

IRLR8729PbF
IRLU8729PbF

HEXFET® Power MOSFET

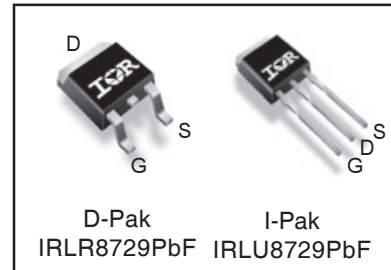
Applications

- High Frequency Synchronous Buck Converters for Computer Processor Power
- High Frequency Isolated DC-DC Converters with Synchronous Rectification for Telecom and Industrial Use

V_{DSS}	R_{DS(on)} max	Q_g
30V	8.9mΩ	10nC

Benefits

- Very Low RDS(on) at 4.5V V_{GS}
- Ultra-Low Gate Impedance
- Fully Characterized Avalanche Voltage and Current
- Lead-Free
- RoHS compliant



G	D	S
Gate	Drain	Source

Absolute Maximum Ratings

	Parameter	Max.	Units
V _{DS}	Drain-to-Source Voltage	30	V
V _{GS}	Gate-to-Source Voltage	± 20	
I _D @ T _C = 25°C	Continuous Drain Current, V _{GS} @ 10V	58 ^①	A
I _D @ T _C = 100°C	Continuous Drain Current, V _{GS} @ 10V	41 ^①	
I _{DM}	Pulsed Drain Current ^①	260	
P _D @ T _C = 25°C	Maximum Power Dissipation ^②	55	W
P _D @ T _C = 100°C	Maximum Power Dissipation ^②	27	
	Linear Derating Factor	0.37	W/°C
T _J	Operating Junction and	-55 to + 175	°C
T _{STG}	Storage Temperature Range		
	Soldering Temperature, for 10 seconds	300 (1.6mm from case)	

Thermal Resistance

	Parameter	Typ.	Max.	Units
R _{θJC}	Junction-to-Case	—	2.73	°C/W
R _{θJA}	Junction-to-Ambient (PCB Mount) ^③	—	50	
R _{θJA}	Junction-to-Ambient	—	110	

ORDERING INFORMATION:

See detailed ordering and shipping information on the last page of this data sheet.

Notes ^① through ^⑤ are on page 11

www.irf.com

Static @ T_J = 25°C (unless otherwise specified)

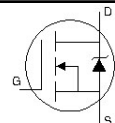
	Parameter	Min.	Typ.	Max.	Units	Conditions
BV _{DSS}	Drain-to-Source Breakdown Voltage	30	—	—	V	V _{GS} = 0V, I _D = 250μA
ΔBV _{DSS} /ΔT _J	Breakdown Voltage Temp. Coefficient	—	21	—	mV/°C	Reference to 25°C, I _D = 1mA
R _{DS(on)}	Static Drain-to-Source On-Resistance	—	6.0	8.9	mΩ	V _{GS} = 10V, I _D = 25A ③
		—	8.9	11.9		V _{GS} = 4.5V, I _D = 20A ③
V _{GS(th)}	Gate Threshold Voltage	1.35	1.8	2.35	V	V _{DS} = V _{GS} , I _D = 25μA
ΔV _{GS(th)} /ΔT _J	Gate Threshold Voltage Coefficient	—	-6.2	—	mV/°C	
I _{DSS}	Drain-to-Source Leakage Current	—	—	1.0	μA	V _{DS} = 24V, V _{GS} = 0V
		—	—	150		V _{DS} = 24V, 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	91	—	—	S	V _{DS} = 15V, I _D = 20A
Q _g	Total Gate Charge	—	10	16	nC	V _{DS} = 15V V _{GS} = 4.5V I _D = 20A See Fig. 16
Q _{gs1}	Pre-V _{th} Gate-to-Source Charge	—	2.1	—		
Q _{gs2}	Post-V _{th} Gate-to-Source Charge	—	1.3	—		
Q _{gd}	Gate-to-Drain Charge	—	4.0	—		
Q _{godr}	Gate Charge Overdrive	—	2.6	—		
Q _{sw}	Switch Charge (Q _{gs2} + Q _{gd})	—	4.8	—		
Q _{oss}	Output Charge	—	6.3	—	nC	V _{DS} = 16V, V _{GS} = 0V
R _G	Gate Resistance	—	1.6	2.7	Ω	
t _{d(on)}	Turn-On Delay Time	—	10	—	ns	V _{DD} = 15V, V _{GS} = 4.5V ③ I _D = 20A R _G = 1.8Ω See Fig. 14
t _r	Rise Time	—	47	—		
t _{d(off)}	Turn-Off Delay Time	—	11	—		
t _f	Fall Time	—	10	—		
C _{iss}	Input Capacitance	—	1350	—	pF	V _{GS} = 0V V _{DS} = 15V f = 1.0MHz
C _{oss}	Output Capacitance	—	280	—		
C _{rss}	Reverse Transfer Capacitance	—	120	—		

Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E _{AS}	Single Pulse Avalanche Energy ②	—	74	mJ
I _{AR}	Avalanche Current ①	—	20	A
E _{AR}	Repetitive Avalanche Energy ①	—	5.5	mJ

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I _S	Continuous Source Current (Body Diode)	—	—	58 ④	A	MOSFET symbol showing the integral reverse p-n junction diode.
I _{SM}	Pulsed Source Current (Body Diode) ①	—	—	260		
V _{SD}	Diode Forward Voltage	—	—	1.0	V	T _J = 25°C, I _S = 20A, V _{GS} = 0V ③
t _{rr}	Reverse Recovery Time	—	16	24	ns	T _J = 25°C, I _F = 20A, V _{DD} = 15V
Q _{rr}	Reverse Recovery Charge	—	19	29	nC	di/dt = 300A/μs ③
t _{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				



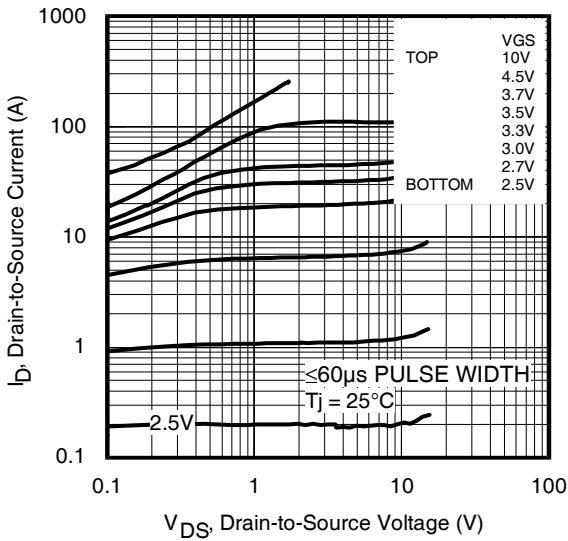


Fig 1. Typical Output Characteristics

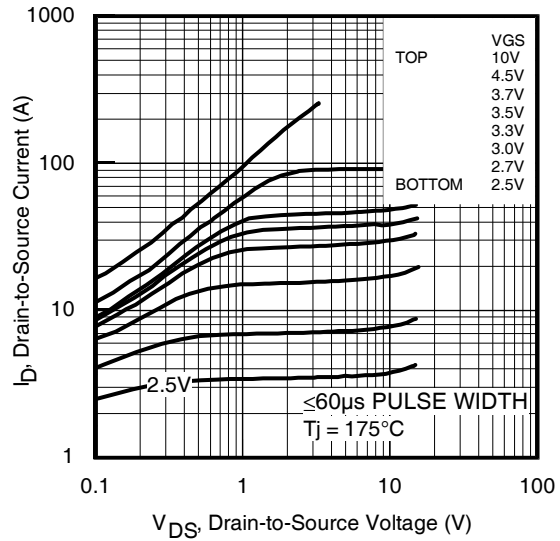


Fig 2. Typical Output Characteristics

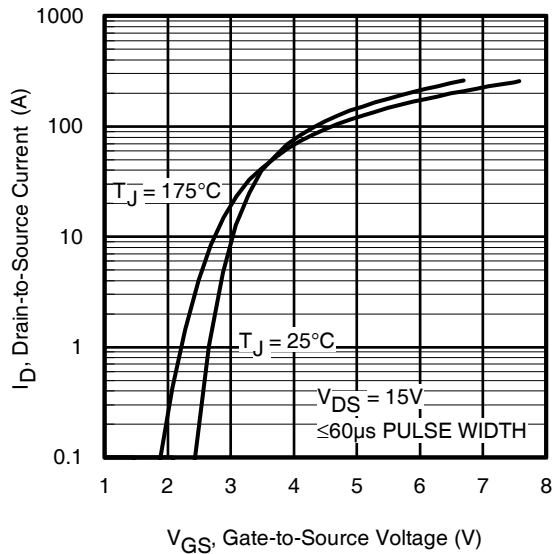


Fig 3. Typical Transfer Characteristics

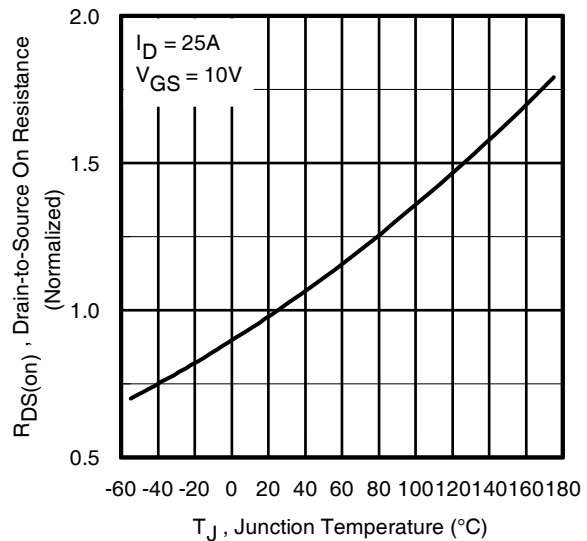


Fig 4. Normalized On-Resistance vs. Temperature

IRLR/U8729PbF

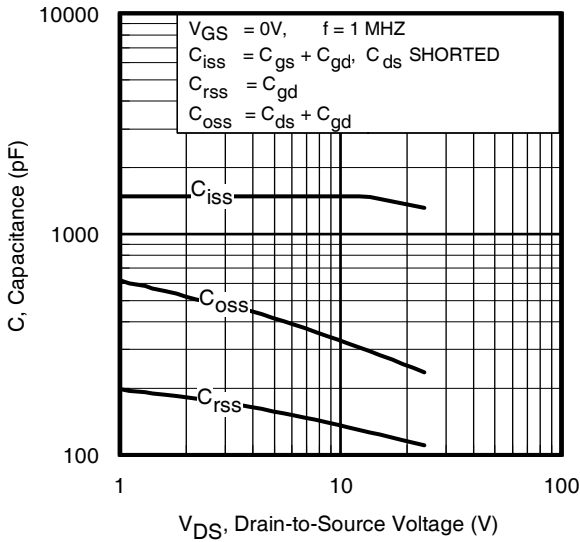


Fig 5. Typical Capacitance vs. Drain-to-Source Voltage

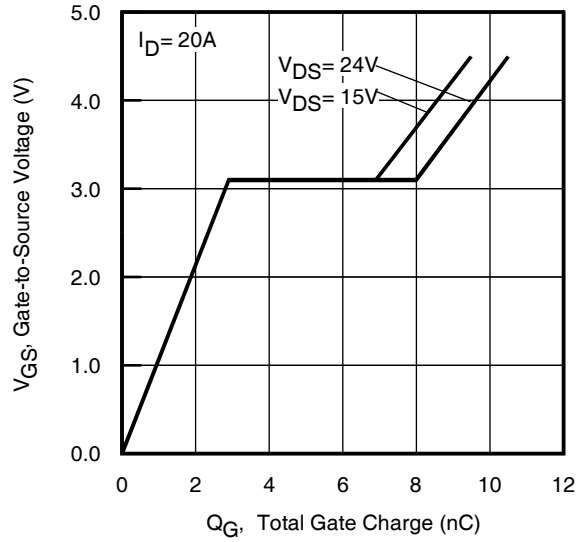


Fig 6. Typical Gate Charge vs. Gate-to-Source Voltage

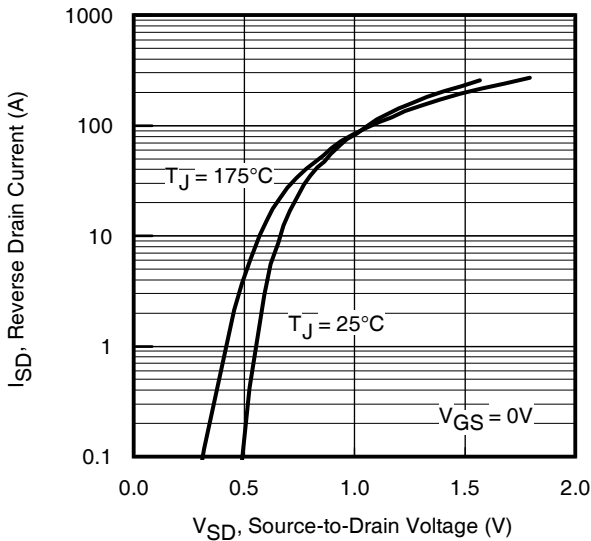


Fig 7. Typical Source-Drain Diode Forward Voltage

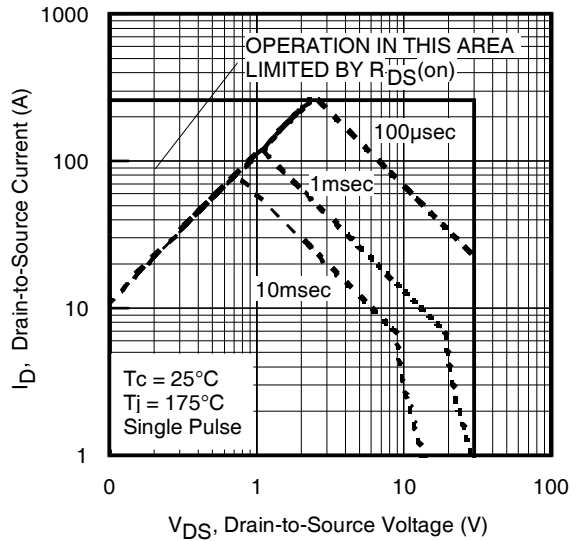


Fig 8. Maximum Safe Operating Area

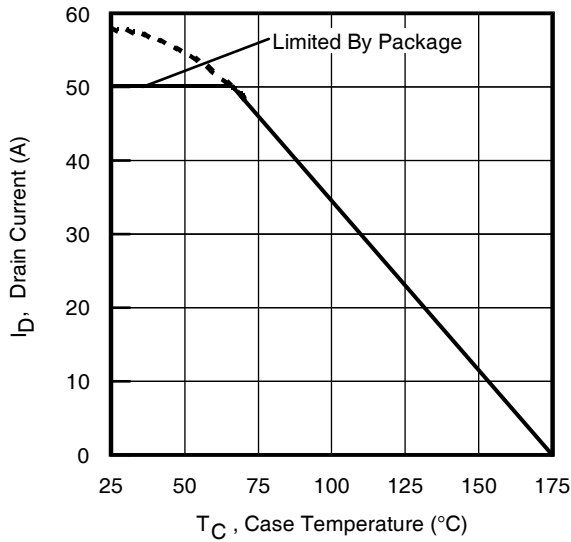


Fig 9. Maximum Drain Current vs. Case Temperature

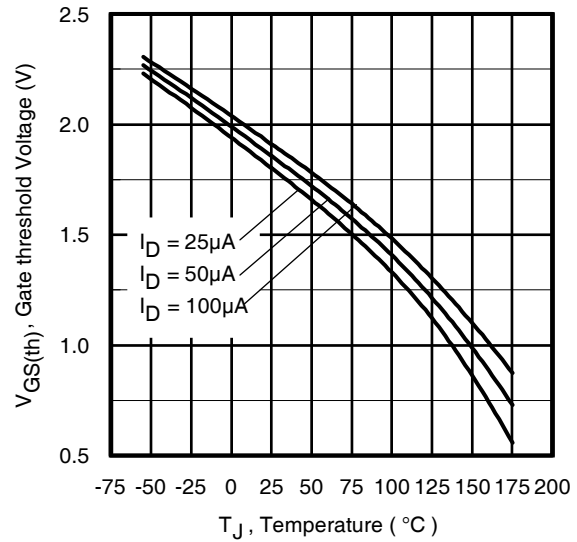


Fig 10. Threshold Voltage vs. Temperature

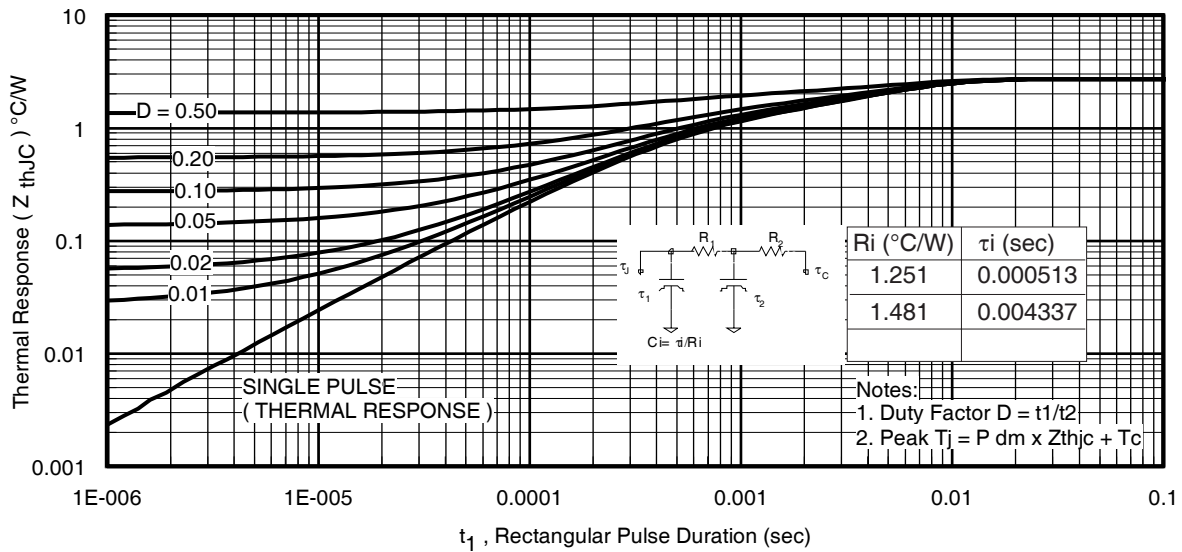


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

IRLR/U8729PbF

International
IR Rectifier

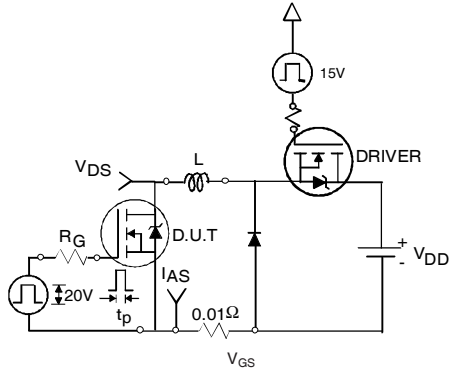


Fig 12a. Unclamped Inductive Test Circuit

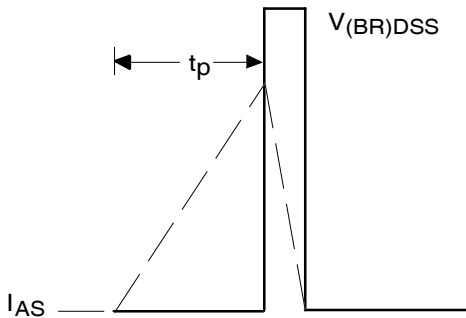


Fig 12b. Unclamped Inductive Waveforms

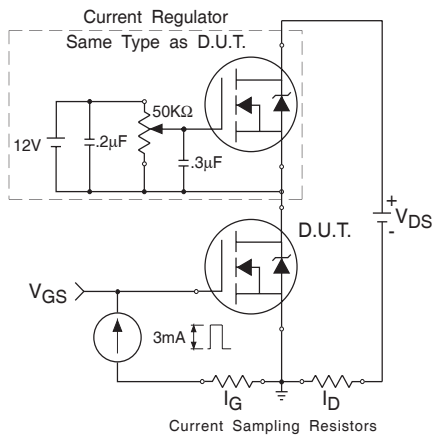


Fig 13. Gate Charge Test Circuit

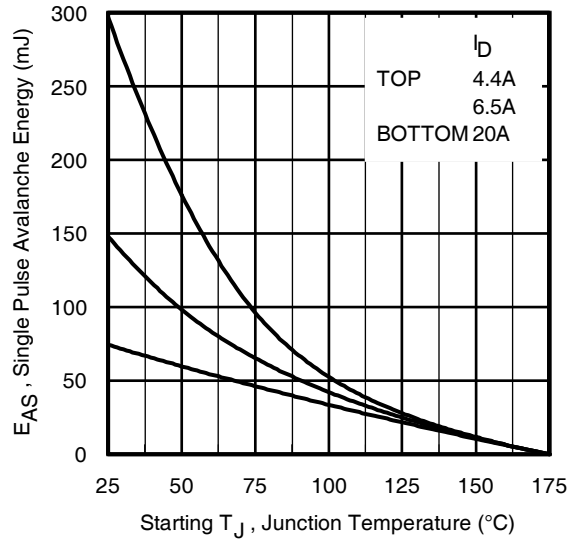


Fig 12c. Maximum Avalanche Energy vs. Drain Current

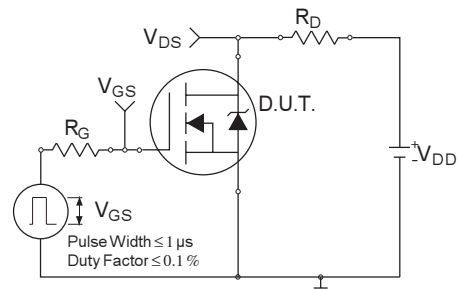


Fig 14a. Switching Time Test Circuit

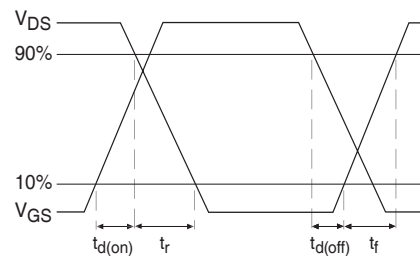


Fig 14b. Switching Time Waveforms

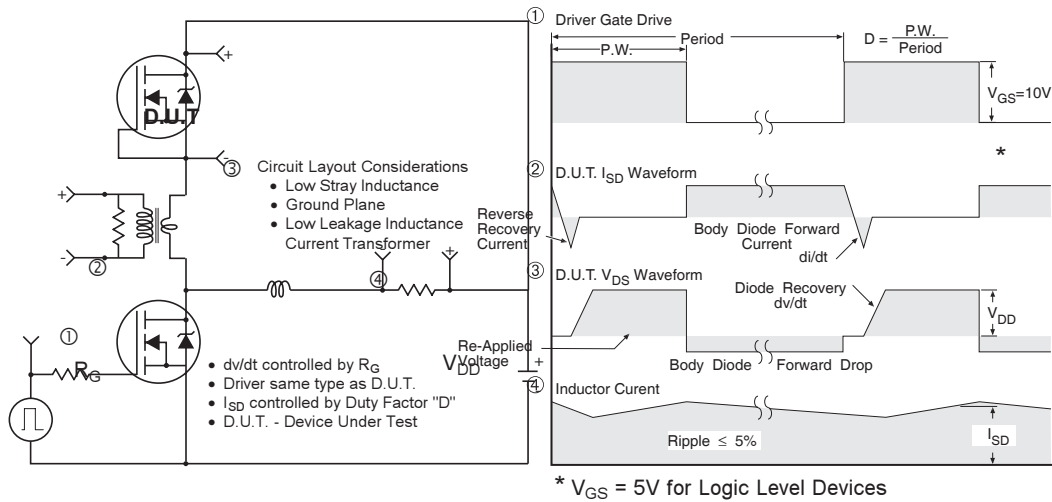


Fig 15. Peak Diode Recovery dv/dt Test Circuit for N-Channel HEXFET[®] Power MOSFETs

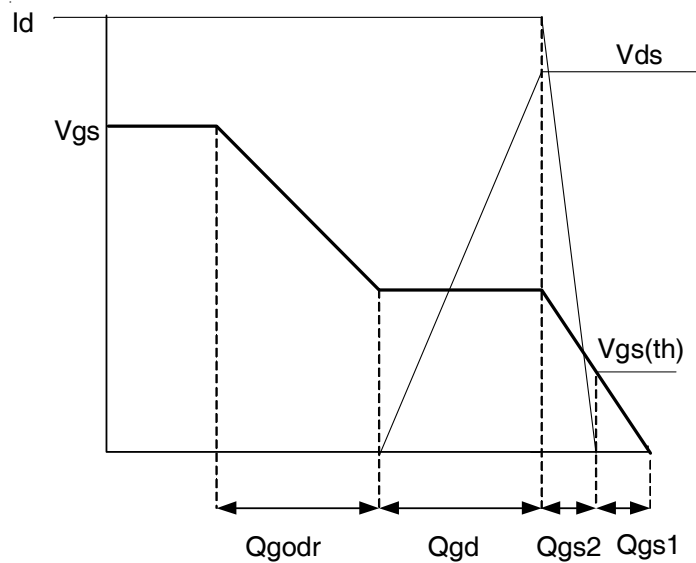


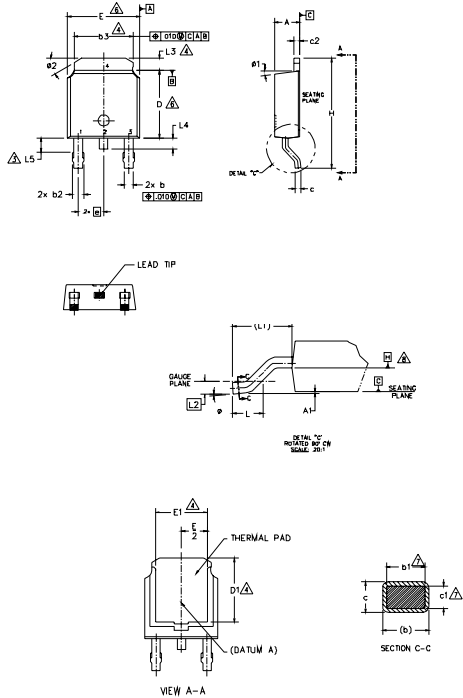
Fig 16. Gate Charge Waveform

IRLR/U8729PbF



D-Pak (TO-252AA) Package Outline

Dimensions are shown in millimeters (inches)



- NOTES:
- 1.- DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994
 - 2.- DIMENSIONS ARE SHOWN IN INCHES [MILLIMETERS]
 - 3.- LEAD DIMENSION UNCONTROLLED IN L5.
 - 4.- DIMENSION D1, E1, L3 & b3 ESTABLISH A MINIMUM MOUNTING SURFACE FOR THERMAL PAD.
 - 5.- SECTION C-C DIMENSIONS APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN .005 AND 0.10 [0.13 AND 0.25] FROM THE LEAD TIP.
 - 6.- DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED .005 [0.13] PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE QUICKEST EXTREMES OF THE PLASTIC BODY.
 - 7.- DIMENSION b1 & c1 APPLIED TO BASE METAL ONLY.
 - 8.- DATUM A & B TO BE DETERMINED AT DATUM PLANE H.
 - 9.- OUTLINE CONFORMS TO JEDEC OUTLINE TO-252AA.

SYMBOL	DIMENSIONS				NOTES
	MILLIMETERS		INCHES		
	MIN.	MAX.	MIN.	MAX.	
A	2.18	2.39	.086	.094	
A1	-	0.13	-	.005	
b	0.64	0.89	.025	.035	7
b1	0.65	0.79	.025	.031	7
b2	0.76	1.14	.030	.045	
b3	4.95	5.46	.195	.215	4
c	0.46	0.61	.018	.024	7
c1	0.41	0.56	.016	.022	
c2	0.46	0.89	.018	.035	
D	5.97	6.22	.235	.245	6
D1	5.21	-	.205	-	4
E	6.35	6.73	.250	.265	6
E1	4.32	-	.170	-	4
e	2.29 BSC		.090 BSC		
H	9.40	10.41	.370	.410	
L	1.40	1.78	.055	.070	
L1	2.74 BSC		.108 REF.		
L2	0.51 BSC		.020 BSC		
L3	0.89	1.27	.035	.050	4
L4	-	1.02	-	.040	
L5	1.14	1.52	.045	.060	3
ϕ	0"	10"	0"	10"	
$\phi 1$	0"	15"	0"	15"	
$\phi 2$	25"	35"	25"	35"	

LEAD ASSIGNMENTS

HEXFET

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

IGBT & CoPAK

- 1.- GATE
- 2.- COLLECTOR
- 3.- EMITTER
- 4.- COLLECTOR

D-Pak (TO-252AA) Part Marking Information

EXAMPLE: THIS IS AN IRFR120
WITH ASSEMBLY
LOT CODE 1234
ASSEMBLED ON WW 16, 2001
IN THE ASSEMBLY LINE 'A'

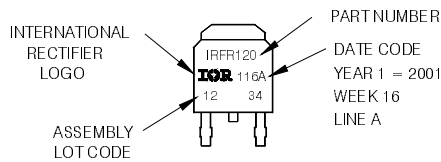
Note: 'P' in assembly line position
indicates 'Lead-Free'

'P̄' in assembly line position indicates
'Lead-Free' qualification to the consumer-level

OR

INTERNATIONAL
RECTIFIER
LOGO

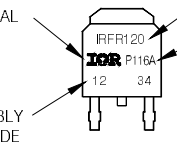
ASSEMBLY
LOT CODE



PART NUMBER
DATE CODE
YEAR 1 = 2001
WEEK 16
LINE A

INTERNATIONAL
RECTIFIER
LOGO

ASSEMBLY
LOT CODE



PART NUMBER
DATE CODE
P = DESIGNATES LEAD-FREE
PRODUCT (OPTIONAL)
P̄ = DESIGNATES LEAD-FREE
PRODUCT QUALIFIED TO THE
CONSUMER LEVEL (OPTIONAL)
YEAR 1 = 2001
WEEK 16
A = ASSEMBLY SITE CODE

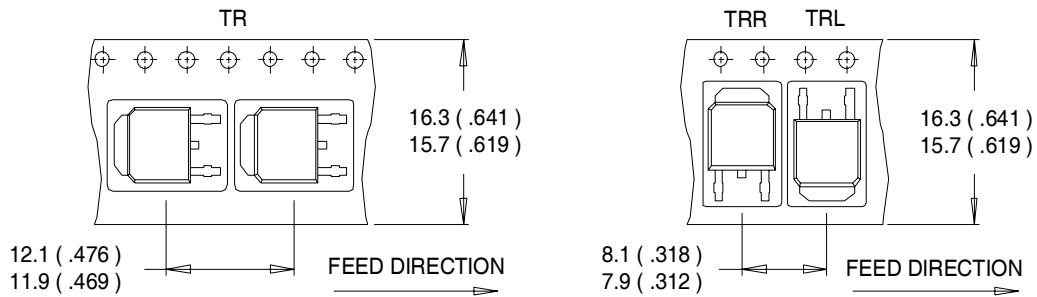
Note: For the most current drawing please refer to IR website at <http://www.irf.com/package/>

IRLR/U8729PbF

International
IR Rectifier

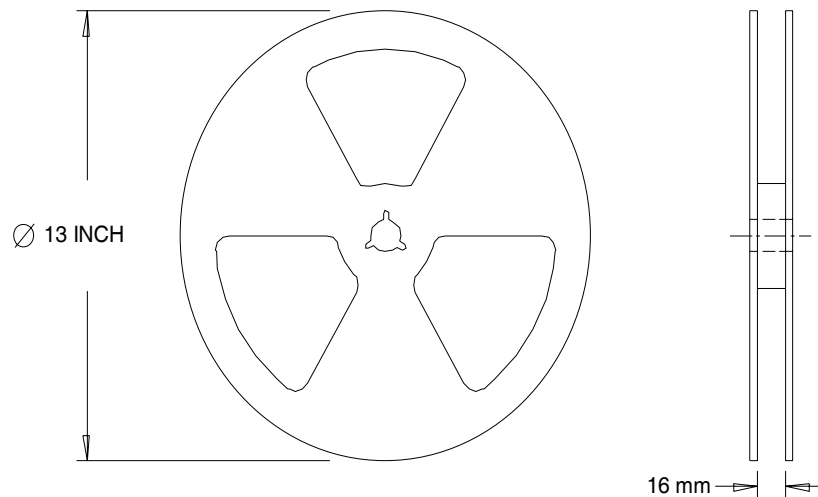
D-Pak (TO-252AA) Tape & Reel Information

Dimensions are shown in millimeters (inches)



NOTES :

1. CONTROLLING DIMENSION : MILLIMETER.
2. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
3. OUTLINE CONFORMS TO EIA-481 & EIA-541.



NOTES :

1. OUTLINE CONFORMS TO EIA-481.

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

Orderable part number	Package Type	Standard Pack		Note
		Form	Quantity	
IRLR8729PBF	D-PAK	Tube/Bulk	75	
IRLR8729TRPBF	D-PAK	Tape and Reel	2000	
IRLU8729PBF	I-PAK	Tube/Bulk	75	

Qualification information†

D-PAK

Qualification level	Consumer ^{††}
Moisture Sensitivity Level	MSL1
	(per JEDEC J-STD-020D ^{†††})
RoHS compliant	Yes

I-PAK

Qualification level	Industrial
Moisture Sensitivity Level	Not applicable
RoHS compliant	Yes

† Qualification standards can be found at International Rectifier's web site <http://www.irf.com/product-info/reliability>

†† Higher qualification ratings may be available should the user have such requirements. Please contact your

International Rectifier sales representative for further information: <http://www.irf.com/whoto-call/salesrep/>

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Starting $T_J = 25^\circ\text{C}$, $L = 0.37\text{mH}$, $R_G = 25\Omega$, $I_{AS} = 20\text{A}$.
- ③ Pulse width $\leq 400\mu\text{s}$; duty cycle $\leq 2\%$.
- ④ Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 50A.
- ⑤ When mounted on 1" square PCB (FR-4 or G-10 Material). For recommended footprint and soldering techniques refer to application note #AN-994.

Data and specifications subject to change without notice.

International
IR Rectifier

IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105

TAC Fax: (310) 252-7903

Visit us at www.irf.com for sales contact information.11/2009