

**IRLR8726PbF**  
**IRLU8726PbF**

HEXFET® Power MOSFET

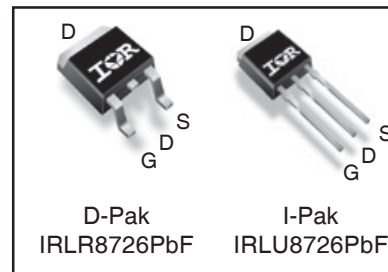
**Applications**

- 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	Qg (typ.)
<b>30V</b>	<b>5.8mΩ @ <math>V_{GS} = 10V</math></b>	<b>15nC</b>

**Benefits**

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



<b>G</b>	<b>D</b>	<b>S</b>
Gate	Drain	Source

**Absolute Maximum Ratings**

	Parameter	Max.	Units
$V_{DS}$	Drain-to-Source Voltage	30	V
$V_{GS}$	Gate-to-Source Voltage	± 20	
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	86 <sup>④</sup>	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	61 <sup>④</sup>	
$I_{DM}$	Pulsed Drain Current <sup>①</sup>	340	
$P_D @ T_C = 25^\circ C$	Maximum Power Dissipation <sup>⑥</sup>	75	W
$P_D @ T_C = 100^\circ C$	Maximum Power Dissipation <sup>⑥</sup>	38	
	Linear Derating Factor	0.5	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
$R_{\theta JC}$	Junction-to-Case <sup>⑥</sup>	—	2.0	°C/W
$R_{\theta JA}$	Junction-to-Ambient (PCB Mount) <sup>⑤</sup>	—	50	
$R_{\theta JA}$	Junction-to-Ambient	—	110	

Notes <sup>①</sup> through <sup>⑥</sup> are on page 11

**ORDERING INFORMATION:**

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

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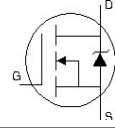
### Static @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$BV_{DSS}$	Drain-to-Source Breakdown Voltage	30	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	20	—	mV/°C	Reference to $25^\circ\text{C}, I_D = 1mA$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	4.0	5.8	mΩ	$V_{GS} = 10V, I_D = 25A$ ③
		—	5.8	8.0		$V_{GS} = 4.5V, I_D = 20A$ ③
$V_{GS(th)}$	Gate Threshold Voltage	1.35	1.80	2.35	V	$V_{DS} = V_{GS}, I_D = 50\mu A$
$\Delta V_{GS(th)}/\Delta T_J$	Gate Threshold Voltage Coefficient	—	-8.6	—	mV/°C	
$I_{DSS}$	Drain-to-Source Leakage Current	—	—	1.0	μA	$V_{DS} = 24V, V_{GS} = 0V$
		—	—	150		$V_{DS} = 24V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
$I_{GSS}$	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{GS} = 20V$
	Gate-to-Source Reverse Leakage	—	—	-100		$V_{GS} = -20V$
$g_{fs}$	Forward Transconductance	73	—	—	S	$V_{DS} = 15V, I_D = 20A$
$Q_g$	Total Gate Charge	—	15	23	nC	$V_{DS} = 15V$ $V_{GS} = 4.5V$ $I_D = 20A$ See Fig. 15
$Q_{gs1}$	Pre-Vth Gate-to-Source Charge	—	3.7	—		
$Q_{gs2}$	Post-Vth Gate-to-Source Charge	—	1.9	—		
$Q_{gd}$	Gate-to-Drain Charge	—	5.7	—		
$Q_{godr}$	Gate Charge Overdrive	—	3.7	—		
$Q_{sw}$	Switch Charge ( $Q_{gs2} + Q_{gd}$ )	—	7.6	—		
$Q_{oss}$	Output Charge	—	10	—	nC	$V_{DS} = 15V, V_{GS} = 0V$
$R_G$	Gate Resistance	—	2.0	3.5	Ω	
$t_{d(on)}$	Turn-On Delay Time	—	12	—	ns	$V_{DD} = 15V, V_{GS} = 4.5V$ ③ $I_D = 20A$ $R_G = 1.8\Omega$ See Fig. 13
$t_r$	Rise Time	—	49	—		
$t_{d(off)}$	Turn-Off Delay Time	—	15	—		
$t_f$	Fall Time	—	16	—		
$C_{iss}$	Input Capacitance	—	2150	—	pF	$V_{DS} = 0V$
$C_{oss}$	Output Capacitance	—	480	—		$V_{DS} = 15V$
$C_{riss}$	Reverse Transfer Capacitance	—	205	—		$f = 1.0MHz$

### Avalanche Characteristics

	Parameter	Typ.	Max.	Units
$E_{AS}$	Single Pulse Avalanche Energy ②	—	120	mJ
$I_{AR}$	Avalanche Current ①	—	20	A

### Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_S$	Continuous Source Current (Body Diode)	—	—	86 ④	A	MOSFET symbol showing the integral reverse p-n junction diode. 
$I_{SM}$	Pulsed Source Current (Body Diode) ①	—	—	340		
$V_{SD}$	Diode Forward Voltage	—	—	1.0	V	$T_J = 25^\circ\text{C}, I_S = 20A, V_{GS} = 0V$ ③
$t_{rr}$	Reverse Recovery Time	—	24	36	ns	$T_J = 25^\circ\text{C}, I_F = 20A, V_{DD} = 15V$
$Q_{rr}$	Reverse Recovery Charge	—	52	78	nC	$di/dt = 300A/\mu s$ ③

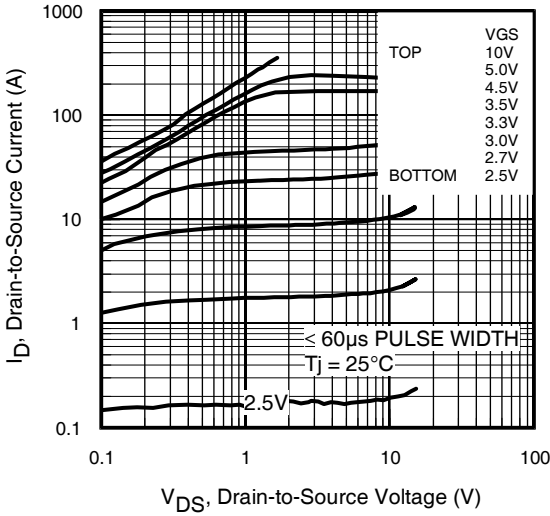


Fig 1. Typical Output Characteristics

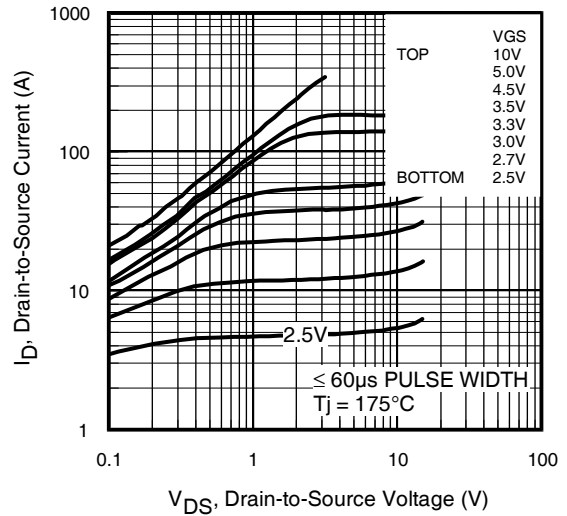


Fig 2. Typical Output Characteristics

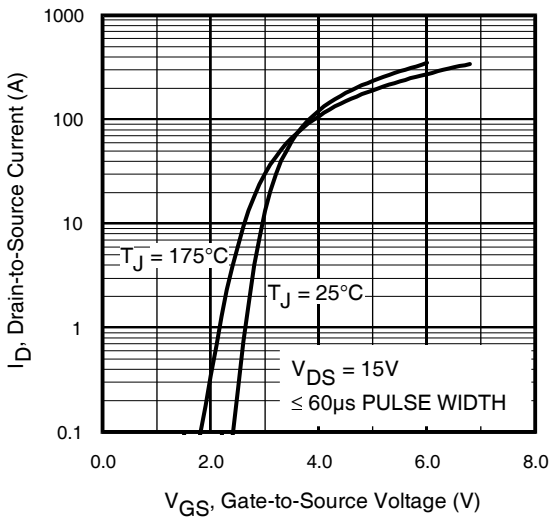


Fig 3. Typical Transfer Characteristics

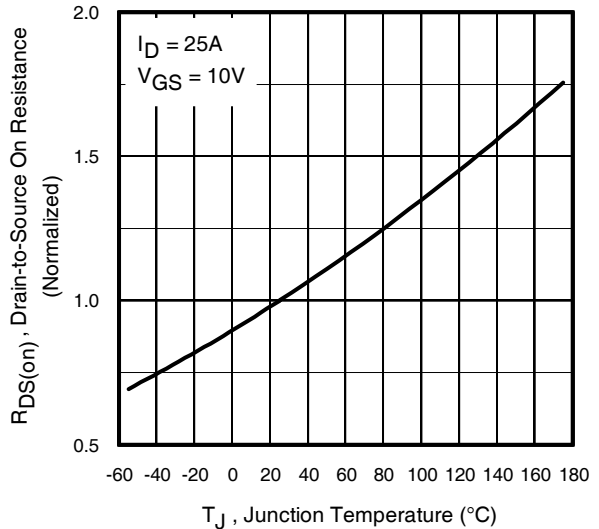
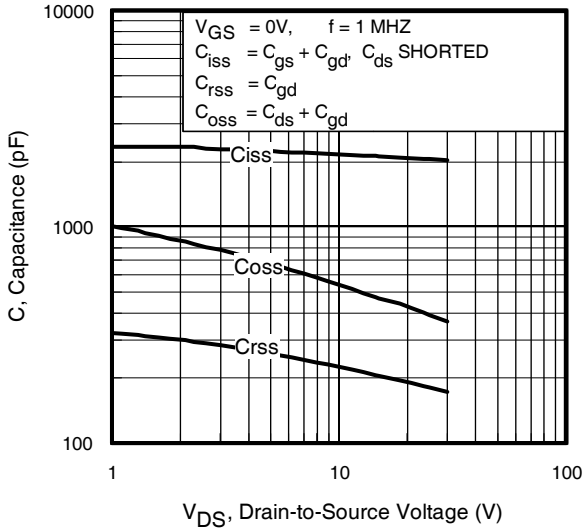
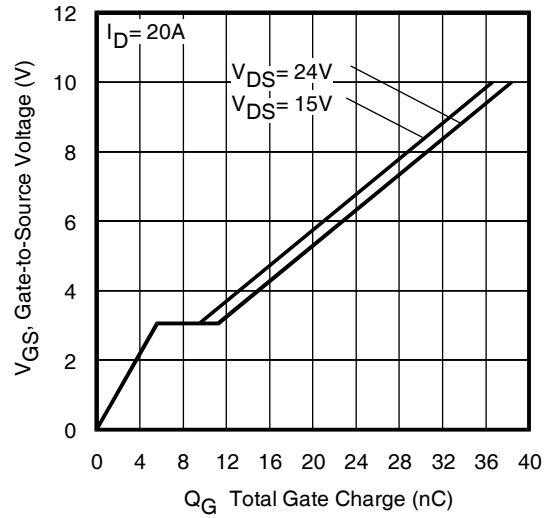


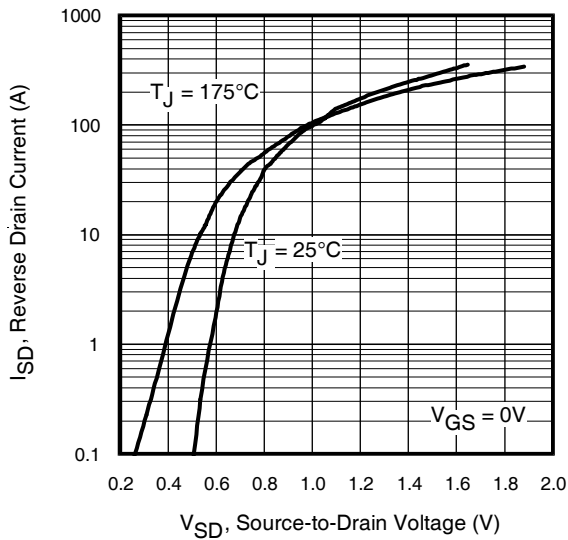
Fig 4. Normalized On-Resistance vs. Temperature



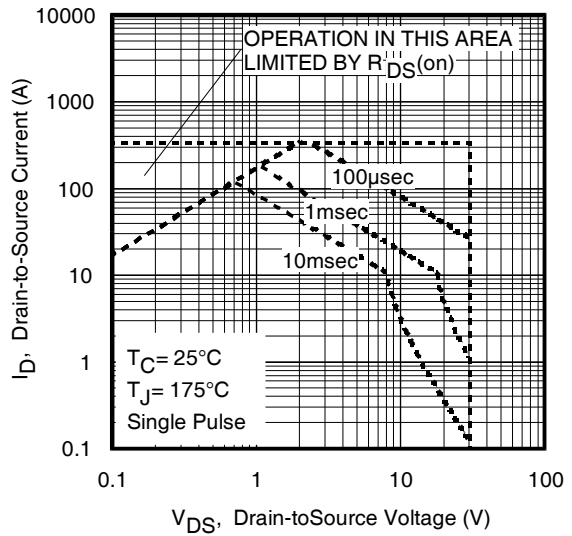
**Fig 5.** Typical Capacitance vs. Drain-to-Source Voltage



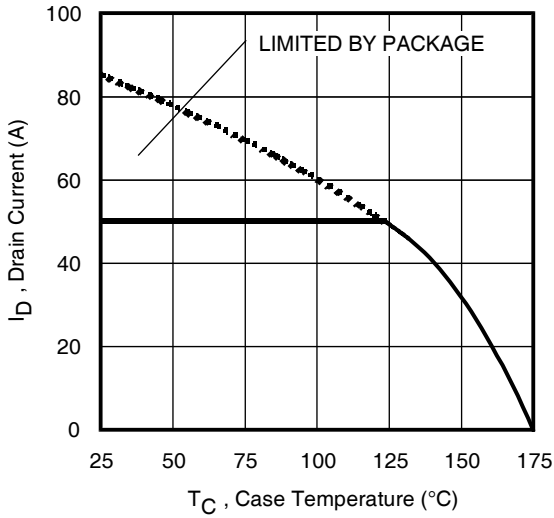
**Fig 6.** Typical Gate Charge vs. Gate-to-Source Voltage



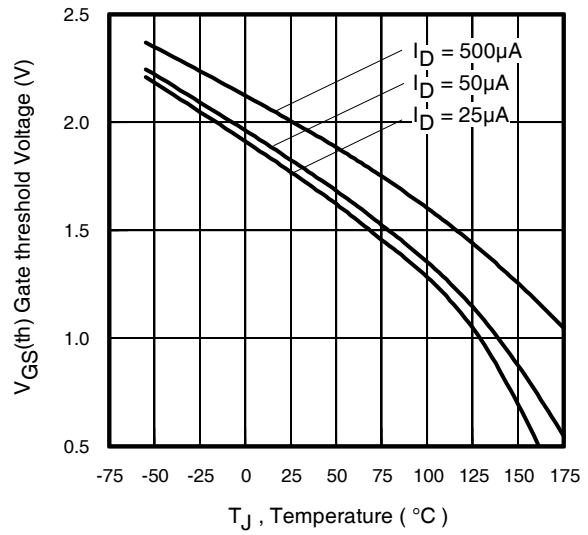
**Fig 7.** Typical Source-Drain Diode Forward Voltage



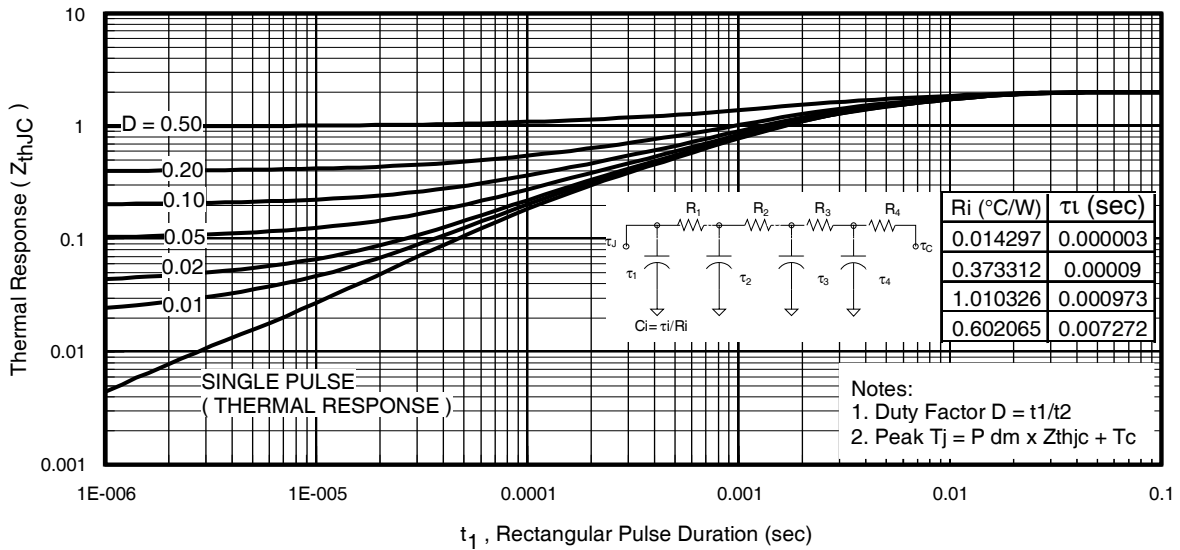
**Fig 8.** Maximum Safe Operating Area



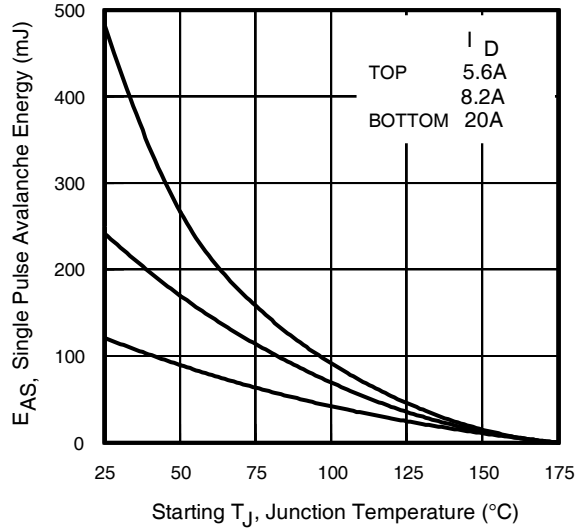
**Fig 9.** Maximum Drain Current vs. Case Temperature



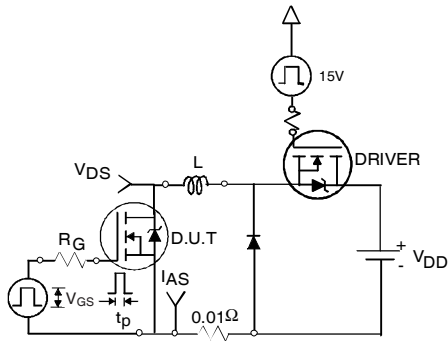
**Fig 10.** Threshold Voltage vs. Temperature



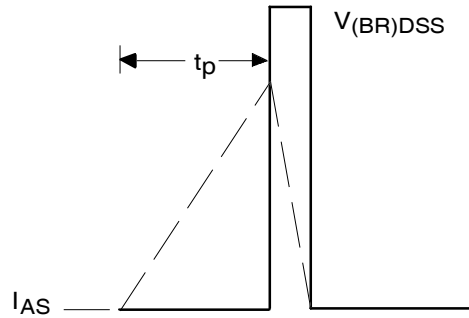
**Fig 11.** Maximum Effective Transient Thermal Impedance, Junction-to-Case



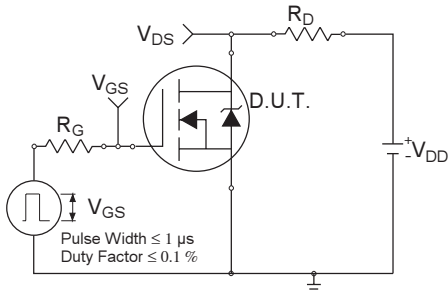
**Fig 12a.** Maximum Avalanche Energy Vs. Drain Current



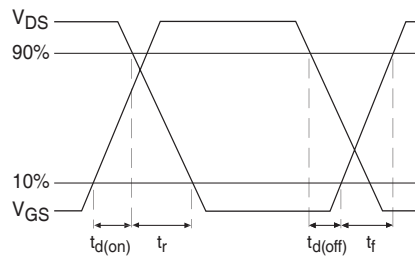
**Fig 12b.** Unclamped Inductive Test Circuit



**Fig 12c.** Unclamped Inductive Waveforms



**Fig 13a.** Switching Time Test Circuit



**Fig 13b.** Switching Time Waveforms

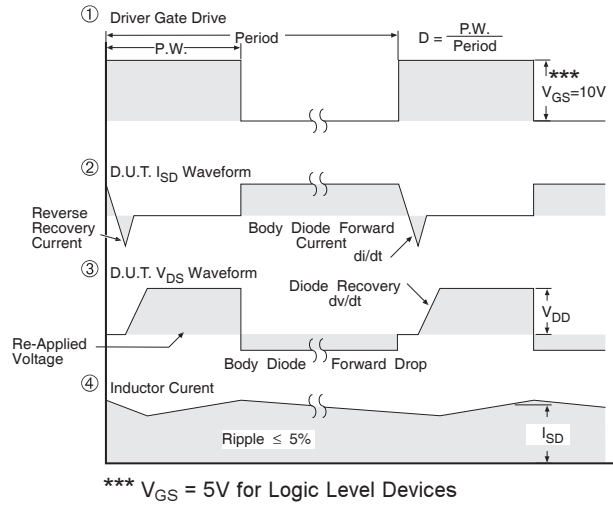
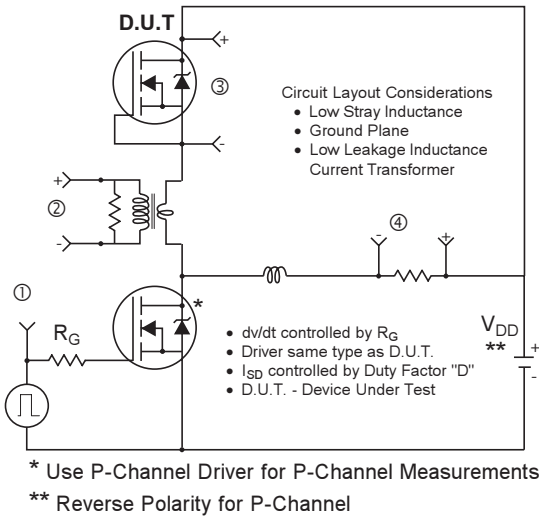


Fig 14. Diode Reverse Recovery Test Circuit for HEXFET® Power MOSFETs

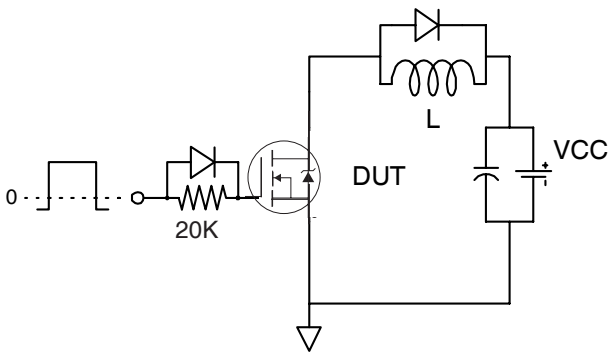


Fig 15. Gate Charge Test Circuit

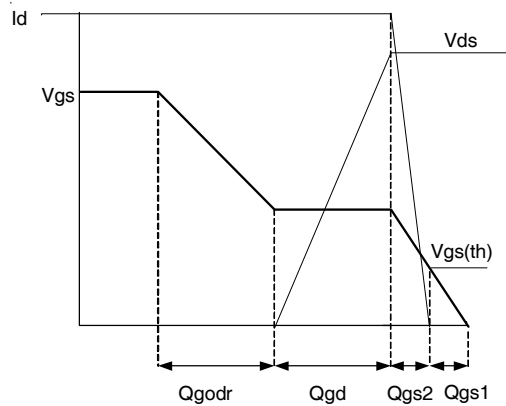


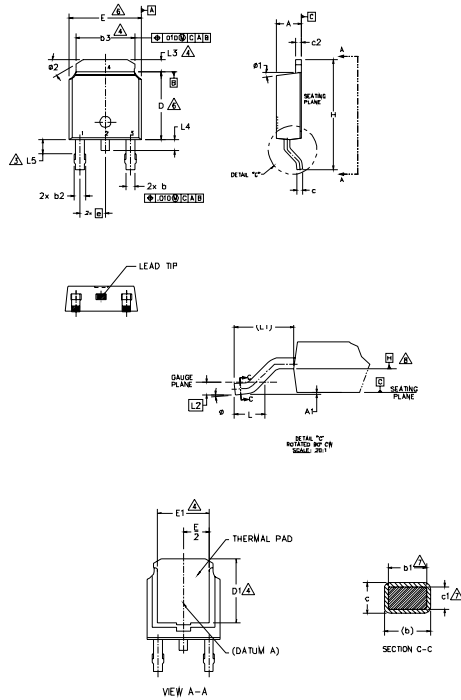
Fig 16. Gate Charge Waveform

# IRLR/U8726PbF



## 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 L.S.
  - 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 OUTMOST 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	
b2	0.76	1.14	.030	.045	
b3	4.95	5.46	.195	.215	4
c	0.46	0.61	.018	.024	
c1	0.41	0.56	.016	.022	7
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	2.34 BSC		.108 REF.		
L2	0.61 BSC		.020 BSC		
L3	0.89	1.27	.035	.050	4
L4	-	1.02	-	.040	
L5	1.14	1.52	.045	.060	3
ø	0'	10'	0'	10'	
ø1	0'	15'	0'	15'	
ø2	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

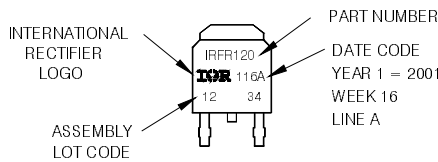
EXAMPLE: THIS IS AN IRFR120  
WITH ASSEMBLY  
LOT CODE 1234  
ASSEMBLED ON WW 16, 2001  
IN THE ASSEMBLY LINE 'A'

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

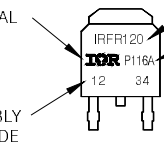
'P' in assembly line position indicates  
'Lead-Free' qualification to the consumer-level

OR

INTERNATIONAL  
RECTIFIER  
LOGO



INTERNATIONAL  
RECTIFIER  
LOGO



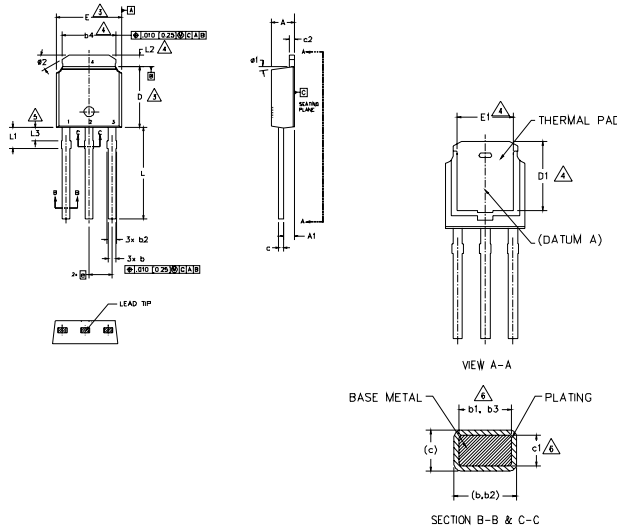
PART NUMBER  
DATE CODE  
P = DESIGNATES LEAD-FREE  
PRODUCT (OPTIONAL)  
P̄ = DESIGNATES LEAD-FREE  
PRODUCT QUALIFIED TO THE  
CONSUMER LEVEL (OPTIONAL)  
YEAR 1 = 2001  
WEEK 16  
A = ASSEMBLY SITE CODE

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



## I-Pak (TO-251AA) Package Outline

Dimensions are shown in millimeters (inches)



- NOTES:
- 1- DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994
  - 2- DIMENSION ARE SHOWN IN INCHES [MILLIMETERS]
  - 3- DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED .005 [0.13] PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTMOST EXTREMES OF THE PLASTIC BODY.
  - 4- THERMAL PAD CONTOUR OPTION WITHIN DIMENSION b4, L2, E1 & D1.
  - 5- LEAD DIMENSION UNCONTROLLED IN L3.
  - 6- DIMENSION b1, b3 & c1 APPLY TO BASE METAL ONLY.
  - 7- OUTLINE CONFORMS TO JEDEC OUTLINE TO-251AA (Date 06/02).
  - 8- CONTROLLING DIMENSION : INCHES.

SYMBOL	DIMENSIONS				NOTES
	MILLIMETERS		INCHES		
	MIN.	MAX.	MIN.	MAX.	
A	2.18	2.39	.086	.094	
A1	0.89	1.14	.035	.045	
b	0.64	0.89	.025	.035	
b1	0.65	0.79	.025	.031	6
b2	0.76	1.14	.030	.045	
b3	0.76	1.04	.030	.041	6
b4	4.95	5.46	.195	.215	4
c	0.46	0.61	.018	.024	
c1	0.41	0.56	.016	.022	6
c2	0.46	0.89	.018	.035	
D	5.97	6.22	.235	.245	3
D1	5.21	-	.205	-	4
E	6.35	6.73	.250	.265	3
E1	4.32	-	.170	-	4
e	2.29	BSC	.090	BSC	
L	8.89	9.65	.350	.380	
L1	1.91	2.29	.045	.090	
L2	0.89	1.27	.035	.050	4
L3	1.14	1.52	.045	.060	5
#1	0"	15"	0"	15"	
#2	25"	35"	25"	35"	

LEAD ASSIGNMENTS

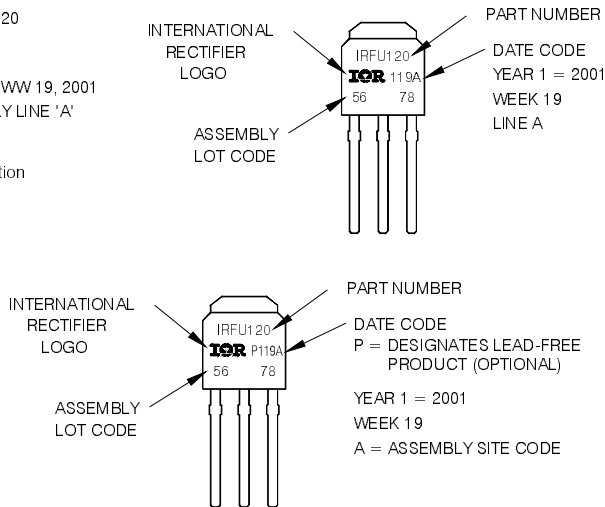
- HEXFET
- 1.- GATE
  - 2.- DRAIN
  - 3.- SOURCE
  - 4.- DRAIN

## I-Pak (TO-251AA) Part Marking Information

EXAMPLE: THIS IS AN IRFU120  
WITH ASSEMBLY  
LOT CODE 5678  
ASSEMBLED ON WW 19, 2001  
IN THE ASSEMBLY LINE 'A'

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

OR



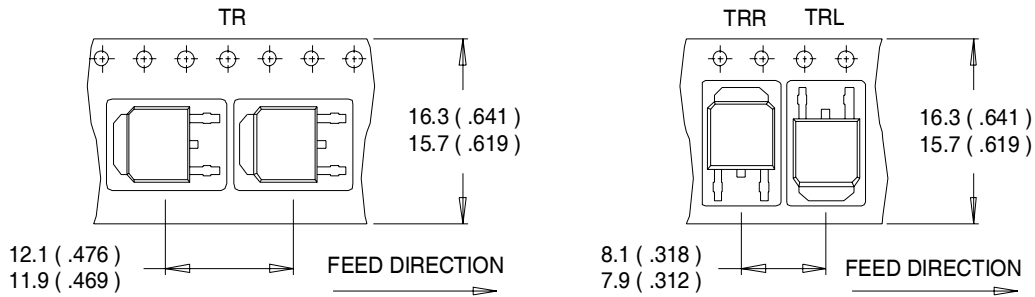
Note: For the most current drawing please refer to IR website at <http://www.irf.com/package/>  
[www.irf.com](http://www.irf.com)

# IRLR/U8726PbF

International  
**IR** Rectifier

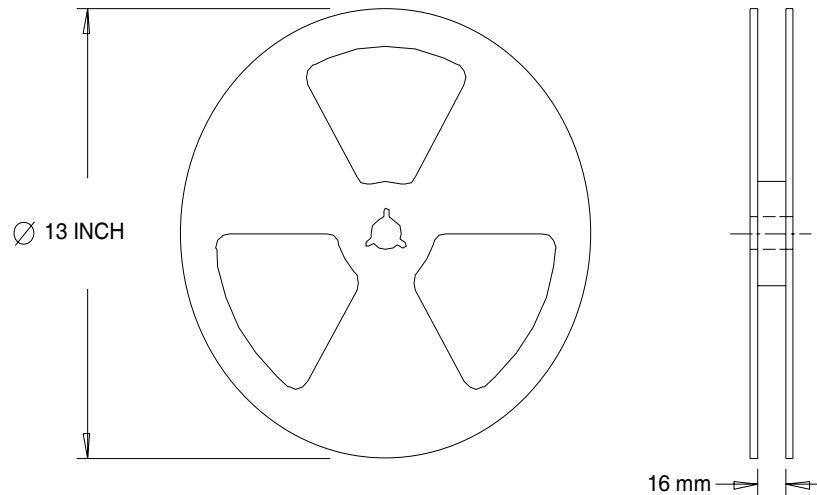
## D-Pak (TO-252AA) Tape & Reel Information

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	
IRLR8726PBF	D-PAK	Tube/Bulk	75	
IRLR8726TRPBF	D-PAK	Tape and Reel	2000	
IRLU8726PBF	I-PAK	Tube/Bulk	75	

### Qualification information<sup>†</sup>

#### D-PAK

Qualification level	Consumer <sup>††</sup>
Moisture Sensitivity Level	MSL 1
	(per JEDEC J-STD-020D <sup>†††</sup> )
RoHS compliant	Yes

#### I-PAK

Qualification level	Industrial
Moisture Sensitivity Level	Not applicable
RoHS compliant	Yes

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

<sup>††</sup> 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  $T_J = 25^\circ\text{C}$ ,  $L = 0.605\text{mH}$ ,  $R_G = 25\Omega$ ,  $I_{AS} = 20\text{A}$ .
- 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.
- ⑥  $R_\theta$  is measured at  $T_J$  approximately at  $90^\circ\text{C}$

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

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