

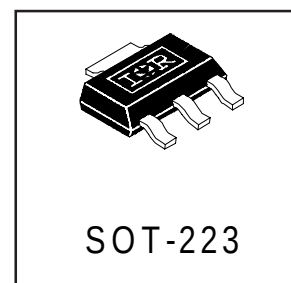
Applications

- High frequency DC-DC converters

V_{DSS}	$R_{DS(on)}$ max	I_D
150V	185mΩ@$V_{GS} = 10V$	2.6A

Benefits

- Low Gate to Drain Charge to Reduce Switching Losses
- Fully Characterized Capacitance Including Effective C_{OSS} to Simplify Design, (See App. Note AN1001)
- Fully Characterized Avalanche Voltage and Current



Absolute Maximum Ratings

	Parameter	Max.	Units
I_D @ $T_A = 25^\circ C$	Continuous Drain Current, V_{GS} @ 10V	2.6	A
I_D @ $T_A = 70^\circ C$	Continuous Drain Current, V_{GS} @ 10V	2.1	
I_{DM}	Pulsed Drain Current ①	21	
P_D @ $T_A = 25^\circ C$	Power Dissipation④	2.8	W
	Linear Derating Factor	0.02	W/°C
V_{GS}	Gate-to-Source Voltage	± 30	V
dv/dt	Peak Diode Recovery dv/dt ⑥	6.3	V/ns
T_J	Operating Junction and	-55 to + 150	°C
T_{STG}	Storage Temperature Range		
	Soldering Temperature, for 10 seconds	300 (1.6mm from case)	

Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Junction-to-Ambient (PCB Mount, steady state)④	—	45	°C/W

Notes ① through ⑥ 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	150	—	—	V	$V_{GS} = 0V$, $I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.19	—	V/ $^\circ\text{C}$	Reference to 25°C , $I_D = 1mA$ ③
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	185	m Ω	$V_{GS} = 10V$, $I_D = 1.6A$ ③
$V_{GS(th)}$	Gate Threshold Voltage	3.0	—	5.0	V	$V_{DS} = V_{GS}$, $I_D = 250\mu A$
I_{DSS}	Drain-to-Source Leakage Current	—	—	25	μA	$V_{DS} = 150V$, $V_{GS} = 0V$
		—	—	250		$V_{DS} = 120V$, $V_{GS} = 0V$, $T_J = 125^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{GS} = 30V$
	Gate-to-Source Reverse Leakage	—	—	-100		$V_{GS} = -30V$

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

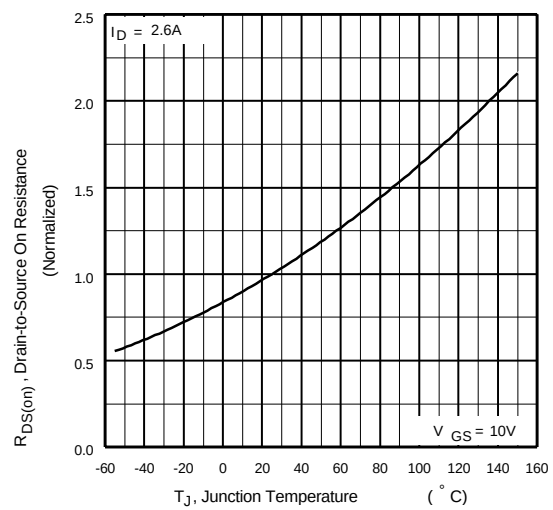
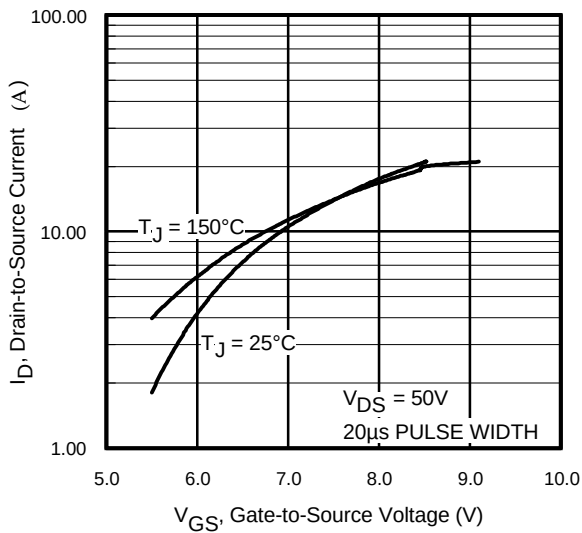
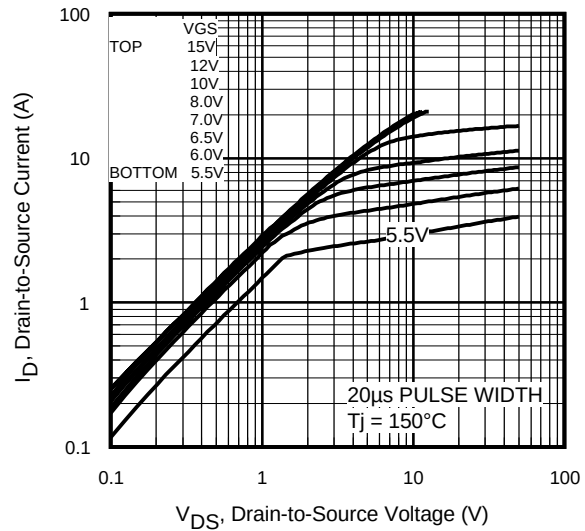
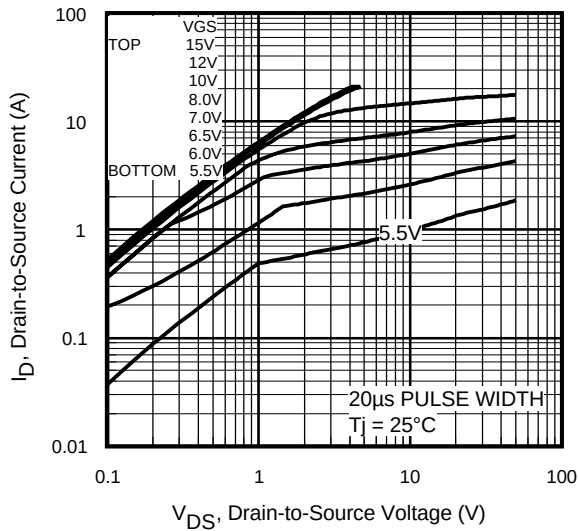
	Parameter	Min.	Typ.	Max.	Units	Conditions
g_{fs}	Forward Transconductance	3.5	—	—	S	$V_{DS} = 50V$, $I_D = 1.6A$
Q_g	Total Gate Charge	—	12	19	nC	$I_D = 1.6A$
Q_{gs}	Gate-to-Source Charge	—	2.1	3.1		$V_{DS} = 120V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	6.8	10		$V_{GS} = 10V$
$t_{d(on)}$	Turn-On Delay Time	—	8.4	—	ns	$V_{DD} = 75V$
t_r	Rise Time	—	21	—		$I_D = 1.6A$
$t_{d(off)}$	Turn-Off Delay Time	—	20	—		$R_G = 15\Omega$
t_f	Fall Time	—	19	—		$V_{GS} = 10V$ ③
C_{iss}	Input Capacitance	—	420	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	100	—		$V_{DS} = 25V$
C_{rss}	Reverse Transfer Capacitance	—	25	—		$f = 1.0MHz$
C_{oss}	Output Capacitance	—	720	—		$V_{GS} = 0V$, $V_{DS} = 1.0V$, $f = 1.0MHz$
C_{oss}	Output Capacitance	—	48	—		$V_{GS} = 0V$, $V_{DS} = 120V$, $f = 1.0MHz$
$C_{oss \text{ eff.}}$	Effective Output Capacitance	—	98	—		$V_{GS} = 0V$, $V_{DS} = 0V$ to $120V$ ⑤

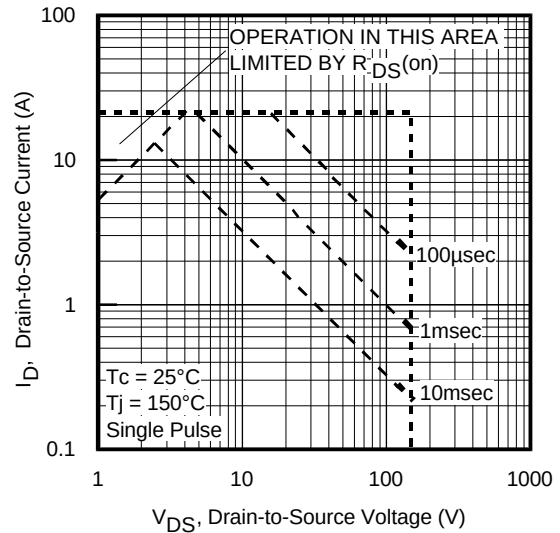
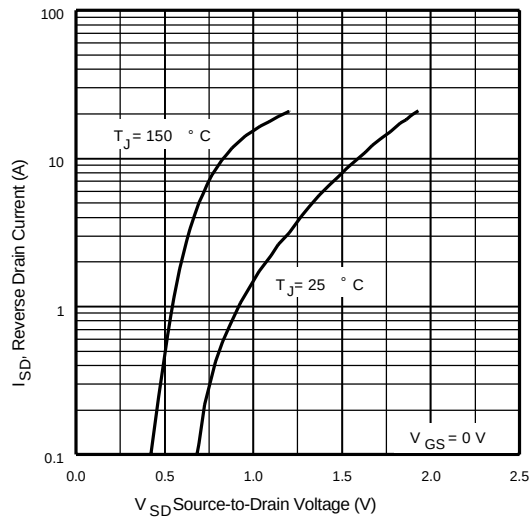
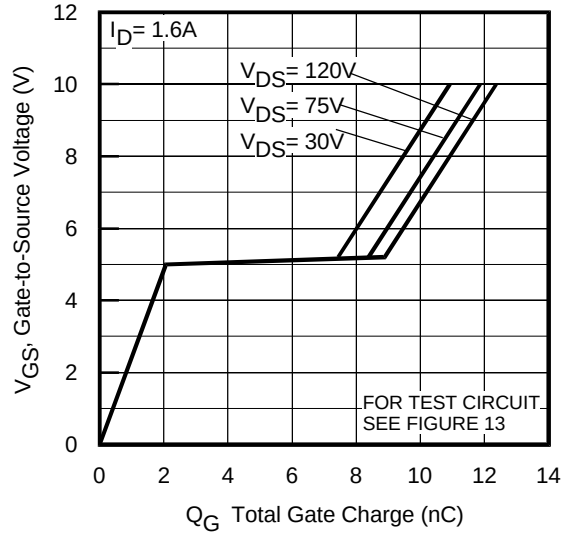
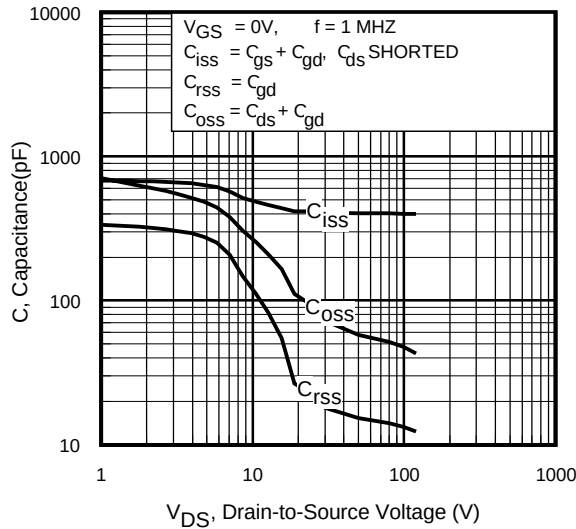
Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy②	—	38	mJ
I_{AR}	Avalanche Current①	—	3.1	A

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	2.6	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	21		
V_{SD}	Diode Forward Voltage	—	—	1.5	V	$T_J = 25^\circ\text{C}$, $I_S = 2.1A$, $V_{GS} = 0V$ ③
t_{rr}	Reverse Recovery Time	—	61	91	ns	$T_J = 25^\circ\text{C}$, $I_F = 1.6A$
Q_{rr}	Reverse Recovery Charge	—	160	240	nC	$di/dt = 100A/\mu s$ ③





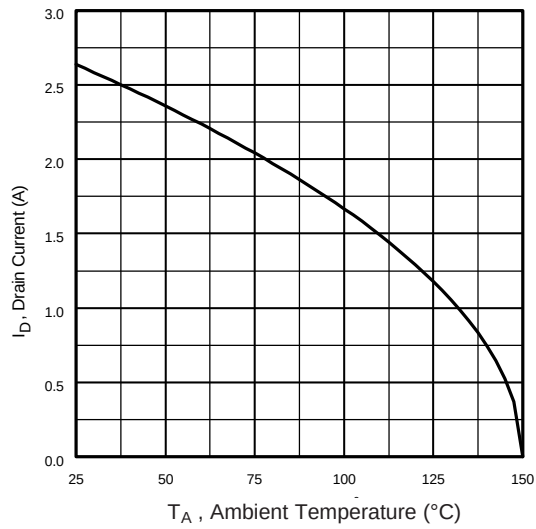


Fig 9. Maximum Drain Current Vs. Ambient Temperature

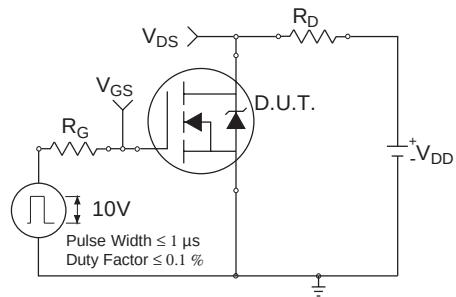


Fig 10a. Switching Time Test Circuit

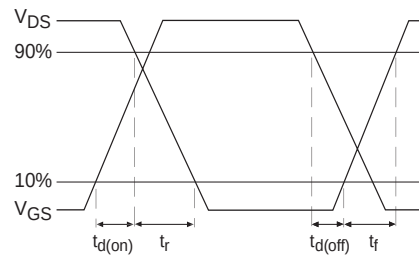


Fig 10b. Switching Time Waveforms

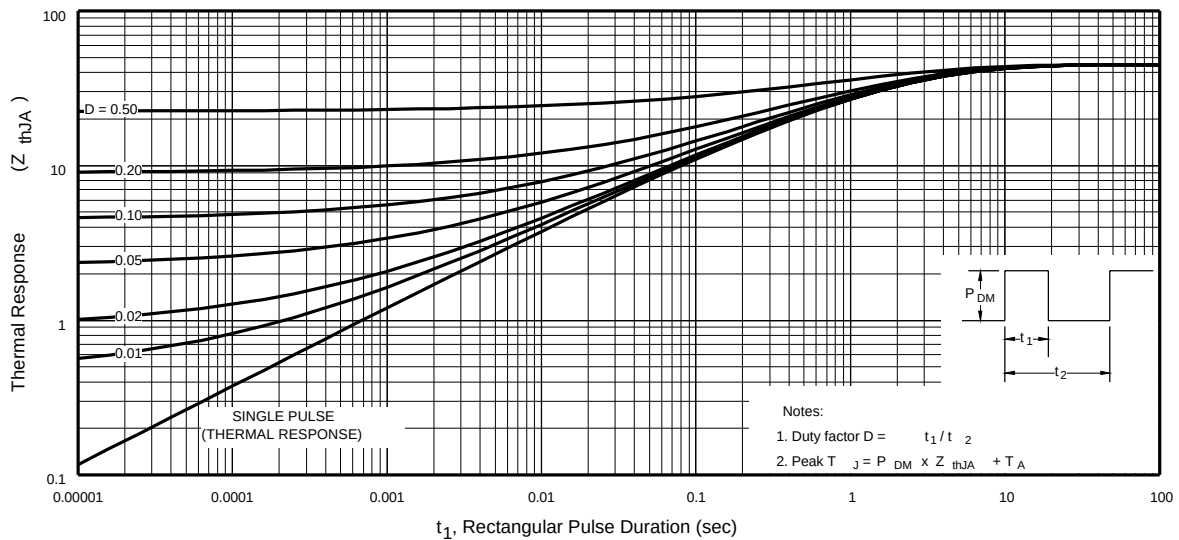


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

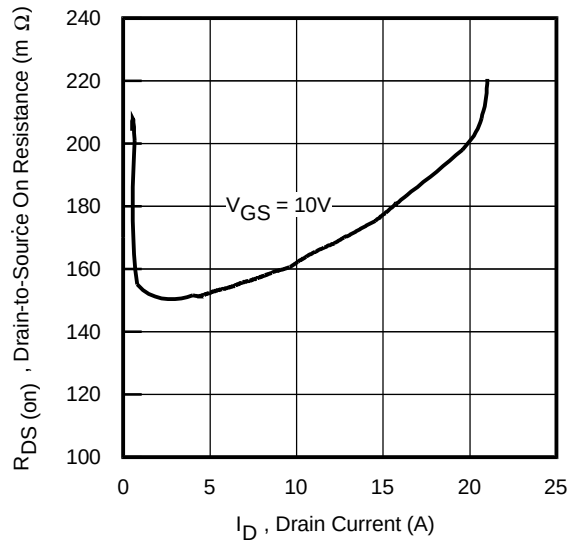


Fig 12. On-Resistance Vs. Drain Current

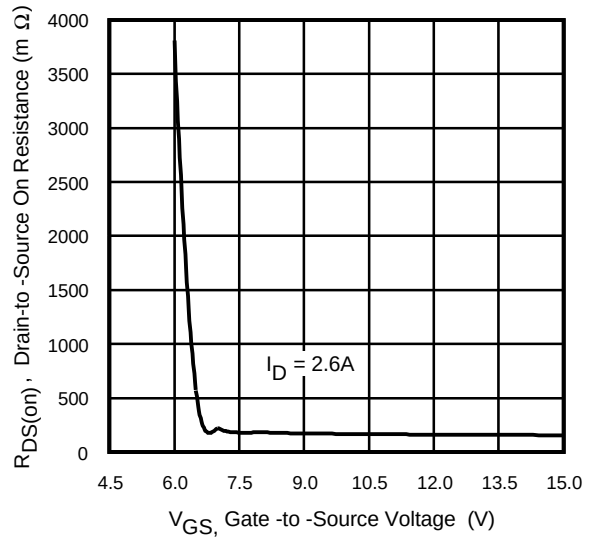


Fig 13. On-Resistance Vs. Gate Voltage

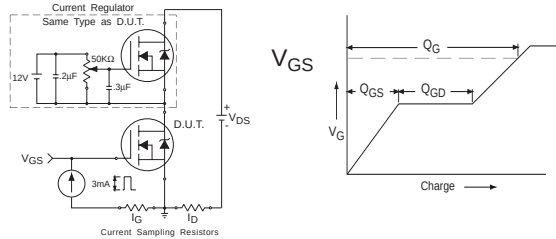


Fig 14a&b. Basic Gate Charge Test Circuit and Waveform

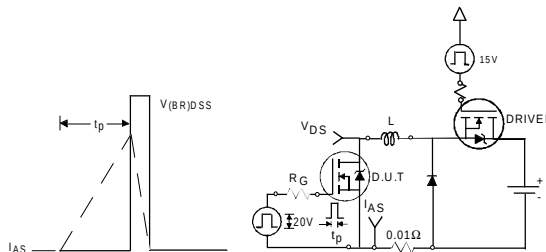


Fig 15a&b. Unclamped Inductive Test circuit and Waveforms

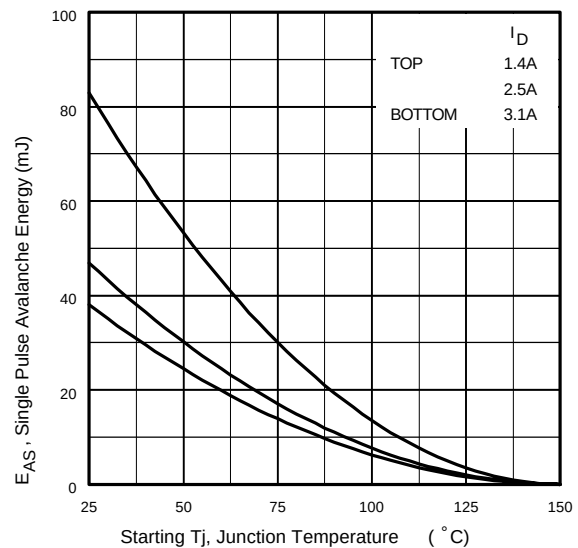
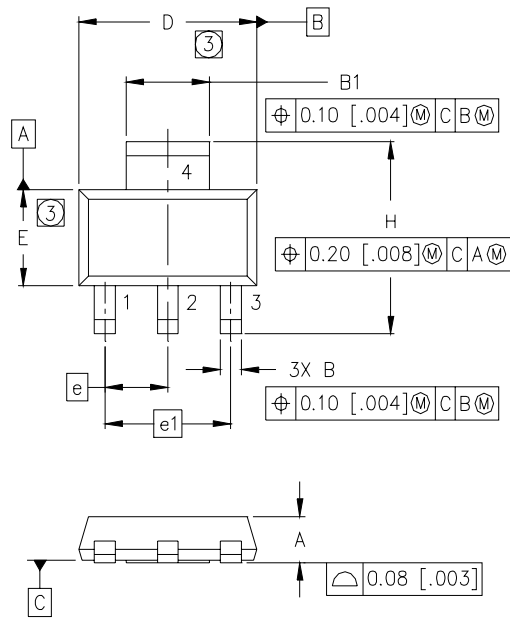
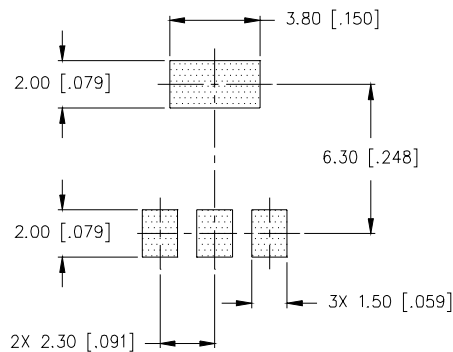


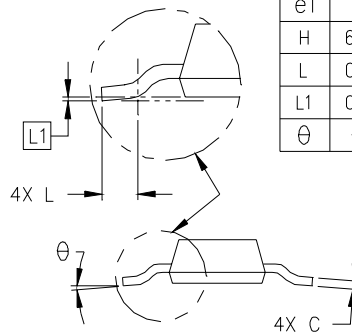
Fig 15c. Maximum Avalanche Energy Vs. Drain Current



MINIMUM RECOMMENDED FOOTPRINT



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.55	1.80	.061	.071
B	0.65	0.85	.026	.033
B1	2.95	3.15	.116	.124
C	0.25	0.35	.010	.014
D	6.30	6.70	.248	.264
E	3.30	3.70	.130	.146
e	2.30	BSC	.0905	BSC
e1	4.60	BSC	.181	BSC
H	6.71	7.29	.264	.287
L	0.91	—	.036	—
L1	0.061	BSC	.0024	BSC
θ	—	10°	—	10°



LEAD ASSIGNMENTS

- 1 = GATE
- 2 = DRAIN
- 3 = SOURCE
- 4 = DRAIN

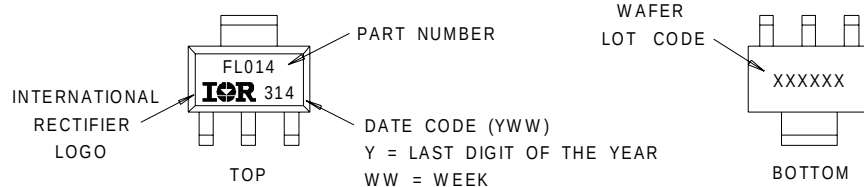
NOTES:

1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSIONS DO NOT INCLUDE MOLD FLASH.
4. OUTLINE CONFORMS TO JEDEC OUTLINE TO-261AA.
5. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].

Part Marking Information

SOT-223

EXAMPLE: THIS IS AN IRFL014

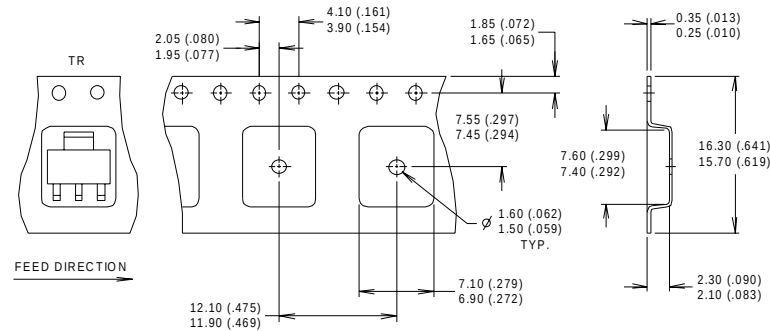


IRFL4315

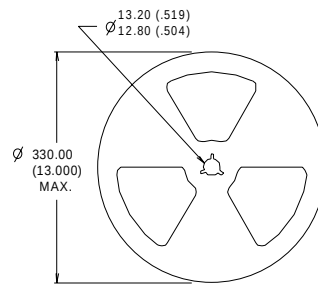
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Tape & Reel Information

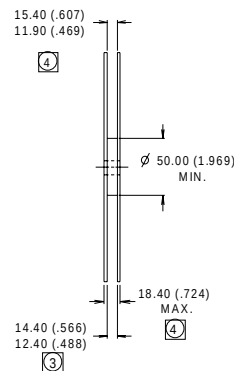
SOT-223 Outline



- NOTES :
1. CONTROLLING DIMENSION: MILLIMETER.
 2. OUTLINE CONFORMS TO EIA-481 & EIA-541.
 3. EACH Ø330.00 (13.00) REEL CONTAINS 2,500 DEVICES.



- NOTES :
1. OUTLINE CONFORMS TO EIA-418-1.
 2. CONTROLLING DIMENSION: MILLIMETER..
 3. DIMENSION MEASURED @ HUB.
 4. INCLUDES FLANGE DISTORTION @ OUTER EDGE.



Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Starting $T_J = 25^\circ\text{C}$, $L = 7.8\text{mH}$, $R_G = 25\Omega$, $I_{AS} = 3.1\text{A}$.
- ③ Pulse width $\leq 400\mu\text{s}$; duty cycle $\leq 2\%$.
- ④ When mounted on 1 inch square copper board.
- ⑤ C_{OSS} eff. is a fixed capacitance that gives the same charging time as C_{OSS} while V_{DS} is rising from 0 to 80% V_{DSS} .
- ⑥ $I_{SD} \leq 1.6\text{A}$, $di/dt \leq 230\text{A}/\mu\text{s}$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq 150^\circ\text{C}$.

Data and specifications subject to change without notice.
This product has been designed and qualified for the Automotive [Q101] market.
Qualification Standards can be found on IR's Web site.

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