

# IRF8852PbF

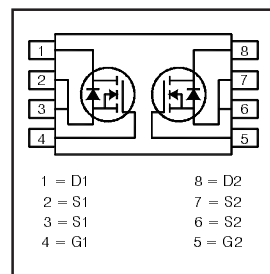
HEXFET® Power MOSFET

- Ultra Low On-Resistance
- Dual N-Channel MOSFET
- Very Small SOIC Package
- Low Profile (< 1.1mm)
- Available in Tape & Reel
- Lead-Free

V <sub>DSS</sub>	R <sub>DS(on)</sub> max	I <sub>d</sub>
25V	11.3mΩ@V <sub>GS</sub> = 10V	7.8A
	15.4mΩ@V <sub>GS</sub> = 4.5V	6.2A

## Description

HEXFET® Power MOSFETs from International Rectifier utilize advanced processing techniques to achieve extremely low on-resistance per silicon area. This benefit, combined with the ruggedized device design, that International Rectifier is well known for, provides the designer with an extremely efficient and reliable device for battery and load management.



The TSSOP-8 package has 45% less footprint area than the standard SO-8. This makes the TSSOP-8 an ideal device for applications where printed circuit board space is at a premium. The low profile (<1.2mm) allows it to fit easily into extremely thin environments such as portable electronics and PCMCIA cards.

## Absolute Maximum Ratings

	Parameter	Max.	Units
V <sub>DS</sub>	Drain-to-Source Voltage	25	V
I <sub>D</sub> @ T <sub>A</sub> = 25°C	Continuous Drain Current, V <sub>GS</sub> @ 10V	7.8	A
I <sub>D</sub> @ T <sub>A</sub> = 70°C	Continuous Drain Current, V <sub>GS</sub> @ 10V	6.2	
I <sub>DM</sub>	Pulsed Drain Current ①	62.4	
P <sub>D</sub> @ T <sub>A</sub> = 25°C	Power Dissipation ④	1.0	W
P <sub>D</sub> @ T <sub>A</sub> = 70°C	Power Dissipation ④	0.64	
	Linear Derating Factor	0.01	W/°C
V <sub>GS</sub>	Gate-to-Source Voltage	± 20	V
T <sub>J</sub>	Operating Junction and	-55 to + 150	°C
T <sub>STG</sub>	Storage Temperature Range		

## Thermal Resistance

	Parameter	Typ.	Max.	Units
R <sub>θJL</sub>	Junction-to-Drain Lead ⑤	—	53	°C/W
R <sub>θJA</sub>	Junction-to-Ambient ⑥	—	125	

Notes ① through ⑥ are on page 10

### ORDERING INFORMATION:

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

www.irf.com

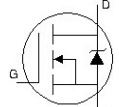
### Static @ T<sub>J</sub> = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
BV <sub>DSS</sub>	Drain-to-Source Breakdown Voltage	25	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	Breakdown Voltage Temp. Coefficient	—	0.02	—	V/°C	Reference to 25°C, I <sub>D</sub> = 1mA
R <sub>DS(on)</sub>	Static Drain-to-Source On-Resistance	—	9.2	11.3	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 7.8A ③
		—	12.5	15.4		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 6.2A ③
V <sub>GS(th)</sub>	Gate Threshold Voltage	1.35	1.8	2.35	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 25μA
I <sub>DSS</sub>	Drain-to-Source Leakage Current	—	—	1.0	μA	V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V
		—	—	150		V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 70°C
I <sub>GSS</sub>	Gate-to-Source Forward Leakage	—	—	100	nA	V <sub>GS</sub> = 20V
	Gate-to-Source Reverse Leakage	—	—	-100		V <sub>GS</sub> = -20V
g <sub>fs</sub>	Forward Transconductance	19	—	—	S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 7.8A
Q <sub>g</sub>	Total Gate Charge	—	9.5	—	nC	I <sub>D</sub> = 7.8A, V <sub>DS</sub> = 13V, V <sub>GS</sub> = 4.5V
Q <sub>g</sub>	Total Gate Charge	—	17.4	26.1	nC	I <sub>D</sub> = 7.8A
Q <sub>gs</sub>	Gate-to-Source Charge	—	3.1	—		V <sub>DS</sub> = 13V
Q <sub>gd</sub>	Gate-to-Drain Charge	—	2.9	—		V <sub>GS</sub> = 10V
R <sub>G</sub>	Gate Resistance	—	2.8	—	Ω	
t <sub>d(on)</sub>	Turn-On Delay Time	—	11.4	—	ns	V <sub>DD</sub> = 13V, V <sub>GS</sub> = 10V ③
t <sub>r</sub>	Rise Time	—	10.9	—		I <sub>D</sub> = 1.0A
t <sub>d(off)</sub>	Turn-Off Delay Time	—	70.8	—		R <sub>D</sub> = 13 Ω
t <sub>f</sub>	Fall Time	—	28.9	—		R <sub>G</sub> = 30 Ω
C <sub>iss</sub>	Input Capacitance	—	1151	—	pF	V <sub>GS</sub> = 0V
C <sub>oss</sub>	Output Capacitance	—	295	—		V <sub>DS</sub> = 20V
C <sub>rss</sub>	Reverse Transfer Capacitance	—	134	—		f = 1.0MHz

### Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E <sub>AS</sub>	Single Pulse Avalanche Energy ②	—	6.5	mJ
I <sub>AR</sub>	Avalanche Current ①	—	7.8	A

### Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I <sub>S</sub>	Continuous Source Current (Body Diode)	—	—	1.3	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I <sub>SM</sub>	Pulsed Source Current (Body Diode) ①	—	—	62.4		
V <sub>SD</sub>	Diode Forward Voltage	—	—	1.0	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = 1.3A, V <sub>GS</sub> = 0V ③
t <sub>rr</sub>	Reverse Recovery Time	—	32	48	ns	T <sub>J</sub> = 25°C, I <sub>F</sub> = 1.3A, V <sub>DD</sub> = 20V
Q <sub>rr</sub>	Reverse Recovery Charge	—	17	26	nC	di/dt = 100A/μs ③

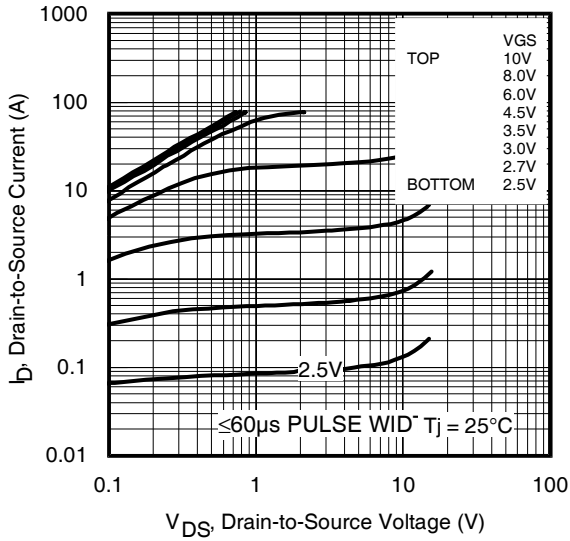


Fig 1. Typical Output Characteristics

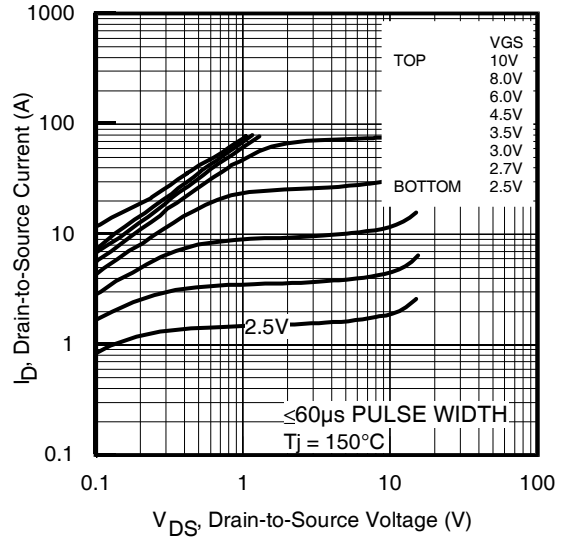


Fig 2. Typical Output Characteristics

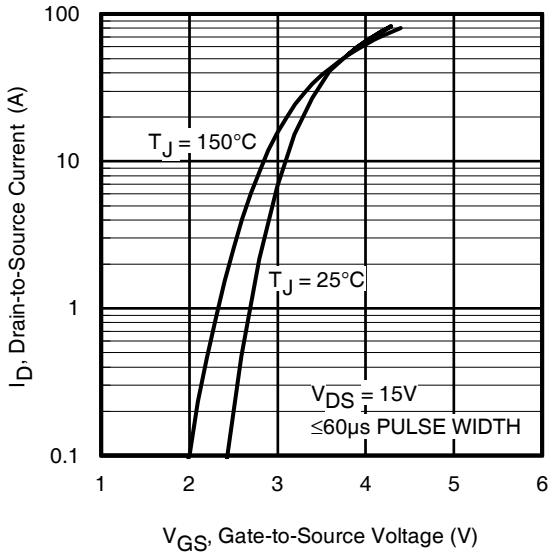


Fig 3. Typical Transfer Characteristics

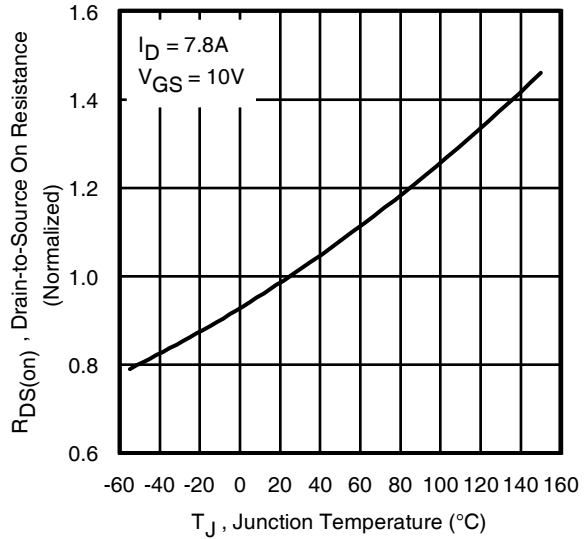
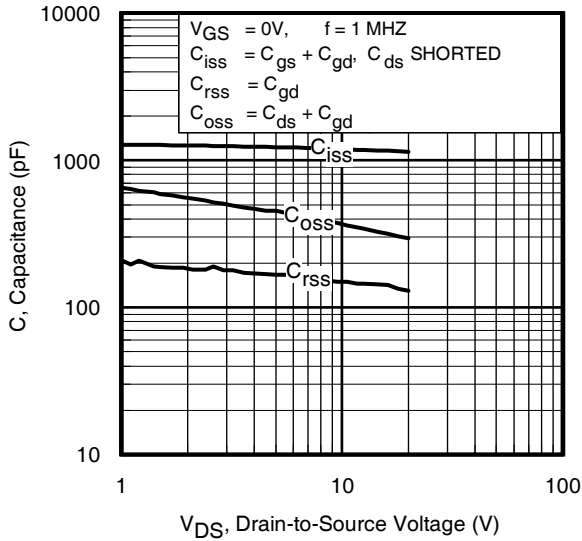


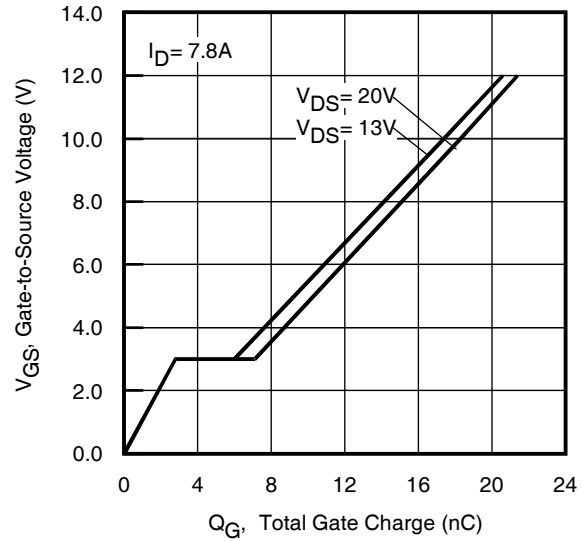
Fig 4. Normalized On-Resistance vs. Temperature

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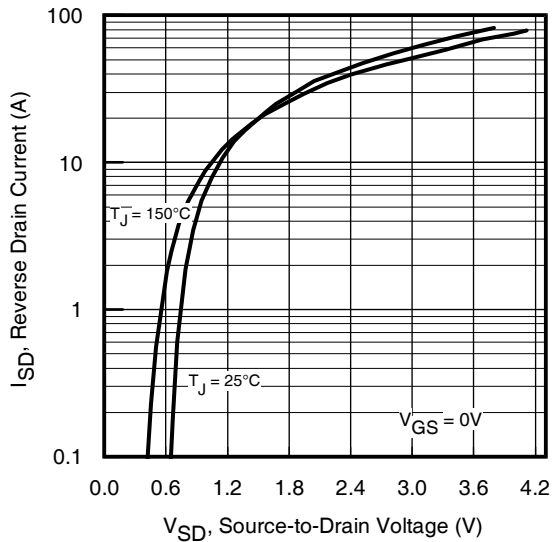
International  
**IR** Rectifier



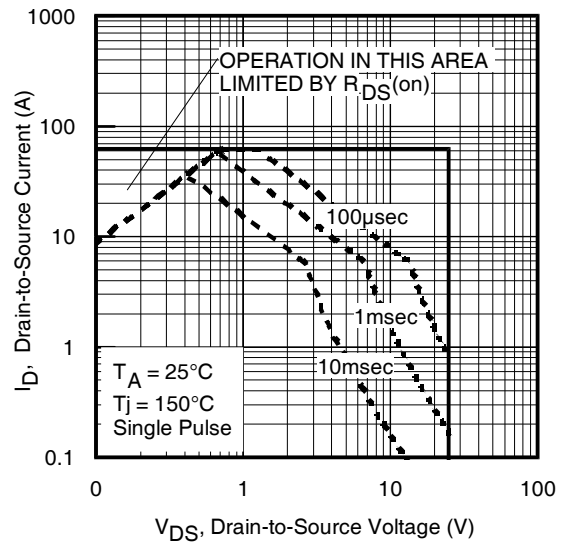
**Fig 5.** Typical Capacitance vs. Drain-to-Source Voltage



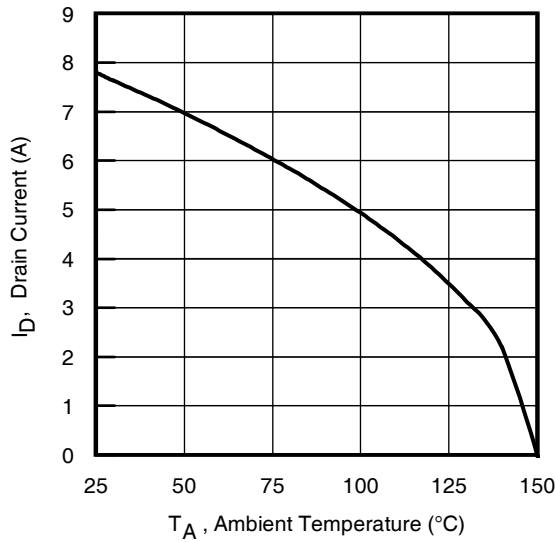
**Fig 6.** Typical Gate Charge vs. Gate-to-Source Voltage



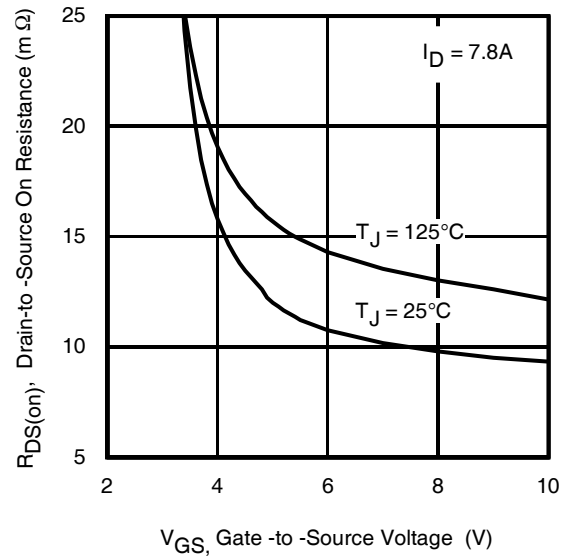
**Fig 7.** Typical Source-Drain Diode Forward Voltage



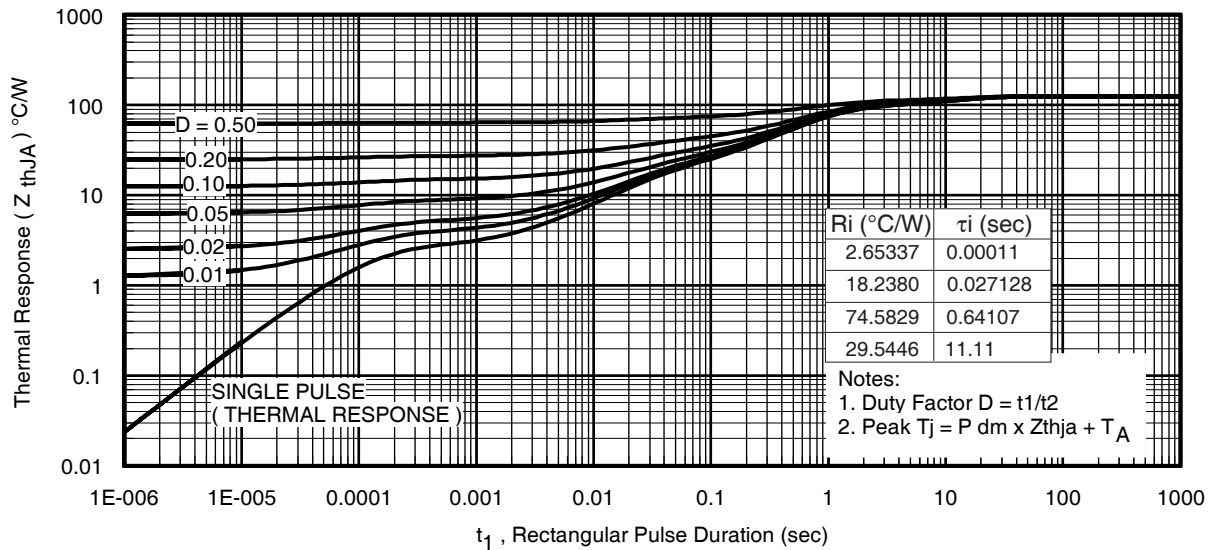
**Fig 8.** Maximum Safe Operating Area



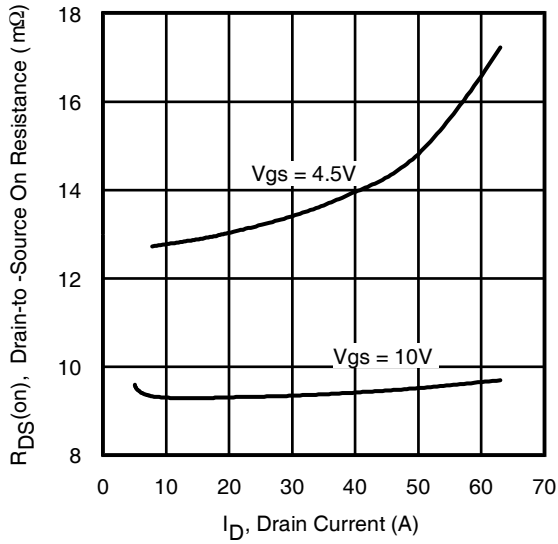
**Fig 9.** Maximum Drain Current vs. Ambient Temperature



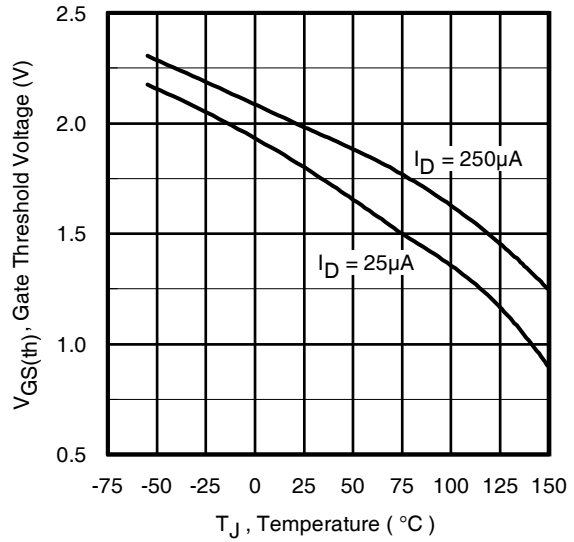
**Fig 10.** Typical On-Resistance Vs. Gate Voltage



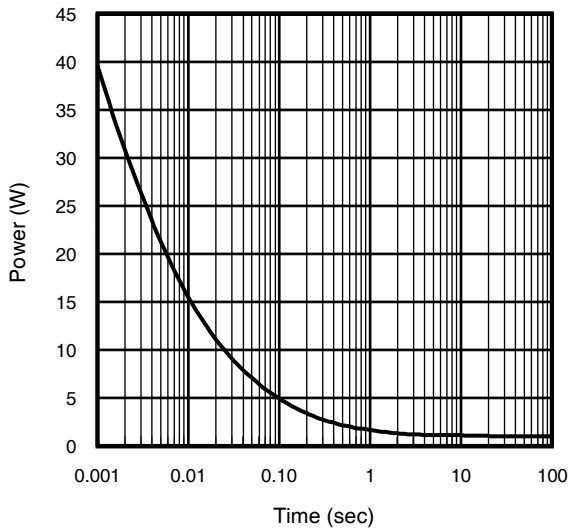
**Fig 11.** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



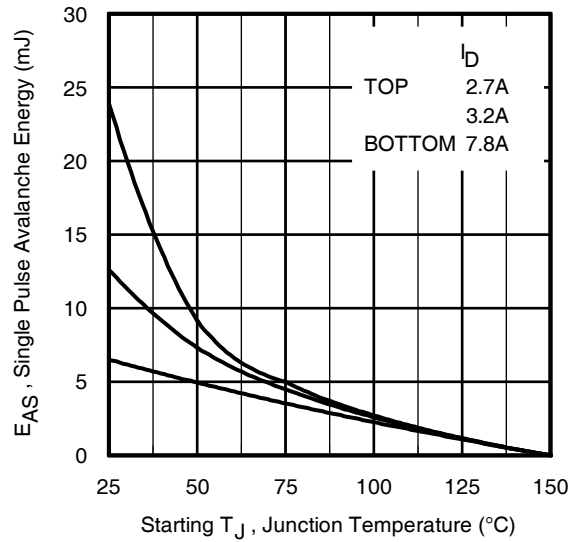
**Fig 12.** Typical On-Resistance vs. Drain Current



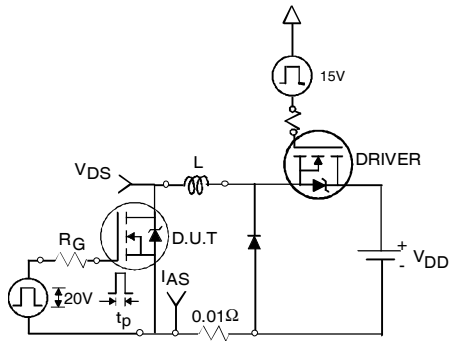
**Fig 13.** Typical Threshold Voltage vs. Junction Temperature



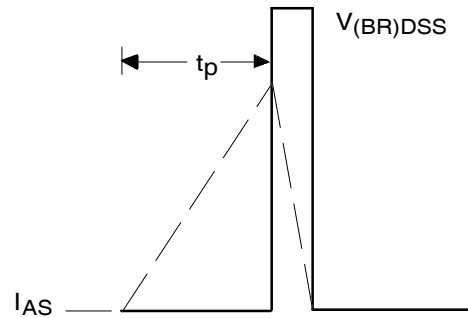
**Fig 14.** Typical Power Vs. Time



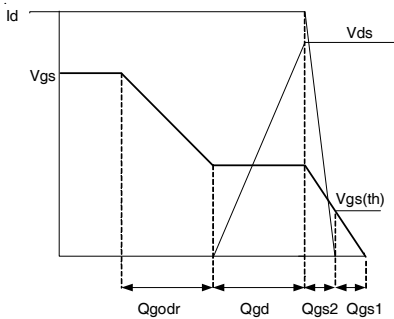
**Fig 15.** Maximum Avalanche Energy vs. Drain Current



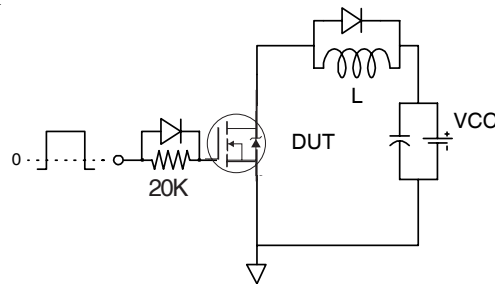
**Fig 16a.** Unclamped Inductive Test Circuit



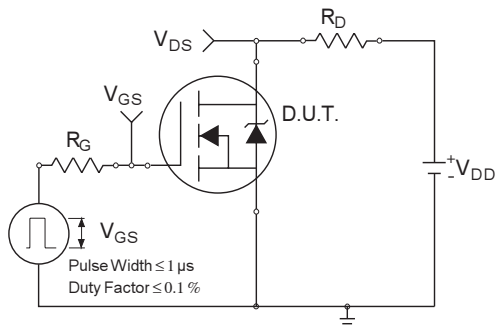
**Fig 16b.** Unclamped Inductive Waveforms



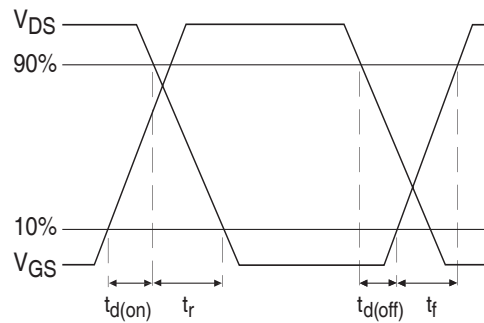
**Fig 17.** Gate Charge Waveform



**Fig 17.** Gate Charge Test Circuit



**Fig 18a.** Switching Time Test Circuit



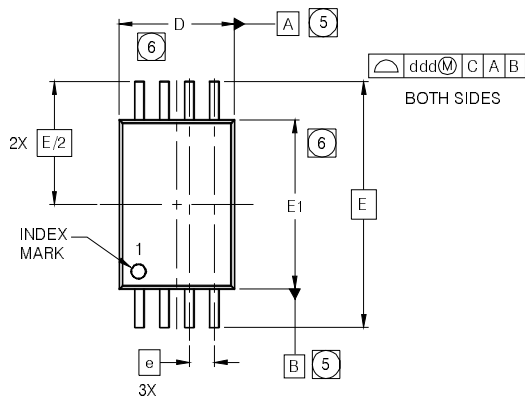
**Fig 18b.** Switching Time Waveforms

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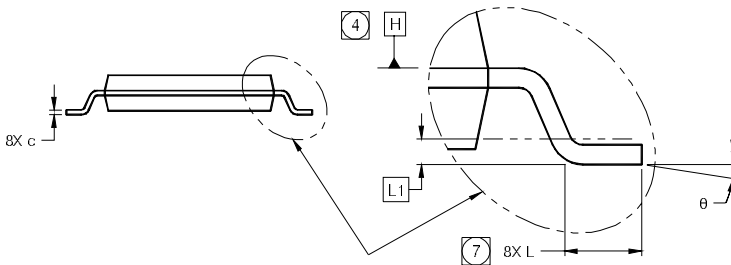
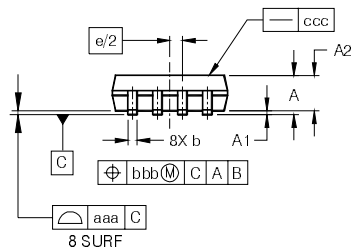
International  
**IR** Rectifier

## TSSOP8 Package Outline

Dimensions are shown in millimeters (inches)



SYMBOL	MO-153AA DIMENSIONS					
	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	---	---	1.20	---	---	.0472
A1	0.05	---	0.15	.0020	---	.0059
A2	0.80	1.00	1.05	.032	.039	.041
b	0.19	---	0.30	.0075	---	.0118
c	0.09	---	0.20	.0036	---	.0078
D	2.90	3.00	3.10	.115	.118	.122
E	6.40 BSC			.251 BSC		
E1	4.30	4.40	4.50	.170	.173	.177
e	0.65 BSC			.0256		
L	0.45	0.60	0.75	.0178	.0236	.0290
L1	0.25 BSC			.010 BSC		
θ	0°	---	8°	0°	---	8°
aaa	0.10			.0039		
bbb	0.10			.0039		
ccc	0.05			.0019		
ddd	0.20			.0078		



### LEAD ASSIGNMENTS



### NOTES

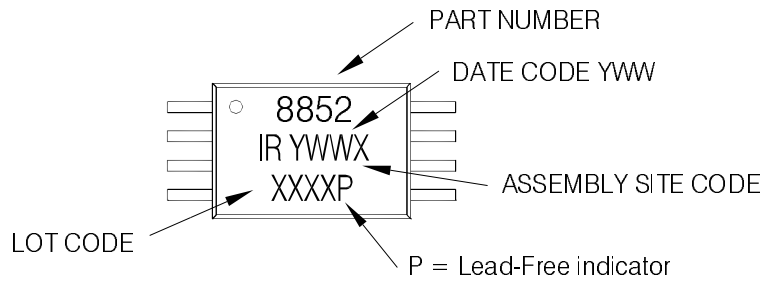
- DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
- DIMENSIONS ARE SHOWN IN MILLIMETERS AND INCHES.
- CONTROLLING DIMENSION: MILLIMETER.
- DATUM PLANE H IS LOCATED AS SHOWN.
- DATUM A AND B TO BE DETERMINED AT DATUM PLANE H.
- DIMENSIONS D AND E1 ARE MEASURED AT DATUM PLANE H.
- DIMENSION L IS THE LEAD LENGTH FOR SOLDERING TO A SUBSTRATE.
- OUTLINE CONFORMS TO JEDEC OUTLINE MO-153AA.

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

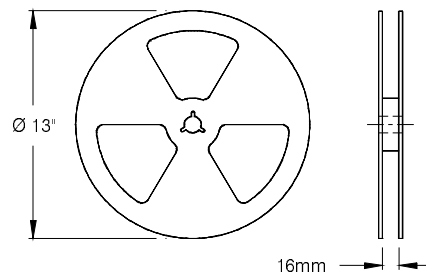
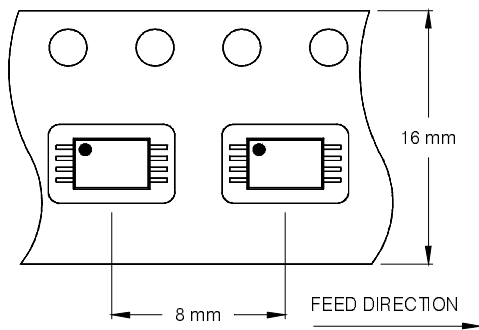


## TSSOP8 Part Marking Information

EXAMPLE: THIS IS AN IRF8852PBF



## TSSOP-8 Tape and Reel Information



**NOTES:**

1. TAPE & REEL OUTLINE CONFORMS TO EIA-481 & EIA-541.

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

# IRF8852PbF

International  
**IR** Rectifier

Orderable part number	Package Type	Standard Pack		Note
		Form	Quantity	
IRF8852TRPbF	TSSOP-8	Tape and Reel	4000	

## Qualification Information<sup>†</sup>

Qualification level	Consumer <sup>††</sup>	
	(per JEDEC JESD47F <sup>†††</sup> guidelines)	
Moisture Sensitivity Level	TSSOP-8	MSL1 (per JEDEC J-STD-020D <sup>†††</sup> )
RoHS Compliant	Yes	

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

†† 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/>

††† Applicable version of JEDEC standard at the time of product release.

### Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Starting  $T_J = 25^\circ\text{C}$ ,  $L = 0.214\text{mH}$ ,  $R_G = 25\Omega$ ,  $I_{AS} = 7.8\text{A}$ .
- ③ Pulse width  $\leq 400\mu\text{s}$ ; duty cycle  $\leq 2\%$ .
- ④ When mounted on 1 inch square copper board.
- ⑤  $R_\theta$  is measured at  $T_J$  of approximately  $90^\circ\text{C}$ .

Data and specifications subject to change without notice.

International  
**IR** Rectifier

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TAC Fax: (310) 252-7903

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