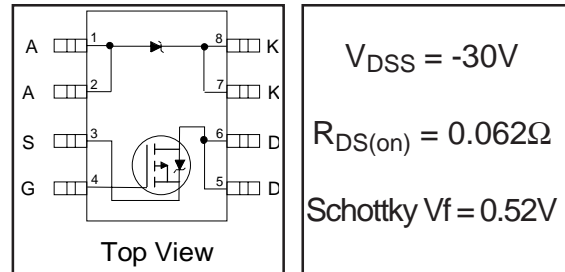


# IRF7321D2

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
- Generation 5 Technology
- SO-8 Footprint

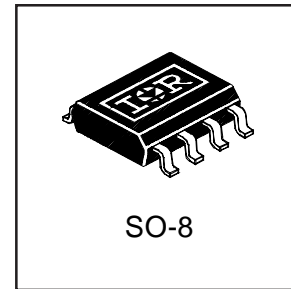


$V_{DSS} = -30V$   
 $R_{DS(on)} = 0.062\Omega$   
Schottky  $V_f = 0.52V$

## 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. Generation 5 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 ( $T_A = 25^\circ C$ Unless Otherwise Noted)

	Parameter	Maximum	Units
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -10V$	-4.7	A
$I_D @ T_A = 70^\circ C$		-3.8	
$I_{DM}$		Pulsed Drain Current ①	
$P_D @ T_A = 25^\circ C$	Power Dissipation	2.0	W
$P_D @ T_A = 70^\circ C$		1.3	
	Linear Derating Factor	16	mW/°C
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	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	Maximum	Units
$R_{\theta JA}$	Junction-to-Ambient ④	62.5	°C/W

### Notes:

- ① Repetitive rating – pulse width limited by max. junction temperature (see fig. 11)
- ②  $I_{SD} \leq -2.9A$ ,  $di/dt \leq -77A/\mu s$ ,  $V_{DD} \leq V_{(BR)DSS}$ ,  $T_J \leq 150^\circ C$
- ③ Pulse width  $\leq 300\mu s$  – duty cycle  $\leq 2\%$
- ④ Surface mounted on FR-4 board,  $t \leq 10sec$ .

# IRF7321D2

International  
Rectifier

## MOSFET Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
V <sub>(BR)DSS</sub>	Drain-to-Source Breakdown Voltage	-30	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA
R <sub>DS(on)</sub>	Static Drain-to-Source On-Resistance	—	0.042	0.062	Ω	V <sub>GS</sub> = -10V, I <sub>D</sub> = -4.9A ③
		—	0.076	0.098		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -3.6A ③
V <sub>GS(th)</sub>	Gate Threshold Voltage	-1.0	—	—	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA
g <sub>fs</sub>	Forward Transconductance	—	7.7	—	S	V <sub>DS</sub> = -15V, I <sub>D</sub> = -4.9A
I <sub>DSS</sub>	Drain-to-Source Leakage Current	—	—	-1.0	μA	V <sub>DS</sub> = -24V, V <sub>GS</sub> = 0V
		—	—	-25		V <sub>DS</sub> = -24V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 55°C
I <sub>GSS</sub>	Gate-to-Source Forward Leakage	—	—	100	nA	V <sub>GS</sub> = -20V
	Gate-to-Source Reverse Leakage	—	—	-100		V <sub>GS</sub> = 20V
Q <sub>g</sub>	Total Gate Charge	—	23	34	nC	I <sub>D</sub> = -4.9A
Q <sub>gs</sub>	Gate-to-Source Charge	—	3.8	5.7		V <sub>DS</sub> = -15V
Q <sub>gd</sub>	Gate-to-Drain ("Miller") Charge	—	5.9	8.9		V <sub>GS</sub> = -10V, See Fig. 6 ③
t <sub>d(on)</sub>	Turn-On Delay Time	—	13	19	ns	V <sub>DD</sub> = -15V
t <sub>r</sub>	Rise Time	—	13	20		I <sub>D</sub> = -1.0A
t <sub>d(off)</sub>	Turn-Off Delay Time	—	34	51		R <sub>G</sub> = 6.0Ω
t <sub>f</sub>	Fall Time	—	32	48		R <sub>D</sub> = 15Ω, ③
C <sub>iss</sub>	Input Capacitance	—	710	—	pF	V <sub>GS</sub> = 0V
C <sub>oss</sub>	Output Capacitance	—	380	—		V <sub>DS</sub> = -25V
C <sub>rss</sub>	Reverse Transfer Capacitance	—	180	—		f = 1.0MHz, See Fig. 5

## MOSFET Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I <sub>S</sub>	Continuous Source Current (Body Diode)	—	—	-2.5	A	
I <sub>SM</sub>	Pulsed Source Current (Body Diode)	—	—	-30		
V <sub>SD</sub>	Body Diode Forward Voltage	—	-0.78	-1.0	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = -1.7A, V <sub>GS</sub> = 0V
t <sub>rr</sub>	Reverse Recovery Time (Body Diode)	—	44	66	ns	T <sub>J</sub> = 25°C, I <sub>F</sub> = -1.7A
Q <sub>rr</sub>	Reverse Recovery Charge	—	42	63	nC	di/dt = 100A/μs ③

## Schottky Diode Maximum Ratings

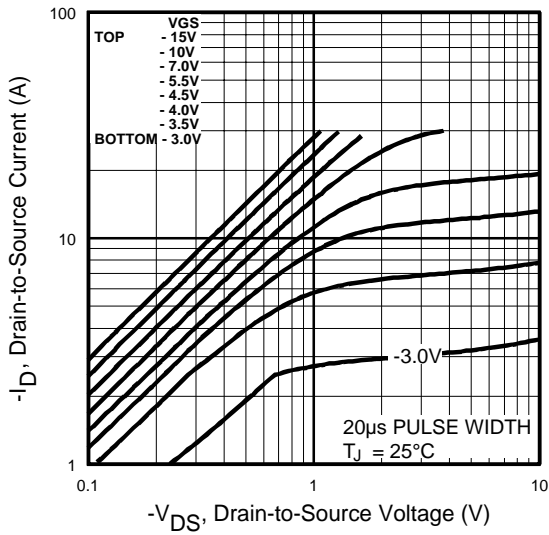
	Parameter	Max.	Units	Conditions
I <sub>f</sub> (av)	Max. Average Forward Current	3.2	A	50% Duty Cycle. Rectangular Wave, T <sub>c</sub> = 25°C See Fig.14 T <sub>c</sub> = 70°C
		2.0		
I <sub>SM</sub>	Max. peak one cycle Non-repetitive Surge current	200	A	Following any rated load condition & with V <sub>rrm</sub> applied
		20		

## Schottky Diode Electrical Specifications

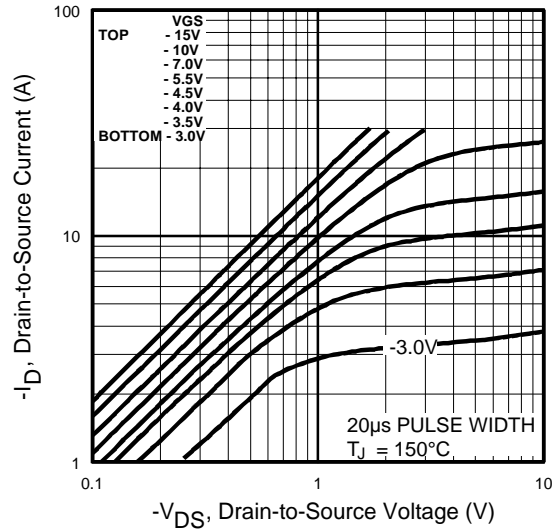
	Parameter	Max.	Units	Conditions	
V <sub>fm</sub>	Max. Forward voltage drop	0.57	V	I <sub>f</sub> = 3.0, T <sub>J</sub> = 25°C	
		0.77			I <sub>f</sub> = 6.0, T <sub>J</sub> = 25°C
		0.52			I <sub>f</sub> = 3.0, T <sub>J</sub> = 125°C
		0.79			I <sub>f</sub> = 6.0, T <sub>J</sub> = 125°C
I <sub>rm</sub>	Max. Reverse Leakage current	0.30	mA	T <sub>J</sub> = 25°C	
		37		T <sub>J</sub> = 125°C	
C <sub>t</sub>	Max. Junction Capacitance	310	pF	V <sub>r</sub> = 5Vdc ( 100kHz to 1 MHz) 25°C	
dv/dt	Max. Voltage Rate of Charge	4900	V/μs	Rated V <sub>r</sub>	

(HEXFET is the reg. TM for International Rectifier Power MOSFET's)

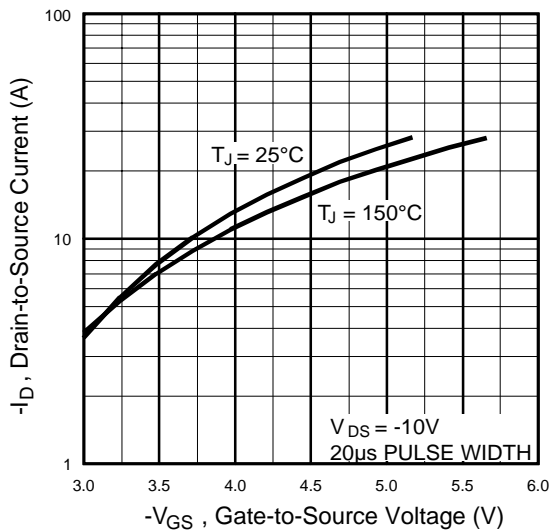
## Power Mosfet Characteristics



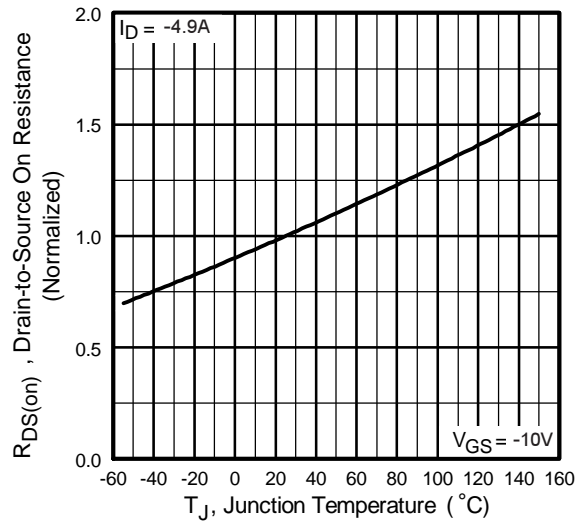
**Fig 1.** Typical Output Characteristics



**Fig 2.** Typical Output Characteristics

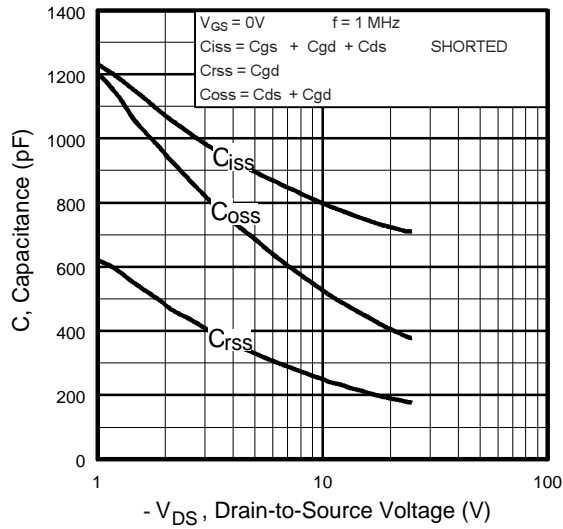


**Fig 3.** Typical Transfer Characteristics

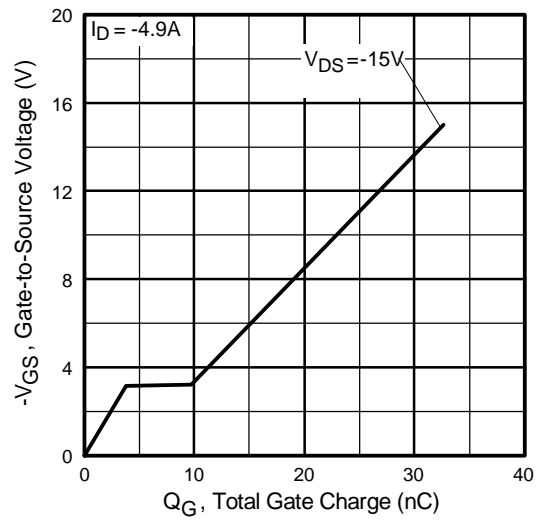


**Fig 4.** Normalized On-Resistance Vs. Temperature

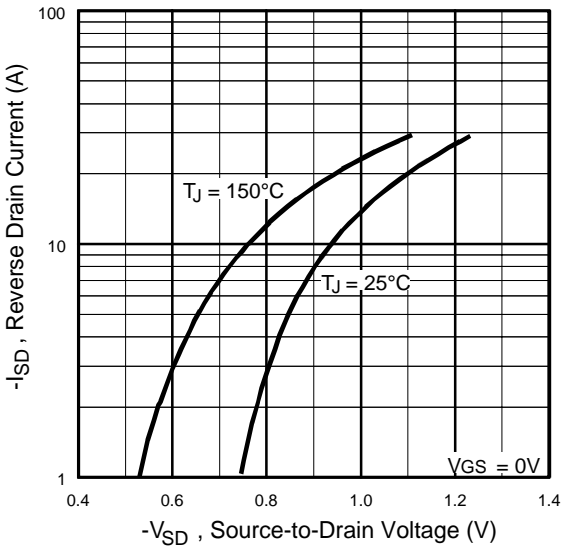
## Power Mosfet Characteristics



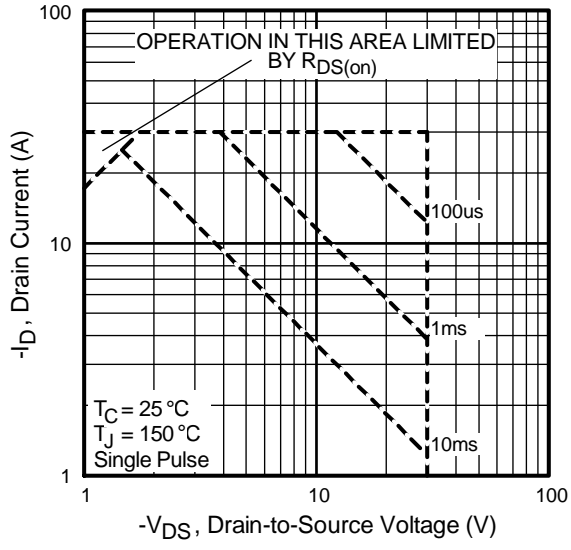
**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage



**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

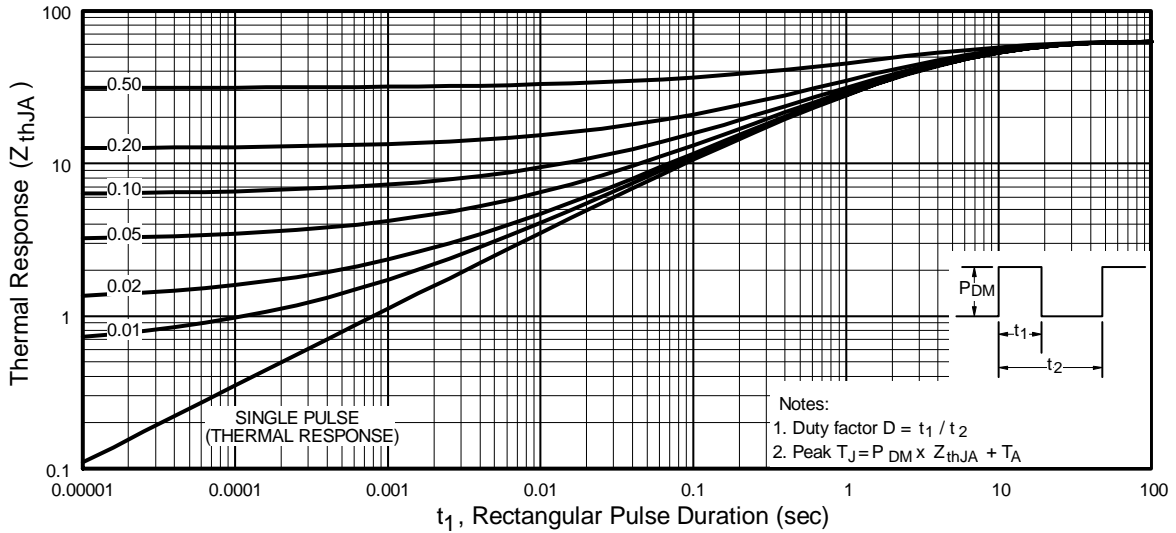


Fig 9. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

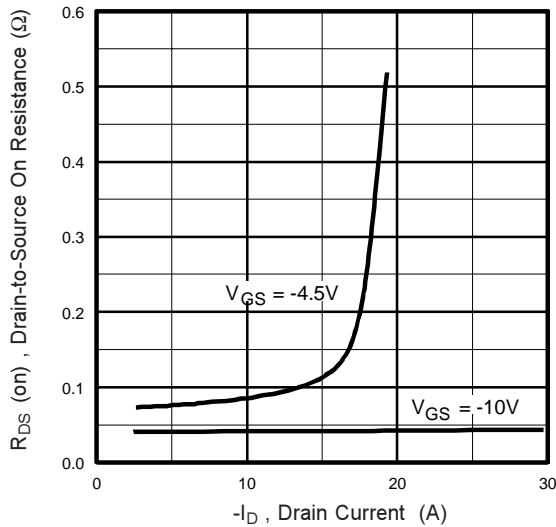


Fig 10. Typical On-Resistance Vs. Drain Current

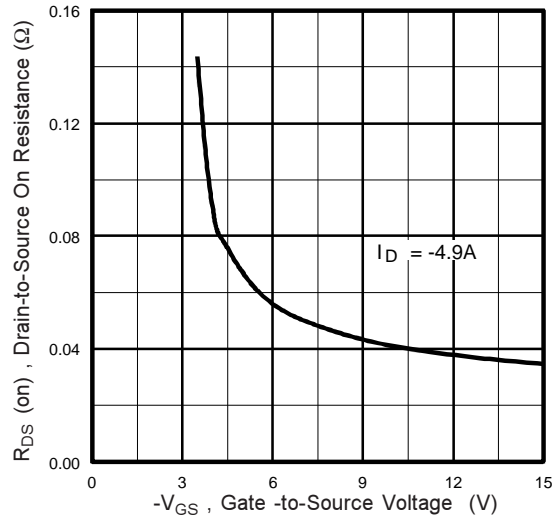
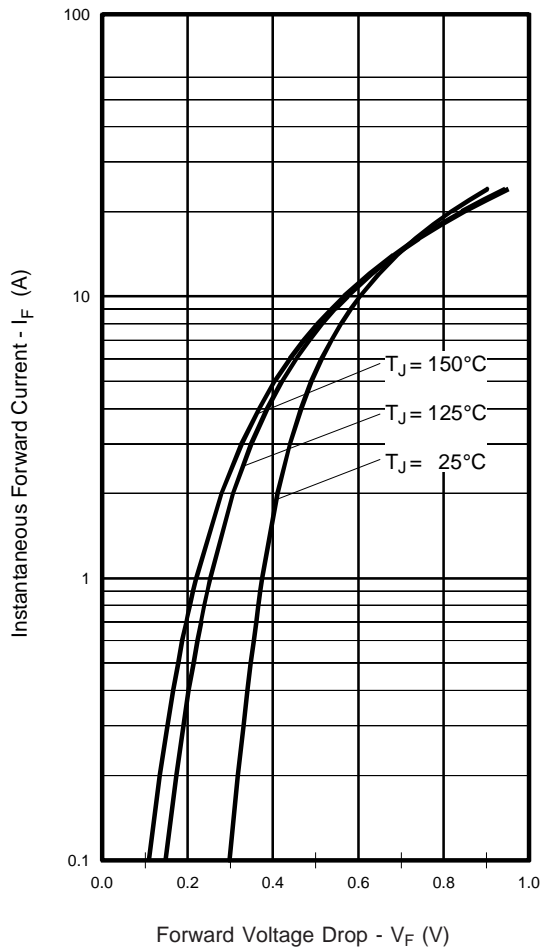
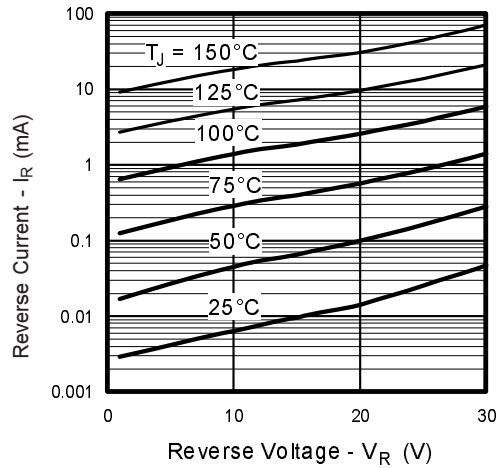


Fig 11. Typical On-Resistance Vs. Gate Voltage

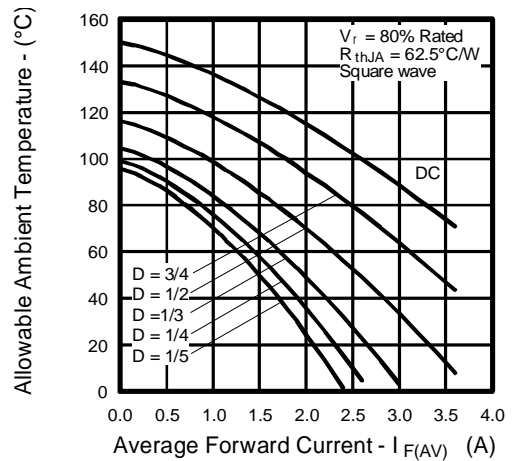
## Schottky Diode Characteristics



**Fig. 12** - Typical Forward Voltage Drop Characteristics



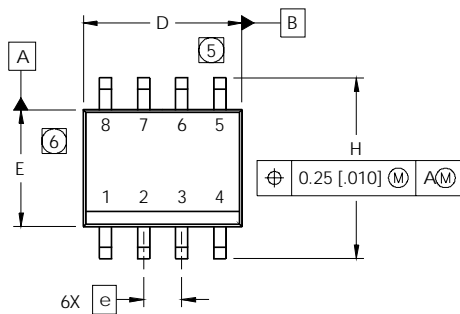
**Fig. 13** - Typical Values of Reverse Current Vs. Reverse Voltage



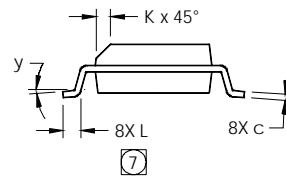
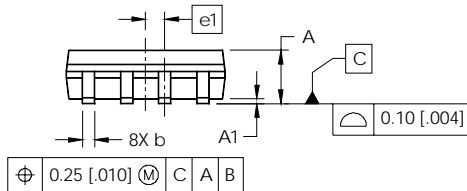
**Fig.14** - Maximum Allowable Ambient Temp. Vs. Forward Current

## SO-8 (Fetky) Package Outline

Dimensions are shown in millimeters (inches)



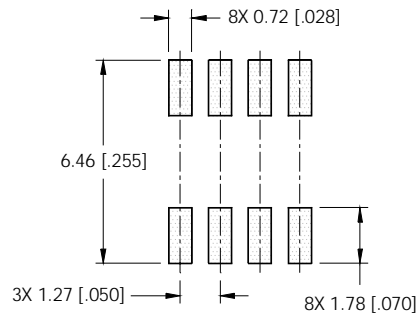
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40	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 [0.006].
- ⑥ DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.25 [0.010].
- 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)

