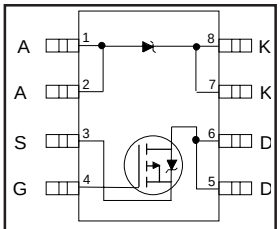
International
IOR Rectifier

PD- 95160A

IRF5803D2PbF

FETKY™ MOSFET & Schottky Diode

- Co-packaged HEXFET® Power MOSFET and Schottky Diode
- Ideal For Buck Regulator Applications
- P-Channel HEXFET®
- Low V_F Schottky Rectifier
- SO-8 Footprint
- Lead-Free



Top View

V_{DSS} = -40V

$R_{DS(on)}$ = 112mΩ

Schottky Vf = 0.51V


SO-8

Description

The **FETKY**™ family of Co-packaged HEXFETs and Schottky diodes offer the designer an innovative board space saving solution for switching regulator and power management applications. HEXFETs utilize advanced processing techniques to achieve extremely low on-resistance per silicon area. Combining this technology with International Rectifier's low forward drop Schottky rectifiers results in an extremely efficient device suitable for use in a wide variety of portable electronics applications.

The SO-8 has been modified through a customized leadframe for enhanced thermal characteristics. The SO-8 package is designed for vapor phase, infrared or wave soldering techniques.

Absolute Maximum Ratings (T_A = 25°C Unless Otherwise Noted)

	Parameter	Maximum	Units
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ -10V	-3.4	A
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ -10V	-2.7	
I_{DM}	Pulsed Drain Current ①	-27	
P_D @T_A = 25°C	Power Dissipation	2.0	W
P_D @T_A = 70°C	Power Dissipation	1.3	
	Linear Derating Factor	16	mW/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to +150	°C

Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JL}$	Junction-to-Drain Lead, MOSFET	—	20	°C/W
$R_{\theta JA}$	Junction-to-Ambient ③, MOSFET	—	62.5	
$R_{\theta JA}$	Junction-to-Ambient ③, SCHOTTKY	—	62.5	

Notes:

① Repetitive rating – pulse width limited by max. junction temperature (see fig. 11)

② Pulse width ≤ 400µs – duty cycle ≤ 2%

③ Surface mounted on 1 inch square copper board, t ≤ 10sec.

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IOR Rectifier

Electrical Characteristics @ T_J = 25°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 = -250µA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	-0.03	—	V/°C	Reference to 25°C, I_D = -1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	112	mΩ	V_{GS} = -10V, I_D = -3.4A ②
		—	—	190		V_{GS} = -4.5V, I_D = -2.7A ②
$V_{GS(th)}$	Gate Threshold Voltage	-1.0	—	-3.0	V	V_{DS} = V_{GS}, I_D = -250µA
g_{fs}	Forward Transconductance	4.0	—	—	S	V_{DS} = -10V, I_D = -3.4A
I_{DSS}	Drain-to-Source Leakage Current	—	—	-10	µA	V_{DS} = -32V, V_{GS} = 0V
		—	—	-25		V_{DS} = -32V, V_{GS} = 0V, T_J = 70°C
I_{GSS}	Gate-to-Source Forward Leakage	—	—	-100	nA	V_{GS} = -20V
	Gate-to-Source Reverse Leakage	—	—	100		V_{GS} = 20V
Q_g	Total Gate Charge	—	25	37	nC	I_D = -3.4A
Q_{gs}	Gate-to-Source Charge	—	4.5	6.8		V_{DS} = -20V
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	3.5	5.3		V_{GS} = -10V, See Fig. 6 & 14 ②
$t_{d(on)}$	Turn-On Delay Time	—	43	65	ns	V_{DD} = -20V
t_r	Rise Time	—	550	825		I_D = -1.0A
$t_{d(off)}$	Turn-Off Delay Time	—	88	130		R_G = 6.0Ω
t_f	Fall Time	—	50	75		V_{GS} = -10V, ②
C_{iss}	Input Capacitance	—	1110	—	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	—	93	—		V_{DS} = -25V
C_{rss}	Reverse Transfer Capacitance	—	73	—		f = 100kHz, See Fig. 5

MOSFET Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current(Body Diode)	—	—	-2.0	A	
I_{SM}	Pulsed Source Current (Body Diode)	—	—	-27		
V_{SD}	Body Diode Forward Voltage	—	—	-1.2	V	T_J = 25°C, I_S = -2.0A, V_{GS} = 0V
t_{rr}	Reverse Recovery Time (Body Diode)	—	27	40	ns	T_J = 25°C, I_F = -2.0A
Q_{rr}	Reverse Recovery Charge	—	34	50	nC	di/dt = 100A/µs ②

Schottky Diode Maximum Ratings

	Parameter	Max.	Units	Conditions	
If (av)	Max. Average Forward Current	3.0	A	50% Duty Cycle. Rectangular Waveform, T_A =30°C See Fig.21	
I_{SM}	Max. peak one cycle Non-repetitive Surge current	340	A	5µs sine or 3µs Rect. pulse	Following any rated load condition & with Vrrm applied
		70		10ms sine or 6ms Rect. pulse	

Schottky Diode Electrical Specifications

	Parameter	Max.	Units	Conditions	
Vfm	Max. Forward Voltage Drop	0.51	V	If = 5.0A, Tj = 25°C	
		0.63		If = 10A, Tj = 25°C	
		0.44		If = 5.0A, Tj = 125°C	
		0.59		If = 10A, Tj = 125°C	
Vrrm	Max. Working Peak Reverse Voltage	40	V		
Irm	Max. Reverse Leakage Current	3.0	mA	Vr = 40V	Tj = 25°C
		37			Tj = 125°C
Ct	Max. Junction Capacitance	405	pF	Vr = 5Vdc (100kHz to 1 MHz) 25°C	

Power Mosfet Characteristics

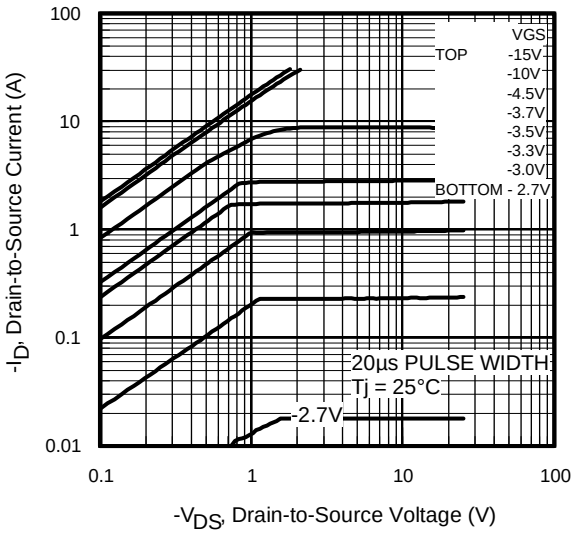


Fig 1. Typical Output Characteristics

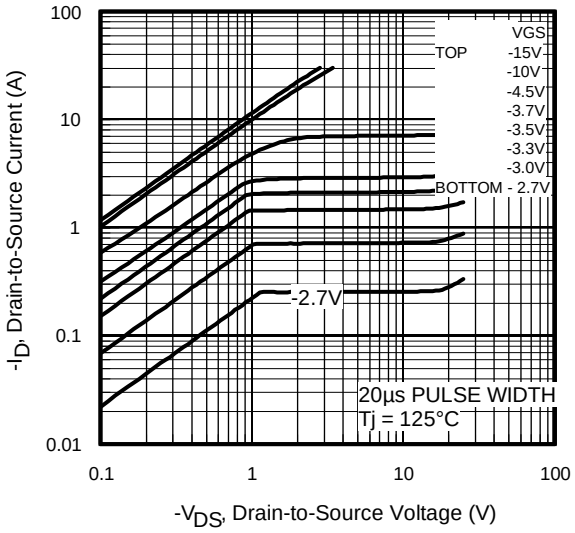


Fig 2. Typical Output Characteristics

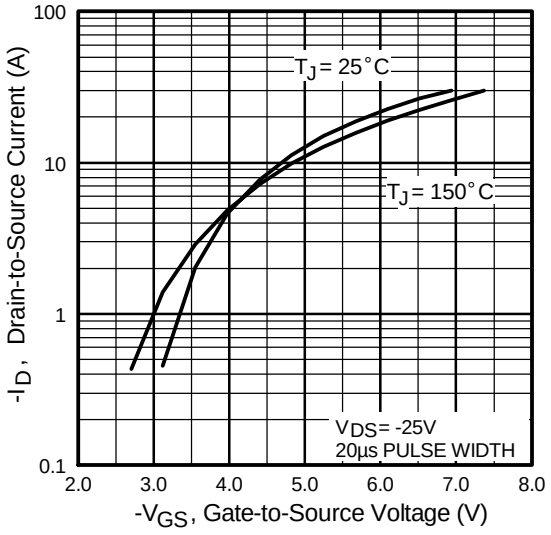


Fig 3. Typical Transfer Characteristics

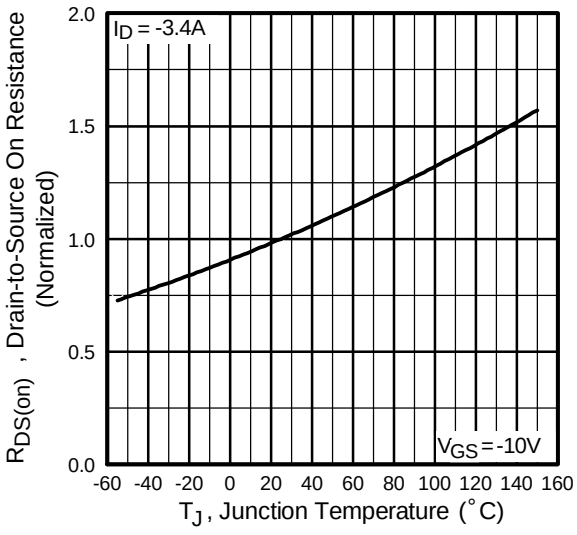


Fig 4. Normalized On-Resistance Vs. Temperature

Power Mosfet Characteristics

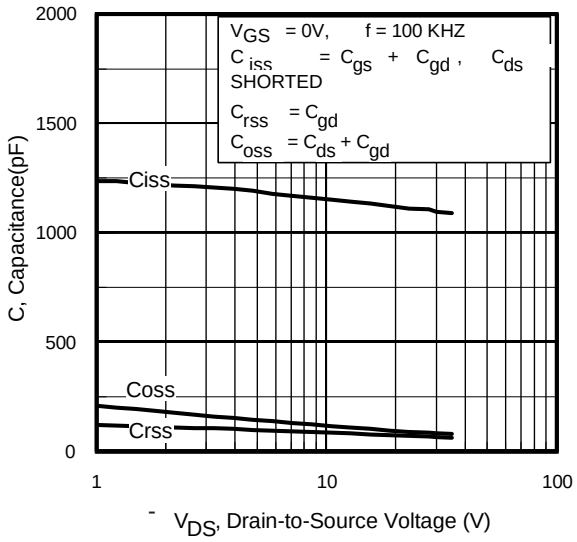


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

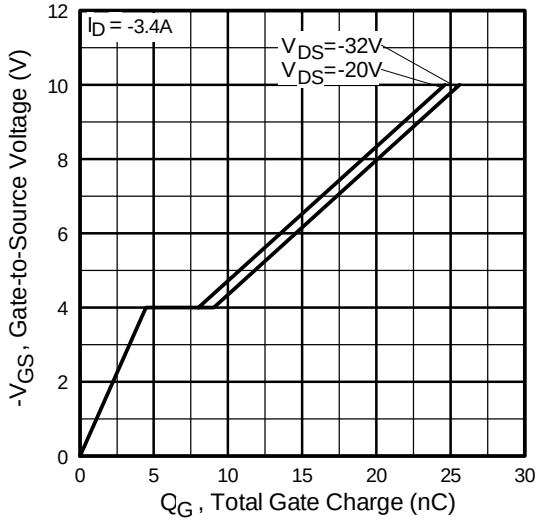


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

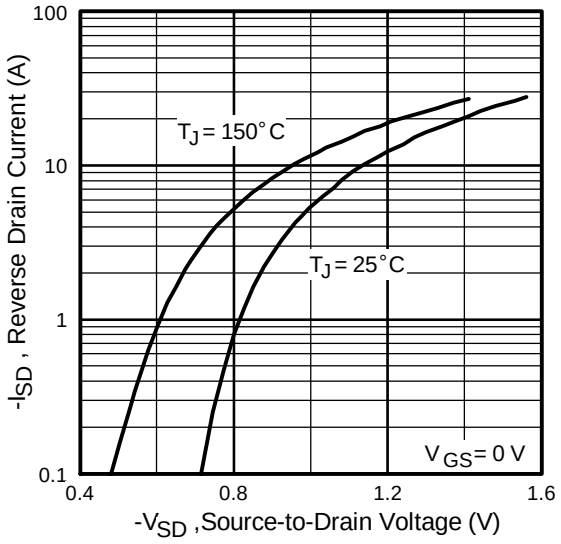


Fig 7. Typical Source-Drain Diode Forward Voltage

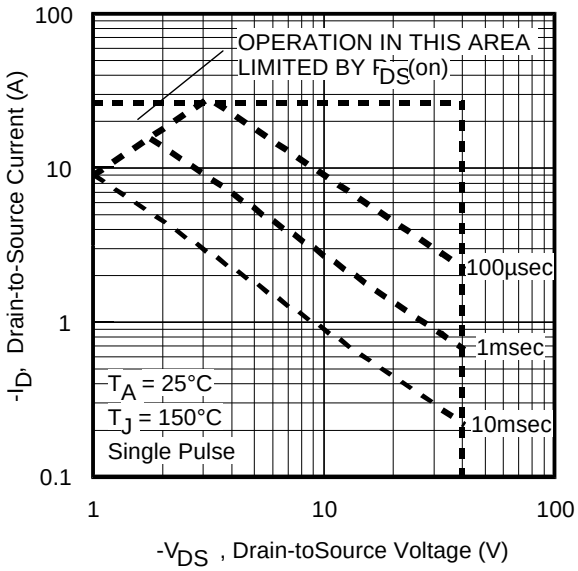


Fig 8. Maximum Safe Operating Area

Power Mosfet Characteristics

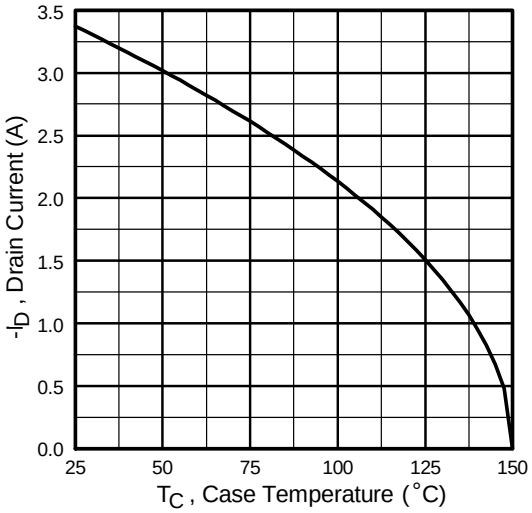


Fig 9. Maximum Drain Current Vs. Case Temperature

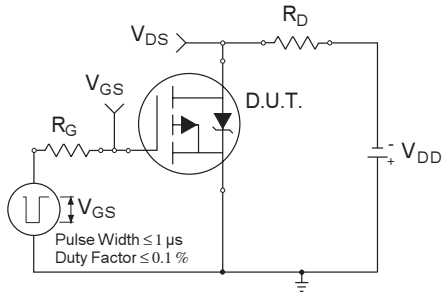


Fig 10a. Switching Time Test Circuit

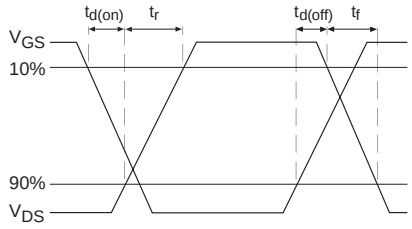


Fig 10b. Switching Time Waveforms

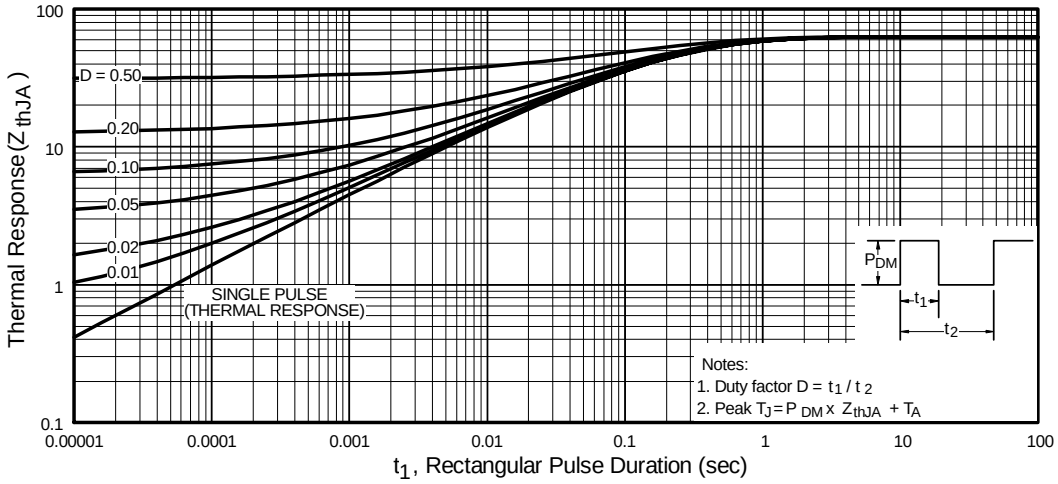


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

Power Mosfet Characteristics

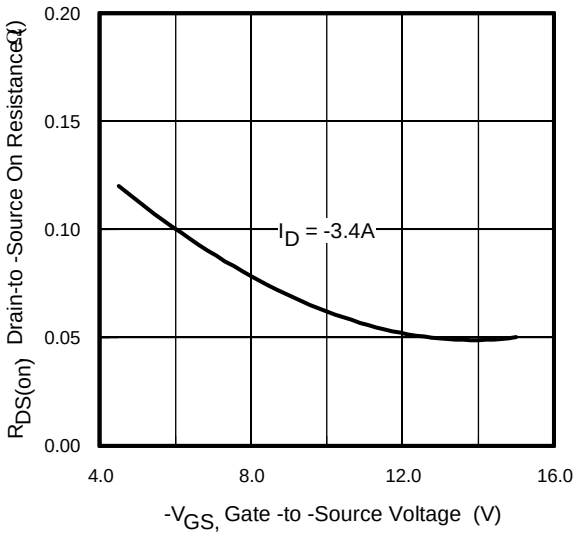


Fig 12. Typical On-Resistance Vs. Gate Voltage

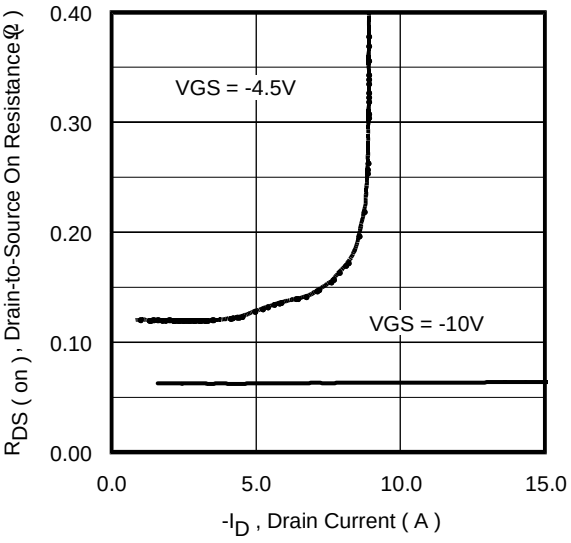


Fig 13. Typical On-Resistance Vs. Drain Current

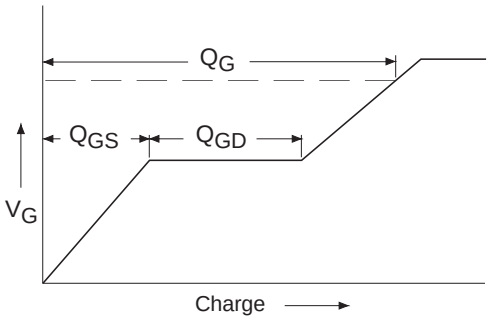


Fig 14a. Basic Gate Charge Waveform

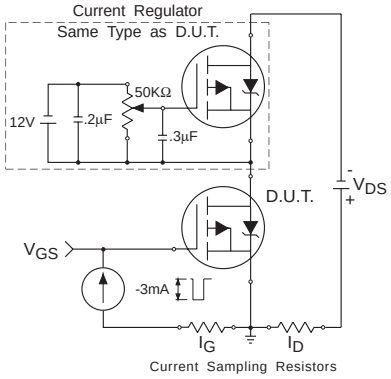


Fig 14b. Gate Charge Test Circuit

Power Mosfet Characteristics

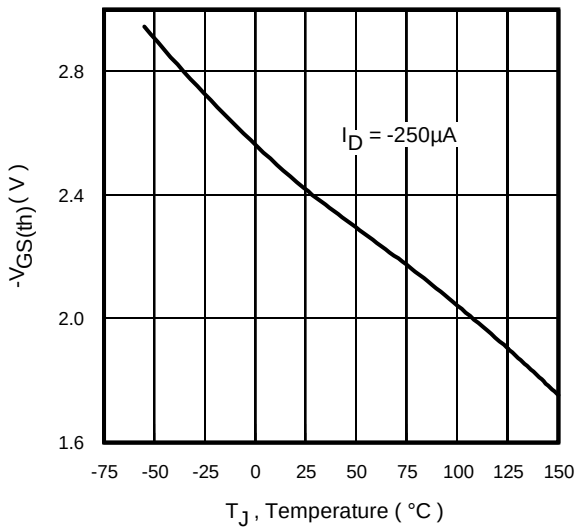


Fig 15. Typical Vgs(th) Vs. Junction Temperature

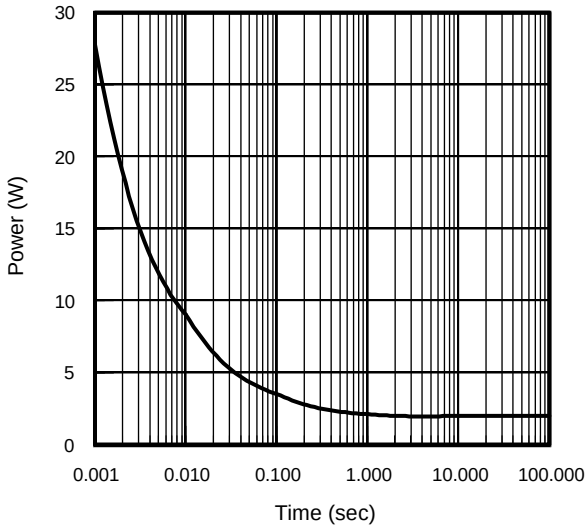


Fig 16. Typical Power Vs. Time

Schottky Diode Characteristics

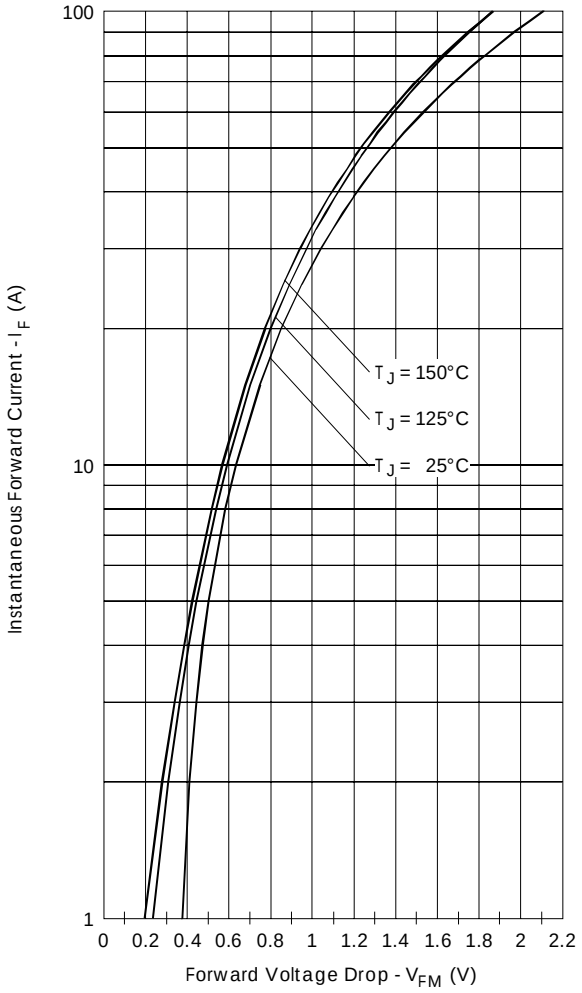


Fig. 17 - Maximum Forward Voltage Drop Characteristics

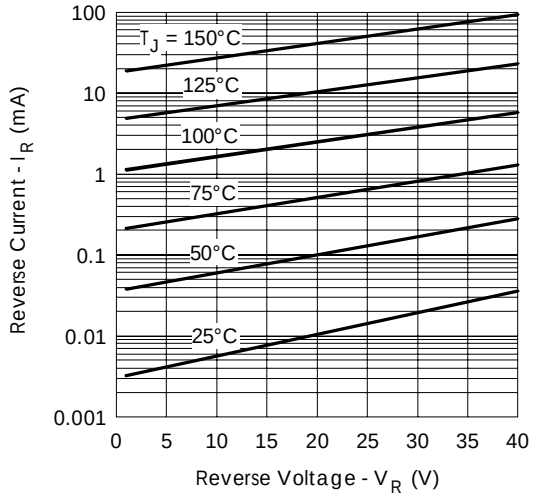


Fig. 18 - Typical Values of Reverse Current Vs. Reverse Voltage

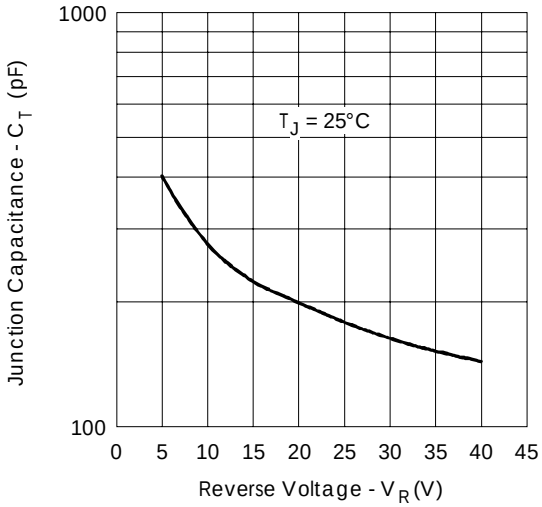


Fig. 19 - Typical Junction Capacitance Vs. Reverse Voltage

Schottky Diode Characteristics

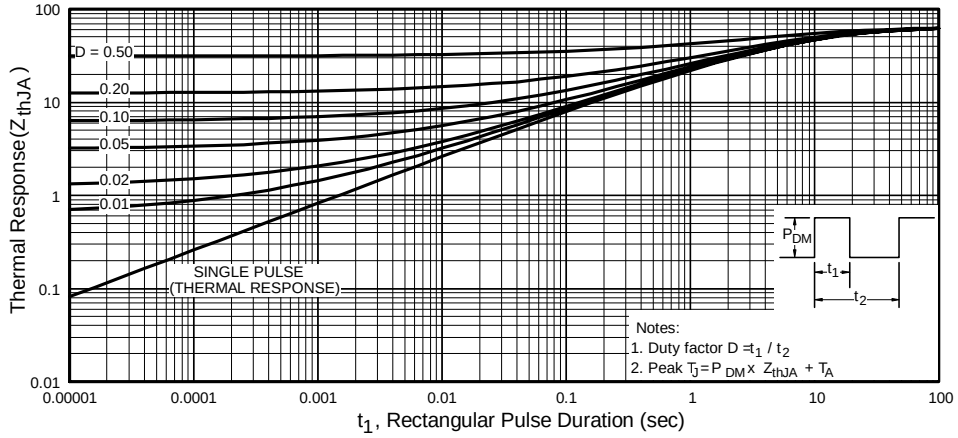


Fig 20. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

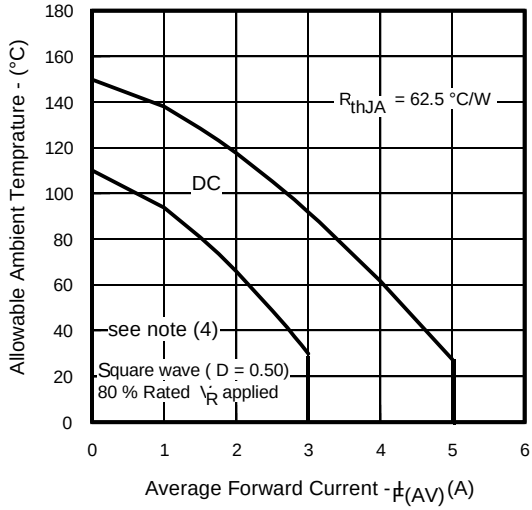


Fig.21 - Maximum Allowable Ambient Temp. Vs. Forward Current

Note (4) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJA}$;

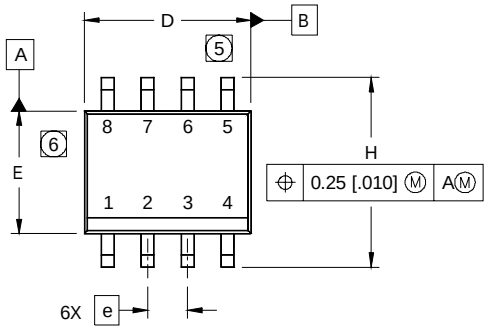
Pd = Forward Power Loss = $I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$;

Pd_{REV} = Inverse Power Loss = $V_{R1} \times I_R (1 - D)$; $I_R @ V_{R1}$ = 80% rated V_R

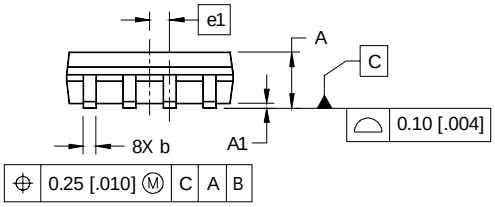
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IOR Rectifier

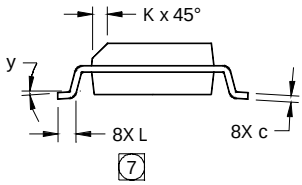
SO-8 (Fetky) Package Outline

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	.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	
e 1	.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°

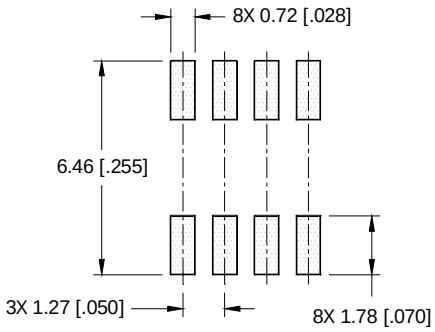




NOTES:

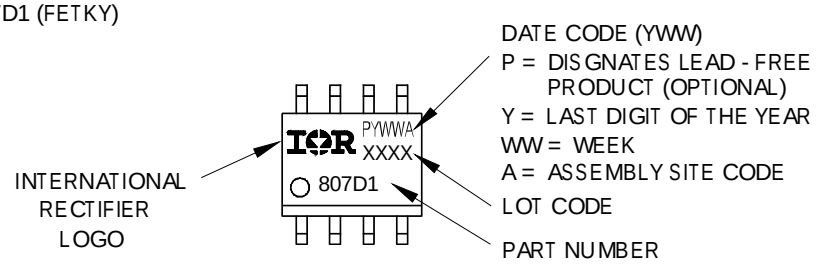
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
5. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 [.006].
6. DIMENSION DOES NOT INCLUDE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

FOOTPRINT



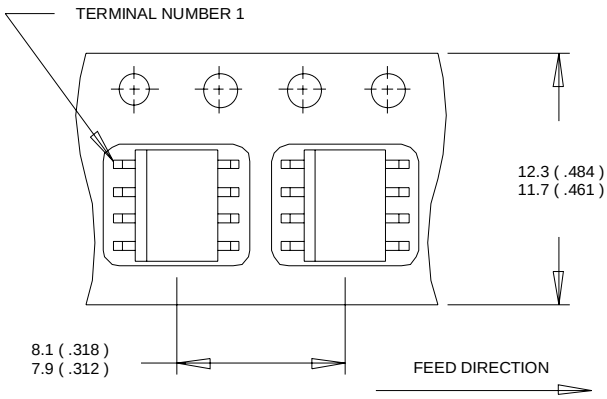
SO-8 (Fetky) Part Marking Information

EXAMPLE: THIS IS AN IRF7807D1 (FETKY)

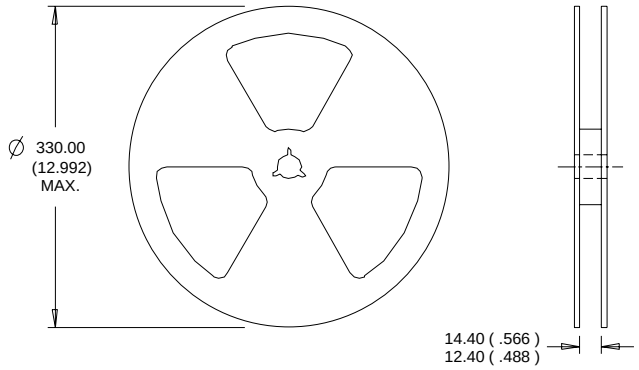


SO-8 (Fetky) Tape and Reel

Dimensions are shown in millimeters (inches)



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.

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

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IOR Rectifier

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TAC Fax: (310) 252-7903
Visit us at www.irf.com for sales contact information.10/04