

International IOR Rectifier IRFK4HE50, IRFK4JE50

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

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

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.

$$V_{DS} = 800V$$

$$R_{DS(on)} = 300m\Omega$$

$$I_D = 26A$$

Absolute Maximum Rating

	Parameter	Max.	Units
I_D @ $T_C=25^\circ C$	Continuous Drain Current	26	A
I_D @ $T_C=100^\circ C$	Continuous Drain Current	16	A
I_{DM}	Pulse Drain Current	104	A ①
P_D @ $T_C=25^\circ C$	Maximum Power Dissipation	500	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	$^\circ C$
T_{STG}	Storage Temperature Range	-40 to 150	$^\circ C$

Thermal and Mechanical Specifications

	Parameter	Min.	Typ.	Max.	Units
R_{thJC}	Junction-to-Case	-	-	0.25	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.

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

	Parameter	Min.	Typ.	Max.	Units	Test Conditions	
B _V DSS	Drain-to-Source Breakdown voltage	800	-	-	V	V _{GS} =0V, I _D =1.0mA	
R _{DS(on)}	Static Drain-to-Source On-State Resistance	-	240	300	mΩ	V _{GS} =10V, I _D =8A	
I _{D(on)}	On-State Drain Current	26	-	-	A	V _{DS} > I _{D(on)} × R _{DS(on)} max, V _{GS} =10V	
V _{GS(th)}	Gate Threshold Voltage	2.0	-	4.0	V	V _{DS} =V _{GS} , I _D =1.0mA	
g _{fs}	Forward Transconductance ③	26	35	-	S	V _{DS} > 50V, I _D =16A	
I _{DSS}	Zero Gate Voltage Drain Current	-	-	1.0	mA	V _{DS} =V _{GS} max, V _{GS} =0V	
		-	-	4.0	mA	V _{GS} =10V, T _C =125°C, V _{DS} =V _{GS} max × 0.8	
I _{GSS}	Gate-to-Source Leakage Forward	-	-	400	nA	V _{GS} =20V	
I _{GSS}	Gate-to-Source Leakage Reverse	-	-	-400	nA	V _{GS} =-20V	
Q _g	Total Gate Charge	-	580	760	nC	I _D =26A, V _{GS} =10V,	
Q _{gs}	Gate-to-Source Charge	-	40	60	nC	V _{DS} =V _{DS} max × 0.8	
Q _{gd}	Gate-to-Drain ("Miller") Charge	-	288	440	nC		
t _{d(on)}	Turn-on Delay Time	IRFK4HE50	-	70	-	ns	V _{DD} =400V, I _D =16A,
		IRFK4JE50	-	80	-	ns	
t _r	Rise Time	IRFK4HE50	-	55	-	ns	V _{GS} =10V,
		IRFK4JE50	-	70	-	ns	
t _{d(off)}	Turn-off Delay Time	IRFK4HE50	-	350	-	ns	R _{SOURCE} =3.3Ω
		IRFK4JE50	-	470	-	ns	
t _f	Fall Time	IRFK4HE50	-	60	-	ns	
		IRFK4JE50	-	100	-	ns	
L _{DS}	Drain-to-Source Inductance	-	18	-	nH		
C _{iss}	Input Capacitance	-	10.5	-	nF	V _{GS} =0V, V _{DS} =25V,	
C _{oss}	Output Capacitance	-	2.5	-	nF	f=1.0MHz	
C _{rss}	Reverse Transfer Capacitance	-	2.0	-	nF		
V _{INS}	R.M.S. Isolation Voltage	2.5	-	-	kV	Circuit to Base	

Source-Drain Diode Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I _S	Continuous Source Current (Body Diode)	-	-	26	A	
I _{SM}	Pulsed Source Current (Body Diode)	-	-	90	A	
V _{SD}	Diode Forward Voltage	-	-	1.8	V	V _{GS} =0V, I _S =26A, T _C =25°C
t _{rr}	Reverse Recovery Time	370	770	1600	ns	di/dt=400A/μs, T _J =150°C
Q _{rr}	Reverse Recovered Charge	12.0	26.0	52.0	μC	I _S =26A

Notes:

③ - Pulse Width ≤ 300μs; Duty cycle ≤ 2%.



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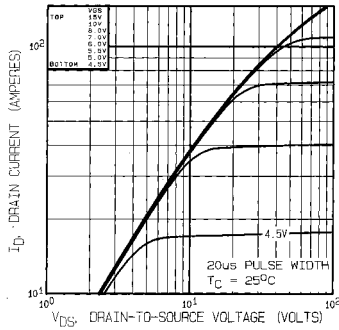


Fig 1. Typical Output Characteristics,
 $T_C = 25^\circ\text{C}$

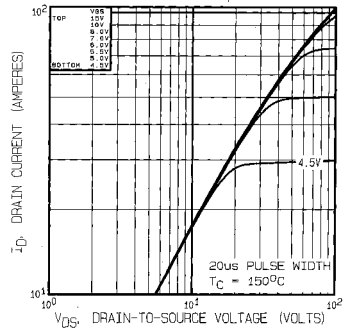


Fig 2. Typical Output Characteristics,
 $T_C = 150^\circ\text{C}$

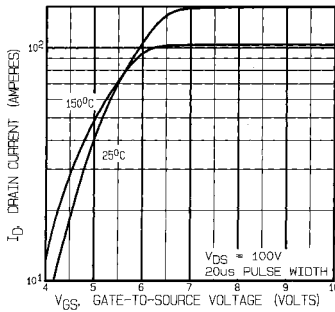


Fig 3. Typical Transfer Characteristics

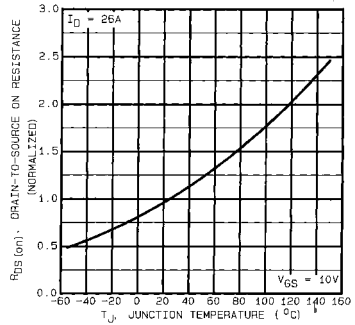


Fig 4. Normalized On-Resistance Vs.
Temperature

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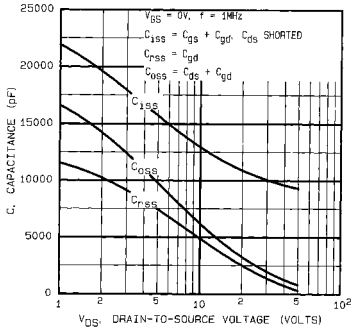


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

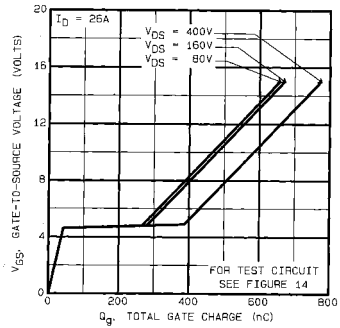


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

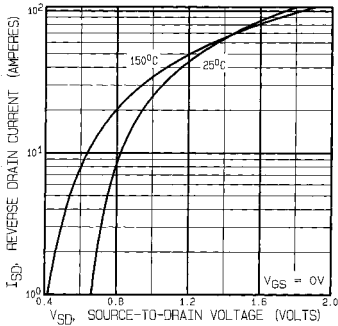


Fig 7. Typical Source-Drain Diode Forward Voltage

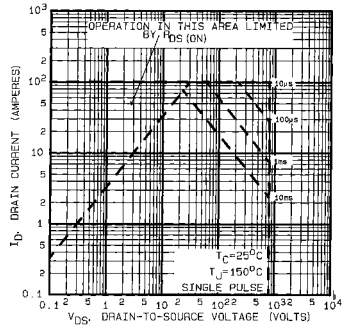


Fig 8. Maximum Safe Operating Area



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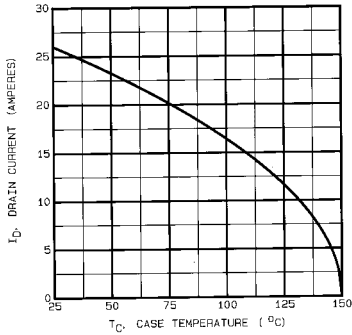


Fig 9. Maximum Drain Current Vs. Case Temperature

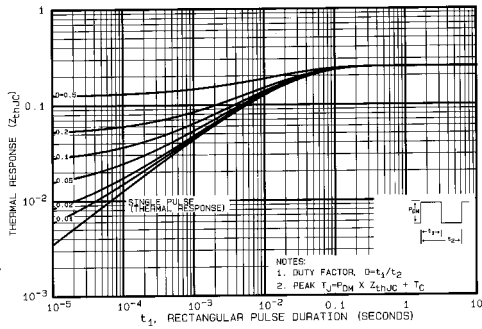


Fig 10. Maximum Effective Transient Thermal Impedance, Junction-to-Case

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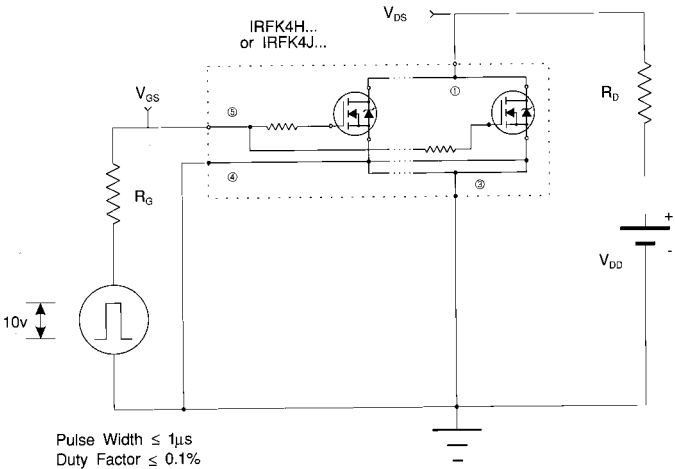


Fig 11a. Switching Time Test Circuit

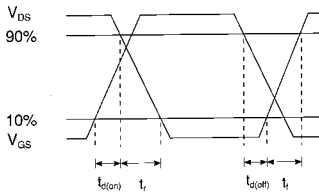
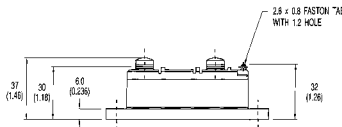
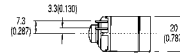
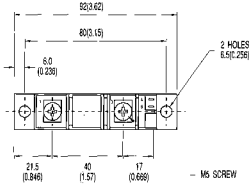
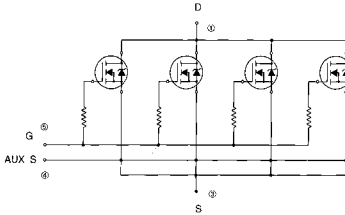


Fig 11b. Switching Time Waveforms



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Circuit Configuration and Outline



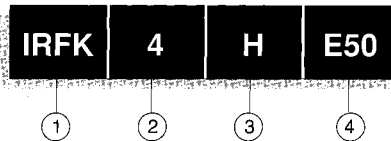
NOTE:
DEVICE IS SUPPLIED WITH
AUXILIARY LEADS 200(7.87) LONG

All dimensions in millimetres (inches)

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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
 - E50 - 800V

WORLD HEADQUARTERS: 233 Kansas St., EL SEGUNDO, California 90245, USA. Tel:(213) 772-2000. Tlx:664464. Fax:(213) 772-9028
EUROPEAN HEADQUARTERS: Hurst Green, OXTED, Surrey RH9 9BB, UK. Tel:(0863) 713215. Tlx:95219. Fax:(0863)714234.

CANADA: 101 Bentley St., Markham, ONTARIO L3R 3J1, Tel:(416)475-1897. Tlx:06-966-650. Fax:(416)475-8801
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DENMARK: P.O. Box 70, Krogsholmvej 51, DK-2880 BAGSVAERD, Tel: (45) 44 37 71 50, Fax: (45) 44 37 71 52.

FRANCE: 123 Rue de Petit Vaux, 91360 EPINAY sur ORGE, Tel:(1)64 54 33 23. Tlx:003943. Fax:(1)64.54.93.30.

FINLAND: Billskogsvägen 19, 02580 Sundby Å St, Tel:(0) 262 8144. Fax:(0) 262 8150.

GERMANY: Saalburgstr. 157, D-6380 BAD HOMBURG, Tel:(61)72 37066. Tlx:410404. Fax:(61)72 37065.

HUNGARY: Szent Istvan Park 15, H-1137 BUDAPEST, Tel:(1) 1298 822. Fax:(1) 1298 822.

HONG KONG: 202 Peter Building, 60 Queens Road Central, HONG KONG, Tel:(85) 252 3635. Fax: (85) 284 52908.

ITALY: Via Liguria 49, 10071 Borgaro, TORINO, Tel:(011)470 14 94. Tlx:221257. Fax:(011)470 42 90.

Via Zucca 8, 20017 Rho MILANO, Tel:(02)93 50 36 50. Fax:(02)93 50 36 55.

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INDIA: 31 Greenacre, 5 Union Park, Khar (W), BOMBAY 400 052. Tel:(022)535026/533773/540242. Tlx:011-71481.

K 6 H 809; 2F, 3-30-4 Nishi-Redebukuro, Toshima-Ku, TOKYO, Japan 174. Tel:(03)993 0641. Fax:(03)993 0542.

SINGAPORE: HEX 10-01 Fortune Centre, 190 Middle Road, SINGAPORE 0718. Tel:(65)336 3922/337 4695/336 6286. Fax: (65)337 4892.

Box: 86, S-162 12 Vallingby 1, STOCKHOLM, Tel:(08)670035. Fax:(08)674242.

SWITZERLAND: CH-8032 ZÜRICH, Kirchenweg 5. Tel:(01)386 8702/8686. Fax:(01)383 5108/2379.

U.S.A.:

Central Zone: 2401 Plum Grove Road, Suite 111, PALATINE, IL60057. Tel:(312)397-0002. Fax:(312)397-0114.

Eastern Zone: 71 Grand Avenue, PALISADES PARK, NJ07650. Tel:(201)943-4554. Fax:(201)943-5754.

Southern Zone: 800 Office Plaza Blvd., Suite 401, KISSIMMEE, FL32743. Tel:(407)933-2383. Fax:(407)933-2293.

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In the interest of product improvement INTERNATIONAL RECTIFIER reserves the right to change specifications at any time without notice.

MJW/1/82