

# IRF7457TRPBF Datasheet



DiGi Electronics Part Number	IRF7457TRPBF-DG
Manufacturer	<a href="#">Infineon Technologies</a>
Manufacturer Product Number	IRF7457TRPBF
Description	MOSFET N-CH 20V 15A 8SO
Detailed Description	N-Channel 20 V 15A (Ta) 2.5W (Ta) Surface Mount 8-SO

<https://www.DiGi-Electronics.com>



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## Purchase and inquiry

Manufacturer Product Number:

IRF7457TRPBF

Series:

HEXFET®

FET Type:

N-Channel

Drain to Source Voltage (Vdss):

20 V

Drive Voltage (Max Rds On, Min Rds On):

4.5V, 10V

Vgs(th) (Max) @ Id:

3V @ 250µA

Vgs (Max):

±20V

FET Feature:

-

Operating Temperature:

-55°C ~ 150°C (Tj)

Supplier Device Package:

8-SO

Manufacturer:

Infineon Technologies

Product Status:

Obsolete

Technology:

MOSFET (Metal Oxide)

Current - Continuous Drain (Id) @ 25°C:

15A (Ta)

Rds On (Max) @ Id, Vgs:

7mOhm @ 15A, 10V

Gate Charge (Qg) (Max) @ Vgs:

42 nC @ 4.5 V

Input Capacitance (Ciss) (Max) @ Vds:

3100 pF @ 10 V

Power Dissipation (Max):

2.5W (Ta)

Mounting Type:

Surface Mount

Package / Case:

8-SOIC (0.154", 3.90mm Width)

## Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.29.0095

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99



International  
**IR** Rectifier

PD- 95032

**SMPS MOSFET****IRF7457PbF****Applications**

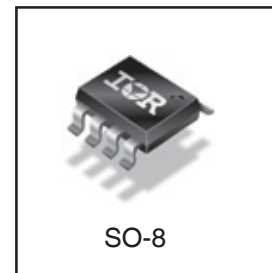
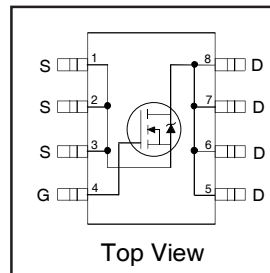
- High Frequency DC-DC Isolated Converters with Synchronous Rectification for Telecom and Industrial use
- High Frequency Buck Converters for Computer Processor Power
- Lead-Free

HEXFET® Power MOSFET

$V_{DS}$	$R_{DS(on)}$ max	$I_D$
20V	7.0m $\Omega$	15A

**Benefits**

- Ultra-Low  $R_{DS(on)}$
- Very Low Gate Impedance
- Fully Characterized Avalanche Voltage and Current

**Absolute Maximum Ratings**

Symbol	Parameter	Max.	Units
$V_{DS}$	Drain-Source Voltage	20	V
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$I_D$ @ $T_A = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS}$ @ 10V	15	A
$I_D$ @ $T_A = 70^\circ\text{C}$	Continuous Drain Current, $V_{GS}$ @ 10V	12	
$I_{DM}$	Pulsed Drain Current <sup>①</sup>	120	
$P_D$ @ $T_A = 25^\circ\text{C}$	Maximum Power Dissipation <sup>③</sup>	2.5	W
$P_D$ @ $T_A = 70^\circ\text{C}$	Maximum Power Dissipation <sup>③</sup>	1.6	W
	Linear Derating Factor	0.02	W/ $^\circ\text{C}$
$T_J, T_{STG}$	Junction and Storage Temperature Range	-55 to + 150	$^\circ\text{C}$

**Thermal Resistance**

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JL}$	Junction-to-Drain Lead	—	20	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Junction-to-Ambient <sup>④</sup>	—	50	

Notes ① through ④ are on page 8  
www.irf.com

## IRF7457PbF

International  
IR RectifierStatic @  $T_J = 25^\circ\text{C}$  (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	20	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.023	—	V/ $^\circ\text{C}$	Reference to $25^\circ\text{C}, I_D = 1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	5.5	7.0	m $\Omega$	$V_{GS} = 10V, I_D = 15A$ ③
		—	8.0	10.5		$V_{GS} = 4.5V, I_D = 12A$ ③
$V_{GS(th)}$	Gate Threshold Voltage	1.0	—	3.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
$I_{DSS}$	Drain-to-Source Leakage Current	—	—	20	$\mu A$	$V_{DS} = 16V, V_{GS} = 0V$
		—	—	100		$V_{DS} = 16V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
$I_{GSS}$	Gate-to-Source Forward Leakage	—	—	200	nA	$V_{GS} = 16V$
	Gate-to-Source Reverse Leakage	—	—	-200		$V_{GS} = -16V$

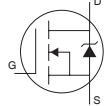
Dynamic @  $T_J = 25^\circ\text{C}$  (unless otherwise specified)

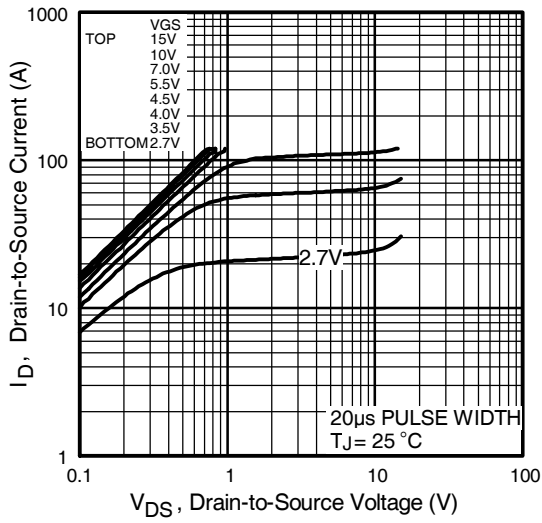
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$g_{fs}$	Forward Transconductance	30	—	—	S	$V_{DS} = 16V, I_D = 12A$
$Q_g$	Total Gate Charge	—	28	42	nC	$I_D = 12A$
$Q_{gs}$	Gate-to-Source Charge	—	11	17		$V_{DS} = 10V$
$Q_{gd}$	Gate-to-Drain ("Miller") Charge	—	10	15		$V_{GS} = 4.5V,$ ③
$Q_{oss}$	Output Gate Charge	—	25	38		$V_{GS} = 0V, V_{DS} = 10V$
$t_{d(on)}$	Turn-On Delay Time	—	14	—	ns	$V_{DD} = 10V,$
$t_r$	Rise Time	—	16	—		$I_D = 12A$
$t_{d(off)}$	Turn-Off Delay Time	—	16	—		$R_G = 1.8\Omega$
$t_f$	Fall Time	—	7.5	—		$V_{GS} = 4.5V$ ③
$C_{iss}$	Input Capacitance	—	3100	—	pF	$V_{GS} = 0V$
$C_{oss}$	Output Capacitance	—	1600	—		$V_{DS} = 10V$
$C_{rss}$	Reverse Transfer Capacitance	—	270	—		$f = 1.0\text{MHz}$

## Avalanche Characteristics

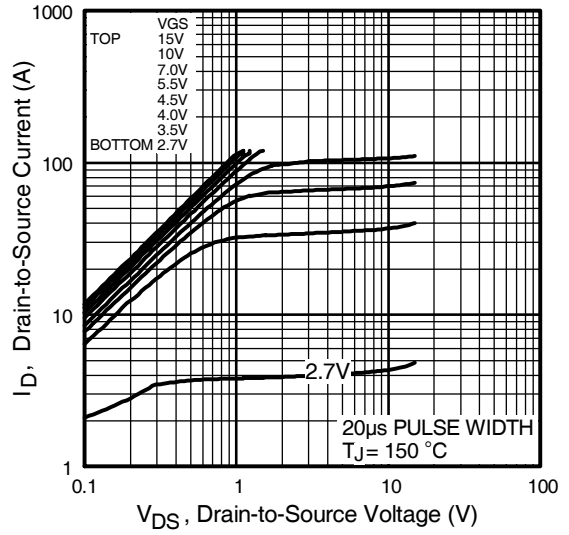
	Parameter	Typ.	Max.	Units
$E_{AS}$	Single Pulse Avalanche Energy②	—	265	mJ
$I_{AR}$	Avalanche Current①	—	15	A

## Diode Characteristics

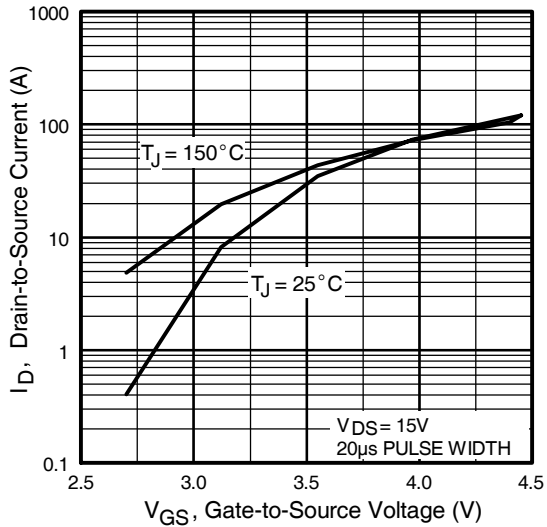
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_S$	Continuous Source Current (Body Diode)	—	—	2.5	A	MOSFET symbol showing the integral reverse p-n junction diode. 
$I_{SM}$	Pulsed Source Current (Body Diode) ①	—	—	120		
$V_{SD}$	Diode Forward Voltage	—	0.8	1.3	V	$T_J = 25^\circ\text{C}, I_S = 12A, V_{GS} = 0V$ ③
		—	0.67	—		$T_J = 125^\circ\text{C}, I_S = 12A, V_{GS} = 0V$
$t_{rr}$	Reverse Recovery Time	—	50	75	ns	$T_J = 25^\circ\text{C}, I_F = 12A, V_R = 15V$
$Q_{rr}$	Reverse Recovery Charge	—	70	105	nC	$di/dt = 100A/\mu s$ ③
$t_{rr}$	Reverse Recovery Time	—	50	75	ns	$T_J = 125^\circ\text{C}, I_F = 12A, V_R = 15V$
$Q_{rr}$	Reverse Recovery Charge	—	74	110	nC	$di/dt = 100A/\mu s$ ③



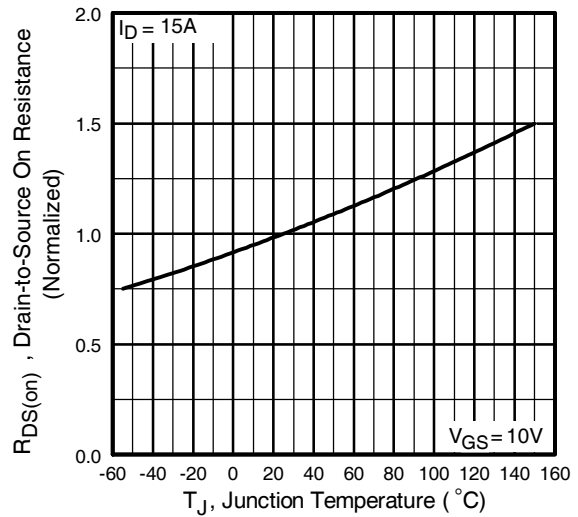
**Fig 1.** Typical Output Characteristics



**Fig 2.** Typical Output Characteristics

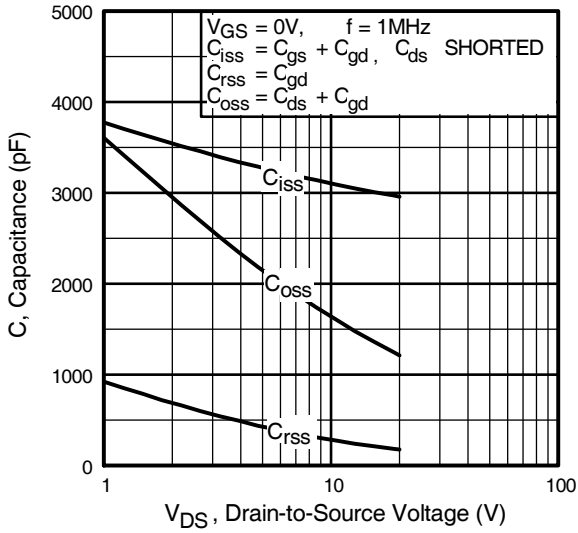


**Fig 3.** Typical Transfer Characteristics

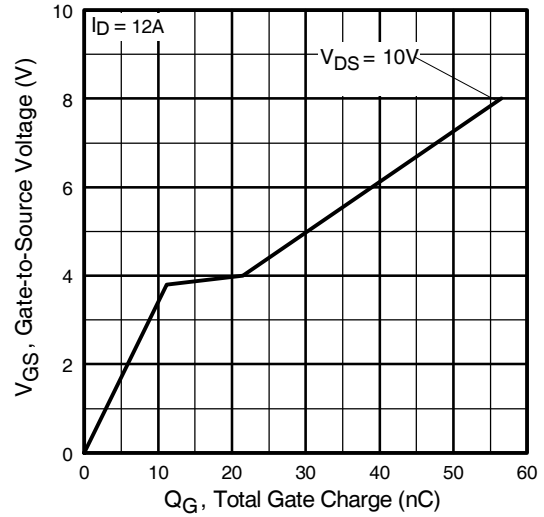


**Fig 4.** Normalized On-Resistance Vs. Temperature

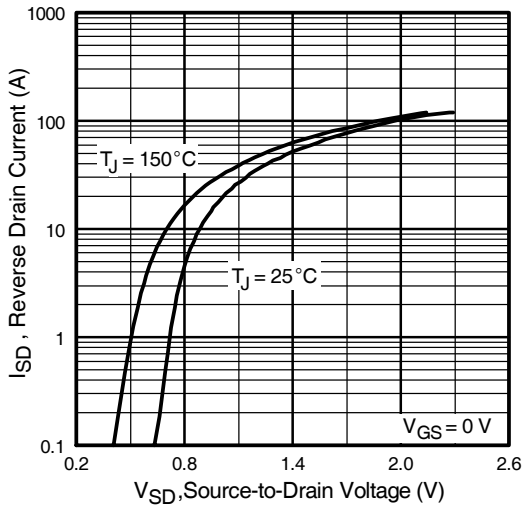
# IRF7457PbF



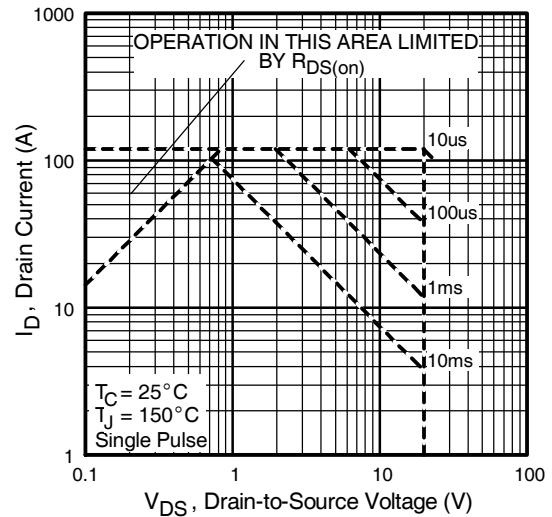
**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage



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



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



**Fig 8.** Maximum Safe Operating Area

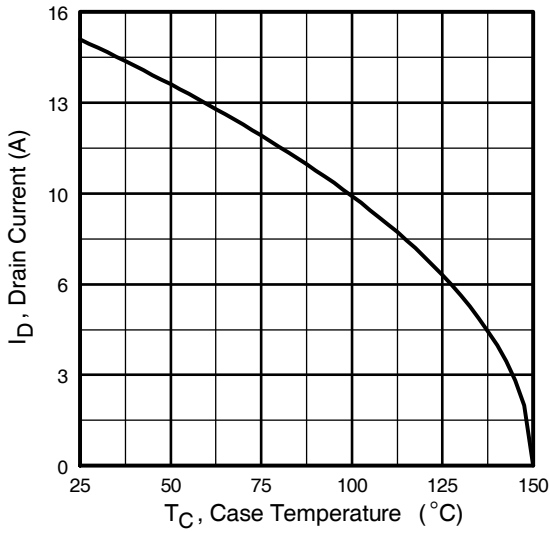


Fig 9. Maximum Drain Current Vs. Case Temperature

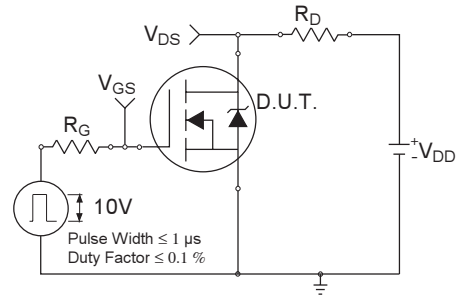


Fig 10a. Switching Time Test Circuit

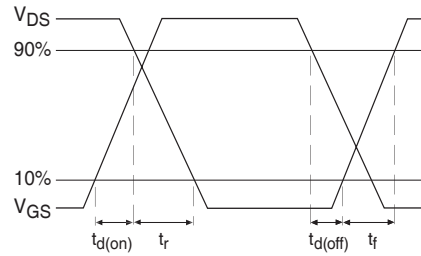


Fig 10b. Switching Time Waveforms

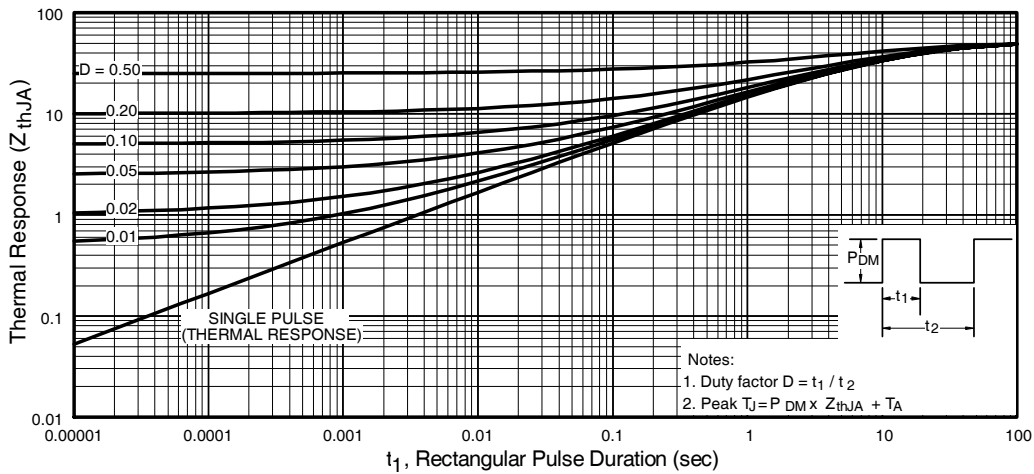
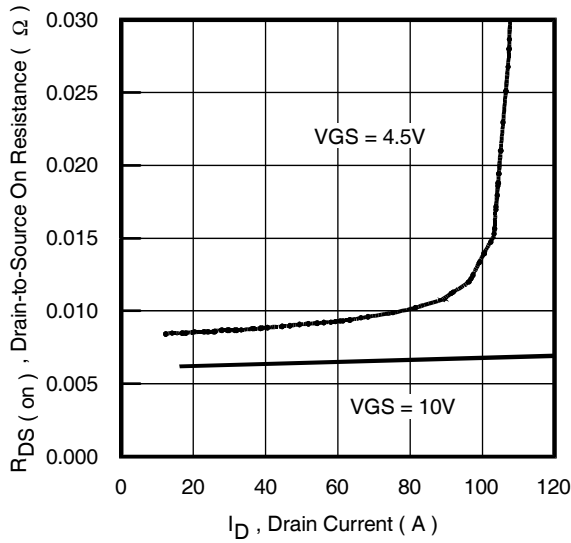


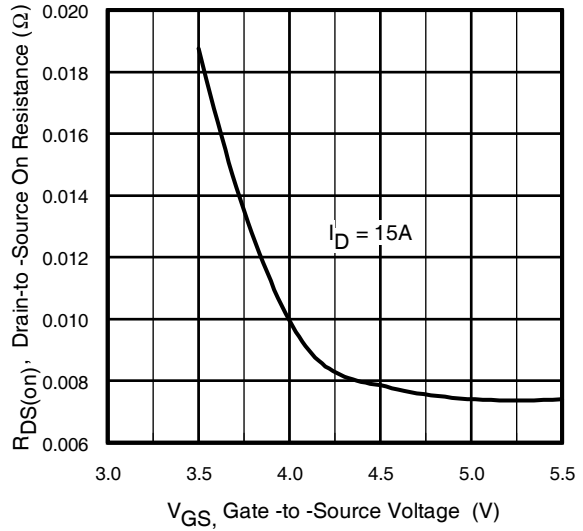
Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

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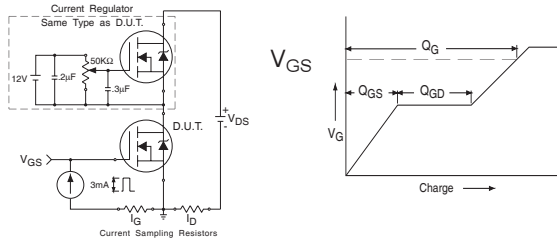
International  
**IR** Rectifier



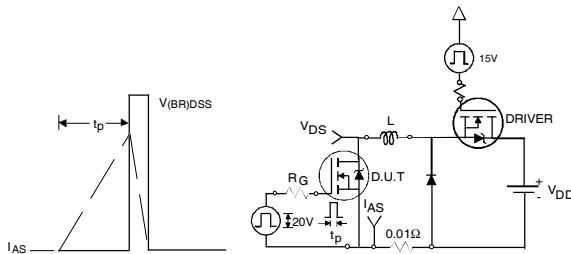
**Fig 12.** On-Resistance Vs. Drain Current



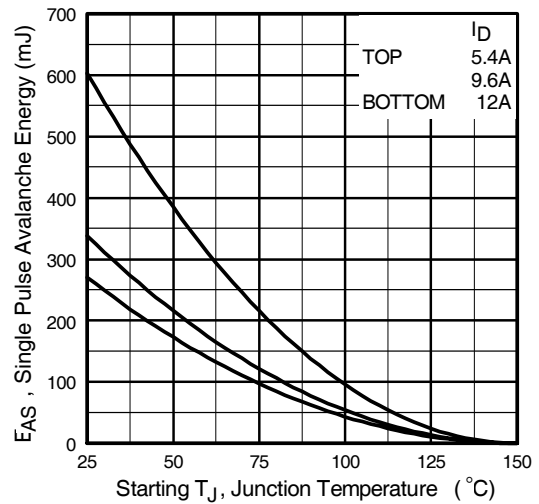
**Fig 14.** On-Resistance Vs. Gate Voltage



**Fig 13a&b.** Basic Gate Charge Test Circuit and Waveform



**Fig 14a&b.** Unclamped Inductive Test circuit and Waveforms



**Fig 14c.** Maximum Avalanche Energy Vs. Drain Current

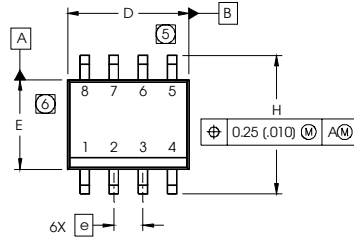




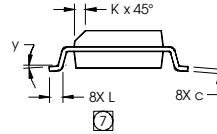
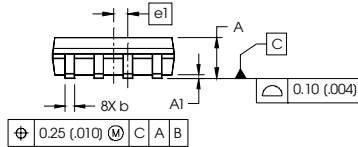
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## SO-8 Package Outline

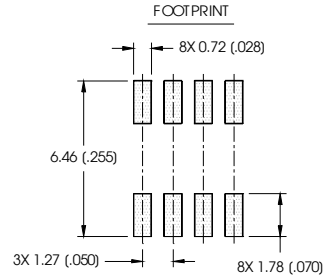
Dimensions are shown in millimeters (inches)



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40	1.27
y	0°	8°	0°	8°

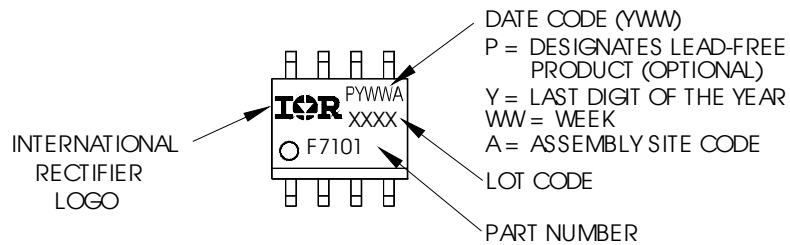


- NOTES:
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
  2. CONTROLLING DIMENSION: MILLIMETER
  3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
  4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
  5. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 (.006).
  6. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.25 (.010).
  7. DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE.



## SO-8 Part Marking Information (Lead-Free)

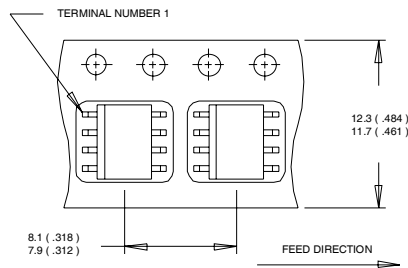
EXAMPLE: THIS IS AN IRF7101 (MOSFET)



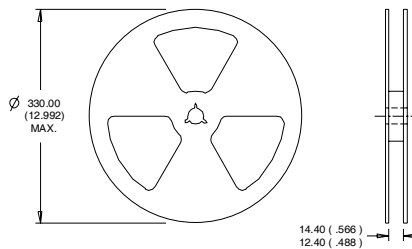
# IRF7457PbF



## SO-8 Tape and Reel



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



- NOTES:
1. CONTROLLING DIMENSION : MILLIMETER.
  2. OUTLINE CONFORMS TO EIA-481 & EIA-541.

**Notes:**

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Starting  $T_J = 25^\circ\text{C}$ ,  $L = 3.7\text{mH}$   
 $R_G = 25\Omega$ ,  $I_{AS} = 12\text{A}$ .
- ③ Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .
- ④ When mounted on 1 inch square copper board,  $t < 10\text{ sec}$

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



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