Bulletin E27111

International IOR Rectifier

IRFK6H250,IRFK6J250

Isolated Base Power HEX-pak™ Assembly - Parallel Chip Configuration

- High Current Capability.
- UL recognised E78996.
- Electrically Isolated Base Plate.
- Easy Assembly into Equipment.

V_{DS} = 200V

$R_{DS(on)}$ = 15mΩ

I_D = 140A

Description

The HEX-pak™ utilises the well-proven HEXFET™ die, combining low on-state resistance with high transconductance. These superior technology die are assembled by state of the art techniques into the TO-240 package, featuring 2.5kV rms isolation and solid M5 screw connections. The small footprint means the package is highly suited to power applications where space is a premium. Available in two versions, IRFK.H... for fast switching and IRFK.J... for oscillation sensitive applications.

Absolute Maximum Rating

	Parameter	Max.	Units
I_D @ T_C=25°C	Continuous Drain Current	140	A
I_D @ T_C=100°C	Continuous Drain Current	90	A
I_{DM}	Pulse Drain Current	560	A ①
P_D @ T_C=25°C	Maximum Power Dissipation	625	W
V_{GS}	Gate-to-Source Voltage	20	V
V_{INS}	R.M.S. Isolation Voltage, circuit to base	2.5	kV
T_J	Operating Junction Temperature Range	-40 to 150	°C
T_{STG}	Storage Temperature Range	-40 to 150	°C

Thermal and Mechanical Specifications

	Parameter	Min.	Typ.	Max.	Units
R_{thJC}	Junction-to-Case	-	-	0.20	K/W ②
R_{thCS}	Case-to-Sink, smooth & greased surface	-	0.1	-	K/W
T	Mounting Torque ±10%				③
	HEXpak to Heatsink	-	5	-	Nm
	Busbar to HEXpak	-	3	-	Nm
wt	Approximate Weight	-	140	-	g
		-	5	-	oz

Notes:

① - Repetitive Rating: Pulse width limited by maximum junction temperature see figure 8.

② - Per Module.

③ - A mounting compound is recommended and the torque should be rechecked after a period of three hours to allow for the spread of the compound.

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

	Parameter		Min.	Typ.	Max.	Units	Test Conditions
B_{VDSS}	Drain-to-Source Breakdown voltage		200	-	-	V	V_{GS}=0V, I_D=1.0mA
$R_{DS(on)}$	Static Drain-to-Source On-State Resistance		-	12	15	mΩ	V_{GS}=10V, I_D=90A
$I_{D(on)}$	On-State Drain Current		140	-	-	A	$V_{DS} > I_{D(on)} \times R_{DS(on)}$max, V_{GS}=10V
$V_{GS(th)}$	Gate Threshold Voltage		2.0	-	4.0	V	V_{DS}=V_{GS}, I_D=1.5mA
g_{fs}	Forward Transconductance ④		66	100	-	S	V_{DS} > 50V, I_D=90A
I_{DSS}	Zero Gate Voltage Drain Current		-	-	1.5	mA	V_{DS}=V_{DS}max, V_{GS}=0v
			-	-	6.0	mA	V_{GS}=10V, T_C=125°C, V_{DS}=V_{DS}max x 0.8
I_{GSS}	Gate-to-Source Leakage Forward		-	-	600	nA	V_{GS}=20V
I_{GSS}	Gate-to-Source Leakage Reverse		-	-	-600	nA	V_{GS}=-20V
Q_g	Total Gate Charge		-	500	610	nC	I_D=140A, V_{GS}=10V,
Q_{gs}	Gate-to-Source Charge		-	75	120	nC	V_{DS}=V_{DS}max x 0.8
Q_{gd}	Gate-to-Drain ("Miller") Charge		-	260	400	nC	
$t_{d(on)}$	Turn-on Delay Time	IRFK6H250	-	65	-	ns	V_{DD}=95V, I_D=90A,
		IRFK6J250	-	75	-	ns	
t_r	Rise Time	IRFK6H250	-	200	-	ns	V_{GS}=10V,
		IRFK6J250	-	250	-	ns	
$t_{d(off)}$	Turn-off Delay Time	IRFK6H250	-	300	-	ns	R_{SOURCE}=3.3Ω
		IRFK6J250	-	400	-	ns	
t_f	Fall Time	IRFK6H250	-	105	-	ns	
		IRFK6J250	-	170	-	ns	
L_{DS}	Drain-to-Source Inductance		-	18	-	nH	
C_{iss}	Input Capacitance		-	15	-	nF	V_{GS}=0V, V_{DS}=25V,
C_{oss}	Output Capacitance		-	4.0	-	nF	f=1.0MHz
C_{rss}	Reverse Transfer Capacitance		-	1.5	-	nF	
	Linear Derating Factor		-	-	5	W/K	

Source-Drain Diode Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	-	-	140	A	
I_{SM}	Pulsed Source Current (Body Diode)	-	-	490	A	
V_{SD}	Diode Forward Voltage	-	-	2.0	V	V_{GS}=0V, I_S= 140A, T_C=25°C
t_{rr}	Reverse Recovery Time	140	300	630	ns	di/dt=400A/µs, T_J=150°C
Q_{rr}	Reverse Recovered Charge	10.0	23.0	50.0	µC	I_S=140A

Notes:

④ - Pulse Width ≤ 300µs; Duty cycle ≤ 2%.

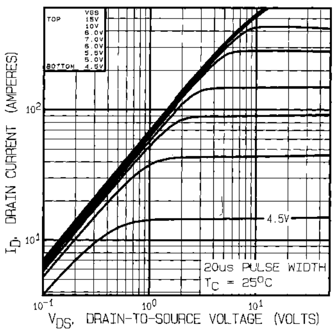


Fig 1. Typical Output Characteristics, T_C=25°C

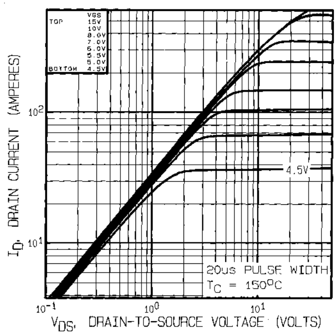


Fig 2. Typical Output Characteristics, T_C=150°C

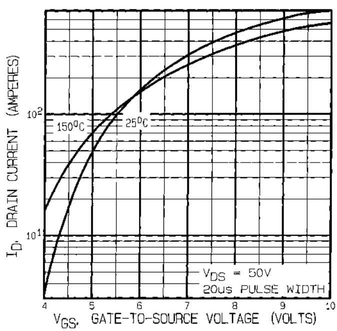


Fig 3. Typical Transfer Characteristics

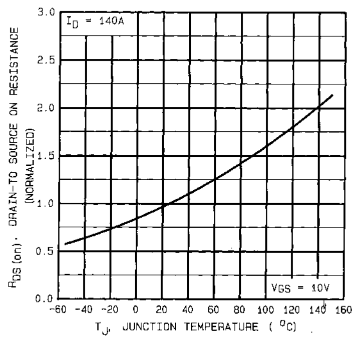


Fig 4. Normalized On-Resistance Vs. Temperature

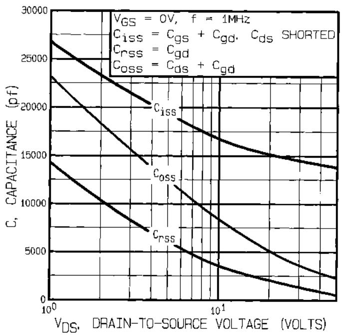


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

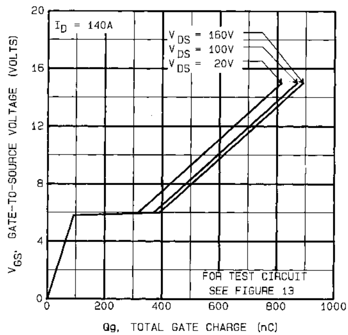


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

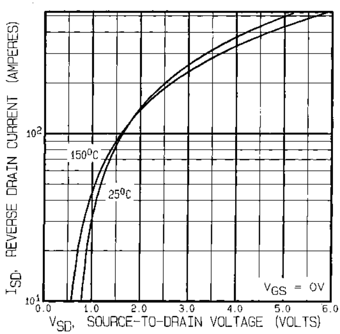


Fig 7. Typical Source-Drain Diode Forward Voltage

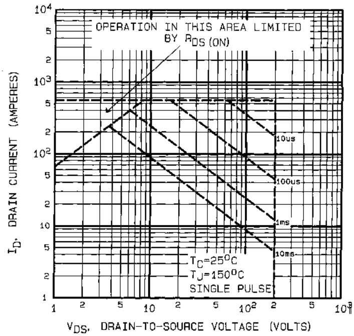


Fig 8. Maximum Safe Operating Area

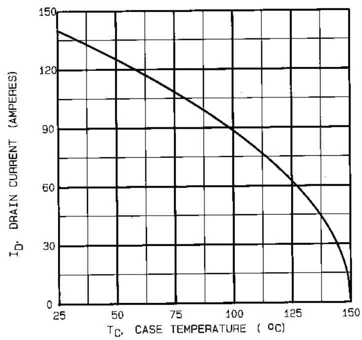


Fig 9. Maximum Drain Current Vs. Case Temperature

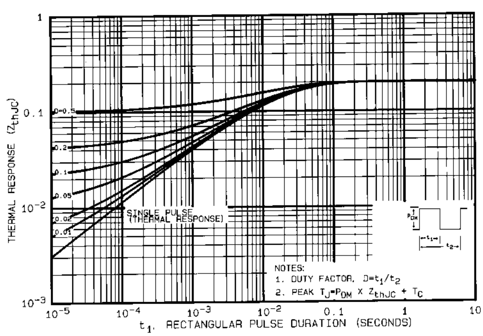


Fig 10. Maximum Effective Transient Thermal Impedance, Junction-to-Case

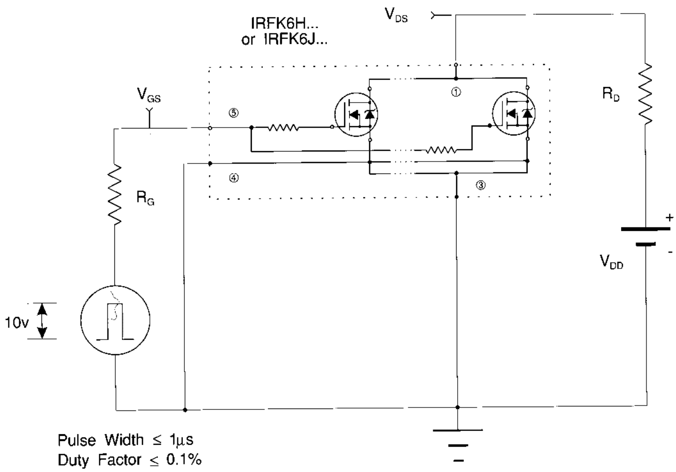


Fig 11a. Switching Time Test Circuit

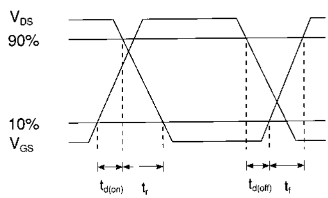
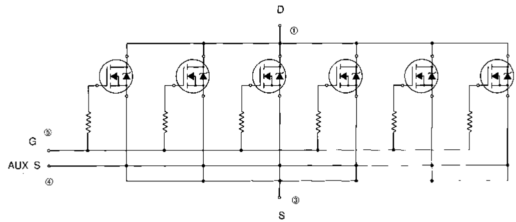
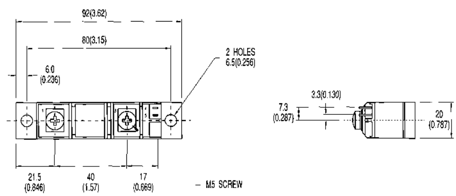
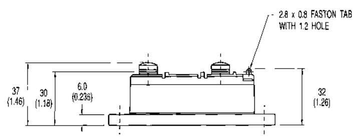


Fig 11b. Switching Time Waveforms

Circuit Configuration and Outline



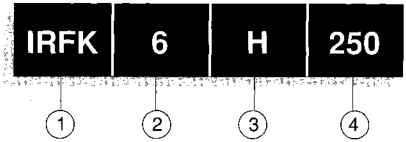




NOTE:
DEVICE IS SUPPLIED WITH
AUXILARY LEADS 200(7.87) LONG

All dimensions in millimetres (inches)

Part Numbering



1. - HEX-pak Module.
2. - Number of HEXFETs in parallel.
3. - H - Fast switching.
   - J - Oscillation resistant for sensitive applications.
4. - Voltage code:- 054 - 60V
   150 - 100V
   250 - 200V
   350 - 400V
   450 - 500V
   C50 - 600V

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