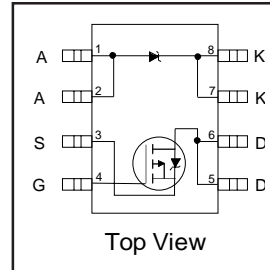


# IRF7322D1

FETKY™ MOSFET / Schottky Diode

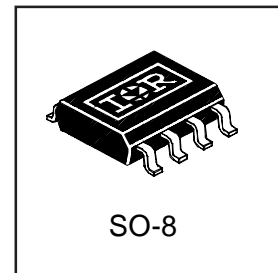
- Co-packaged HEXFET® Power MOSFET and Schottky Diode
- Ideal For Buck Regulator Applications
- P-Channel HEXFET
- Low  $V_F$  Schottky Rectifier
- Generation 5 Technology
- SO-8 Footprint



|                            |
|----------------------------|
| $V_{DSS} = -20V$           |
| $R_{DS(on)} = 0.058\Omega$ |
| Schottky $V_f = 0.39V$     |

## Description

The FETKY family of co-packaged MOSFETs and Schottky diodes offers the designer an innovative, board space saving solution for switching regulator and power management applications. Generation 5 HEXFET Power MOSFETs 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, $V_{GS} @ -4.5V$ | -5.3                   | A     |
| $I_D @ T_A = 70^\circ C$ |                                            | -4.3                   |       |
| $I_{DM}$                 |                                            | 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                     | $\pm 12$               | 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 maximum junction temperature (see figure 9)
- 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,  $t \leq 10sec$ .

**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    | -20   | —     | —     | V     | V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA                       |
| R <sub>DS(on)</sub>  | Static Drain-to-Source On-Resistance | —     | 0.049 | 0.062 | Ω     | V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -2.9A ③                   |
|                      |                                      | —     | 0.082 | 0.098 |       | V <sub>GS</sub> = -2.7V, I <sub>D</sub> = -1.5A ③                   |
| V <sub>GS(th)</sub>  | Gate Threshold Voltage               | -0.70 | —     | —     | V     | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA         |
| g <sub>fs</sub>      | Forward Transconductance             | —     | 5.9   | —     | S     | V <sub>DS</sub> = -10V, I <sub>D</sub> = -1.5A                      |
| I <sub>DSS</sub>     | Drain-to-Source Leakage Current      | —     | —     | -1.0  | μA    | V <sub>DS</sub> = -16V, V <sub>GS</sub> = 0V                        |
|                      |                                      | —     | —     | -25   |       | V <sub>DS</sub> = -16V, 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> = -12.0V                                            |
|                      | Gate-to-Source Reverse Leakage       | —     | —     | -100  |       | V <sub>GS</sub> = 12.0V                                             |
| Q <sub>g</sub>       | Total Gate Charge                    | —     | 19    | 29    | nC    | I <sub>D</sub> = -2.9A                                              |
| Q <sub>gs</sub>      | Gate-to-Source Charge                | —     | 4.0   | 6.1   |       | V <sub>DS</sub> = -16V                                              |
| Q <sub>gd</sub>      | Gate-to-Drain ("Miller") Charge      | —     | 7.7   | 12    |       | V <sub>GS</sub> = -4.5V (see figure 6) ③                            |
| t <sub>d(on)</sub>   | Turn-On Delay Time                   | —     | 15    | 22    | ns    | V <sub>DD</sub> = -10V                                              |
| t <sub>r</sub>       | Rise Time                            | —     | 40    | 60    |       | I <sub>D</sub> = -2.9A                                              |
| t <sub>d(off)</sub>  | Turn-Off Delay Time                  | —     | 42    | 63    |       | R <sub>G</sub> = 6.0Ω                                               |
| t <sub>f</sub>       | Fall Time                            | —     | 49    | 73    |       | R <sub>D</sub> = 3.4Ω ③                                             |
| C <sub>iss</sub>     | Input Capacitance                    | —     | 780   | —     | pF    | V <sub>GS</sub> = 0V                                                |
| C <sub>oss</sub>     | Output Capacitance                   | —     | 470   | —     |       | V <sub>DS</sub> = -15V                                              |
| C <sub>rss</sub>     | Reverse Transfer Capacitance         | —     | 240   | —     |       | f = 1.0MHz (see figure 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)     | —    | —    | -21  | A     |                                                                     |
| V <sub>SD</sub> | Body Diode Forward Voltage             | —    | —    | -1.2 | V     | T <sub>J</sub> = 25°C, I <sub>S</sub> = -2.9A, V <sub>GS</sub> = 0V |
| t <sub>rr</sub> | Reverse Recovery Time (Body Diode)     | —    | 47   | 71   | ns    | T <sub>J</sub> = 25°C, I <sub>F</sub> = -2.9A                       |
| Q <sub>rr</sub> | Reverse Recovery Charge                | —    | 49   | 73   | nC    | di/dt = 100A/μs ③                                                   |

**Schottky Diode Maximum Ratings**

|                    | Parameter                                        | Max. | Units | Conditions                                                         |
|--------------------|--------------------------------------------------|------|-------|--------------------------------------------------------------------|
| I <sub>F(av)</sub> | Max. Average Forward Current                     | 2.7  | A     | 50% Duty Cycle. Rectangular Wave, T <sub>A</sub> = 25°C            |
|                    |                                                  | 2    |       | See Fig. 14<br>T <sub>A</sub> = 70°C                               |
| I <sub>SM</sub>    | Max. peak one cycle Non-repetitive Surge current | 120  | A     | 5μs sine or 3μs Rect. pulse                                        |
|                    |                                                  | 11   |       | 10ms sine or 6ms Rect. pulse                                       |
|                    |                                                  |      |       | Following any rated load condition & with V <sub>RSM</sub> applied |

**Schottky Diode Electrical Specifications**

|                 | Parameter                    | Max. | Units | Conditions                                      |
|-----------------|------------------------------|------|-------|-------------------------------------------------|
| V <sub>FM</sub> | Max. Forward voltage drop    | 0.50 | V     | I <sub>F</sub> = 1.0A, T <sub>J</sub> = 25°C    |
|                 |                              | 0.62 |       | I <sub>F</sub> = 2.0A, T <sub>J</sub> = 25°C    |
|                 |                              | 0.39 |       | I <sub>F</sub> = 1.0A, T <sub>J</sub> = 125°C   |
|                 |                              | 0.57 |       | I <sub>F</sub> = 2.0A, T <sub>J</sub> = 125°C . |
| I <sub>RM</sub> | Max. Reverse Leakage current | 0.02 | mA    | V <sub>R</sub> = 20V   T <sub>J</sub> = 25°C    |
|                 |                              | 8    |       | T <sub>J</sub> = 125°C                          |
| C <sub>t</sub>  | Max. Junction Capacitance    | 92   | pF    | V <sub>R</sub> = 5Vdc ( 100kHz to 1 MHz) 25°C   |
| dv/dt           | Max. Voltage Rate of Charge  | 3600 | V/ μs | Rated V <sub>R</sub>                            |

Power Mosfet Characteristics

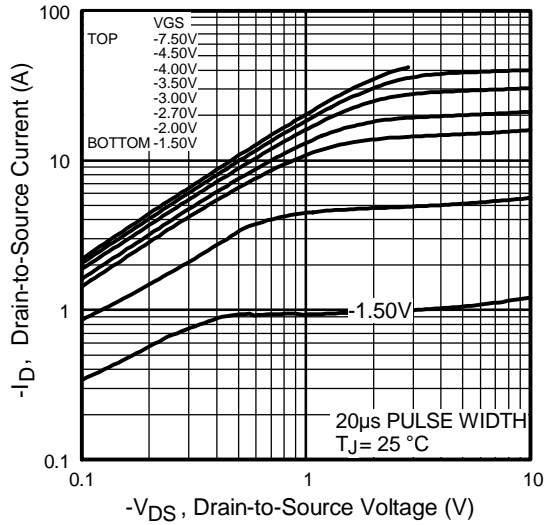


Fig 1. Typical Output Characteristics

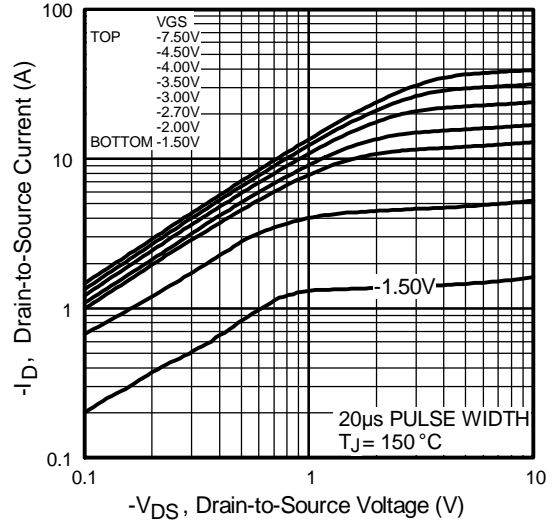


Fig 2. Typical Output Characteristics

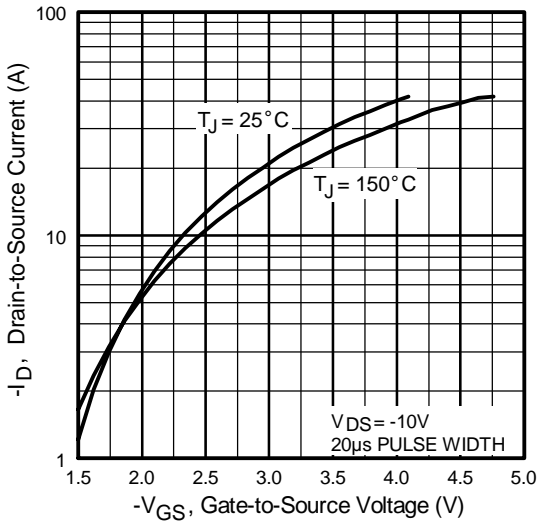


Fig 3. Typical Transfer Characteristics

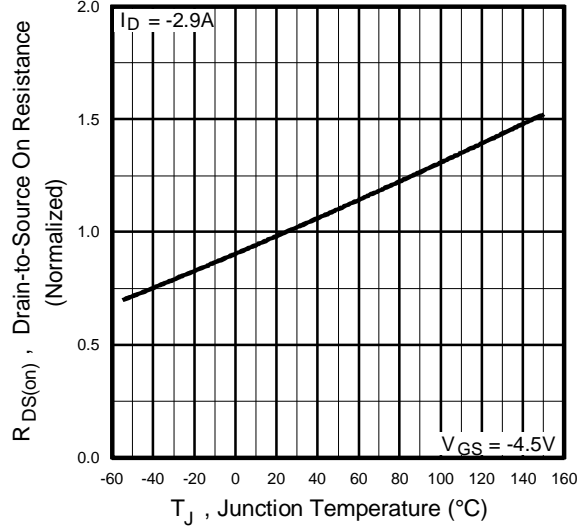


Fig 4. Normalized On-Resistance Vs. Temperature

Power Mosfet Characteristics

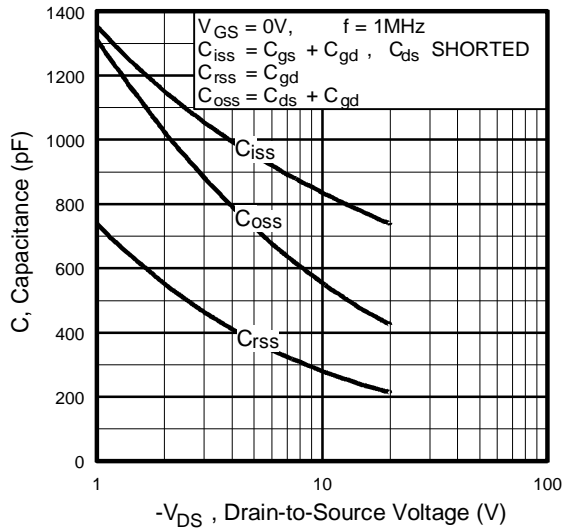


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

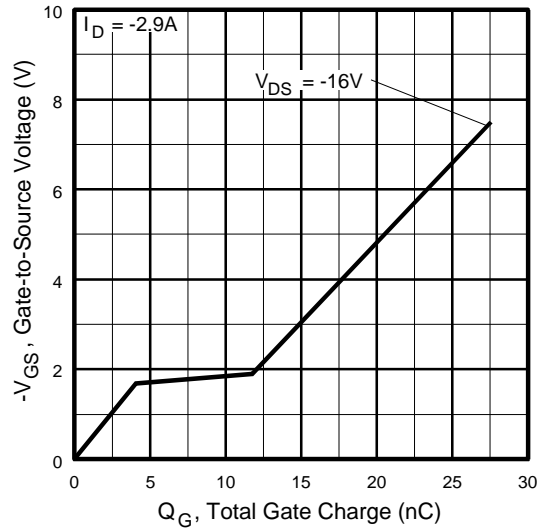


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

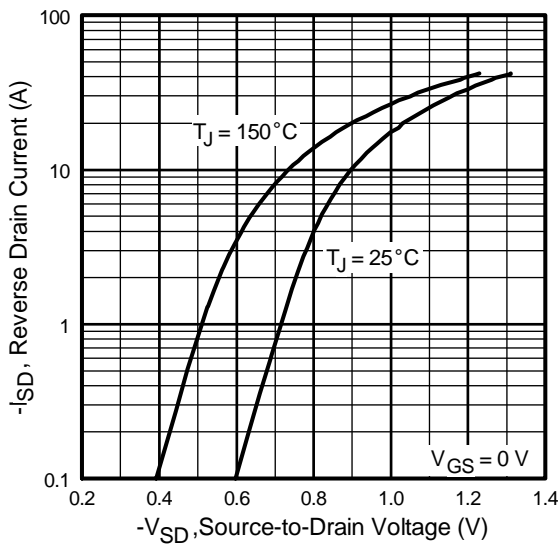


Fig 7. Typical Source-Drain Diode Forward Voltage

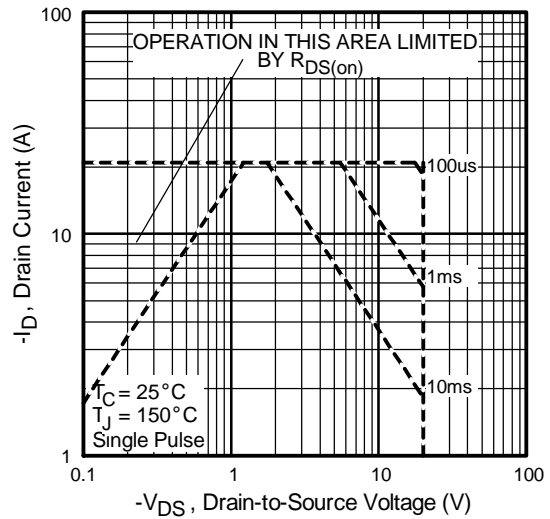


Fig 8. Maximum Safe Operating Area

Power Mosfet Characteristics

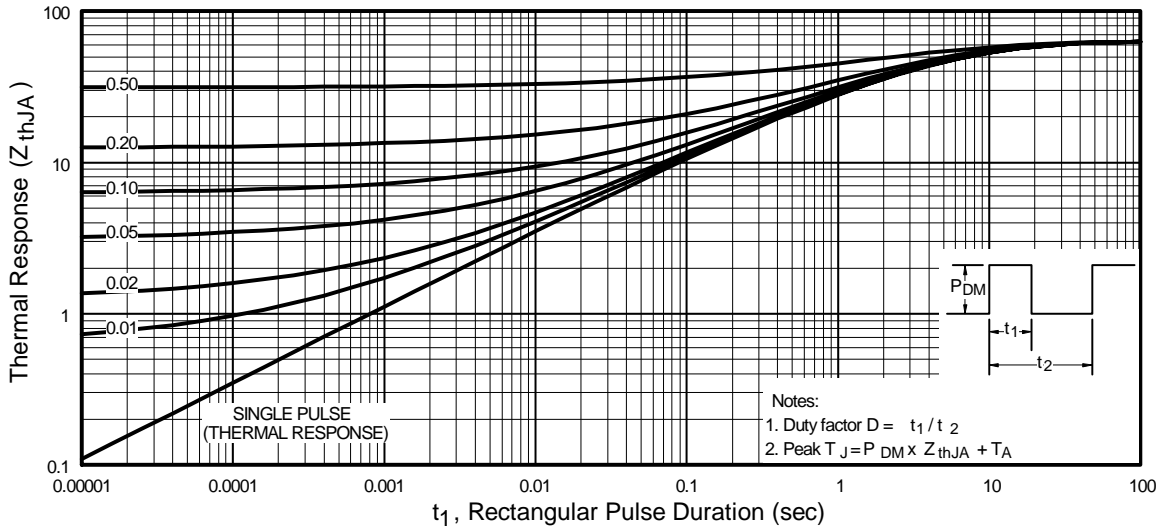


Fig 9. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

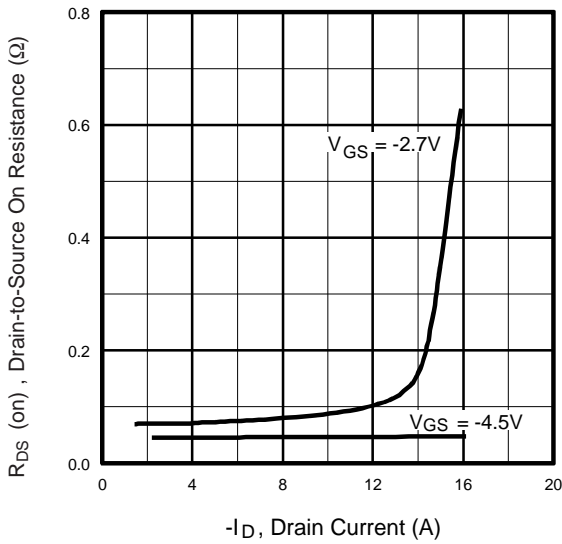


Fig 10. Typical On-Resistance Vs. Drain Current

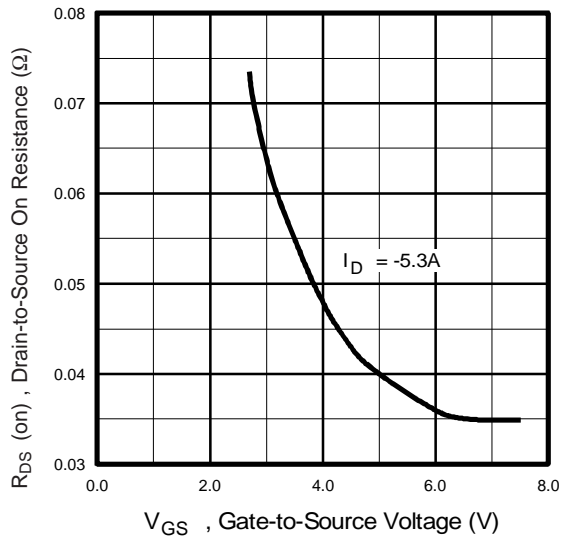


Fig 11. Typical On-Resistance Vs. Gate Voltage

Schottky Diode Characteristics

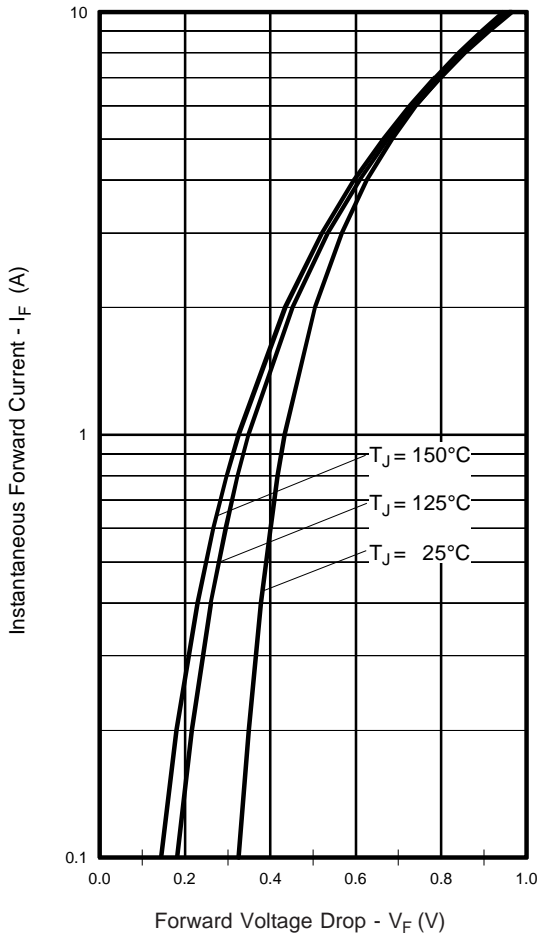


Fig. 12 - Typical Forward Voltage Drop Characteristics

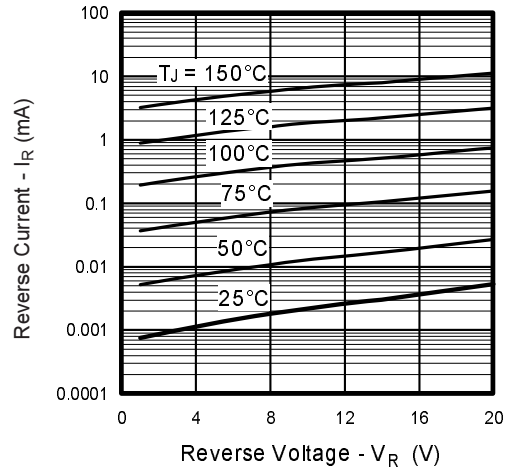


Fig. 13 - Typical Values of Reverse Current Vs. Reverse Voltage

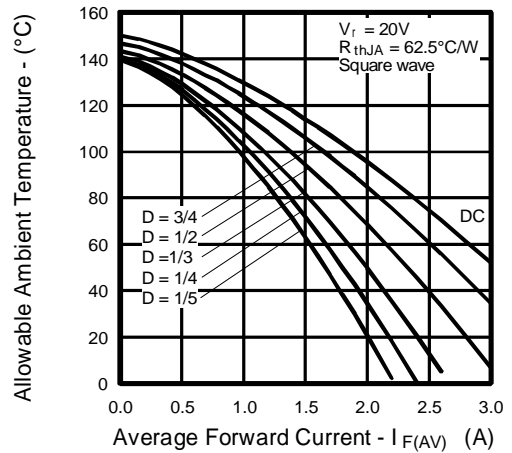
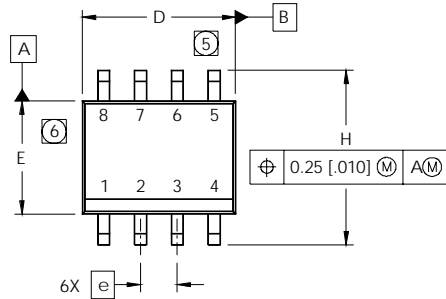


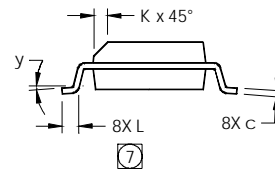
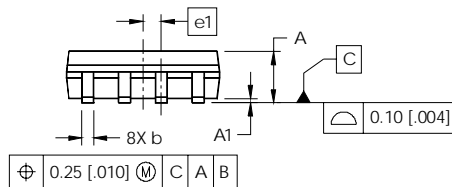
Fig.14 - Maximum Allowable Ambient Temp. Vs. Forward Current

## SO-8 (Fetky) Package Outline

Dimensions are shown in millimeters (inches)



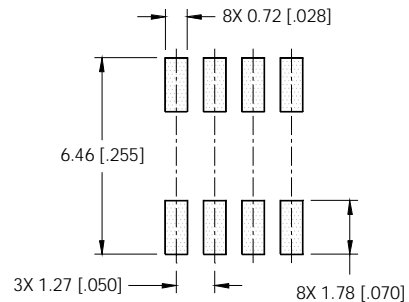
| DIM | INCHES     |       | MILLIMETERS |      |
|-----|------------|-------|-------------|------|
|     | MIN        | MAX   | MIN         | MAX  |
| A   | .0532      | .0688 | 1.35        | 1.75 |
| A1  | .0040      | .0098 | 0.10        | 0.25 |
| b   | .013       | .020  | 0.33        | 0.51 |
| 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:**

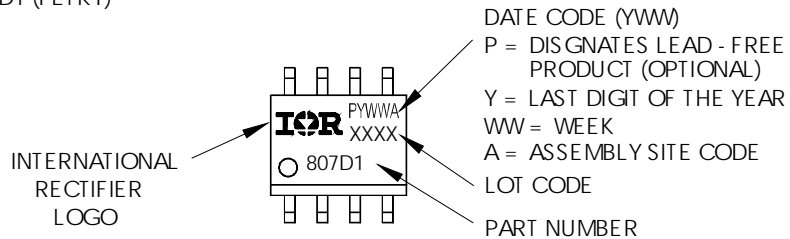
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA
- ⑤ DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 [0.006].
- ⑥ DIMENSION DOES NOT 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)

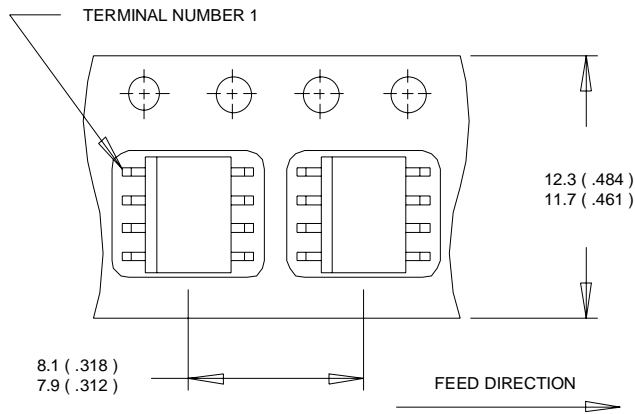


# IRF7322D1

International  
**IR** Rectifier

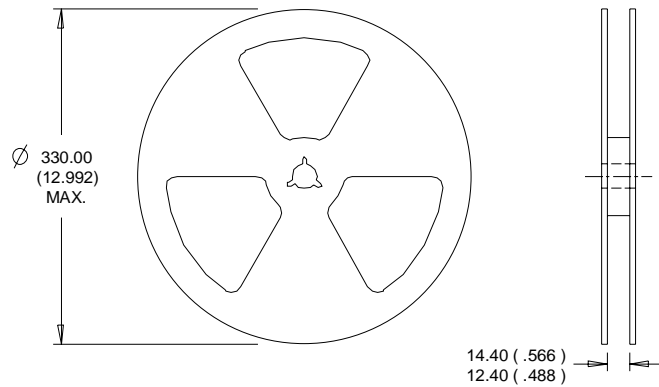
## SO-8 (Fetky) Tape and Reel

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.

International  
**IR** Rectifier

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TAC Fax: (310) 252-7903

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