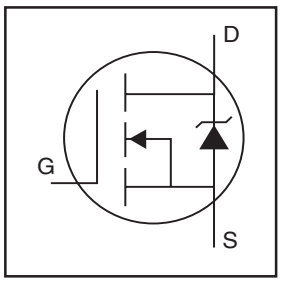
International
IOR Rectifier

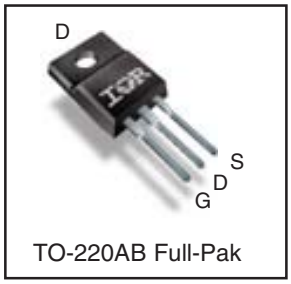
IRFI4229PbF

PDP SWITCH

Features
- Advanced Process Technology
- Key Parameters Optimized for PDP Sustain, Energy Recovery and Pass Switch Applications
- Low E_{PULSE} Rating to Reduce Power Dissipation in PDP Sustain, Energy Recovery and Pass Switch Applications
- Low Q_G for Fast Response
- High Repetitive Peak Current Capability for Reliable Operation
- Short Fall & Rise Times for Fast Switching
- 150°C Operating Junction Temperature for Improved Ruggedness
- Repetitive Avalanche Capability for Robustness and Reliability

Key Parameters		
V_{DS} max	250	V
$V_{DS\ (Avalanche)}$ typ.	300	V
$R_{DS(ON)}$ typ. @ 10V	38	mΩ
I_{RP} max @ T_C= 100°C	32	A
T_J max	150	°C





TO-220AB Full-Pak

G	D	S
Gate	Drain	Source

Description
This HEXFET® Power MOSFET is specifically designed for Sustain; Energy Recovery & Pass switch applications in Plasma Display Panels. This MOSFET utilizes the latest processing techniques to achieve low on-resistance per silicon area and low E_{PULSE} rating. Additional features of this MOSFET are 150°C operating junction temperature and high repetitive peak current capability. These features combine to make this MOSFET a highly efficient, robust and reliable device for PDP driving applications.

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{GS}	Gate-to-Source Voltage	±30	V
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 10V	19	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 10V	12	
I_{DM}	Pulsed Drain Current ①	72	
I_{RP} @ T_C = 100°C	Repetitive Peak Current ⑤	32	
P_D @T_C = 25°C	Power Dissipation	46	W
P_D @T_C = 100°C	Power Dissipation	18	
	Linear Derating Factor	0.37	W/°C
T_J T_{STG}	Operating Junction and Storage Temperature Range	-40 to + 150	°C
	Soldering Temperature for 10 seconds	300	
	Mounting Torque, 6-32 or M3 Screw	10lb·in (1.1N·m)	N

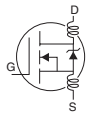
Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case ④	——	2.73	°C/W
$R_{\theta JA}$	Junction-to-Ambient ④	——	65	

Notes ① through ⑤ are on page 8

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	250	—	—	V	V_{GS} = 0V, I_D = 250µA
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	340	—	mV/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	38	46	mΩ	V_{GS} = 10V, I_D = 11A ③
$V_{GS(th)}$	Gate Threshold Voltage	3.0	—	5.0	V	V_{DS} = V_{GS}, I_D = 250µA
$\Delta V_{GS(th)}/\Delta T_J$	Gate Threshold Voltage Coefficient	—	-12	—	mV/°C	
I_{DSS}	Drain-to-Source Leakage Current	—	—	20	µA	V_{DS} = 250V, V_{GS} = 0V
		—	—	200		V_{DS} = 250V, 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
g_{fs}	Forward Transconductance	26	—	—	S	V_{DS} = 25V, I_D = 11A
Q_g	Total Gate Charge	—	73	110	nC	V_{DD} = 125V, I_D = 11A, V_{GS} = 10V③
Q_{gd}	Gate-to-Drain Charge	—	24	—		
$t_{d(on)}$	Turn-On Delay Time	—	18	—	ns	V_{DD} = 125V, V_{GS} = 10V ③
t_r	Rise Time	—	17	—		I_D = 11A
$t_{d(off)}$	Turn-Off Delay Time	—	32	—		R_G = 2.4Ω
t_f	Fall Time	—	13	—		See Fig. 22
t_{st}	Shoot Through Blocking Time	100	—	—	ns	V_{DD} = 200V, V_{GS} = 15V, R_G= 5.1Ω
E_{PULSE}	Energy per Pulse	—	770	—	µJ	L = 220nH, C= 0.3µF, V_{GS} = 15V V_{DS} = 200V, R_G= 5.1Ω, T_J = 25°C
		—	1380	—		L = 220nH, C= 0.3µF, V_{GS} = 15V V_{DS} = 200V, R_G= 5.1Ω, T_J = 100°C
C_{iss}	Input Capacitance	—	4480	—	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	—	400	—		V_{DS} = 25V
C_{rss}	Reverse Transfer Capacitance	—	100	—		f = 1.0MHz,
C_{oss} eff.	Effective Output Capacitance	—	270	—		V_{GS} = 0V, V_{DS} = 0V to 200V
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	—		

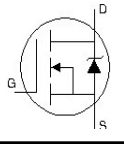


Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy②	—	110	mJ
E_{AR}	Repetitive Avalanche Energy ①	—	4.6	mJ
$V_{DS(Avalanche)}$	Repetitive Avalanche Voltage ①	300	—	V
I_{AS}	Avalanche Current ②	—	11	A

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S @ T_C = 25°C	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	—	—	1.3	V	T_J = 25°C, I_S = 11A, V_{GS} = 0V ③
t_{rr}	Reverse Recovery Time	—	120	180	ns	T_J = 25°C, I_F = 11A, V_{DD} = 50V
Q_{rr}	Reverse Recovery Charge	—	540	810	nC	di/dt = 100A/µs ③



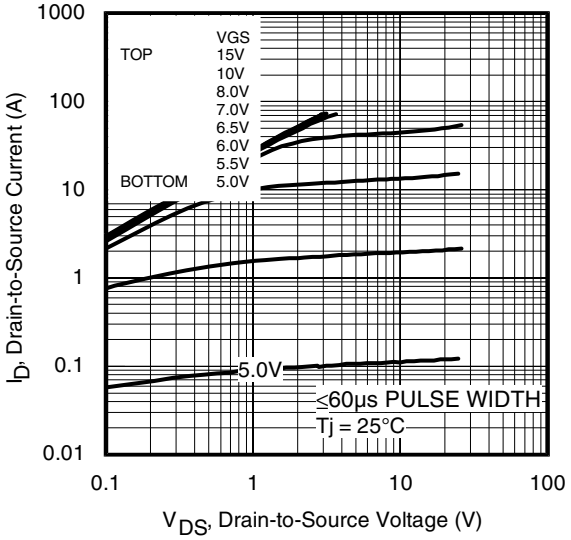


Fig 1. Typical Output Characteristics

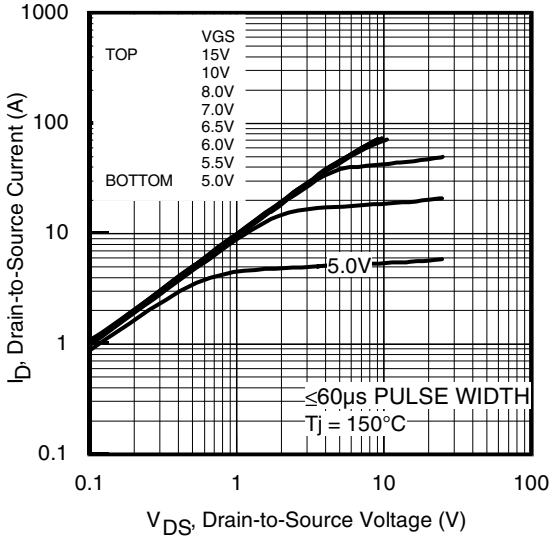


Fig 2. Typical Output Characteristics

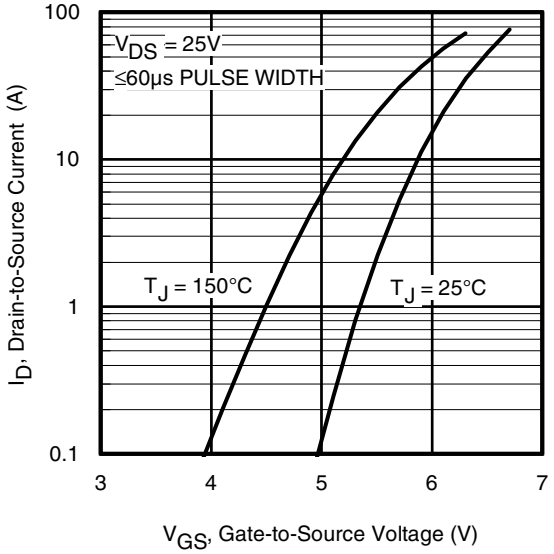


Fig 3. Typical Transfer Characteristics

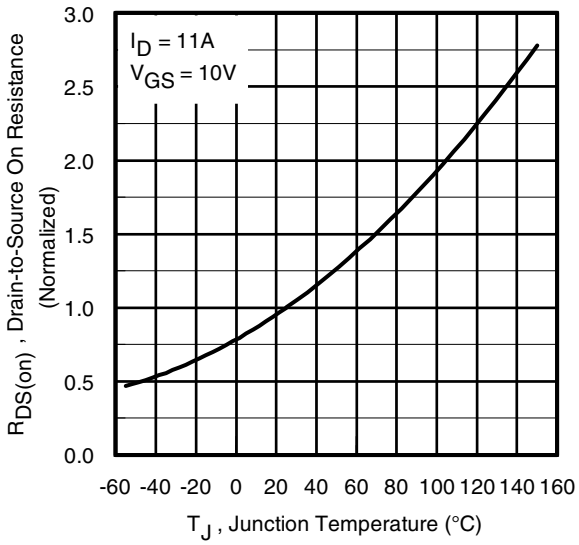


Fig 4. Normalized On-Resistance vs. Temperature

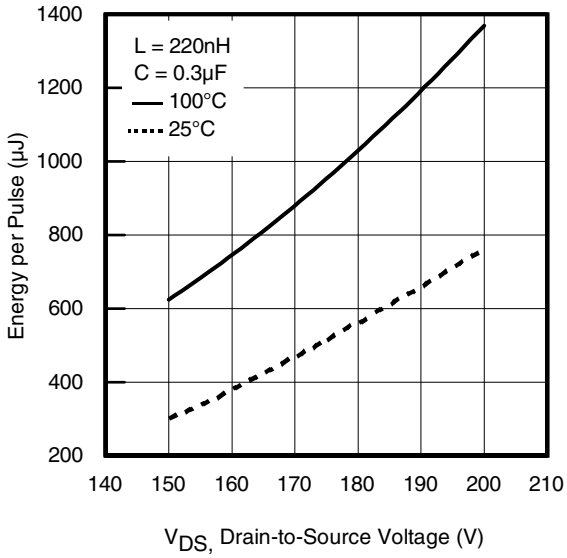


Fig 5. Typical E_{PULSE} vs. Drain-to-Source Voltage

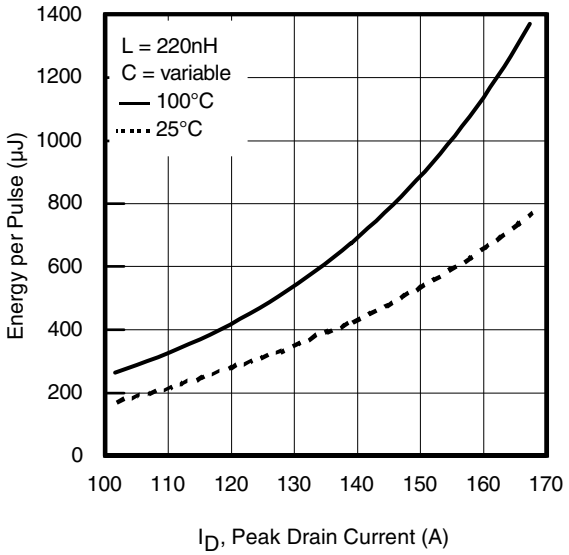


Fig 6. Typical E_{PULSE} vs. Drain Current

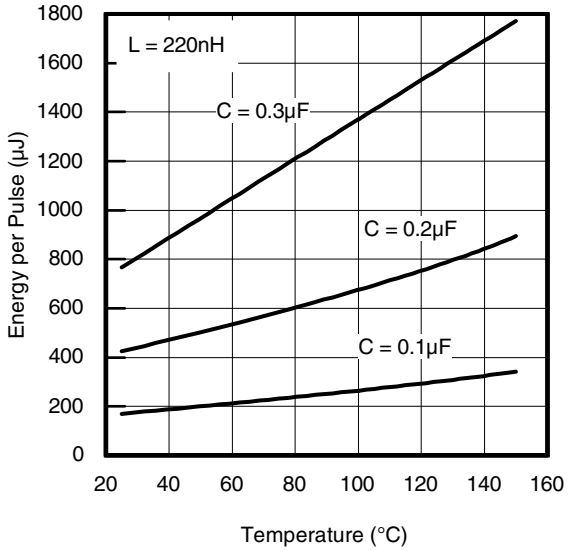


Fig 7. Typical E_{PULSE} vs.Temperature

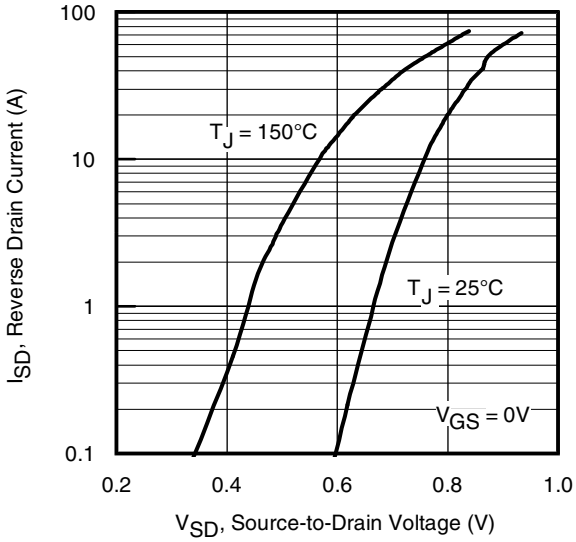


Fig 8. Typical Source-Drain Diode Forward Voltage

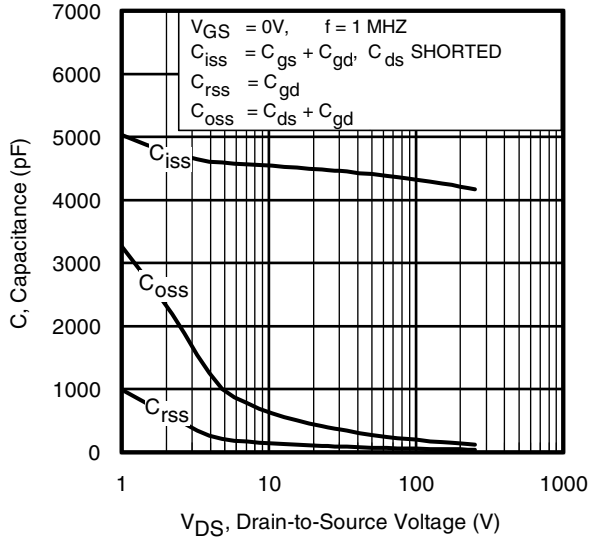


Fig 9. Typical Capacitance vs.Drain-to-Source Voltage

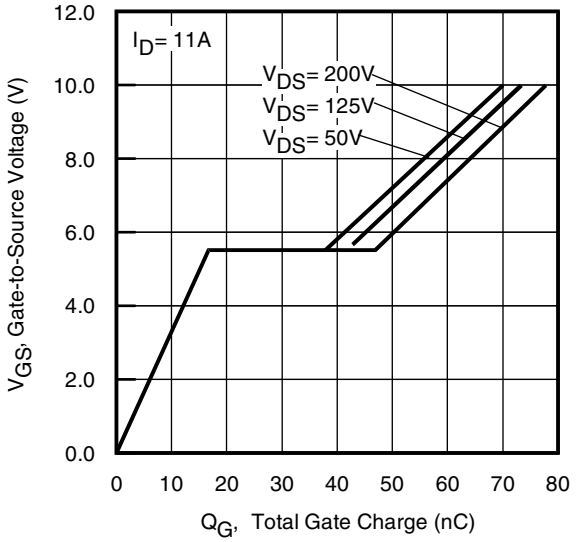


Fig 10. Typical Gate Charge vs.Gate-to-Source Voltage

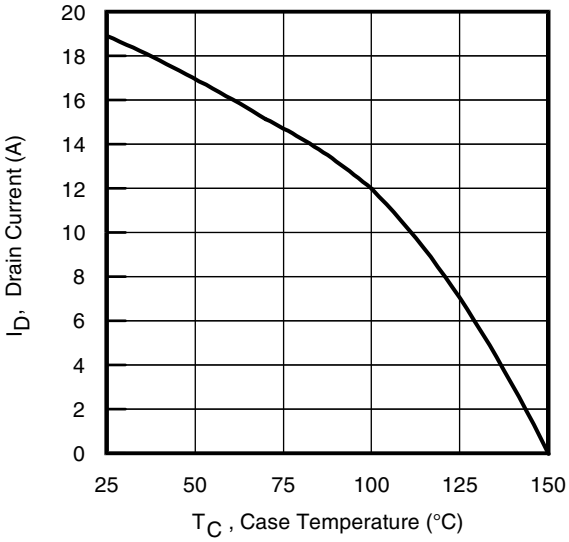


Fig 11. Maximum Drain Current vs. Case Temperature

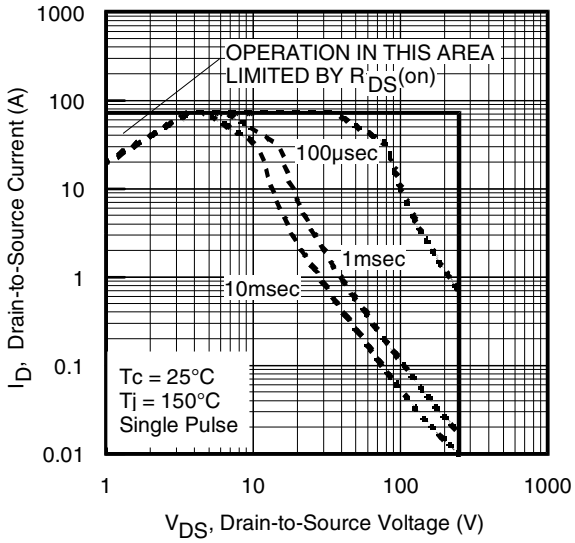


Fig 12. Maximum Safe Operating Area

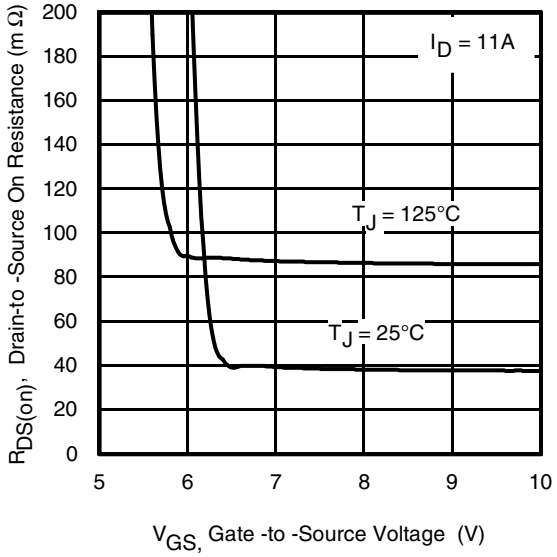


Fig 13. On-Resistance vs. Gate Voltage

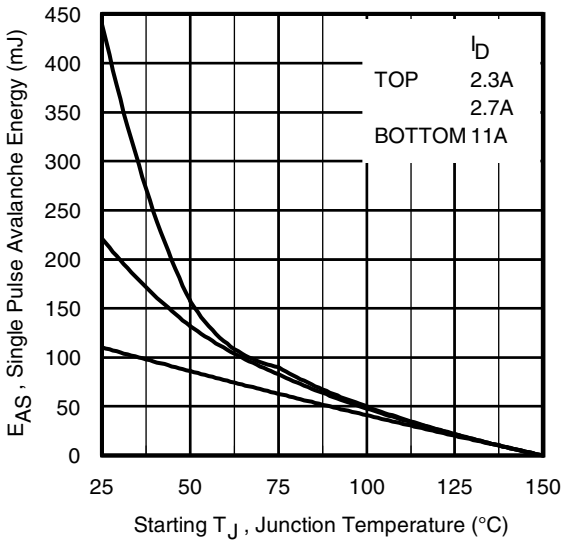


Fig 14. Maximum Avalanche Energy vs. Temperature

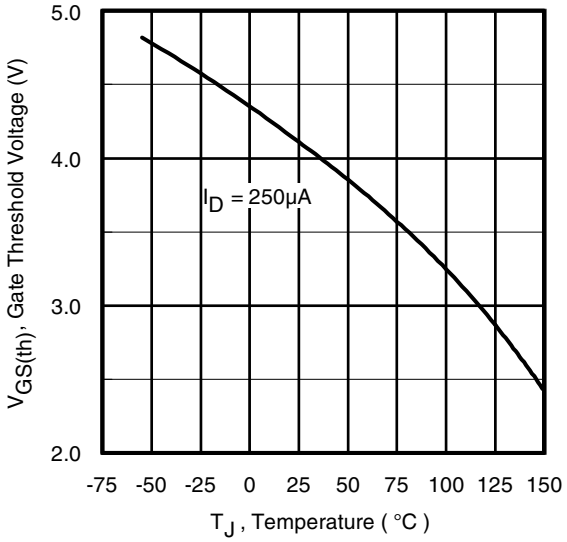


Fig 15. Threshold Voltage vs. Temperature

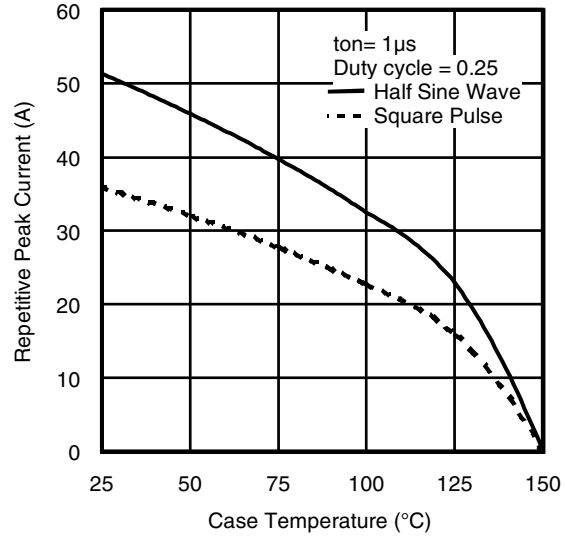


Fig 16. Typical Repetitive peak Current vs. Case temperature

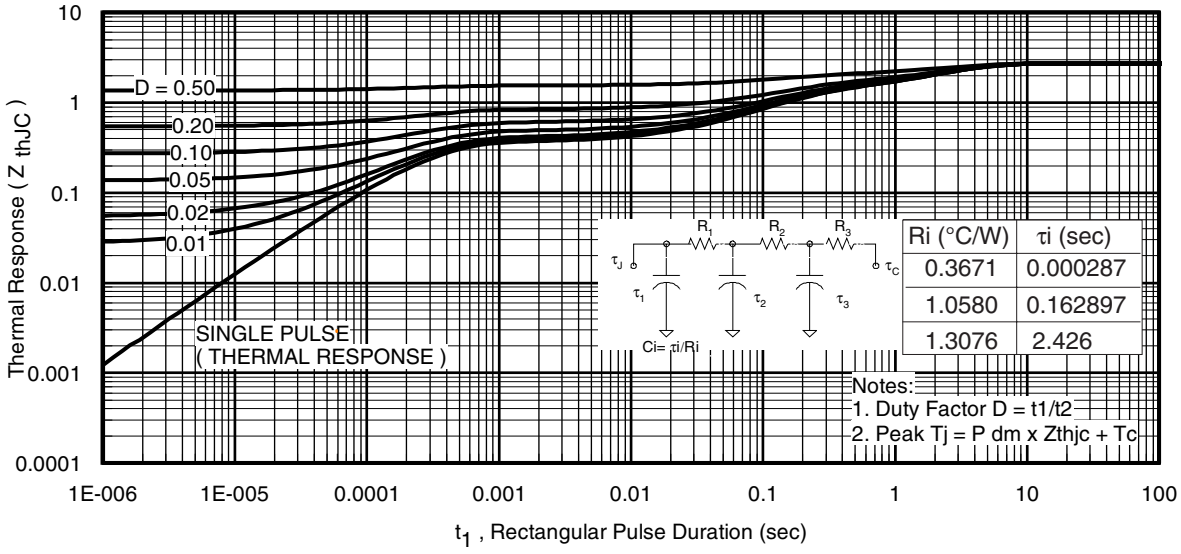


Fig 17. Maximum Effective Transient Thermal Impedance, Junction-to-Case

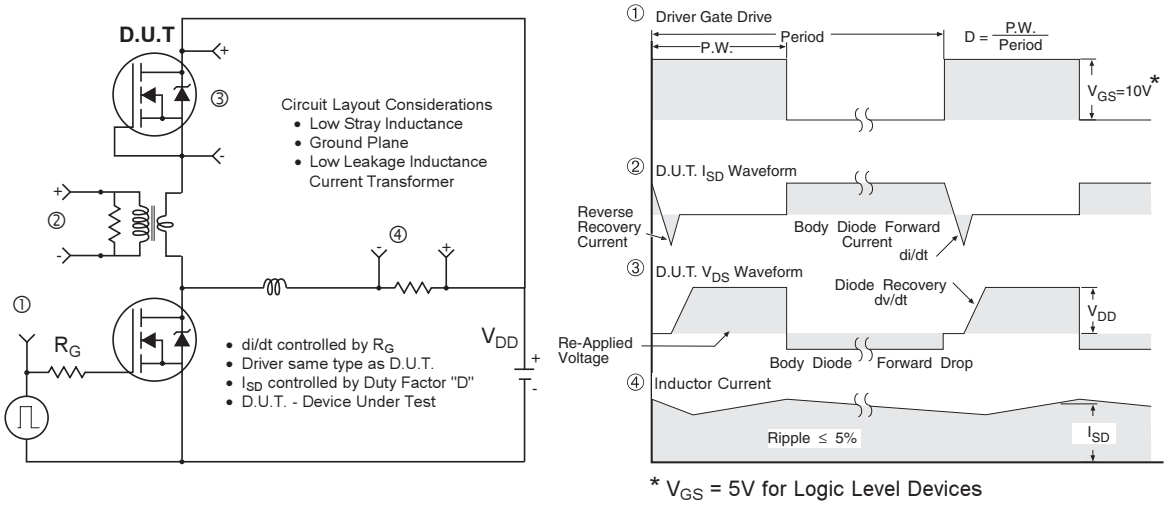


Fig 18. Diode Reverse Recovery Test Circuit for N-Channel HEXFET® Power MOSFETs

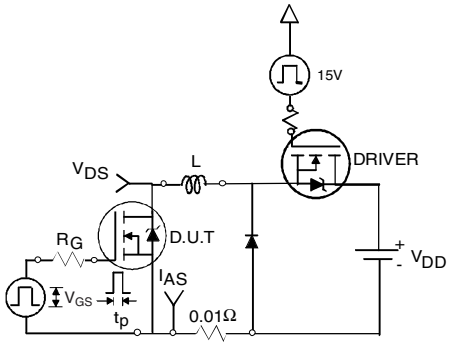


Fig 19a. Unclamped Inductive Test Circuit

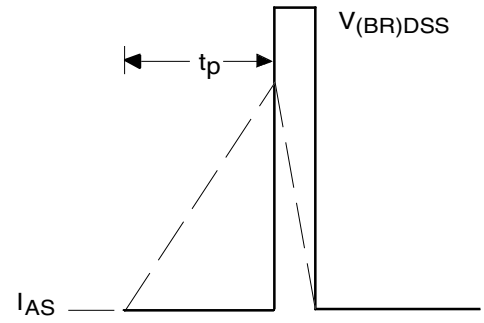


Fig 19b. Unclamped Inductive Waveforms

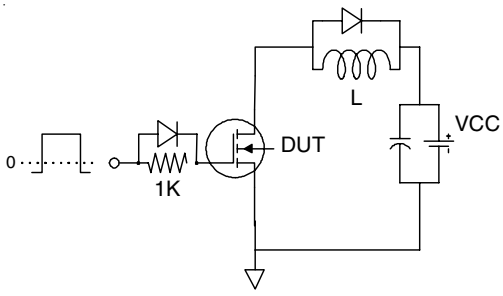


Fig 20a. Gate Charge Test Circuit

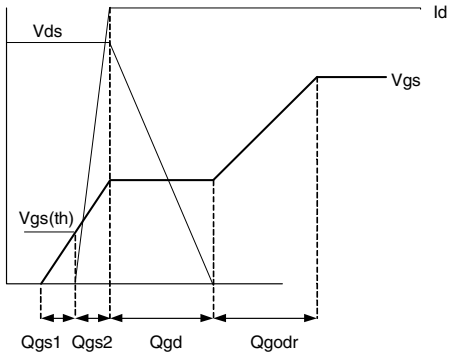


Fig 20b. Gate Charge Waveform

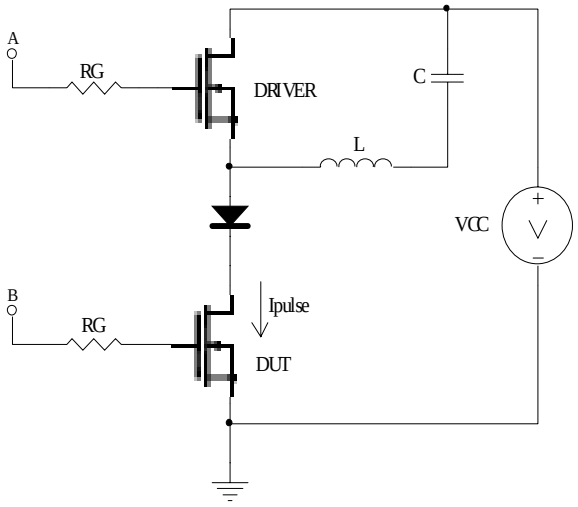


Fig 21a. t_{st} and E_{PULSE} Test Circuit

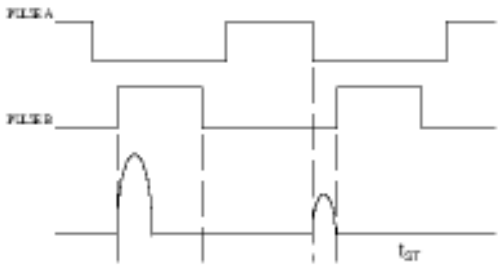


Fig 21b. t_{st} Test Waveforms

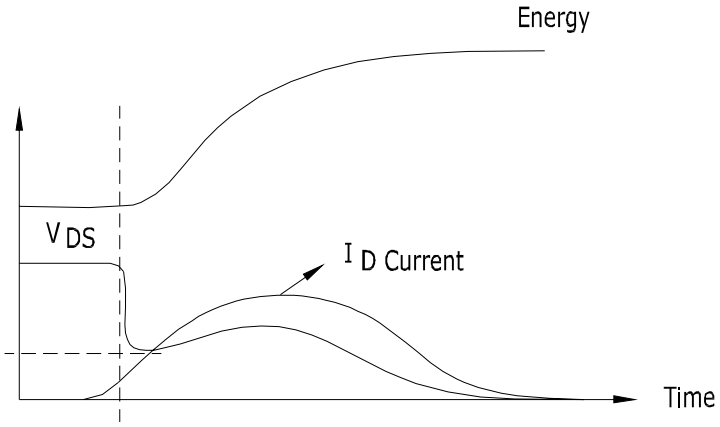


Fig 21c. E_{PULSE} Test Waveforms

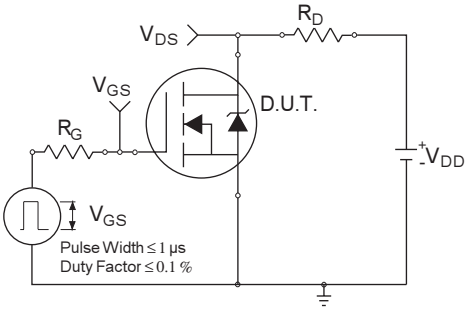


Fig 22a. Switching Time Test Circuit

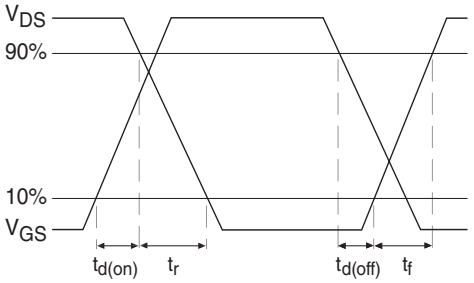
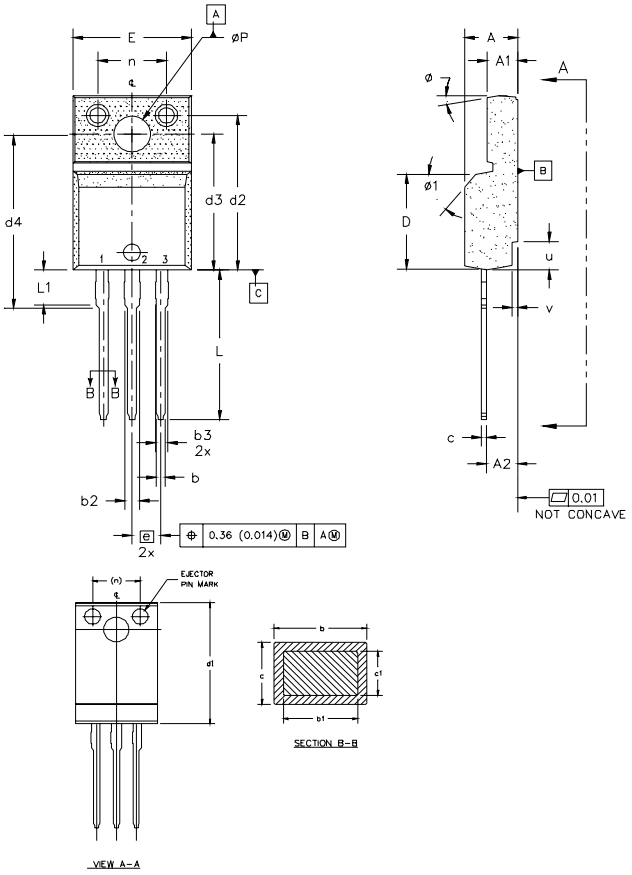


Fig 22b. Switching Time Waveforms

TO-220AB Full-Pak Package Outline (Dimensions are shown in millimeters (inches))



NOTES:

1.0 DIMENSIONING AND TOLERANCING PER ASME Y14.5 M- 1994.
2.0 DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
3.0 LEAD DIMENSION AND FINISH UNCONTROLLED IN L1.
4.0 DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.005" (0.127) PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
5.0 DIMENSION b1 APPLY TO BASE METAL ONLY.
6.0 STEP OPTIONAL ON PLASTIC BODY DEFINED BY DIMENSIONS u & v.
7.0 CONTROLLING DIMENSION : INCHES.

SYMBOL	DIMENSIONS				NOTES
	MILLIMETERS		INCHES		
	MIN.	MAX.	MIN.	MAX.	
A	4.57	4.83	0.180	0.190	
A1	2.57	2.83	0.101	0.114	
A2	2.51	2.85	0.099	0.112	
b	0.622	0.89	0.024	0.035	
b1	0.622	0.838	0.024	0.033	5
b2	1.229	1.400	0.048	0.055	
b3	1.229	1.400	0.048	0.055	
c	0.440	0.629	0.017	0.025	
c1	0.440	0.584	0.017	0.023	
D	8.65	9.80	0.341	0.386	4
d1	15.80	16.12	0.622	0.635	
d2	13.97	14.22	0.550	0.560	
d3	12.30	12.92	0.484	0.509	
d4	8.64	9.91	0.340	0.390	
E	10.36	10.63	0.408	0.419	4
e	2.54 BSC		0.100 BSC		
L	13.20	13.73	0.520	0.541	
L1	3.10	3.50	0.122	0.138	3
n	6.05	6.15	0.238	0.242	
øP	3.05	3.45	0.120	0.136	
u	2.40	2.50	0.094	0.098	6
v	0.40	0.50	0.016	0.020	6
ø	3°	7°	3°	7°	
ø1		45°		45°	

LEAD ASSIGNMENTS

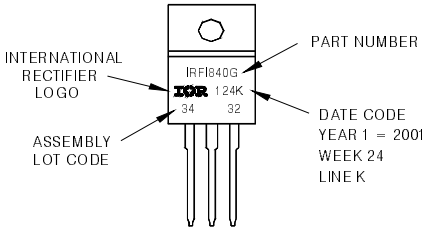
HEXFET
1.- GATE
2.- DRAIN
3.- SOURCE

IGBTs, CoPACK
1.- GATE
2.- COLLECTOR
3.- EMITTER

TO-220AB Full-Pak Part Marking Information

EXAMPLE: THIS IS AN IRFI840G
WITH ASSEMBLY
LOT CODE 3432
ASSEMBLED ON WW 24, 2001
IN THE ASSEMBLY LINE 'K'

Note: 'P' in assembly line position
indicates 'Lead-Free'



TO-220AB Full-Pak packages are not recommended for Surface Mount Application.

Notes:

① Repetitive rating; pulse width limited by max. junction temperature.

② Starting T_J = 25°C, L = 1.9mH, R_G = 25Ω, I_{AS} = 11A.

③ Pulse width ≤ 400µs; duty cycle ≤ 2%.

④ R_θ is measured at T_J of approximately 90°C.

⑤ Half sine wave with duty cycle = 0.25, ton=1µsec.

Note: For the most current drawing please refer to IR website at: http://www.irf.com/package/

Data and specifications subject to change without notice.
This product has been designed and qualified for the Industrial market.
Qualification Standards can be found on IR's Web site.

International
IOR Rectifier

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TAC Fax: (310) 252-7903
Visit us at www.irf.com for sales contact information. 03/08