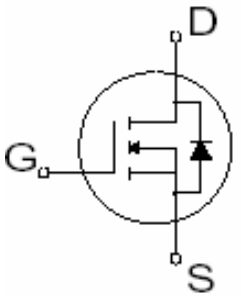
STEK

E 1010

HEXFET® Power MOSFET

- Advanced Process Technology
- Ultra Low On-Resistance
- Dynamic dv/dt Rating
- 175°C Operating Temperature
- Fast Switching
- Fully Avalanche Rated



V_{DSS} = 60V

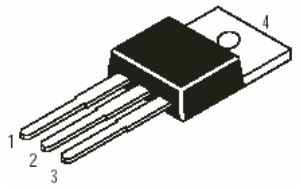
I_D = 84A

$R_{DS(ON)}$ =13mΩ

Description

Advanced HEXFET® Power MOSFETs from International Rectifier utilize advanced processing techniques to achieve extremely low on-resistance per silicon area. This benefit, combined with the fast switching speed and ruggedized device design that HEXFET power MOSFETs are well known for, provides the designer with an extremely efficient and reliable device for use in a wide variety of applications.

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



Pin1–Gate

Pin2–Drain

Pin3–Source

Absolute Maximum Ratings

	Parameter	Max.	Units
ID @ TC = 25°C	Continuous Drain Current, VGS @ 10V	84.⑦	A
ID @ TC = 100°C	Continuous Drain Current, VGS @ 10V	59	
I_{DM}	Pulsed Drain Current ①	330	
PD @TC = 25°C	Power Dissipation	170	W
	Linear Derating Factor	1.4	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
I_{AR}	Avalanche Current①	50	A
E_{AR}	Repetitive Avalanche Energy①	17	mJ
dv/dt	Peak Diode Recovery dv/dt . ③	4.0	V/ns
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 175	°C
	Soldering Temperature, for 10 seconds	300 (1.6mm from case)	
	Mounting torque, 6-32 or M3 srew	10 lbf•in (1.1N•m)	

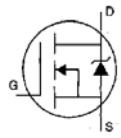
Thermal Resistance

	Parameter	Typ.	Max.	Units
RθJC	Junction-to-Case	—	0.75	°C/W
RθCS	Case-to-Sink, Flat, Greased Surface	0.50	—	
RθJA	Junction-to-Ambient	—	62	

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

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	60	—	—	V	V_{GS}=0V,I_D=250uA
$\triangle V_{(BR)DSS}/\triangle T_J$	Breakdown Voltage Temp. Coefficient	—	0.064	—	V/˚C	Reference to 25˚C,I_D=1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	13	mΩ	V_{GS}=10V,I_D=50A ④
$V_{GS(th)}$	Gate Threshold Voltage	2.0	—	4.0	V	V_{DS}=V_{GS}, I_D=250μA
gfs	Forward Transconductance	20	—	—	S	V_{DS}=25V,I_D=50A ④
I_{DSS}	Drain-to-Source Leakage current	—	—	25	μA	V_{DS}=60V,V_{GS}=0V
		—	—	250		V_{DS}=48V,V_{GS}=0V,T_J=150˚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	—	—	130	nC	I_D=50A
Qgs	Gate-to-Source charge	—	—	28		V_{DS}=48V
Qgd	Gate-to-Drain ("Miller") charge	—	—	44		V_{GS}=10V See Fig.6 and 13④
$t_{d(on)}$	Turn-on Delay Time	—	12	—	nS	V_{DD}=30V
tr	Rise Time	—	78	—		I_D=50A
$t_{d(off)}$	Turn-Off Delay Time	—	48	—		R_G=3.6Ω
tf	Fall Time	—	53	—		V_{GS} =10V See Figure 10④
LD	Internal Drain Inductance	—	4.5	—	nH	Between lead, 6mm(0.25in.) from package and center of die contact
LS	Internal Source Inductance	—	7.5	—		
Ciss	Input Capacitance	—	3210	—	pF	V_{GS}=0V
Coss	Output Capacitance	—	690	—		V_{DS}=25V
Crss	Reverse Transfer Capacitance	—	140	—		f=1.0MHz See Figure 5
EAS	Single Pulse Avalanche Energy.	—	1180	320	mJ	I_{AS} = 50A, L = 260μH

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	—	—	84	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	330		
V_{SD}	Diode Forward Voltage	—	—	1.3	V	T_J=25˚C,I_S=50A,V_{GS}=0V ④
trr	Reverse Recovery Time	—	73	110	nS	T_J=25˚C,I_F=50A di/dt=100A/μs ④
Qrr	Reverse Recovery Charge	—	220	330	μC	
ton	Forward Turn-on Time	Intrinsic turn-on time is neglegible (turn-on is dominated by Ls + L_D)				

Notes:

1. Repetitive rating; pulse width limited by max. junction temperature.
2. Starting TJ = 25°C, L = 260μH
RG = 25W, IAS = 50A, VGS =10V
3. ISD≤50A, di/dt≤230A/μs, VDD≤V(BR)DSS, TJ≤175°C
4. Pulse width≤400μs; duty cycle ≤2%.
5. This is a typical value at device destruction and represents
operation outside rated limits.
6. This is a calculated value limited to TJ = 175°C .
7.Calculated continuous current based on maximum allowable
junction temperature. Package limitation current is 75A.