

# IRF7526D1PbF

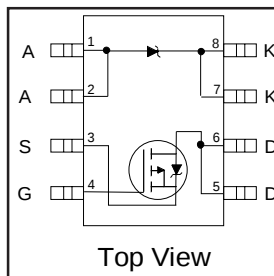
## FETKY™ MOSFET & Schottky Diode

- Co-packaged HEXFET® Power MOSFET and Schottky Diode
- P-Channel HEXFET
- Low  $V_F$  Schottky Rectifier
- Generation 5 Technology
- Micro8™ Footprint
- Lead-Free

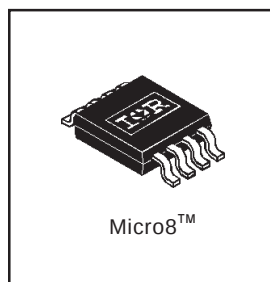
### Description

The **FETKY™** family of co-packaged HEXFETs and Schottky diodes offer the designer an innovative board space saving solution for switching regulator 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 like cell phone, PDA, etc.

The new Micro8™ package, with half the footprint area of the standard SO-8, provides the smallest footprint available in an SOIC outline. This makes the Micro8™ an ideal device for applications where printed circuit board space is at a premium. The low profile (<1.1mm) of the Micro8™ will allow it to fit easily into extremely thin application environments such as portable electronics and PCMCIA cards.



|                           |
|---------------------------|
| $V_{DSS} = -30V$          |
| $R_{DS(on)} = 0.20\Omega$ |
| Schottky $V_f = 0.39V$    |



### Absolute Maximum Ratings

| Parameter                  | Maximum     | Units |
|----------------------------|-------------|-------|
| $I_D$ @ $T_A = 25^\circ C$ | -2.0        | A     |
| $I_D$ @ $T_A = 70^\circ C$ | -1.6        |       |
| $I_{DM}$                   | -16         |       |
| $P_D$ @ $T_A = 25^\circ C$ | 1.25        | W     |
| $P_D$ @ $T_A = 70^\circ C$ | 0.8         |       |
|                            | 10          | mW/°C |
| $V_{GS}$                   | $\pm 20$    | V     |
| $dv/dt$                    | -5.0        | V/ns  |
| $T_J, T_{STG}$             | -55 to +150 | °C    |

### Thermal Resistance Ratings

| Parameter       | Maximum | Units |
|-----------------|---------|-------|
| $R_{\theta JA}$ | 100     | °C/W  |

#### Notes:

- ① Repetitive rating – pulse width limited by max. junction temperature (see Fig. 9)
- ②  $I_{SD} \leq -1.2A$ ,  $di/dt \leq 160A/\mu s$ ,  $V_{DD} \leq V_{(BR)DSS}$ ,  $T_J \leq 150^\circ C$
- ③ Pulse width  $\leq 300\mu s$  – duty cycle  $\leq 2\%$
- ④ When mounted on 1 inch square copper board to approximate typical multi-layer PCB thermal resistance

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

|               | Parameter                            | Min. | Typ. | Max. | Units    | Conditions                                            |
|---------------|--------------------------------------|------|------|------|----------|-------------------------------------------------------|
| $V_{(BR)DSS}$ | Drain-to-Source Breakdown Voltage    | -30  | —    | —    | V        | $V_{GS} = 0V, I_D = -250\mu A$                        |
| $R_{DS(on)}$  | Static Drain-to-Source On-Resistance | —    | 0.17 | 0.20 | $\Omega$ | $V_{GS} = -10V, I_D = -1.2A$ ③                        |
|               |                                      | —    | 0.30 | 0.40 |          | $V_{GS} = -4.5V, I_D = -0.60A$ ③                      |
| $V_{GS(th)}$  | Gate Threshold Voltage               | -1.0 | —    | —    | V        | $V_{DS} = V_{GS}, I_D = -250\mu A$                    |
| $g_{fs}$      | Forward Transconductance             | 0.94 | —    | —    | S        | $V_{DS} = -10V, I_D = -0.60A$                         |
| $I_{DSS}$     | Drain-to-Source Leakage Current      | —    | —    | -1.0 | $\mu A$  | $V_{DS} = -24V, V_{GS} = 0V$                          |
|               |                                      | —    | —    | -25  |          | $V_{DS} = -24V, V_{GS} = 0V, T_J = 125^\circ\text{C}$ |
| $I_{GSS}$     | Gate-to-Source Forward Leakage       | —    | —    | -100 | nA       | $V_{GS} = -20V$                                       |
|               | Gate-to-Source Reverse Leakage       | —    | —    | 100  |          | $V_{GS} = 20V$                                        |
| $Q_g$         | Total Gate Charge                    | —    | 7.5  | 11   | nC       | $I_D = -1.2A$                                         |
| $Q_{gs}$      | Gate-to-Source Charge                | —    | 1.3  | 1.9  |          | $V_{DS} = -24V$                                       |
| $Q_{gd}$      | Gate-to-Drain ("Miller") Charge      | —    | 2.5  | 3.7  |          | $V_{GS} = -10V$ , See Fig. 6 ③                        |
| $t_{d(on)}$   | Turn-On Delay Time                   | —    | 9.7  | —    | ns       | $V_{DD} = -15V$                                       |
| $t_r$         | Rise Time                            | —    | 12   | —    |          | $I_D = -1.2A$                                         |
| $t_{d(off)}$  | Turn-Off Delay Time                  | —    | 19   | —    |          | $R_G = 6.2\Omega$                                     |
| $t_f$         | Fall Time                            | —    | 9.3  | —    |          | $R_D = 12\Omega$ , ③                                  |
| $C_{iss}$     | Input Capacitance                    | —    | 180  | —    | pF       | $V_{GS} = 0V$                                         |
| $C_{oss}$     | Output Capacitance                   | —    | 87   | —    |          | $V_{DS} = -25V$                                       |
| $C_{rss}$     | Reverse Transfer Capacitance         | —    | 42   | —    |          | $f = 1.0\text{MHz}$ , See Fig. 5                      |

**MOSFET Source-Drain Ratings and Characteristics**

|          | Parameter                              | Min. | Typ. | Max.  | Units | Conditions                                         |
|----------|----------------------------------------|------|------|-------|-------|----------------------------------------------------|
| $I_S$    | Continuous Source Current (Body Diode) | —    | —    | -1.25 | A     |                                                    |
| $I_{SM}$ | Pulsed Source Current (Body Diode)     | —    | —    | -9.6  |       |                                                    |
| $V_{SD}$ | Body Diode Forward Voltage             | —    | —    | -1.2  | V     | $T_J = 25^\circ\text{C}, I_S = -1.2A, V_{GS} = 0V$ |
| $t_{rr}$ | Reverse Recovery Time (Body Diode)     | —    | 30   | 45    | ns    | $T_J = 25^\circ\text{C}, I_F = -1.2A$              |
| $Q_{rr}$ | Reverse Recovery Charge                | —    | 37   | 55    | nC    | $di/dt = 100A/\mu s$ ③                             |

**Schottky Diode Maximum Ratings**

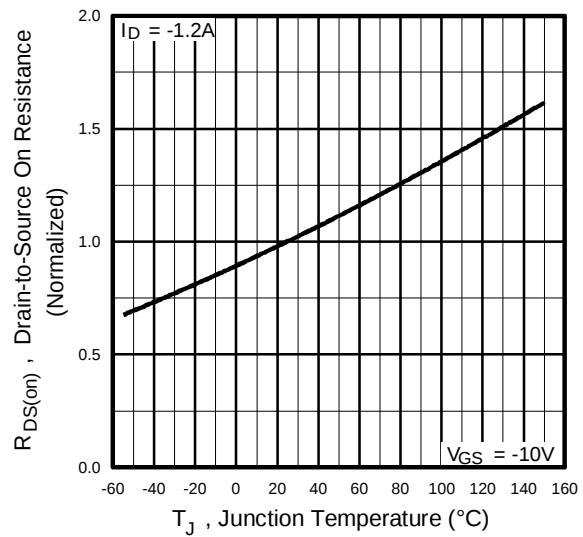
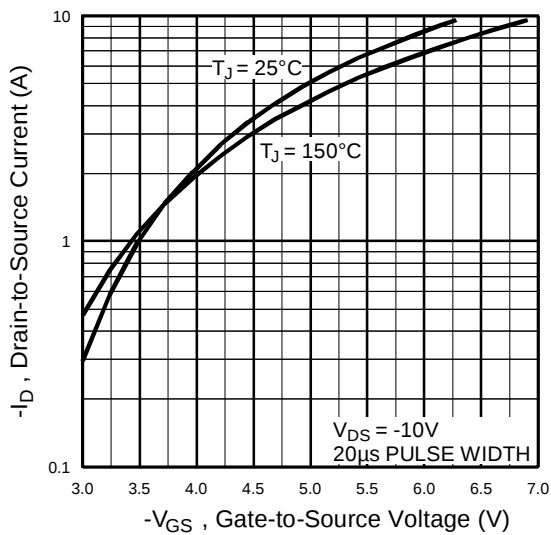
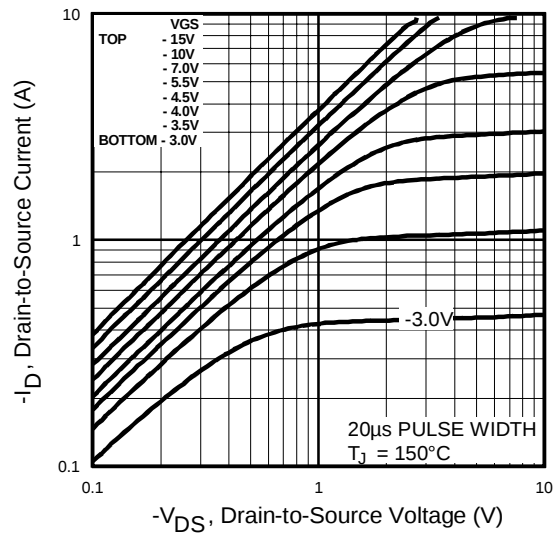
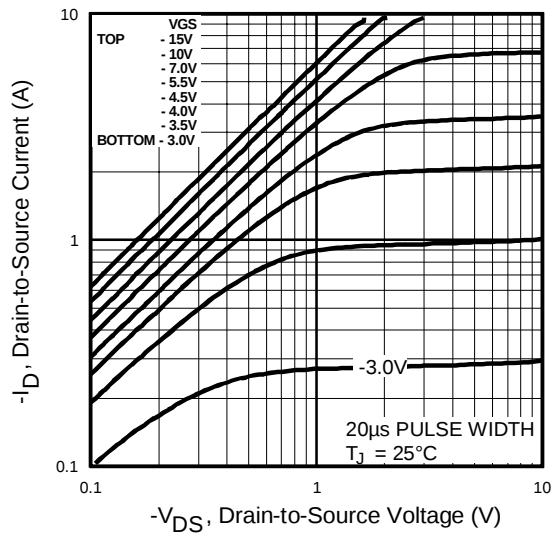
|             | Parameter                                        | Max. | Units | Conditions                                                                                            |
|-------------|--------------------------------------------------|------|-------|-------------------------------------------------------------------------------------------------------|
| $I_{F(av)}$ | Max. Average Forward Current                     | 1.9  | A     | 50% Duty Cycle. Rectangular Wave, $T_A = 25^\circ\text{C}$<br>See Fig. 14<br>$T_A = 70^\circ\text{C}$ |
|             |                                                  | 1.3  |       |                                                                                                       |
| $I_{SM}$    | Max. peak one cycle Non-repetitive Surge current | 120  | A     | 5 $\mu s$ sine or 3 $\mu s$ Rect. pulse                                                               |
|             |                                                  | 11   |       | 10ms sine or 6ms Rect. pulse                                                                          |

**Schottky Diode Electrical Specifications**

|          | Parameter                    | Max. | Units      | Conditions                                         |
|----------|------------------------------|------|------------|----------------------------------------------------|
| $V_{FM}$ | Max. Forward voltage drop    | 0.50 | V          | $I_F = 1.0A, T_J = 25^\circ\text{C}$               |
|          |                              | 0.62 |            | $I_F = 2.0A, T_J = 25^\circ\text{C}$               |
|          |                              | 0.39 |            | $I_F = 1.0A, T_J = 125^\circ\text{C}$              |
|          |                              | 0.57 |            | $I_F = 2.0A, T_J = 125^\circ\text{C}$              |
| $I_{RM}$ | Max. Reverse Leakage current | 0.06 | mA         | $V_R = 30V, T_J = 25^\circ\text{C}$                |
|          |                              | 16   |            | $T_J = 125^\circ\text{C}$                          |
| $C_t$    | Max. Junction Capacitance    | 92   | pF         | $V_R = 5Vdc$ ( 100kHz to 1 MHz) $25^\circ\text{C}$ |
| $dv/dt$  | Max. Voltage Rate of Charge  | 3600 | V/ $\mu s$ | Rated $V_R$                                        |

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

### Power Mosfet Characteristics



Power Mosfet Characteristics

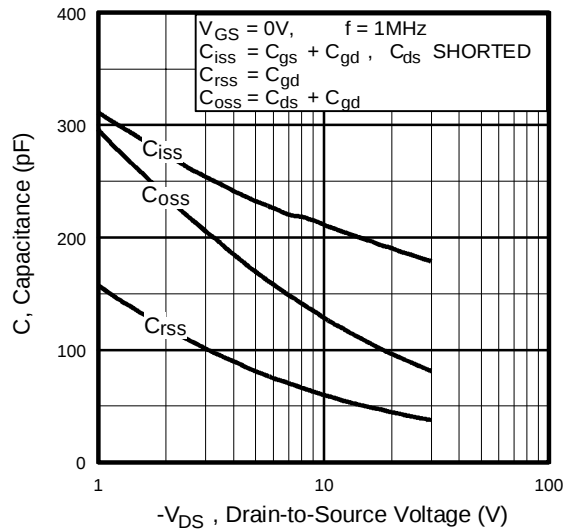


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

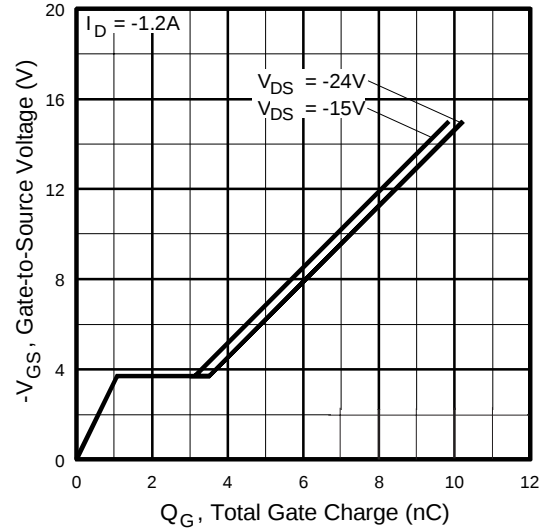


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

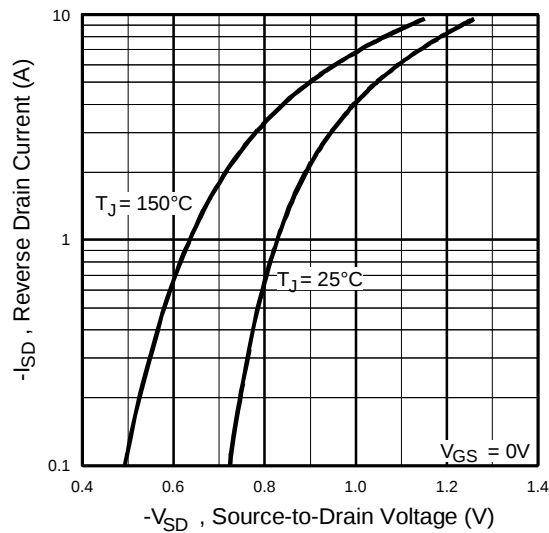


Fig 7. Typical Source-Drain Diode Forward Voltage

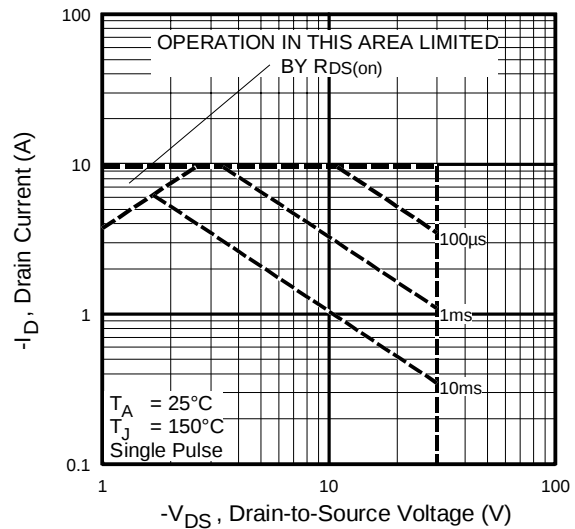
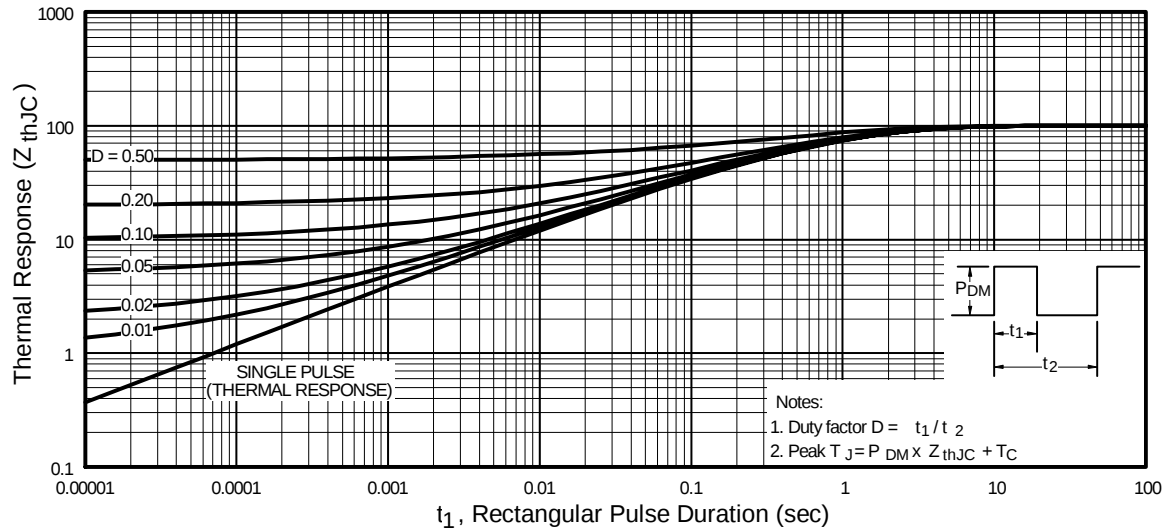
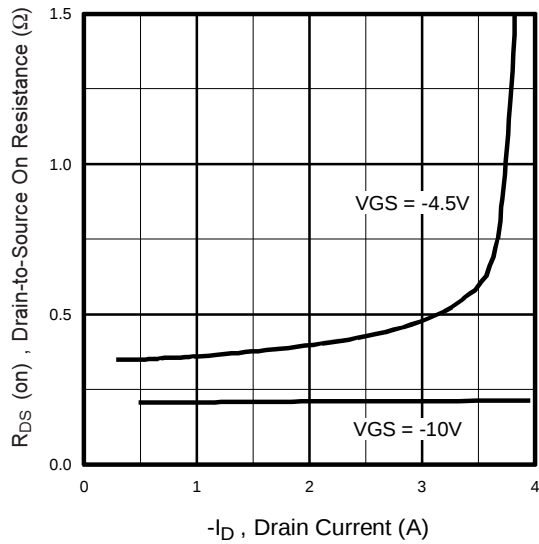


Fig 8. Maximum Safe Operating Area

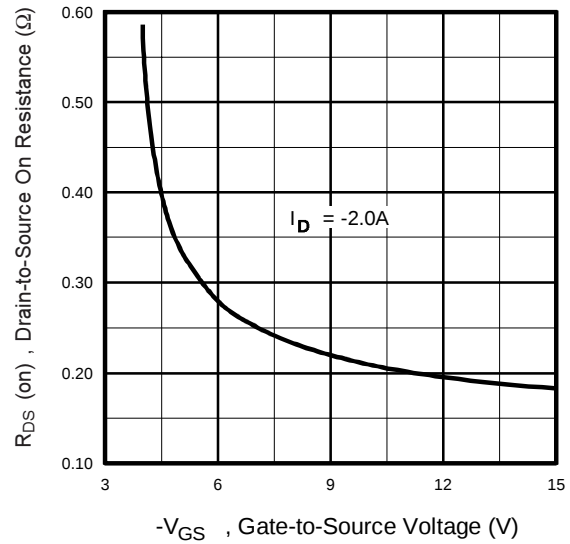
### Power Mosfet Characteristics



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

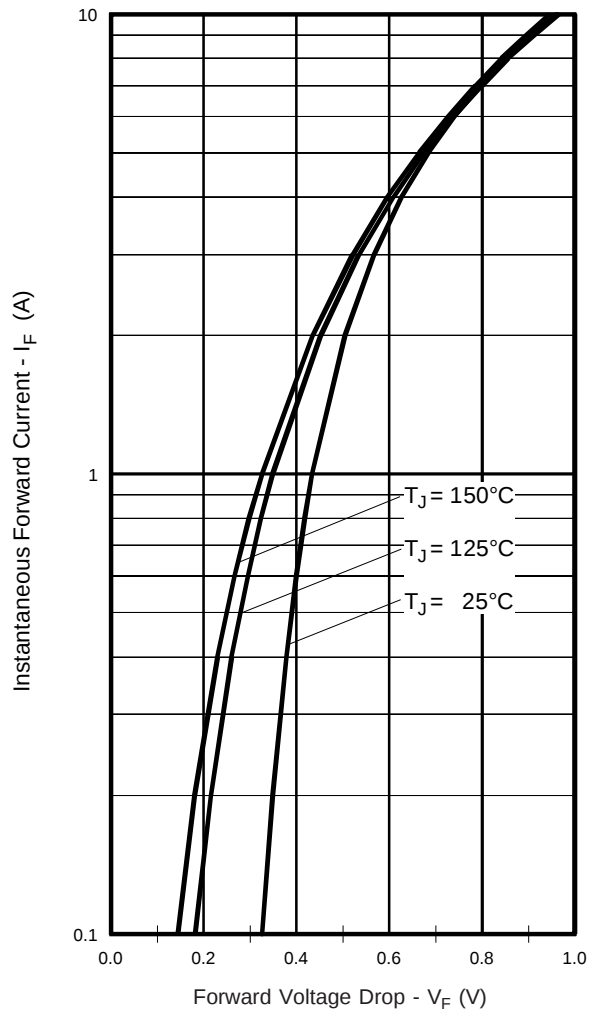


**Fig 10.** Typical On-Resistance Vs. Drain Current

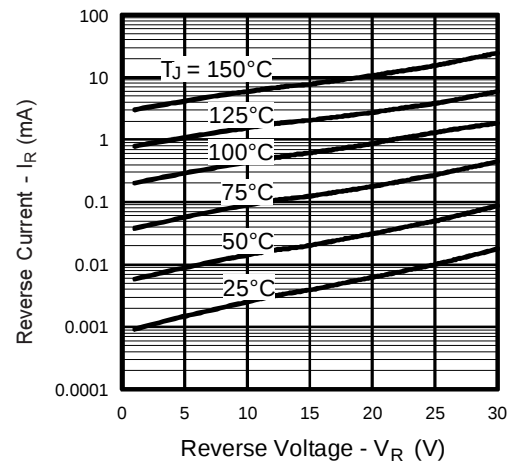


**Fig 11.** Typical On-Resistance Vs. Gate Voltage

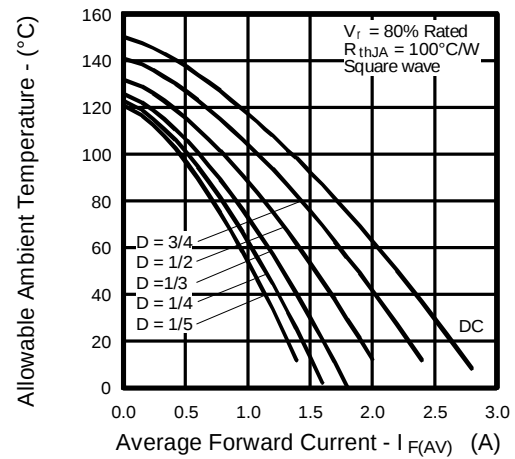
# Schottky Diode Characteristics



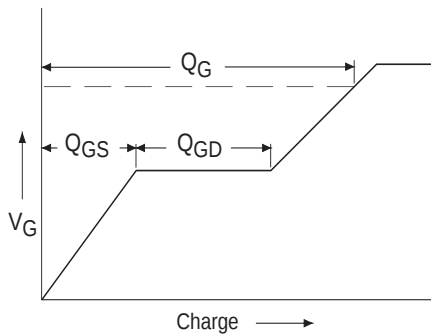
**Fig. 12** -Typical Forward Voltage Drop Characteristics



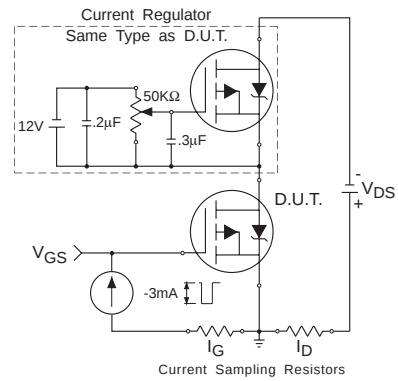
**Fig. 13** - Typical Values of Reverse Current Vs. Reverse Voltage



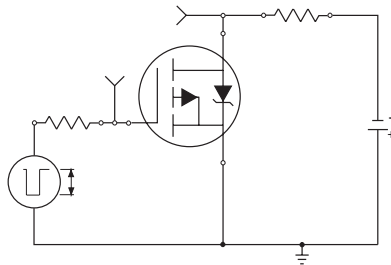
**Fig.14** - Maximum Allowable Ambient Temp. Vs. Forward Current



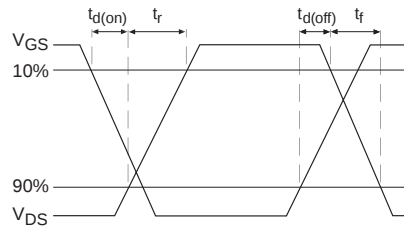
**Fig 15a.** Basic Gate Charge Waveform



**Fig 15b.** Gate Charge Test Circuit

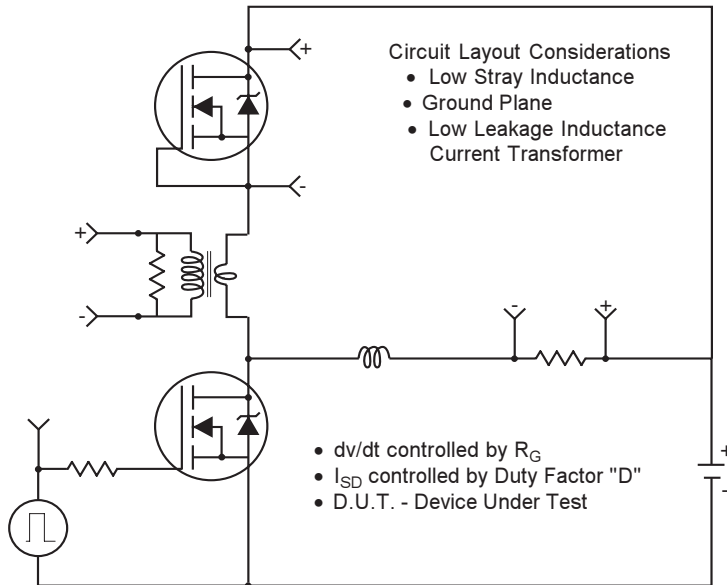


**Fig 16a.** Switching Time Test Circuit



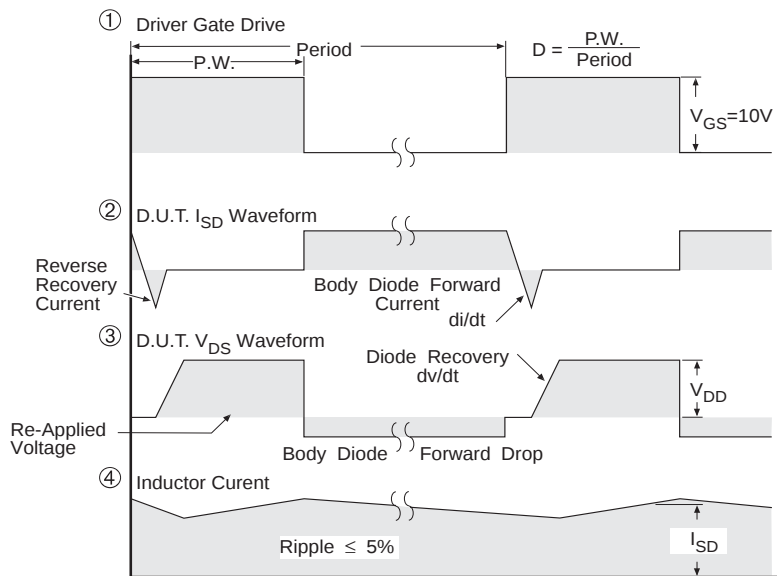
**Fig 16b.** Switching Time Waveforms

### Peak Diode Recovery dv/dt Test Circuit



\* Reverse Polarity for P-Channel

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

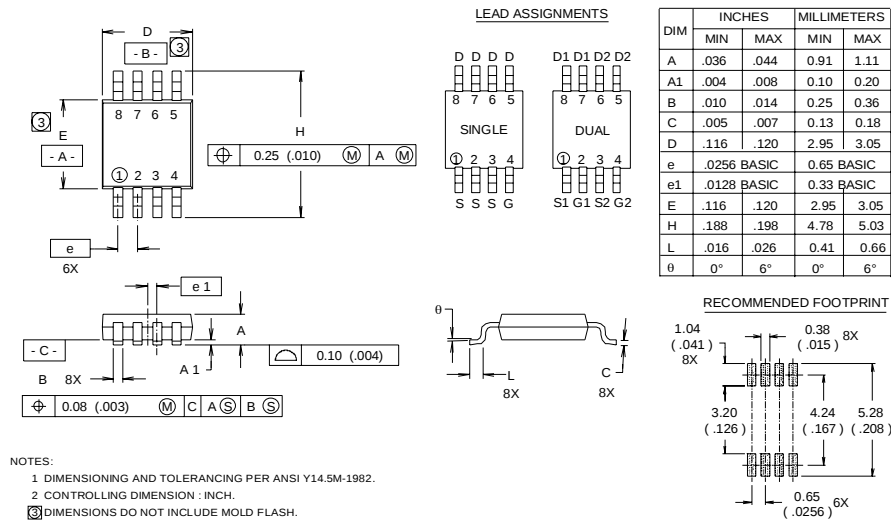


\*\*\*  $V_{GS} = 5.0V$  for Logic Level and 3V Drive Devices

**Fig 17 For P Channel HEXFETS**

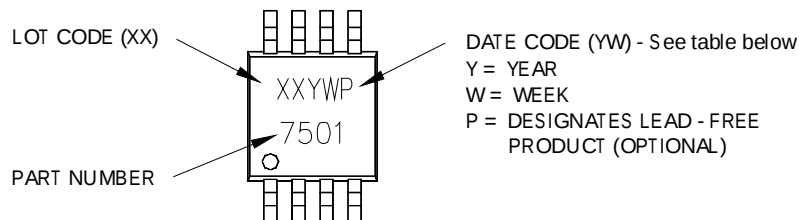
## Micro8 Package Outline

Dimensions are shown in millimeters (inches)



## Micro8 Part Marking Information

EXAMPLE: THIS IS AN IRF7501



WW = (1-26) IF PRECEDED BY LAST DIGIT OF CALENDAR YEAR

| YEAR | Y | WORK WEEK | W |
|------|---|-----------|---|
| 2001 | 1 | 01        | A |
| 2002 | 2 | 02        | B |
| 2003 | 3 | 03        | C |
| 2004 | 4 | 04        | D |
| 2005 | 5 |           |   |
| 2006 | 6 |           |   |
| 2007 | 7 |           |   |
| 2008 | 8 |           |   |
| 2009 | 9 |           |   |
| 2010 | 0 | 24        | X |
|      |   | 25        | Y |
|      |   | 26        | Z |

WW = (27-52) IF PRECEDED BY A LETTER

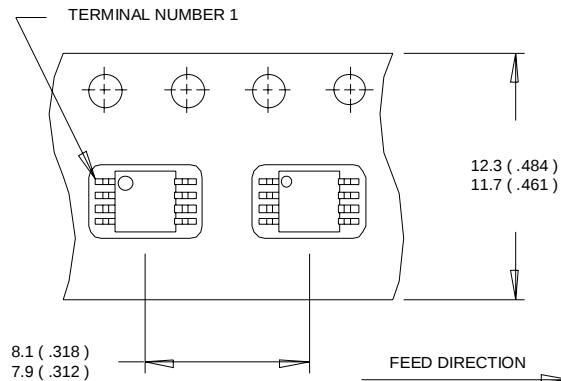
| YEAR | Y | WORK WEEK | W |
|------|---|-----------|---|
| 2001 | A | 27        | A |
| 2002 | B | 28        | B |
| 2003 | C | 29        | C |
| 2004 | D | 30        | D |
| 2005 | E |           |   |
| 2006 | F |           |   |
| 2007 | G |           |   |
| 2008 | H |           |   |
| 2009 | J |           |   |
| 2010 | K | 50        | X |
|      |   | 51        | Y |
|      |   | 52        | Z |

## IRF7526D1PbF

International  
**IR** Rectifier

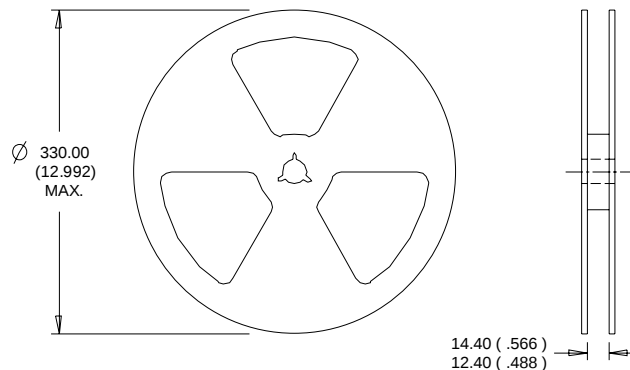
### Micro8 Tape & Reel Information

Dimensions are shown in millimeters (inches)



#### NOTES:

1. OUTLINE CONFORMS TO EIA-481 & EIA-541.
2. CONTROLLING DIMENSION : MILLIMETER.



#### 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.  
Qualifications Standards can be found on IR's Web site.

International  
**IR** Rectifier

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