
dv/dt	Peak Diode Recovery dv/dt ③	7.8	V/ns
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150	°C
	Soldering Temperature, for 10 seconds (1.6mm from case)	300	
	Mounting Torque, 6-32 or M3 screw	10	N

Avalanche Characteristics

Symbol	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy②	—	370	mJ
I_{AR}	Avalanche Current①	—	17	A
E_{AR}	Repetitive Avalanche Energy①	—	22	mJ

Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case⑥	—	0.56	°C/W
$R_{\theta CS}$	Case-to-Sink, Flat, Greased Surface	0.50	—	
$R_{\theta JA}$	Junction-to-Ambient⑥	—	58	

02/03/06

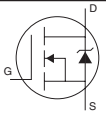
Static @ T_J = 25°C (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	500	——	——	V	V_{GS} = 0V, I_D = 250µA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	——	0.59	——	V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	——	0.26	0.29	Ω	V_{GS} = 10V, I_D = 10A ④
$V_{GS(th)}$	Gate Threshold Voltage	3.0	——	5.0	V	V_{DS} = V_{GS}, I_D = 250µA
I_{DSS}	Drain-to-Source Leakage Current	——	——	50	µA	V_{DS} = 500V, V_{GS} = 0V
		——	——	250	µA	V_{DS} = 400V, V_{GS} = 0V, T_J = 125°C
I_{GSS}	Gate-to-Source Forward Leakage	——	——	100	nA	V_{GS} = 30V
	Gate-to-Source Reverse Leakage	——	——	-100		V_{GS} = -30V

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

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
g_{fs}	Forward Transconductance	6.4	——	——	S	V_{DS} = 50V, I_D = 10A
Q_g	Total Gate Charge	——	——	120	nC	I_D = 17A
Q_{gs}	Gate-to-Source Charge	——	——	34		V_{DS} = 400V
Q_{gd}	Gate-to-Drain ("Miller") Charge	——	——	54		V_{GS} = 10V, See Fig. 6 and 13 ④
$t_{d(on)}$	Turn-On Delay Time	——	22	——	ns	V_{DD} = 250V
t_r	Rise Time	——	60	——		I_D = 17A
$t_{d(off)}$	Turn-Off Delay Time	——	45	——		R_G = 7.5Ω
t_f	Fall Time	——	30	——		V_{GS} = 10V,See Fig. 10 ④
C_{iss}	Input Capacitance	——	2830	——	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	——	330	——		V_{DS} = 25V
C_{rss}	Reverse Transfer Capacitance	——	38	——		f = 1.0MHz, See Fig. 5
C_{oss}	Output Capacitance	——	3310	——		V_{GS} = 0V, V_{DS} = 1.0V, f = 1.0MHz
C_{oss}	Output Capacitance	——	93	——		V_{GS} = 0V, V_{DS} = 400V, f = 1.0MHz
C_{oss} eff.	Effective Output Capacitance	——	155	——		V_{GS} = 0V, V_{DS} = 0V to 400V ⑤

Diode Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	——	——	17	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	——	——	68		
V_{SD}	Diode Forward Voltage	——	——	1.5	V	T_J = 25°C, I_S = 17A, V_{GS} = 0V ④
t_{rr}	Reverse Recovery Time	——	520	780	ns	T_J = 25°C, I_F = 17A
Q_{rr}	Reverse RecoveryCharge	——	5.3	8.0	µC	di/dt = 100A/µs ④
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by L_S+L_D)				

Notes:

① Repetitive rating; pulse width limited by max. junction temperature.

② Starting T_J = 25°C, L = 2.5mH, R_G = 25Ω, I_{AS} = 17A,

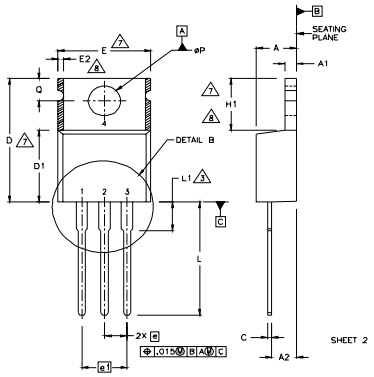
③ I_{SD} ≤ 17A, di/dt ≤ 376A/µs, V_{DD} ≤ $V_{(BR)DSS}$, T_J ≤ 150°C

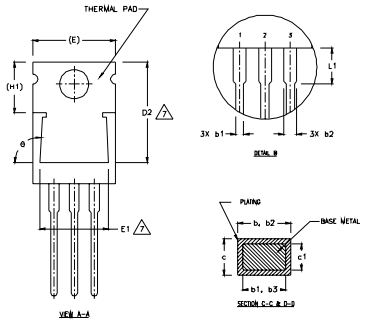
④ Pulse width ≤ 300µs; duty cycle ≤ 2%.

⑤ C_{oss} eff. is a fixed capacitance that gives the same charging time as C_{oss} while V_{DS} is rising from 0 to 80% V_{DSS}.

⑥ R_θ is measured at T_J approximately 90°C

TO-220AB Package Outline (Dimensions are shown in millimeters (inches)





NOTES:

1 DIMENSIONING AND TOLERANCING PER ASME Y14.5 M- 1994.
2 DIMENSIONS ARE SHOWN IN INCHES [MILLIMETERS].
3 LEAD DIMENSION AND FINISH UNCONTROLLED IN L1.
4 DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED .005" (0.127) PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
5 DIMENSION b1 & c1 APPLY TO BASE METAL ONLY.
6 CONTROLLING DIMENSION : INCHES.
7 THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSIONS E,H1,D2 & E1
8 DIMENSION E2 X H1 DEFINE A ZONE WHERE STAMPING AND SINGULATION IRREGULARITIES ARE ALLOWED.

LEAD ASSIGNMENTS

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

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

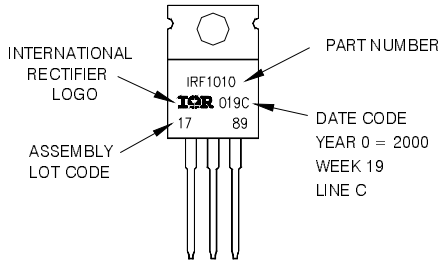
DIODES
1.- ANODE/OPEN
2.- CATHODE
3.- ANODE

SYMBOL	DIMENSIONS				NOTES
	MILLIMETERS		INCHES		
	MIN.	MAX.	MIN.	MAX.	
A	3.56	4.82	.140	.190	
A1	0.51	1.40	.020	.055	
A2	2.04	2.92	.080	.115	
b	0.38	1.01	.015	.040	
b1	0.38	0.96	.015	.038	5
b2	1.15	1.77	.045	.070	
b3	1.15	1.73	.045	.068	
c	0.36	0.61	.014	.024	
c1	0.36	0.56	.014	.022	5
D	14.22	16.51	.560	.650	4
D1	8.38	9.02	.330	.355	
D2	12.19	12.88	.480	.507	7
E	9.66	10.66	.380	.420	4,7
E1	8.38	8.89	.330	.350	7
e	2.54 BSC		.100 BSC		
e1	5.08		.200 BSC		
H1	5.85	6.55	.230	.270	7,8
L	12.70	14.73	.500	.580	
L1	–	6.35	–	.250	3
øP	3.54	4.08	.139	.161	
Q	2.54	3.42	.100	.135	
ø	90°-93°		90°-93°		

TO-220AB Part Marking Information

EXAMPLE: THIS IS AN IRF1010
LOT CODE 1789
ASSEMBLED ON WW 19, 2000
IN THE ASSEMBLY LINE 'C'

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



TO-220AB packages are not recommended for Surface Mount Application.

This product has been designed and qualified for the industrial market.
Qualification Standards can be found on IR's Web site.

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