

Applications

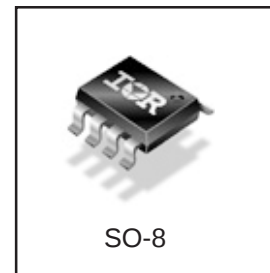
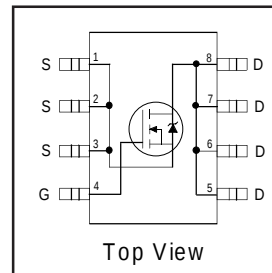
- High Frequency Isolated DC-DC Converters with Synchronous Rectification for Telecom and Industrial Use
- High Frequency Buck Converters for Computer Processor Power

HEXFET® Power MOSFET

V_{DS}	$R_{DS(on)}$ max	I_D
40V	13m Ω	10A

Benefits

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



Absolute Maximum Ratings

Symbol	Parameter	Max.	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-to-Source Voltage	± 20	V
I_D @ $T_A = 25^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10V	10	A
I_D @ $T_A = 70^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10V	8.3	
I_{DM}	Pulsed Drain Current ^①	83	
P_D @ $T_A = 25^\circ\text{C}$	Maximum Power Dissipation ^③	2.5	W
P_D @ $T_A = 70^\circ\text{C}$	Maximum Power Dissipation ^③	1.6	W
	Linear Derating Factor	0.02	mW/ $^\circ\text{C}$
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	$^\circ\text{C/W}$
$R_{\theta JA}$	Junction-to-Ambient ^④	—	50	

Notes ^① through ^④ are on page 8
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Static @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	40	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.043	—	V/ $^\circ\text{C}$	Reference to 25°C , $I_D = 1mA$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	9.5	13	$m\Omega$	$V_{GS} = 10V, I_D = 10A$ ③
		—	12	16		$V_{GS} = 4.5V, I_D = 8.0A$ 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	$V_{DS} = 32V, V_{GS} = 0V$
		—	—	100		$V_{DS} = 32V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	200	nA	$V_{GS} = 16V$
	Gate-to-Source Reverse Leakage	—	—	-200		$V_{GS} = -16V$

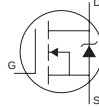
Dynamic @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

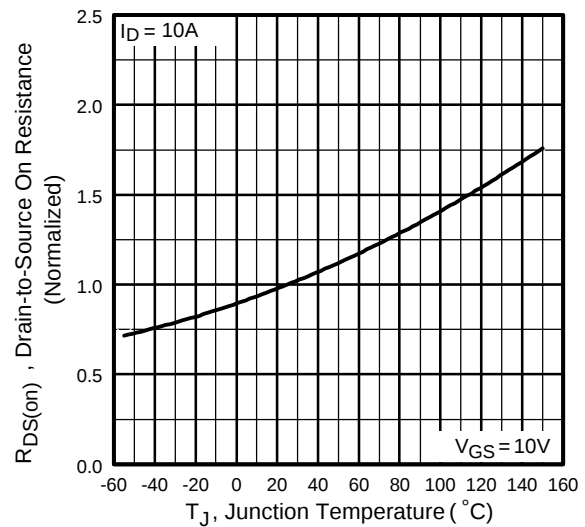
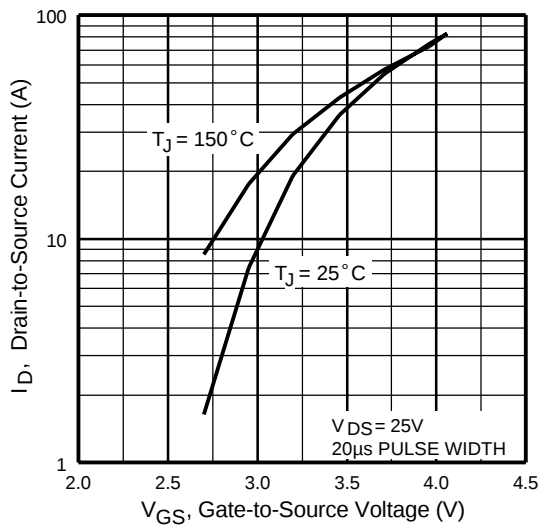
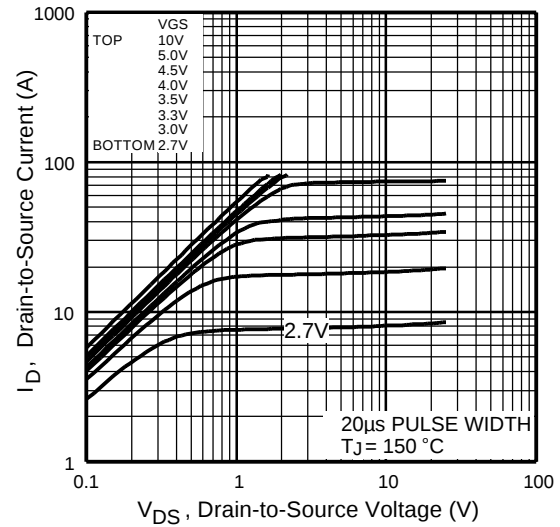
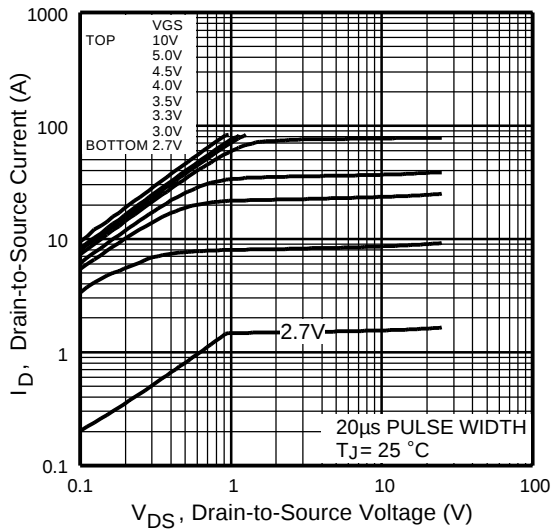
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
g_{fs}	Forward Transconductance	22	—	—	S	$V_{DS} = 20V, I_D = 8.0A$
Q_g	Total Gate Charge	—	21	32	nC	$I_D = 8.0A$
Q_{gs}	Gate-to-Source Charge	—	7.2	11		$V_{DS} = 20V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	8.2	12		$V_{GS} = 4.5V$ ③
Q_{oss}	Output Gate Charge	—	23	35		$V_{GS} = 0V, V_{DS} = 16V$
$t_{d(on)}$	Turn-On Delay Time	—	12	—	ns	$V_{DD} = 20V$
t_r	Rise Time	—	2.7	—		$I_D = 8.0A$
$t_{d(off)}$	Turn-Off Delay Time	—	15	—		$R_G = 1.8\Omega$
t_f	Fall Time	—	4.1	—		$V_{GS} = 4.5V$ ③
C_{iss}	Input Capacitance	—	2820	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	700	—		$V_{DS} = 20V$
C_{rss}	Reverse Transfer Capacitance	—	46	—		$f = 1.0MHz$

Avalanche Characteristics

Symbol	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy②	—	300	mJ
I_{AR}	Avalanche Current①	—	8.0	A

Diode Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	2.3	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	83		
V_{SD}	Diode Forward Voltage	—	0.80	1.3	V	$T_J = 25^\circ\text{C}, I_S = 8.0A, V_{GS} = 0V$ ③
		—	0.65	—		$T_J = 125^\circ\text{C}, I_S = 8.0A, V_{GS} = 0V$
t_{rr}	Reverse Recovery Time	—	69	100	ns	$T_J = 25^\circ\text{C}, I_F = 8.0A, V_R = 20V$
Q_{rr}	Reverse Recovery Charge	—	130	200	nC	$di/dt = 100A/\mu s$ ③
t_{rr}	Reverse Recovery Time	—	73	110	ns	$T_J = 125^\circ\text{C}, I_F = 8.0A, V_R = 20V$
Q_{rr}	Reverse Recovery Charge	—	160	240	nC	$di/dt = 100A/\mu s$ ③



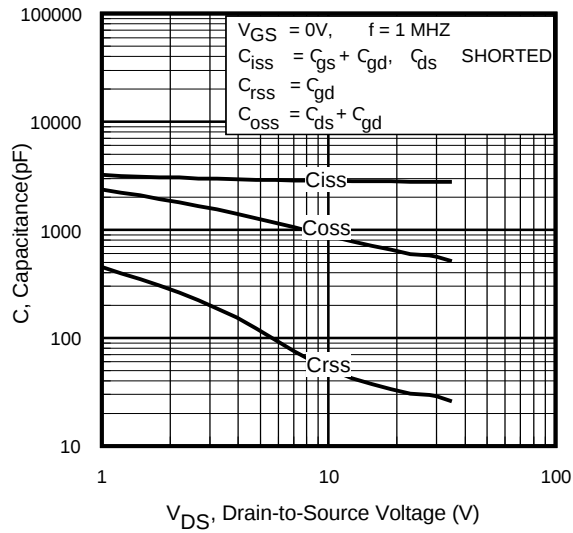


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

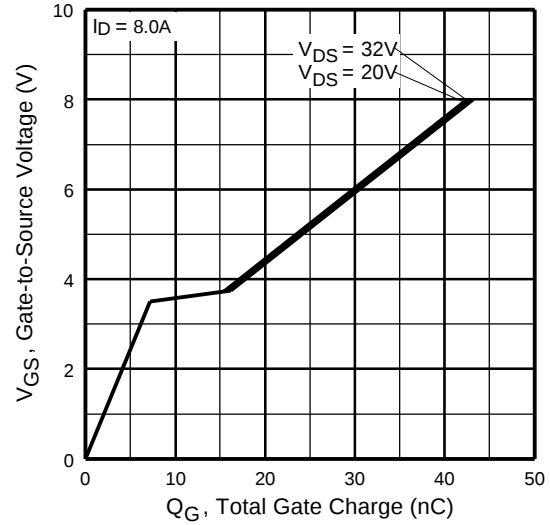


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

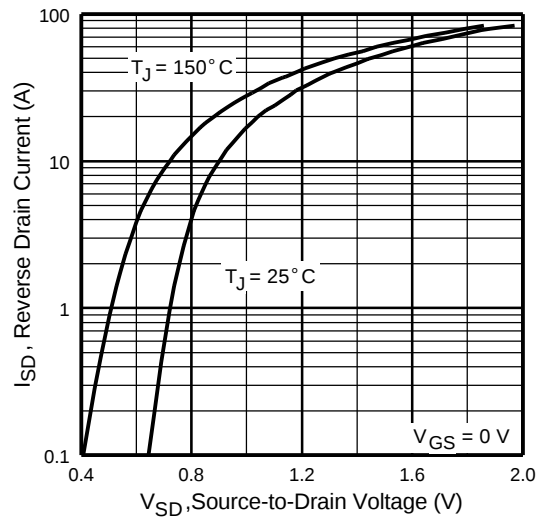


Fig 7. Typical Source-Drain Diode Forward Voltage

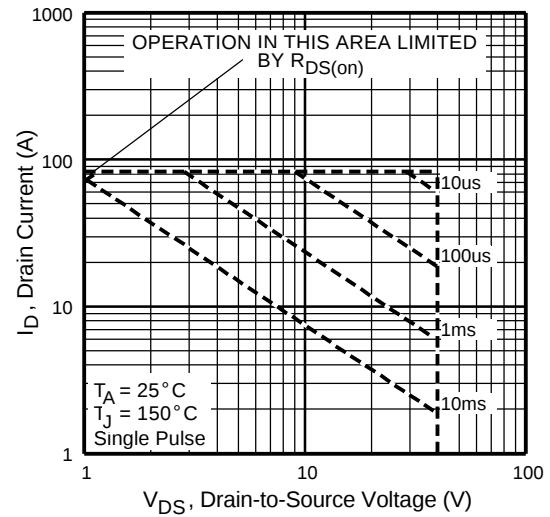


Fig 8. Maximum Safe Operating Area

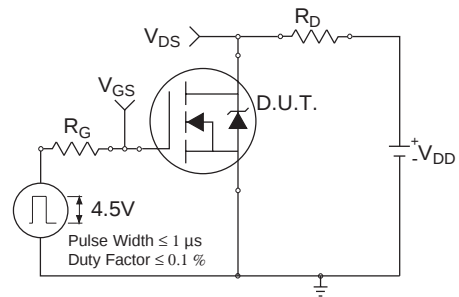
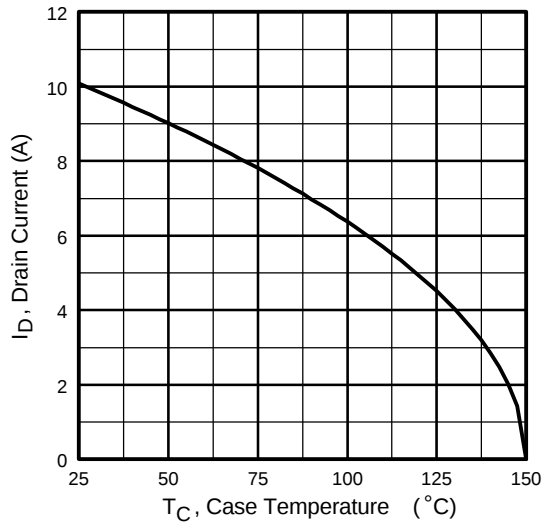


Fig 10a. Switching Time Test Circuit

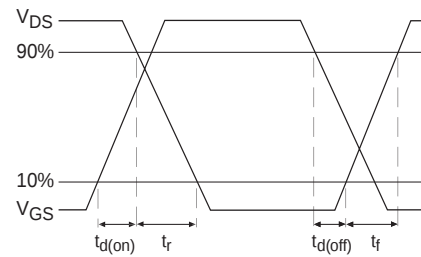


Fig 10b. Switching Time Waveforms

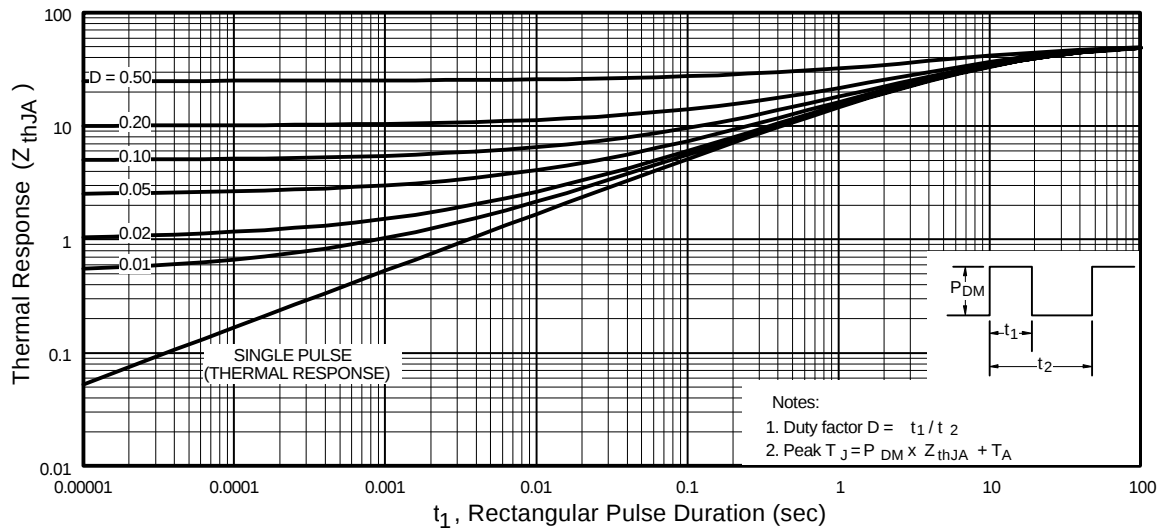


Fig 10. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

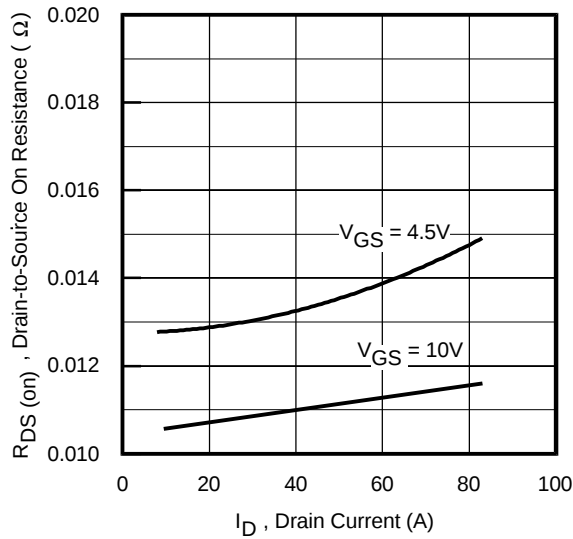


Fig 12. On-Resistance Vs. Drain Current

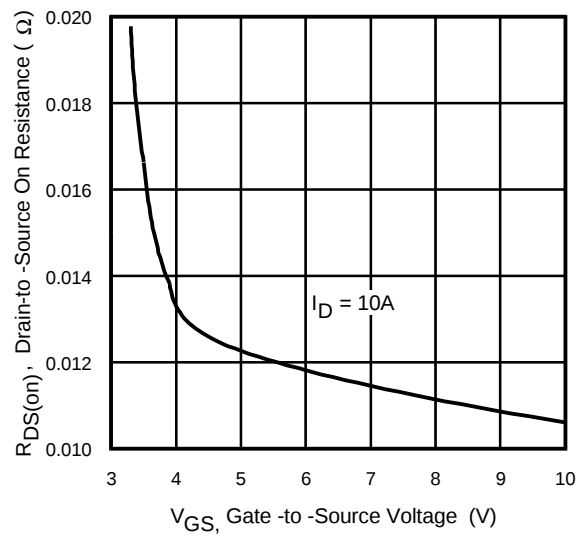


Fig 13. On-Resistance Vs. Gate Voltage

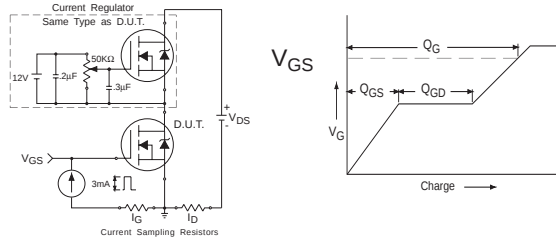


Fig 13a&b. Basic Gate Charge Test Circuit and Waveform

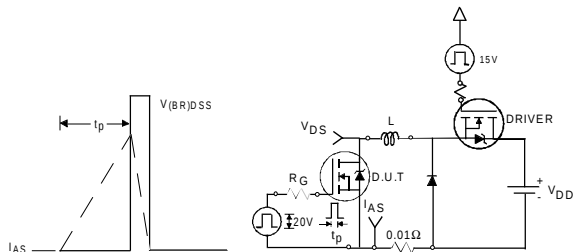


Fig 14a&b. Unclamped Inductive Test circuit and Waveforms

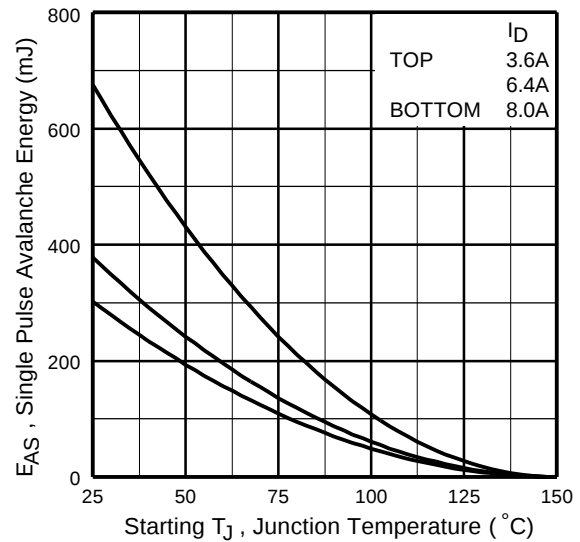
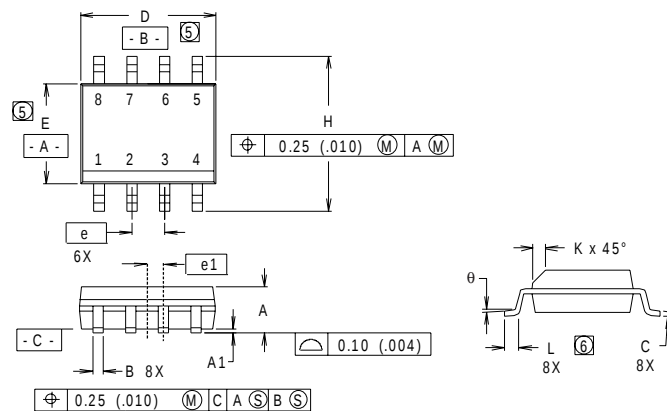


Fig 14c. Maximum Avalanche Energy Vs. Drain Current

SO-8 Package Details

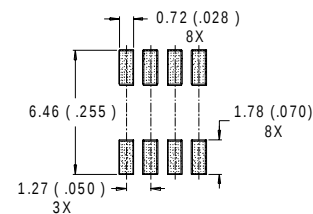


NOTES:

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..

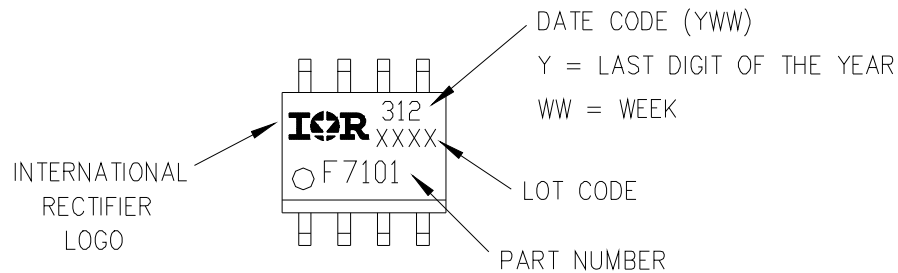
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
B	.014	.018	0.36	0.46
C	.0075	.0098	0.19	0.25
D	.189	.196	4.80	4.98
E	.150	.157	3.81	3.99
e	.050 BASIC		1.27 BASIC	
e1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.011	.019	0.28	0.48
L	0.16	.050	0.41	1.27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

RECOMMENDED FOOTPRINT



SO-8 Part Marking

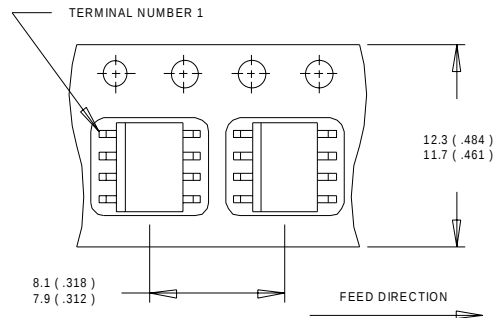
EXAMPLE: THIS IS AN IRF7101



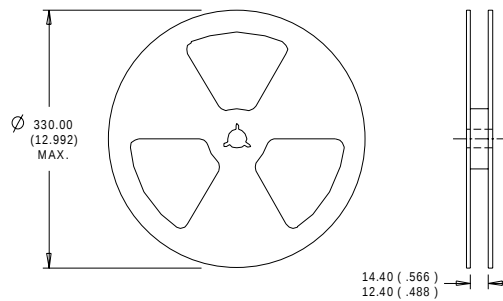
IRF7471

International
IR Rectifier

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 $T_J = 25^\circ\text{C}$, $L = 9.4\text{mH}$
 $R_G = 25\Omega$, $I_{AS} = 8.0\text{A}$.
- ③ Pulse width $\leq 400\mu\text{s}$; duty cycle $\leq 2\%$.
- ④ When mounted on 1 inch square copper board.

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.

International
IR Rectifier

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