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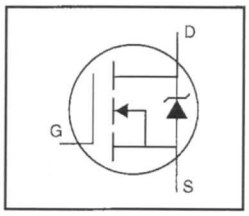
IRFP254

HEXFET® Power MOSFET

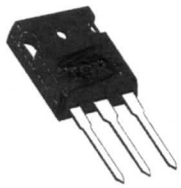
- Dynamic dv/dt Rating
- Repetitive Avalanche Rated
- Isolated Central Mounting Hole
- Fast Switching
- Ease of Paralleling
- Simple Drive Requirements



V_{DSS} = 250V

$R_{DS(on)}$ = 0.14Ω

I_D = 23A



TO-247AC

The TO-247 package is preferred for commercial–industrial applications where higher power levels preclude the use of TO-220 devices. The TO-247 is similar but superior to the earlier TO-218 package because of its isolated mounting hole. It also provides greater creepage distance between pins to meet the requirements of most safety specifications.

Absolute Maximum Ratings

	Parameter	Max.	Units
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 10 V	23	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 10 V	15	
I_{DM}	Pulsed Drain Current ①	92	
P_D @ T_C = 25°C	Power Dissipation	190	W
	Linear Derating Factor	1.5	W/°C
V_{GS}	Gate-to-Source Voltage	±20	V
E_{AS}	Single Pulse Avalanche Energy ②	410	mJ
I_{AR}	Avalanche Current ①	23	A
E_{AR}	Repetitive Avalanche Energy ①	19	mJ
dv/dt	Peak Diode Recovery dv/dt ③	4.8	V/ns
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +150	°C
	Soldering Temperature, for 10 seconds	300 (1.6mm from case)	
	Mounting Torque, 6-32 or M3 screw	10 lbf•in (1.1 N•m)	

Thermal Resistance

	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	—	—	0.65	°C/W
$R_{\theta CS}$	Case-to-Sink, Flat, Greased Surface	—	0.24	—	
$R_{\theta JA}$	Junction-to-Ambient	—	—	40	

Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	250	—	—	V	V_{GS}=0V, I_D= 250μA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.39	—	V/°C	Reference to 25°C, I_D= 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.14	Ω	V_{GS}=10V, I_D=14A ④
$V_{GS(th)}$	Gate Threshold Voltage	2.0	—	4.0	V	V_{DS}=V_{GS}, I_D= 250μA
g_{fs}	Forward Transconductance	11	—	—	S	V_{DS}=50V, I_D=14A ④
I_{DSS}	Drain-to-Source Leakage Current	—	—	25	μA	V_{DS}=250V, V_{GS}=0V
		—	—	250		V_{DS}=200V, 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
Q_g	Total Gate Charge	—	—	140	nC	I_D=23A
Q_{gs}	Gate-to-Source Charge	—	—	24		V_{DS}=200V
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	—	71		V_{GS}=10V See Fig. 6 and 13 ④
$t_{d(on)}$	Turn-On Delay Time	—	15	—	ns	V_{DD}=125V
t_r	Rise Time	—	63	—		I_D=23A
$t_{d(off)}$	Turn-Off Delay Time	—	74	—		R_G=6.2Ω
t_f	Fall Time	—	50	—		R_D=5.4Ω See Figure 10 ④
L_D	Internal Drain Inductance	—	5.0	—	nH	Between lead, 6 mm (0.25in.) from package and center of die contact 
L_S	Internal Source Inductance	—	13	—		
C_{iss}	Input Capacitance	—	2700	—	pF	V_{GS}=0V
C_{oss}	Output Capacitance	—	620	—		V_{DS}= 25V
C_{rss}	Reverse Transfer Capacitance	—	180	—		f=1.0MHz See Figure 5

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	—	—	23	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	92		
V_{SD}	Diode Forward Voltage	—	—	1.8	V	T_J=25°C, I_S=23A, V_{GS}=0V ④
t_{rr}	Reverse Recovery Time	—	370	560	ns	T_J=25°C, I_F=23A
Q_{rr}	Reverse Recovery Charge	—	4.6	6.9	μC	di/dt=100A/μs ④
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is neglegible (turn-on is dominated by L_S+L_D)				

Notes:

① Repetitive rating; pulse width limited by max. junction temperature (See Figure 11)

② V_{DD}=50V, starting T_J=25°C, L=1.2mH R_G=25Ω, I_{AS}=23A (See Figure 12)

③ I_{SD}≤23A, di/dt≤180A/μs, V_{DD}≤$V_{(BR)DSS}$, T_J≤150°C

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