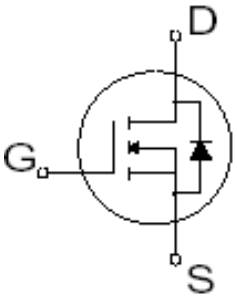
LTO-DMS

IRFP640

HEXFET® Power MOSFET

- Dynamic dv/dt Rating
- Repetitive Avalanche Rated
- Fast switching
- Ease of Paralleling
- Simple Drive Requirements



V_{DSS} = 200V

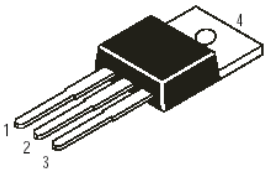
I_D = 18A

$R_{DS(ON)}$ =0.18Ω

Description

Third Generation HEXFETs from International Rectifier provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The TO-220 package is universally preferred for all commercial-industrial applications at power dissipation levels to approximately 50watts. The low thermal resistance and low package cost of the TO-220 contribute to its wide acceptance throughout the industry.



Pin1–Gate
Pin2–Drain
Pin3–Source

Absolute Maximum Ratings

	Parameter	Max.	Units
I_D@T_C=25 ˚C	Continuous Drain Current, V_{GS}@10V	18	A
I_D@T_C=100˚C	Continuous Drain Current, V_{GS}@10V	11	
I_{DM}	Pulsed Drain Current ①	72	
P_D@T_C=25˚C	Power Dissipation	125	W
	Linear Derating Factor	1.0	W/ ˚C
V_{GS}	Gate-to-Source Voltage	±20	V
E_{AS}	Single Pulse Avalanche Energy ②	580	mJ
I_{AR}	Avalanche Current ①	18	A
E_{AR}	Repetitive Avalanche Energy ①	13	mJ
dv/dt	Peak Diode Recovery dv/dt ③	5.0	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(1.1N•m)	

Thermal Resistance

	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case	—	—	1.0	˚C/W
$R_{\theta CS}$	Case-to-Sink, Flat, Greased Surface	—	0.50	—	
$R_{\theta JA}$	Junction-to-Ambient	—	—	62	

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Electrical Characteristics @TJ=25 ˚C(unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	200	—	—	V	V_{GS}=0V,I_D=250uA
$\triangle V_{(BR)DSS}/\triangle T_J$	Breakdown Voltage Temp. Coefficient	—	0.29	—	V/˚C	Reference to 25˚C,I_D=1mA
$R_{DS(on)}$	Static Drain-to-Source On-resistance	—	—	0.18	Ω	V_{GS}=10V,I_D=11A ④
$V_{GS(th)}$	Gate Threshold Voltage	2.0	—	4.0	V	V_{DS}=V_{GS}, I_D=250μA
gfs	Forward Transconductance	6.7	—	—	S	V_{DS}=50V,I_D=11A ④
I_{DSS}	Drain-to-Source Leakage current	—	—	25	μA	V_{DS}=200V,V_{GS}=0V
		—	—	250		V_{DS}=160V,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
Qg	Total Gate Charge	—	—	70	nC	I_D=18A
Qgs	Gate-to-Source charge	—	—	13		V_{DS}=160V
Qgd	Gate-to-Drain("Miller") charge	—	—	39		V_{GS}=10V See Fig.6 and 13④
$t_{d(on)}$	Turn-on Delay Time	—	14	—	nS	V_{DD}=100V
t_r	Rise Time	—	51	—		I_D=18A
$t_{d(off)}$	Turn-Off Delay Time	—	45	—		R_G=9.1Ω
t_f	Fall Time	—	36	—		R_D=5.4Ω See Figure 10④
L_D	Internal Drain Inductance	—	4.5	—	nH	Between lead, 6mm(0.25in.) from package and center of die contact
L_S	Internal Source Inductance	—	7.5	—		
Ciss	Input Capacitance	—	1300	—	pF	V_{GS}=0V
Coss	Output Capacitance	—	430	—		V_{DS}=25V
Crss	Reverse Transfer Capacitance	—	130	—		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)	—	—	18	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	72		
V_{SD}	Diode Forward Voltage	—	—	2.0	V	T_J=25˚C,I_S=18A,V_{GS}=0V ④
trr	Reverse Recovery Time	—	300	610	nS	T_J=25˚C,I_F=18A
Qrr	Reverse Recovery Charge	—	3.4	7.1	μC	di/dt=100A/μs ④
ton	Forward Turn-on Time	Intrinsic turn-on time is negligible (turn-on is dominated by Ls + L_D)				

Notes:

① Repetitive rating; pulse width limited by max. junction temperature(see figure 11)

② VDD=50V ,starting TJ=25 ˚C ,L=4.6mH RG=25Ω， IAS=18A(see Figure 12)

③ISD≤18A,di/dt≤120A/μS,VDD≤V(BR)DSS, TJ≤150 ˚C

④Pulse width≤300μS; duty cycle≤2%.