

SMPS MOSFET

IRF7457

HEXFET® Power MOSFET

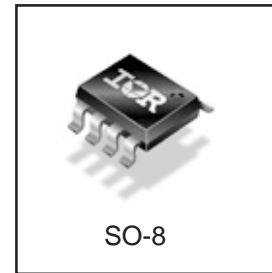
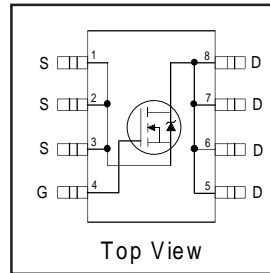
Applications

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

V_{DSS}	R_{DS(on)} max	I_D
20V	7.0mΩ	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	± 20	V
I _D @ T _A = 25°C	Continuous Drain Current, V _{GS} @ 10V	15	A
I _D @ T _A = 70°C	Continuous Drain Current, V _{GS} @ 10V	12	
I _{DM}	Pulsed Drain Current ^①	120	
P _D @ T _A = 25°C	Maximum Power Dissipation ^③	2.5	W
P _D @ T _A = 70°C	Maximum Power Dissipation ^③	1.6	W
	Linear Derating Factor	0.02	W/°C
T _J , T _{STG}	Junction and Storage Temperature Range	-55 to + 150	°C

Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units
R _{θJL}	Junction-to-Drain Lead	—	20	°C/W
R _{θJA}	Junction-to-Ambient ^④	—	50	

Notes ① through ④ are on page 8
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International
IR Rectifier

Static @ $T_J = 25^\circ\text{C}$ (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 Ω	$V_{GS} = 10V, I_D = 15A$ 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	μA	$V_{DS} = 16V, V_{GS} = 0V$
		—	—	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		$V_{GS} = -16V$

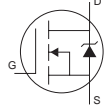
Dynamic @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

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

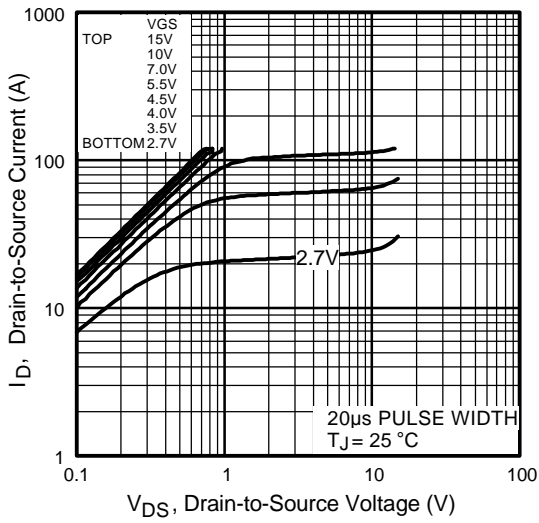


Fig 1. Typical Output Characteristics

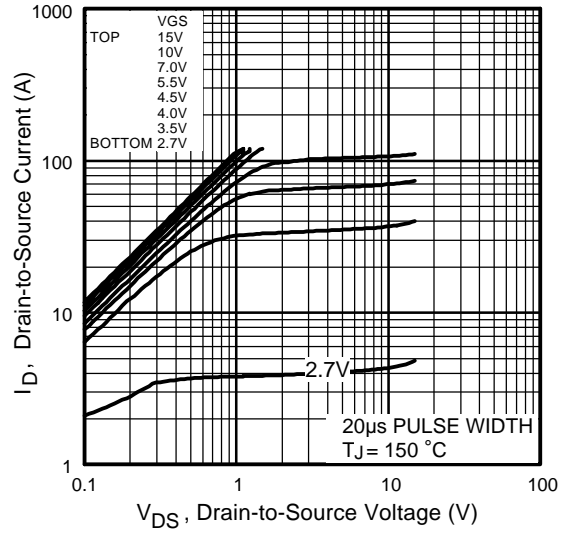


Fig 2. Typical Output Characteristics

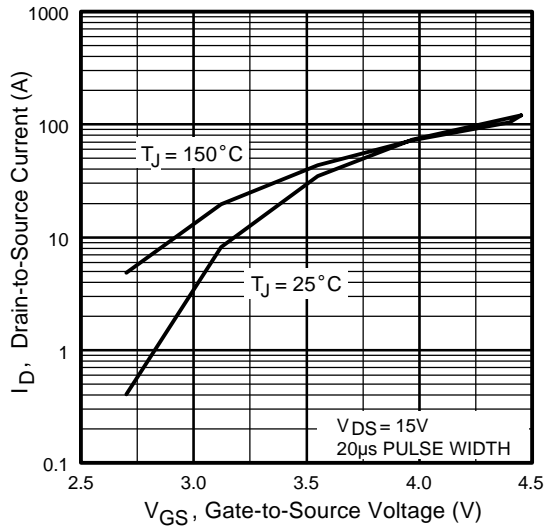


Fig 3. Typical Transfer Characteristics

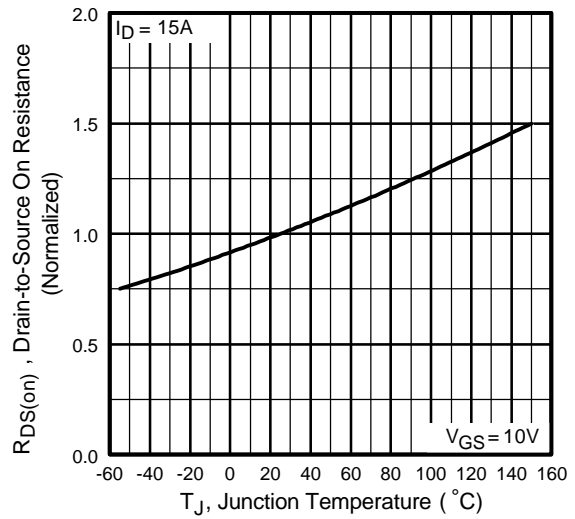
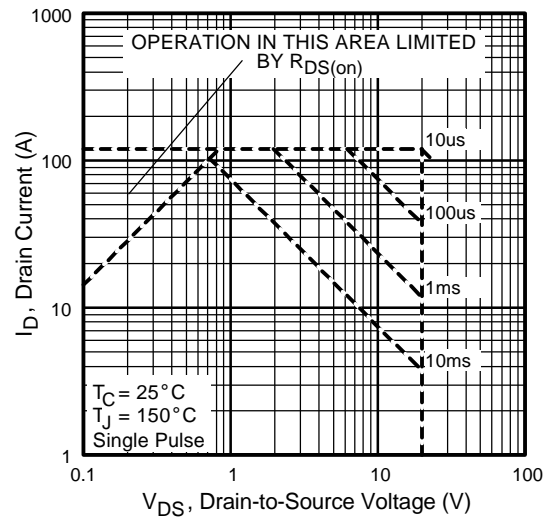
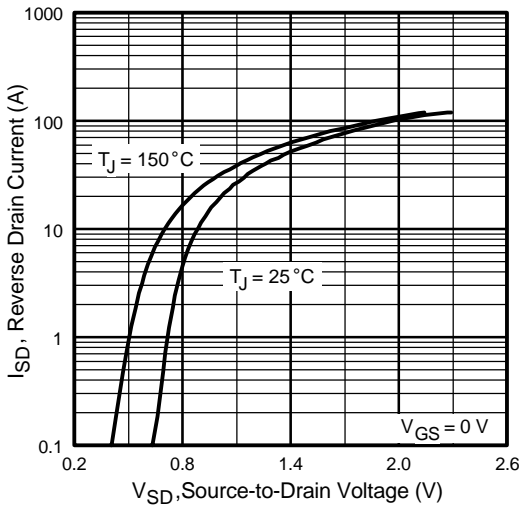
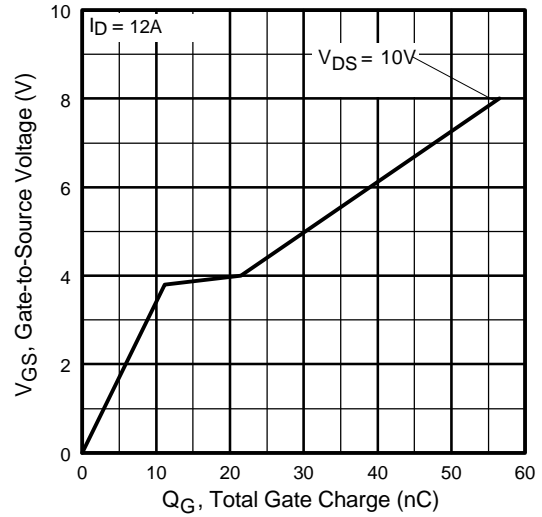
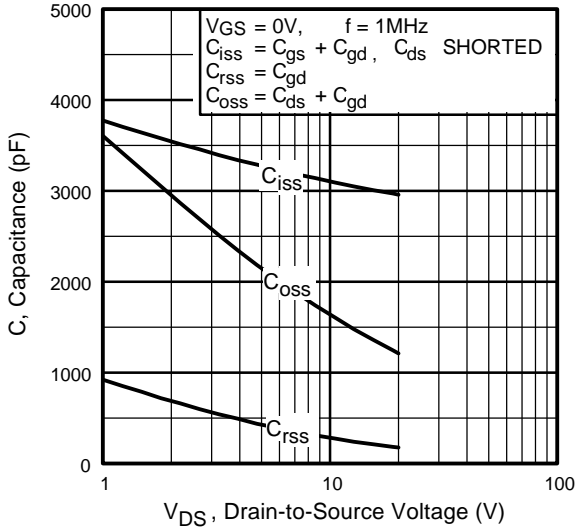


Fig 4. Normalized On-Resistance Vs. Temperature



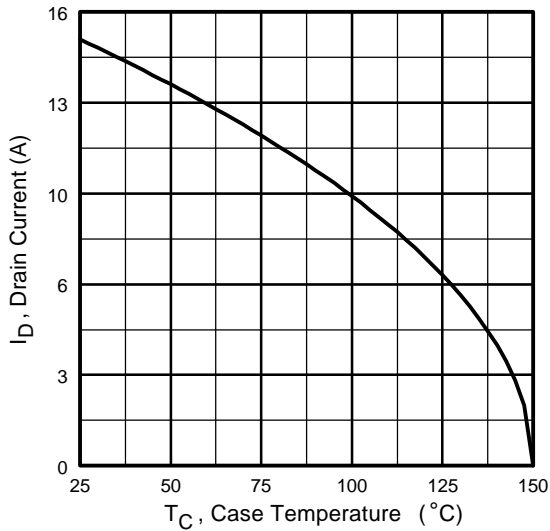


Fig 9. Maximum Drain Current Vs. Case Temperature

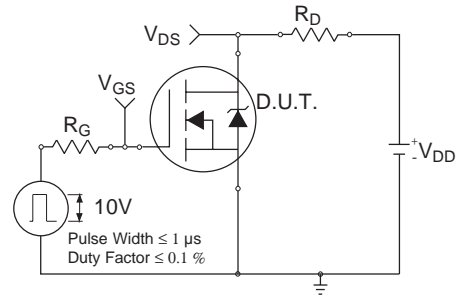


Fig 10a. Switching Time Test Circuit

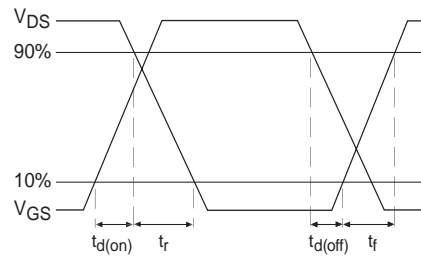


Fig 10b. Switching Time Waveforms

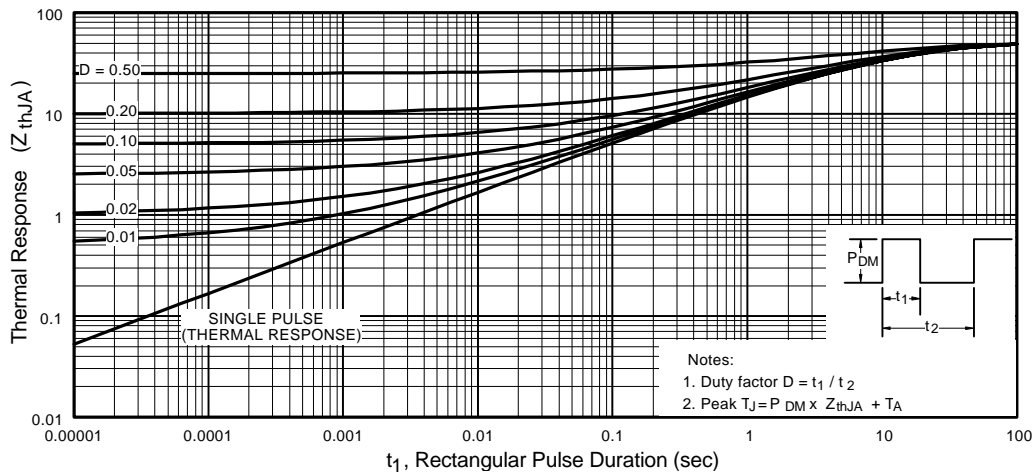


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

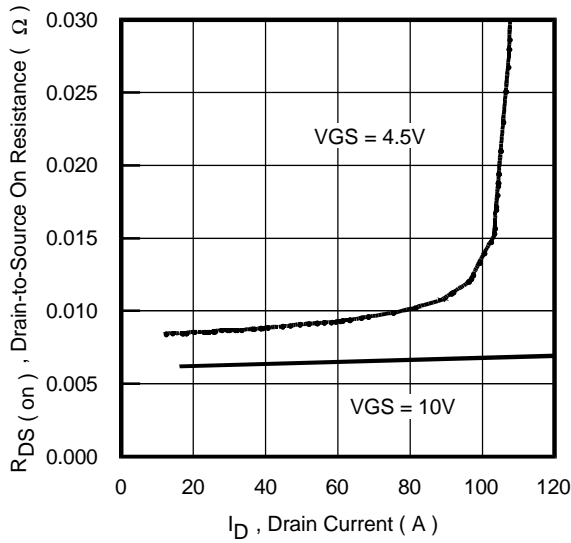


Fig 12. On-Resistance Vs. Drain Current

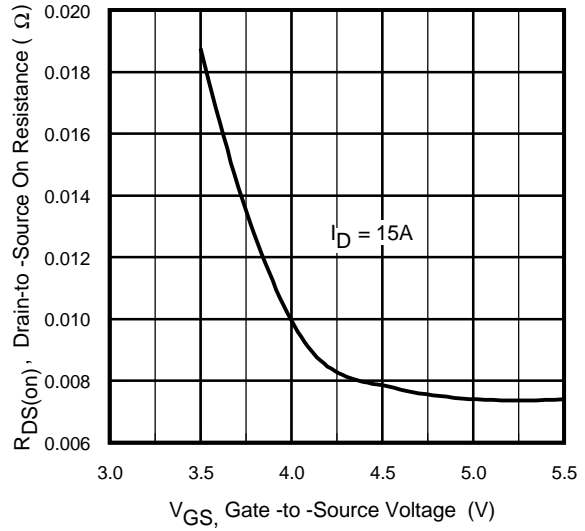


Fig 14. On-Resistance Vs. Gate Voltage

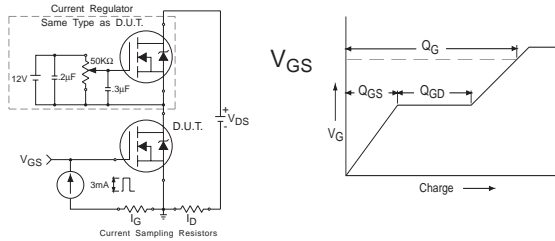


Fig 13a&b. Basic Gate Charge Test Circuit and Waveform

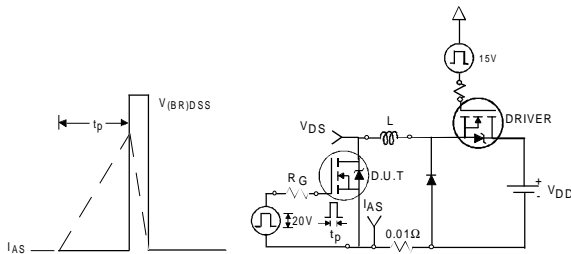


Fig 14a&b. Unclamped Inductive Test circuit and Waveforms

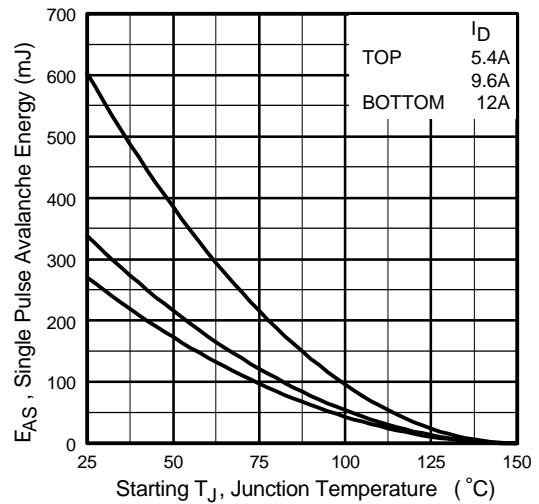
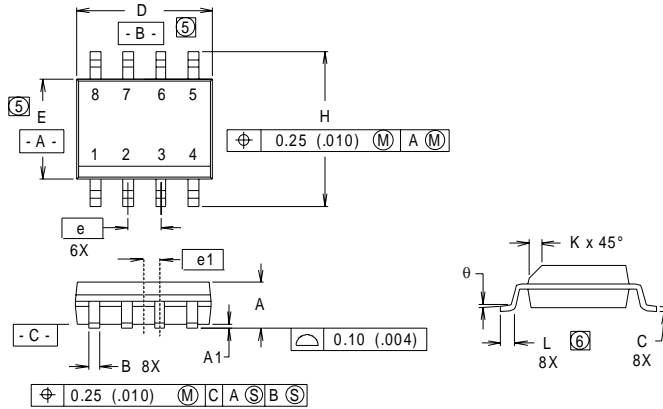


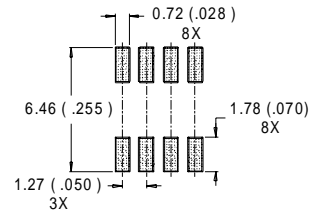
Fig 14c. Maximum Avalanche Energy Vs. Drain Current

SO-8 Package Details



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
B	.014	.018	0.36	0.46
C	.0075	.0098	0.19	0.25
D	.189	.196	4.80	4.98
E	.150	.157	3.81	3.99
e	.050 BASIC		1.27 BASIC	
e1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.011	.019	0.28	0.48
L	0.16	.050	0.41	1.27
θ	0°	8°	0°	8°

RECOMMENDED FOOTPRINT

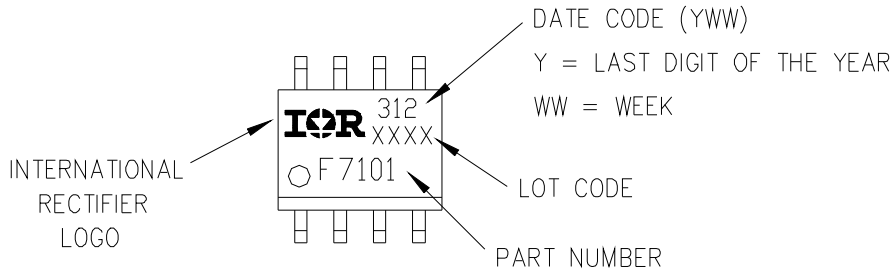


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M-1982.
2. CONTROLLING DIMENSION : INCH.
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 0.25 (.006).
- ⑥ DIMENSIONS IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE..

SO-8 Part Marking

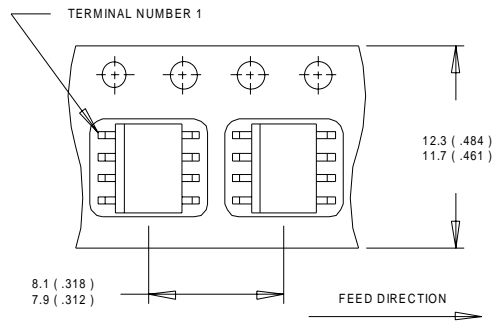
EXAMPLE: THIS IS AN IRF7101



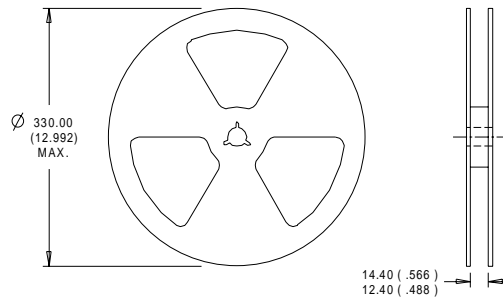
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SO-8 Tape and Reel



- 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, $t < 10$ sec

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.

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IR Rectifier

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