

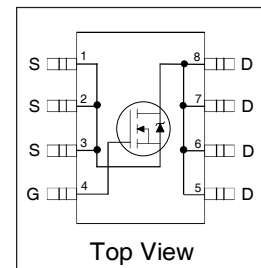
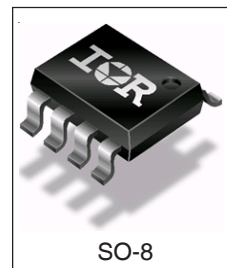
- N-Channel Application-Specific MOSFETs
- Ideal for CPU Core DC-DC Converters
- Low Conduction Losses
- Low Switching Losses
- Minimizes Parallel MOSFETs for high current applications
- 100% Tested for R_G

Description

This new device employs advanced HEXFET Power MOSFET technology to achieve an unprecedented balance of on-resistance and gate charge. The reduced conduction and switching losses make it ideal for high efficiency DC-DC converters that power the latest generation of microprocessors.

The IRF7809AV has been optimized for all parameters that are critical in synchronous buck converters including $R_{DS(on)}$, gate charge and C_{dv}/dt -induced turn-on immunity. The IRF7809AV offers particularly low $R_{DS(on)}$ and high C_{dv}/dt immunity for synchronous FET applications.

The package is designed for vapor phase, infra-red, convection, or wave soldering techniques. Power dissipation of greater than 2W is possible in a typical PCB mount application.



DEVICE CHARACTERISTICS^⑤

	IRF7809AV
$R_{DS(on)}$	7.0m Ω
Q_G	41nC
Q_{sw}	14nC
Q_{oss}	30nC

Absolute Maximum Ratings

Parameter	Symbol	IRF7809A V	Units
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 12	
Continuous Drain or Source Current ($V_{GS} \geq 4.5V$)	$T_A = 25^\circ C$	I_D	A
	$T_L = 90^\circ C$		
Pulsed Drain Current ^①	I_{DM}	100	
Power Dissipation	$T_A = 25^\circ C$	P_D	W
	$T_L = 90^\circ C$		
Junction & Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ C$
Continuous Source Current (Body Diode)	I_S	2.5	A
Pulsed Source Current ^①	I_{SM}	50	

Thermal Resistance

Parameter		Max.	Units
Maximum Junction-to-Ambient ^③	$R_{\theta JA}$	50	$^\circ C/W$
Maximum Junction-to-Lead	$R_{\theta JL}$	20	$^\circ C/W$

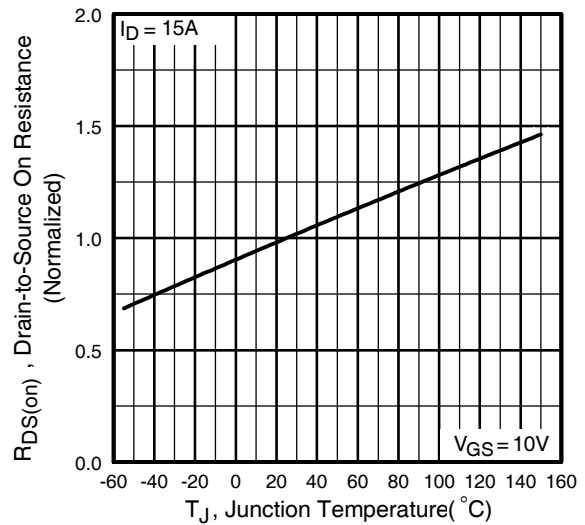
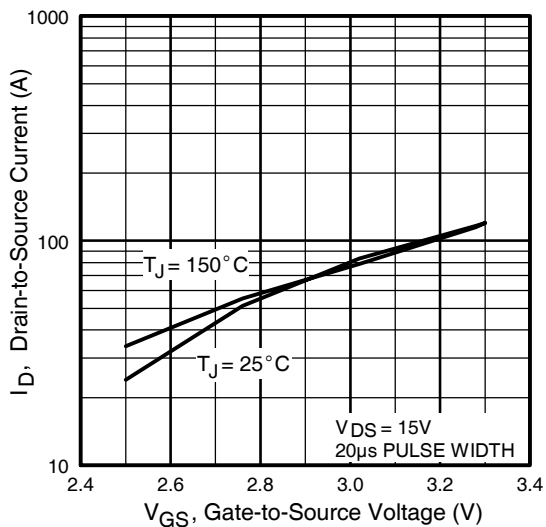
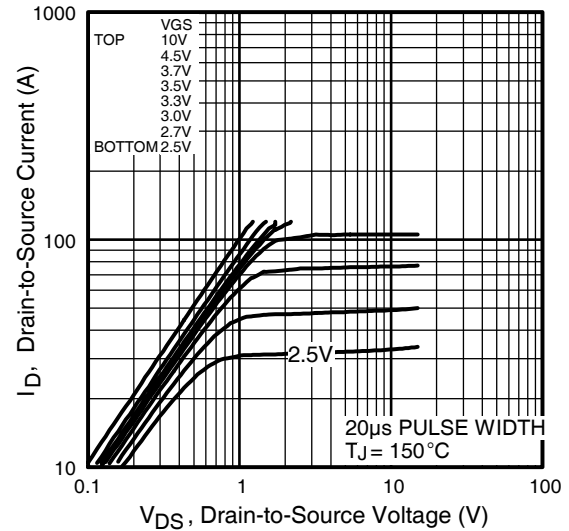
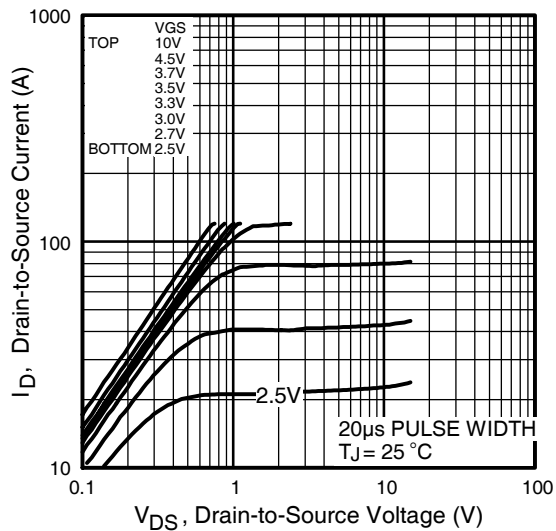
Electrical Characteristics

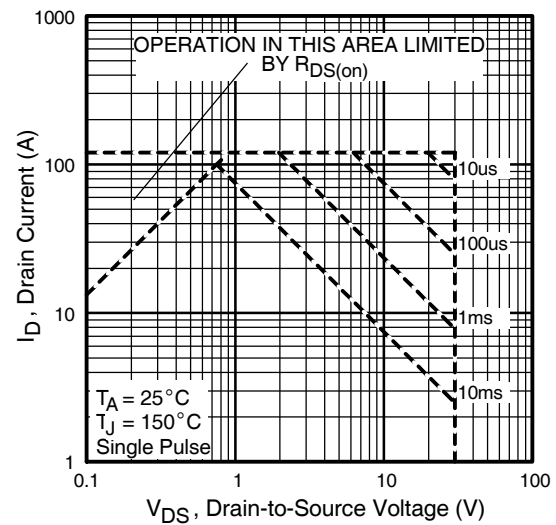
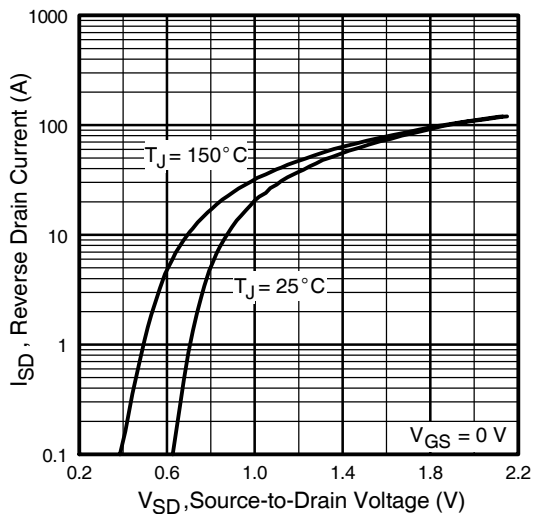
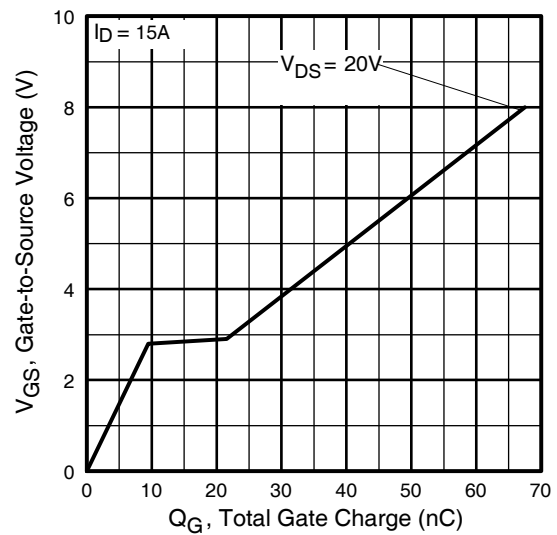
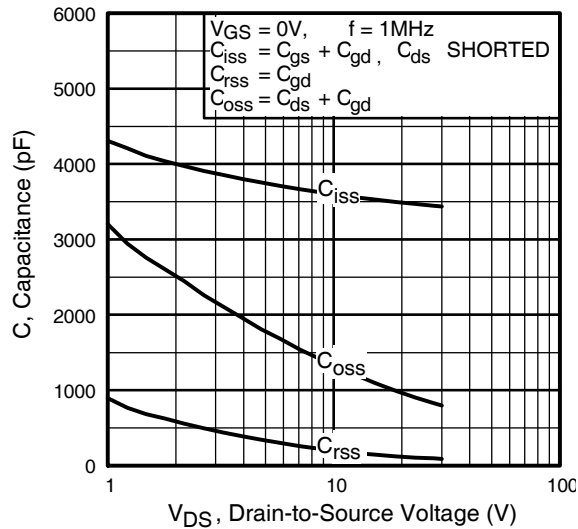
Parameter		Min	Typ	Max	Units	Conditions
Drain-to-Source Breakdown Voltage	BV_{DSS}	30	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
Static Drain-Source on Resistance	$R_{DS(on)}$		7.0	9.0	$m\Omega$	$V_{GS} = 4.5V, I_D = 15A$ ②
Gate Threshold Voltage	$V_{GS(th)}$	1.0			V	$V_{DS} = V_{GS}, I_D = 250\mu A$
Drain-Source Leakage Current	I_{DSS}			30	μA	$V_{DS} = 24V, V_{GS} = 0$
				150		$V_{DS} = 24V, V_{GS} = 0,$ $T_J = 100^\circ C$
Gate-Source Leakage Current*	I_{GSS}			± 100	nA	$V_{GS} = \pm 12V$
Total Gate Chg Cont FET	Q_G		41	62	nC	$V_{GS}=5V, I_D=15A, V_{DS}=20V$
Total Gate Chg Sync FET	Q_G		36	54		$V_{GS} = 5V, V_{DS} < 100mV$
Pre-Vth Gate-Source Charge	Q_{GS1}		7.0			$V_{DS} = 20V, I_D = 15A$
Post-Vth Gate-Source Charge	Q_{GS2}		2.3			
Gate to Drain Charge	Q_{GD}		12			$I_D=15A, V_{DS}=16V$
Switch Chg($Q_{GS2} + Q_{GD}$)	Q_{SW}		14	21		
Output Charge*	Q_{OSS}		30	45		$V_{DS} = 16V, V_{GS} = 0$
Gate Resistance	R_G		1.5	3.0	Ω	
Turn-on Delay Time	$t_{d(on)}$		14		ns	$V_{DD} = 16V, I_D = 15A$ $V_{GS} = 5V$ Clamped Inductive Load
Rise Time	t_r		36			
Turn-off Delay Time	$t_{d(off)}$		96			
Fall Time	t_f		10			
Input Capacitance	C_{iss}	—	3780	—	pF	$V_{DS} = 16V, V_{GS} = 0$
Output Capacitance	C_{oss}	—	1060	—		
Reverse Transfer Capacitance	C_{rss}	—	130	—		

Source-Drain Rating & Characteristics

Parameter		Min	Typ	Max	Units	Conditions
Diode Forward Voltage*	V_{SD}			1.3	V	$I_S = 15A$ ②, $V_{GS} = 0V$
Reverse Recovery Charge④	Q_{rr}		120		nC	$di/dt \sim 700A/\mu s$ $V_{DS} = 16V, V_{GS} = 0V, I_S = 15A$
Reverse Recovery Charge (with Parallel Schottky)④	$Q_{rr(s)}$		150		nC	$di/dt = 700A/\mu s$ (with 10BQ040) $V_{DS} = 16V, V_{GS} = 0V, I_S = 15A$

- Notes:**
- ① Repetitive rating; pulse width limited by max. junction temperature.
 - ② Pulse width $\leq 400\mu s$; duty cycle $\leq 2\%$.
 - ③ When mounted on 1 inch square copper board, $t < 10$ sec.
 - ④ Typ = measured - Q_{OSS}
 - ⑤ Typical values measured at $V_{GS} = 4.5V, I_F = 15A$.





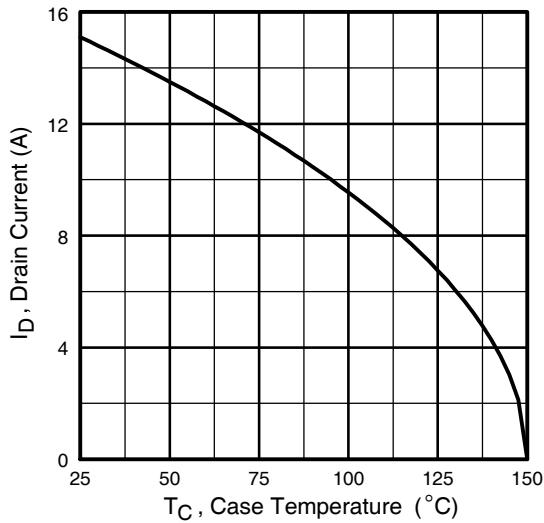


Fig 9. Maximum Drain Current Vs. Case Temperature

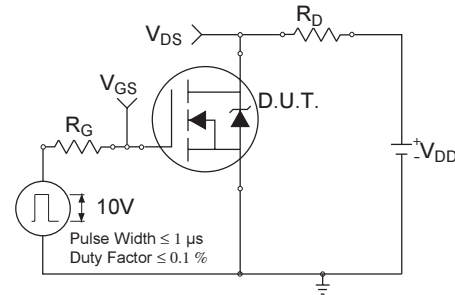


Fig 10a. Switching Time Test Circuit

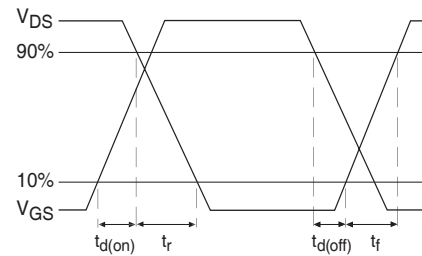


Fig 10b. Switching Time Waveforms

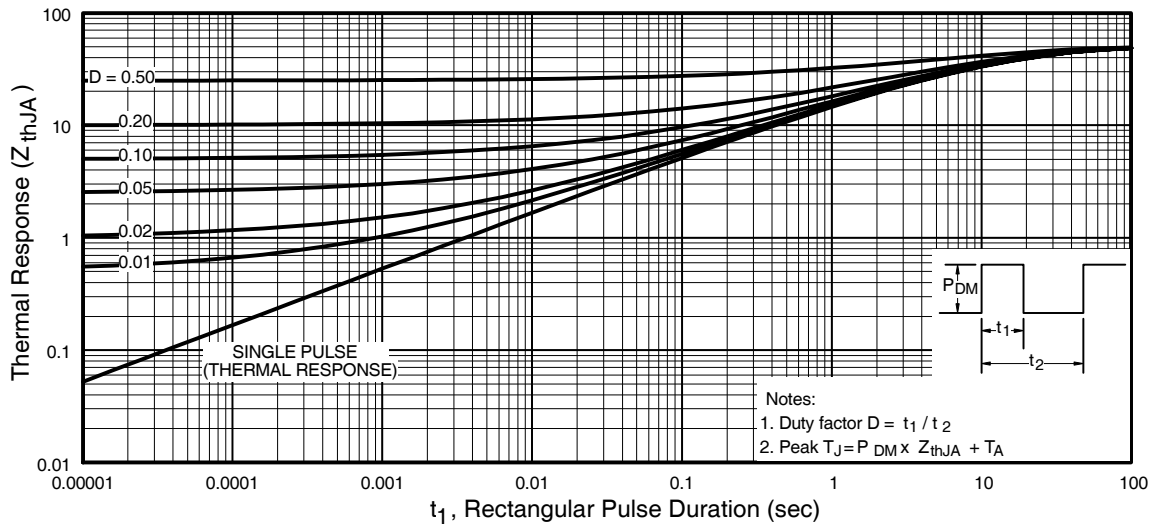


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

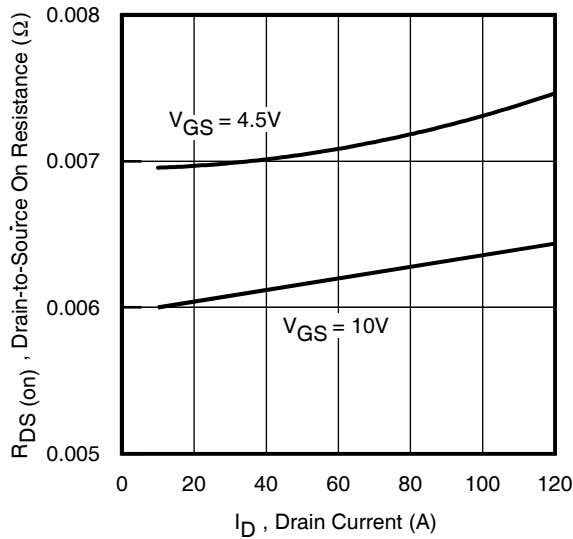


Fig 12. On-Resistance Vs. Drain Current

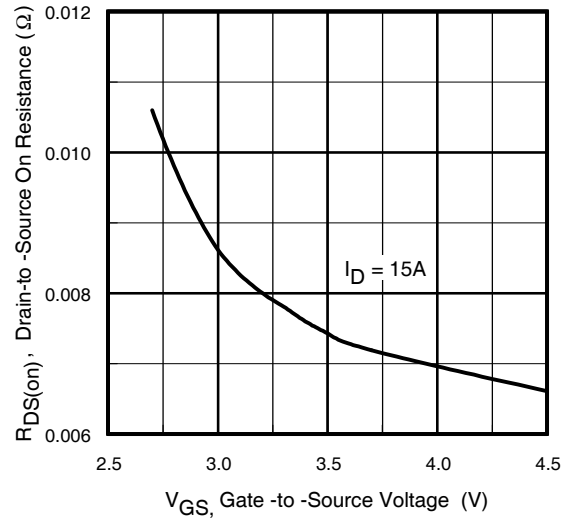


Fig 13. On-Resistance Vs. Gate Voltage

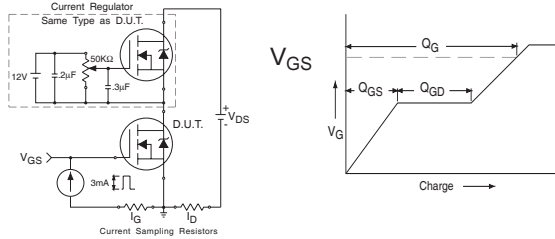


Fig 13a&b. Basic Gate Charge Test Circuit and Waveform

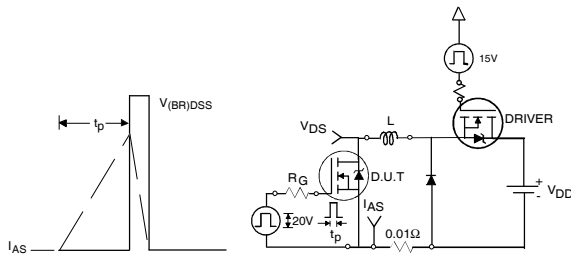


Fig 14a&b. Unclamped Inductive Test circuit and Waveforms

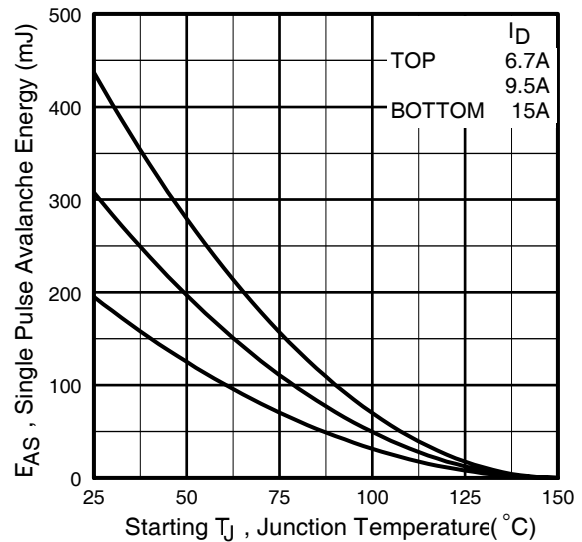
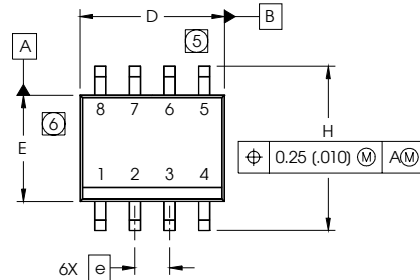
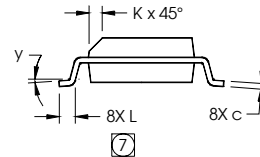
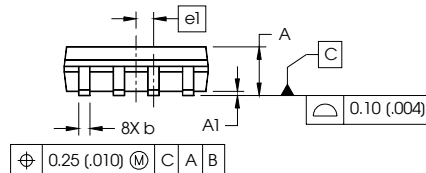


Fig 14c. Maximum Avalanche Energy Vs. Drain Current

SO-8 Package Details



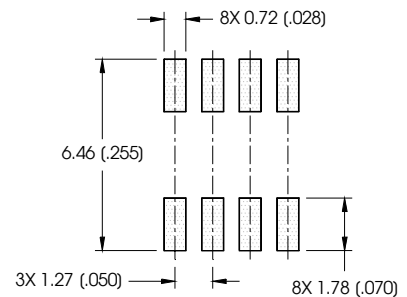
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40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



NOTES:

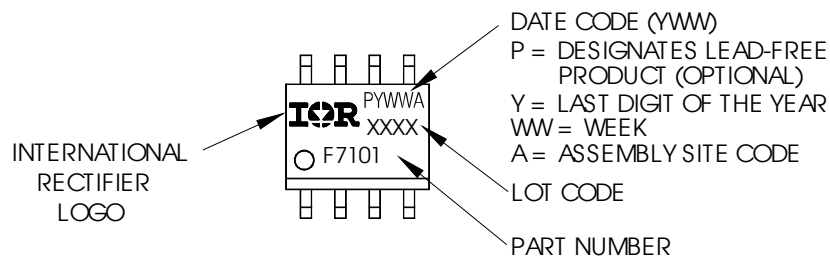
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
- ⑤ DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 (.006).
- ⑥ DIMENSION DOES NOT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

FOOTPRINT



SO-8 Part Marking

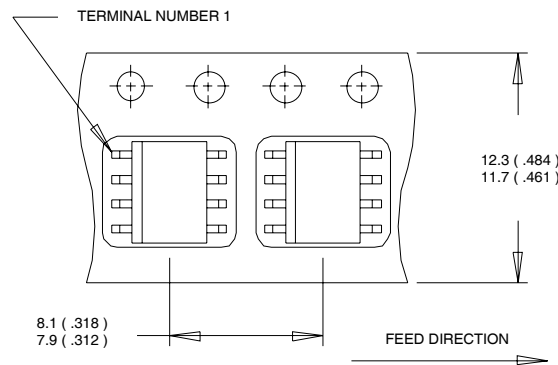
EXAMPLE: THIS IS AN IRF7101 (MOSFET)



IRF7809AV

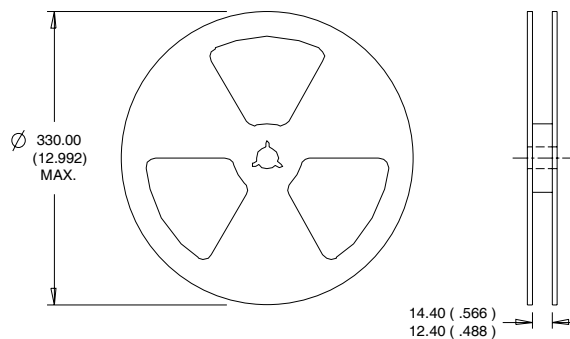
International
IOR Rectifier

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.

International
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