

International I^{OR} Rectifier

- Generation V Technology
- Ultra Low On-Resistance
- P-Channel Mosfet
- Surface Mount
- Available in Tape & Reel
- Dynamic dv/dt Rating
- Fast Switching

Description

Fifth Generation HEXFETs from International Rectifier utilize advanced processing techniques to achieve the lowest possible on-resistance per silicon area. This benefit, combined with the fast switching speed and ruggedized device design that HEXFET Power MOSFETs are well known for, provides the designer with an extremely efficient device for use in a wide variety of applications.

The SO-8 has been modified through a customized leadframe for enhanced thermal characteristics and multiple-die capability making it ideal in a variety of power applications. With these improvements, multiple devices can be used in an application with dramatically reduced board space. The package is designed for vapor phase, infra red, or wave soldering techniques. Power dissipation of greater than 0.8W is possible in a typical PCB mount application.

Absolute Maximum Ratings

	Parameter	Max.	Units
I _D @ T _A = 25°C	10 Sec. Pulsed Drain Current, V _{GS} @ -10V	-6.7	A
I _D @ T _A = 25°C	Continuous Drain Current, V _{GS} @ -10V	-5.8	
I _D @ T _A = 70°C	Continuous Drain Current, V _{GS} @ -10V	-3.7	
I _{DM}	Pulsed Drain Current ①	-23	
P _D @T _A = 25°C	Power Dissipation	2.5	W
	Linear Derating Factor	0.02	W/°C
V _{GS}	Gate-to-Source Voltage	± 20	V
dv/dt	Peak Diode Recovery dv/dt ②	-5.0	V/ns
T _J , T _{STG}	Junction and Storage Temperature Range	-55 to + 150	°C

Thermal Resistance Ratings

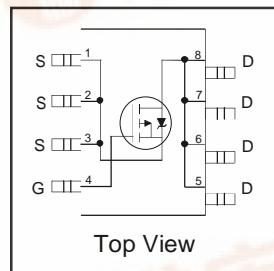
	Parameter	Typ.	Max.	Units
R _{QJA}	Maximum Junction-to-Ambient ④	---	50	°C/W

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PD - 91247D

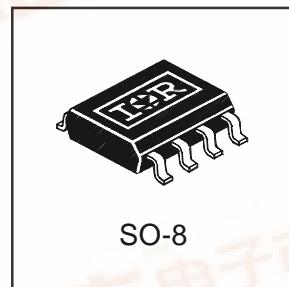
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HEXFET® Power MOSFET



V_{DSS} = -30V

R_{DS(on)} = 0.045Ω



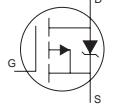
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Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(\text{BR})\text{DSS}}$	Drain-to-Source Breakdown Voltage	-30	—	—	V	$V_{\text{GS}} = 0\text{V}$, $I_D = -250\mu\text{A}$
$\Delta V_{(\text{BR})\text{DSS}/\Delta T_J}$	Breakdown Voltage Temp. Coefficient	—	-0.020	—	V/ $^\circ\text{C}$	Reference to 25°C , $I_D = -1\text{mA}$
$R_{\text{DS}(\text{ON})}$	Static Drain-to-Source On-Resistance	—	0.045	Ω	$V_{\text{GS}} = -10\text{V}$, $I_D = -2.8\text{A}$ ③	
	—	—	0.070		$V_{\text{GS}} = -4.5\text{V}$, $I_D = -2.4\text{A}$ ③	
$V_{\text{GS}(\text{th})}$	Gate Threshold Voltage	-1.0	—	—	V	$V_{\text{DS}} = V_{\text{GS}}$, $I_D = -250\mu\text{A}$
g_{fs}	Forward Transconductance	3.1	—	—	S	$V_{\text{DS}} = -15\text{V}$, $I_D = -2.8\text{A}$
I_{DSS}	Drain-to-Source Leakage Current	—	—	-1.0	μA	$V_{\text{DS}} = -24\text{V}$, $V_{\text{GS}} = 0\text{V}$
	—	—	-25	μA	$V_{\text{DS}} = -24\text{V}$, $V_{\text{GS}} = 0\text{V}$, $T_J = 125^\circ\text{C}$	
I_{GSS}	Gate-to-Source Forward Leakage	—	—	-100	nA	$V_{\text{GS}} = -20\text{V}$
	Gate-to-Source Reverse Leakage	—	—	100	nA	$V_{\text{GS}} = 20\text{V}$
Q_g	Total Gate Charge	—	—	59	nC	$I_D = -2.8\text{A}$
Q_{gs}	Gate-to-Source Charge	—	—	5.7		$V_{\text{DS}} = -2.4\text{V}$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	—	21		$V_{\text{GS}} = -10\text{V}$, See Fig. 6 and 12 ③
$t_{\text{d}(\text{on})}$	Turn-On Delay Time	—	16	—	ns	$V_{\text{DD}} = -15\text{V}$
t_r	Rise Time	—	33	—		$I_D = -2.8\text{A}$
$t_{\text{d}(\text{off})}$	Turn-Off Delay Time	—	45	—		$R_G = 6.0\Omega$
t_f	Fall Time	—	47	—		$R_D = 5.3\Omega$, See Fig. 10 ③
L_D	Internal Drain Inductance	—	2.5	—	nH	Between lead tip
L_S	Internal Source Inductance	—	4.0	—		and center of die contact
C_{iss}	Input Capacitance	—	1100	—	pF	$V_{\text{GS}} = 0\text{V}$
C_{oss}	Output Capacitance	—	490	—		$V_{\text{DS}} = -25\text{V}$
C_{rss}	Reverse Transfer Capacitance	—	220	—		$f = 1.0\text{MHz}$, See Fig. 5

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	-3.1	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	-23		
V_{SD}	Diode Forward Voltage	—	—	-1.0	V	$T_J = 25^\circ\text{C}$, $I_S = -2.0\text{A}$, $V_{\text{GS}} = 0\text{V}$ ③
t_{rr}	Reverse Recovery Time	—	42	63	ns	$T_J = 25^\circ\text{C}$, $I_F = -2.8\text{A}$
Q_{rr}	Reverse Recovery Charge	—	64	96	nC	$dI/dt = 100\text{A}/\mu\text{s}$ ③
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by $L_S + L_D$)				

Notes:

① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)

③ Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.

② $I_{\text{SD}} \leq -2.8\text{A}$, $dI/dt \leq 90\text{A}/\mu\text{s}$, $V_{\text{DD}} \leq V_{(\text{BR})\text{DSS}}$, $T_J \leq 150^\circ\text{C}$

④ Surface mounted on FR-4 board, $t \leq 10\text{sec}$.

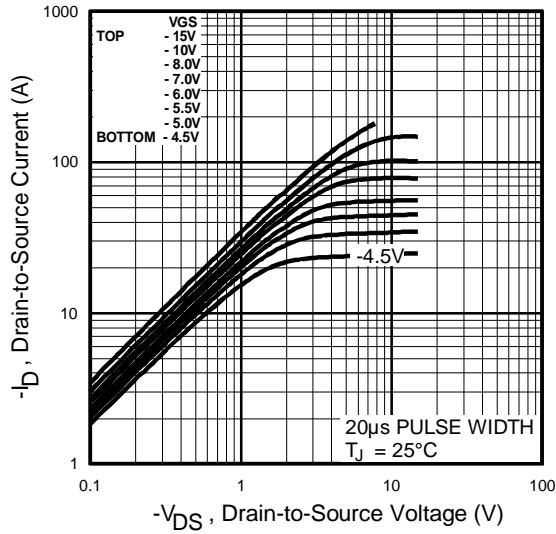


Fig 1. Typical Output Characteristics

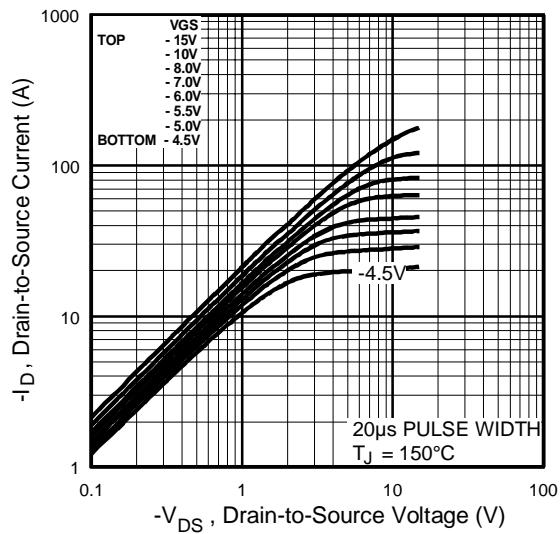


Fig 2. Typical Output Characteristics

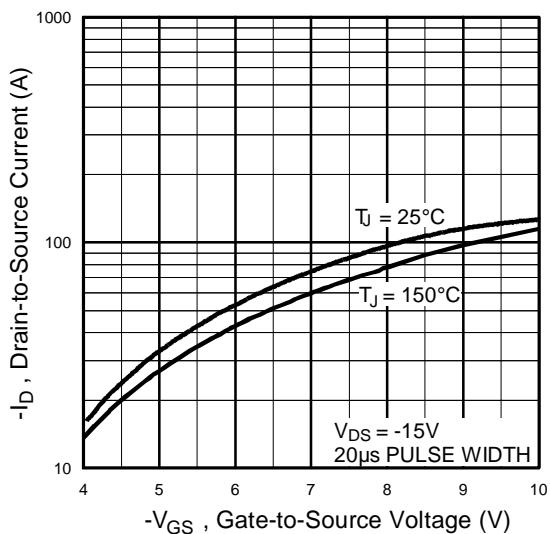


Fig 3. Typical Transfer Characteristics

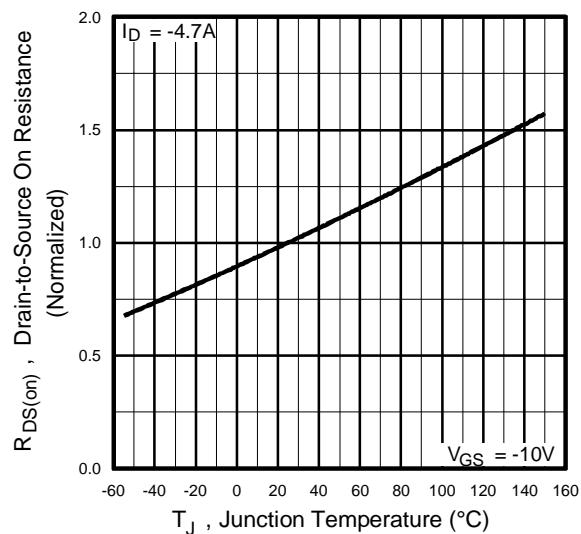


Fig 4. Normalized On-Resistance Vs. Temperature

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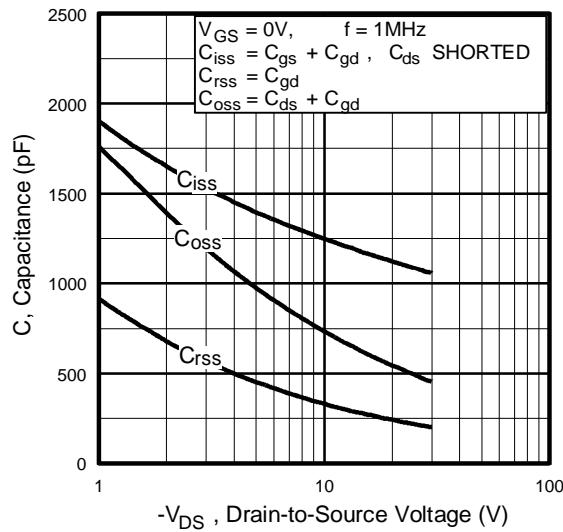


Fig 5. Typical Capacitance Vs.
Drain-to-Source Voltage

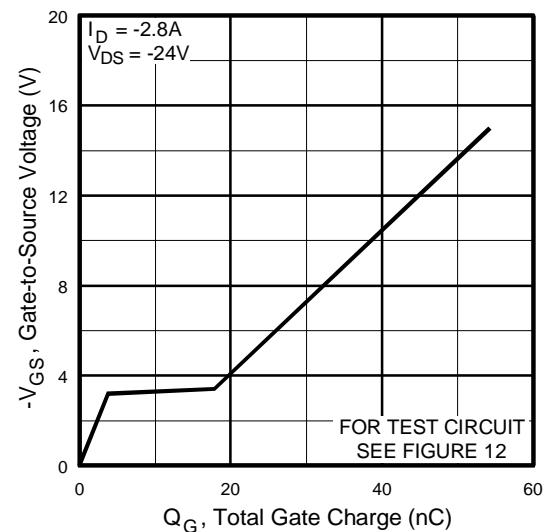


Fig 6. Typical Gate Charge Vs.
Gate-to-Source Voltage

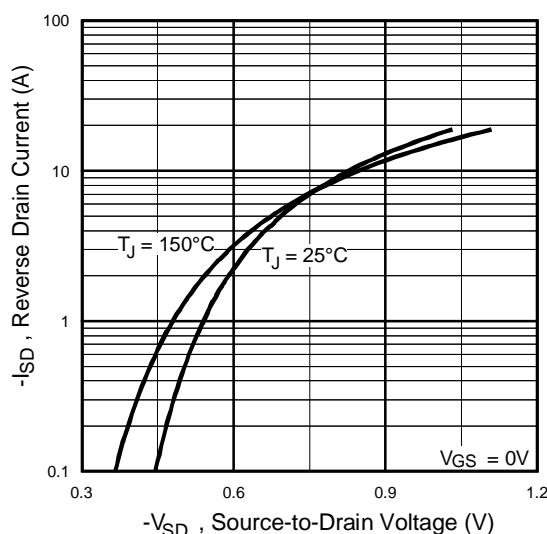


Fig 7. Typical Source-Drain Diode
Forward Voltage

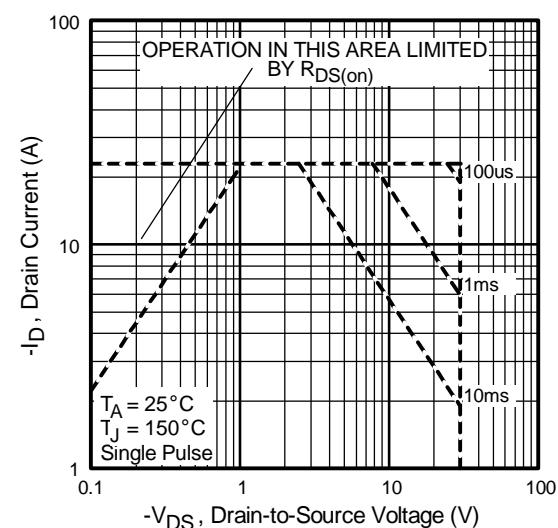


Fig 8. Maximum Safe Operating Area

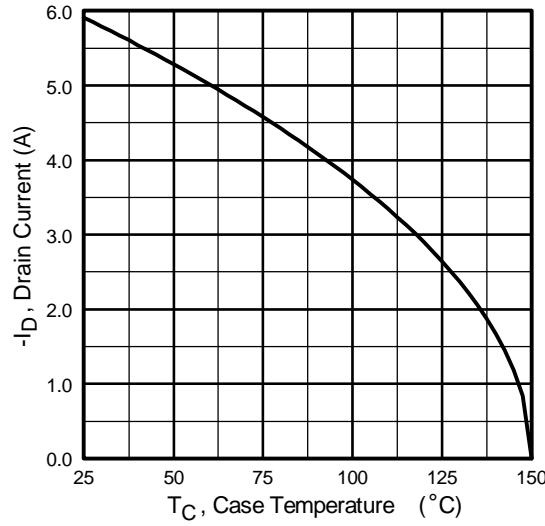


Fig 9. Maximum Drain Current Vs.
Ambient Temperature

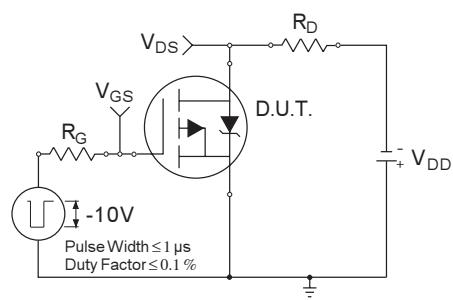


Fig 10a. Switching Time Test Circuit

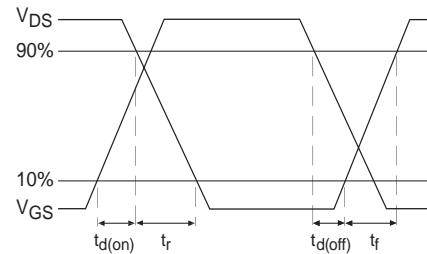
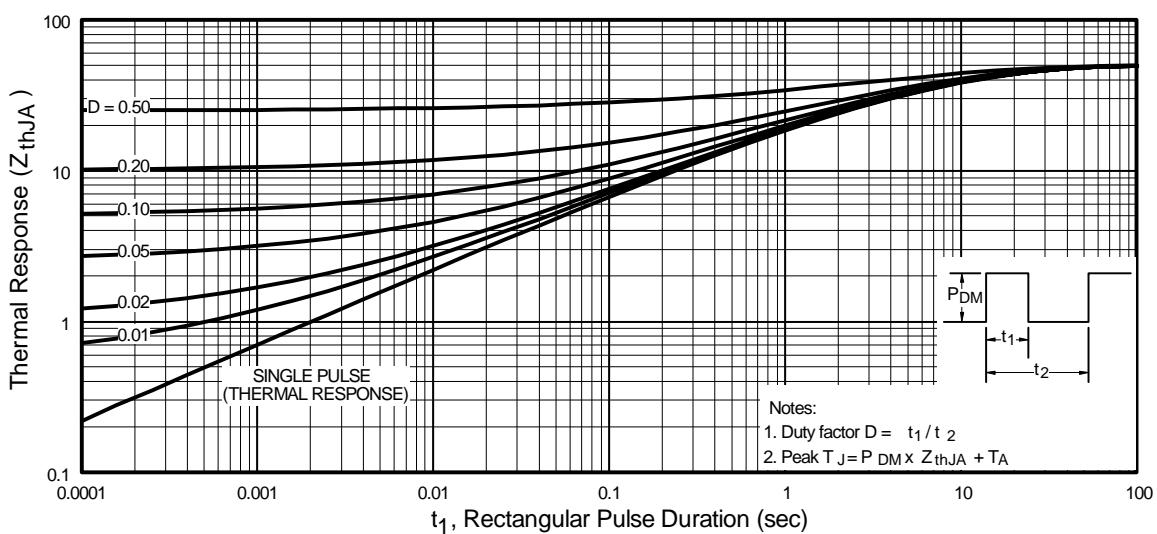


Fig 10b. Switching Time Waveforms



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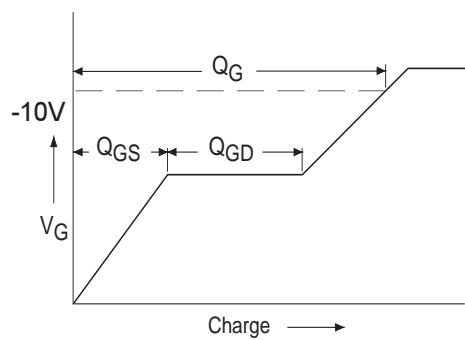


Fig 12a. Basic Gate Charge Waveform

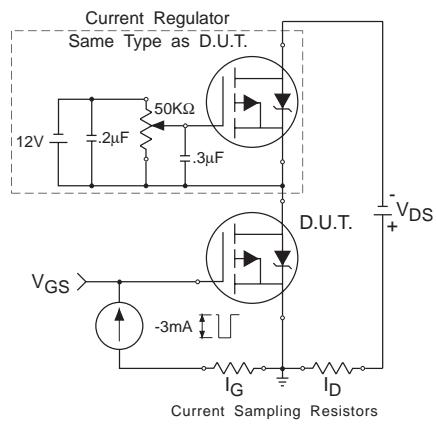
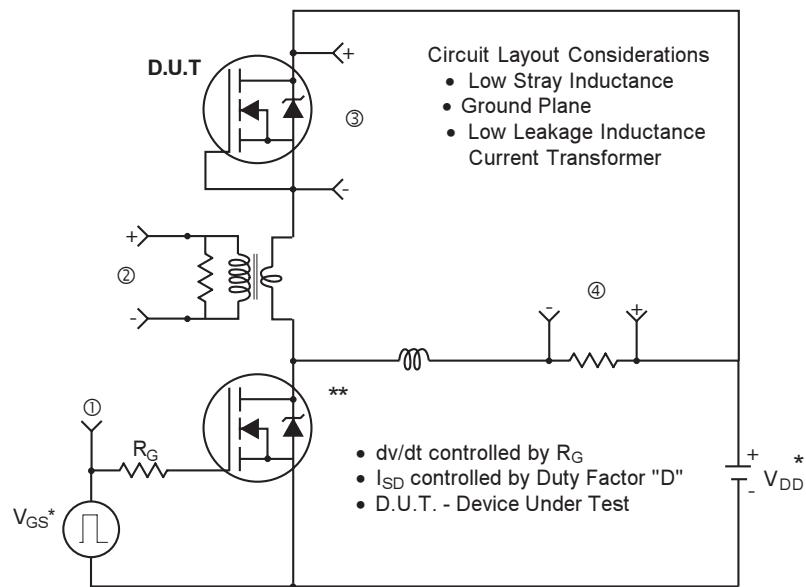


Fig 12b. Gate Charge Test Circuit

Peak Diode Recovery dv/dt Test Circuit



* Reverse Polarity for P-Channel

** Use P-Channel Driver for P-Channel Measurements

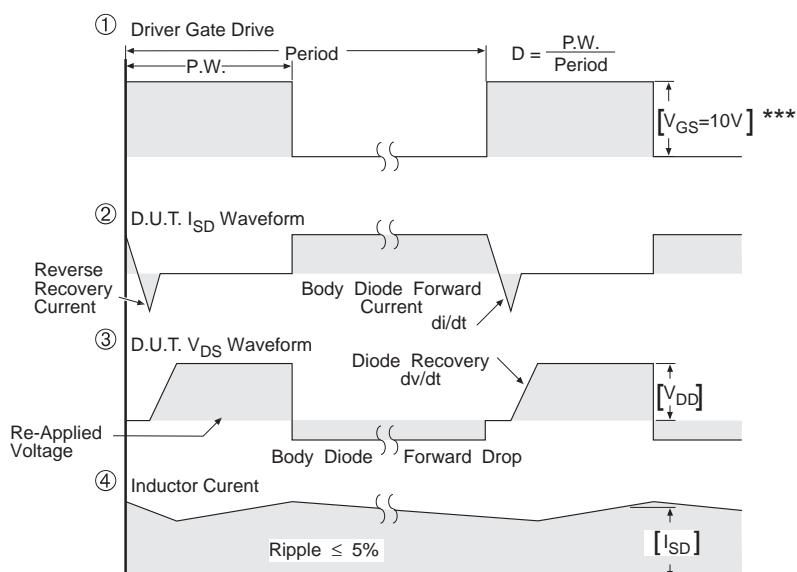


Fig 13. For P-Channel HEXFETs

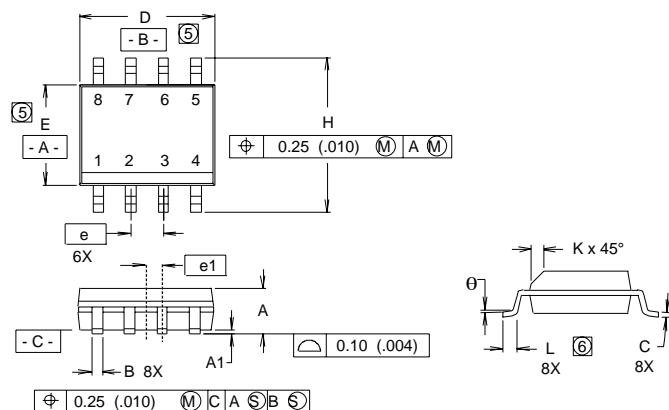
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Package Outline

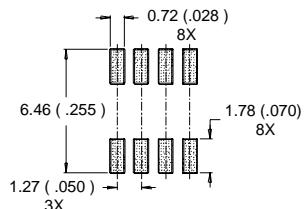
SO-8 Outline

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	.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	0.50	0.41	1.27
θ	0°	8°	0°	8°

RECOMMENDED FOOTPRINT



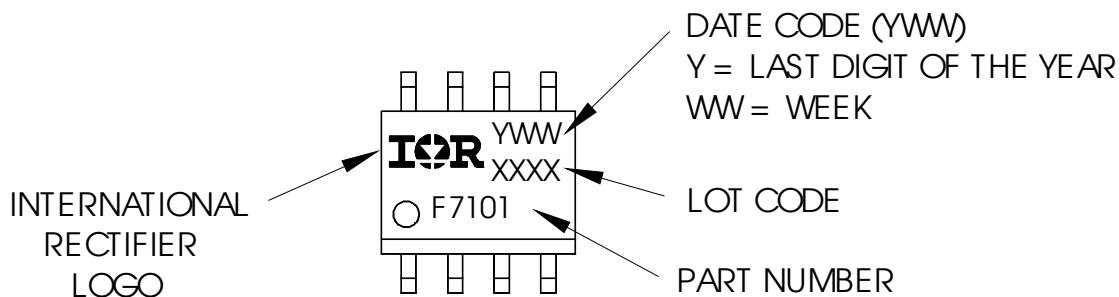
NOTES:

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) DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE..

Part Marking Information

SO-8

EXAMPLE: THIS IS AN IRF7101 (MOSFET)



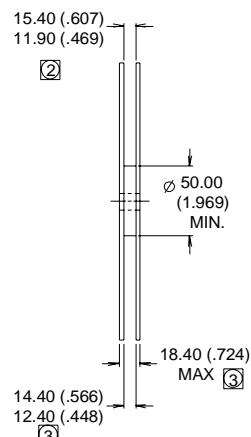
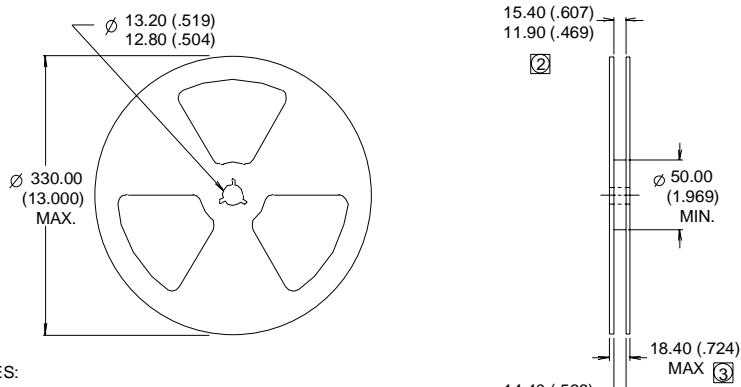
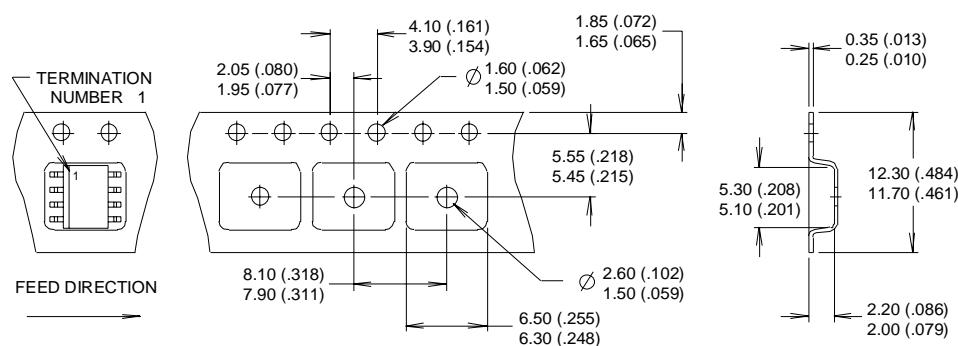
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Tape & Reel Information

SO-8

Dimensions are shown in millimeters (inches)



Data and specifications subject to change without notice.

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