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Jameco Part Number 1563665

# International **IR** Rectifier

PD - 94974A

## IRLML2803PbF

HEXFET® Power MOSFET

- Generation V Technology
- Ultra Low On-Resistance
- N-Channel MOSFET
- SOT-23 Footprint
- Low Profile (<1.1mm)
- Available in Tape and Reel
- Fast Switching
- Lead-Free

### Description

Fifth Generation HEXFETs from International Rectifier utilize advanced processing techniques to achieve extremely low 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 and reliable device for use in a wide variety of applications.

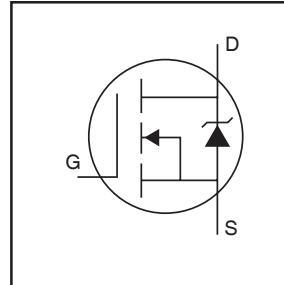
A customized leadframe has been incorporated into the standard SOT-23 package to produce a HEXFET Power MOSFET with the industry's smallest footprint. This package, dubbed the Micro3, is ideal for applications where printed circuit board space is at a premium. The low profile (<1.1mm) of the Micro3 allows it to fit easily into extremely thin application environments such as portable electronics and PCMCIA cards.

### Absolute Maximum Ratings

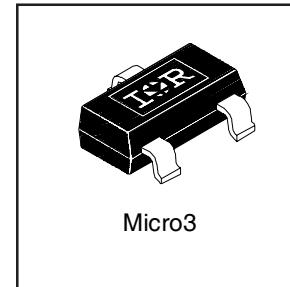
	Parameter	Max.	Units
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	1.2	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	0.93	
$I_{DM}$	Pulsed Drain Current ①	7.3	
$P_D @ T_A = 25^\circ C$	Power Dissipation	540	mW
	Linear Derating Factor	4.3	mW/°C
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$E_{AS}$	Single Pulse Avalanche Energy ⑤	3.9	mJ
$dv/dt$	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

	Parameter	Typ.	Max.	Units
$R_{QJA}$	Maximum Junction-to-Ambient ④	—	230	°C/W



$V_{DSS} = 30V$   
 $R_{DS(on)} = 0.25\Omega$



Micro3

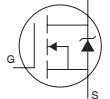
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## Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

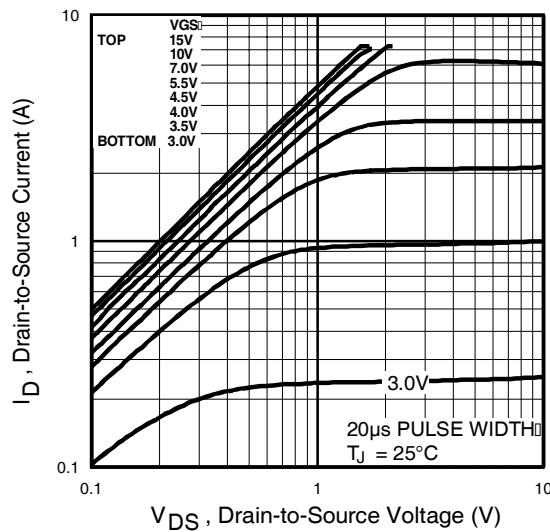
	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(\text{BR})\text{DSS}}$	Drain-to-Source Breakdown Voltage	30	—	—	V	$V_{\text{GS}} = 0\text{V}$ , $I_D = 250\mu\text{A}$
$\Delta V_{(\text{BR})\text{DSS}/\Delta T_J}$	Breakdown Voltage Temp. Coefficient	—	0.029	—	V/ $^\circ\text{C}$	Reference to $25^\circ\text{C}$ , $I_D = 1\text{mA}$
$R_{\text{DS}(\text{on})}$	Static Drain-to-Source On-Resistance	—	0.25	—	$\Omega$	$V_{\text{GS}} = 10\text{V}$ , $I_D = 0.91\text{A}$ ③
		—	0.40	—		$V_{\text{GS}} = 4.5\text{V}$ , $I_D = 0.46\text{A}$ ③
$V_{\text{GS}(\text{th})}$	Gate Threshold Voltage	1.0	—	—	V	$V_{\text{DS}} = V_{\text{GS}}$ , $I_D = 250\mu\text{A}$
$g_{\text{fs}}$	Forward Transconductance	0.87	—	—	S	$V_{\text{DS}} = 10\text{V}$ , $I_D = 0.46\text{A}$
$I_{\text{DSS}}$	Drain-to-Source Leakage Current	—	—	1.0	$\mu\text{A}$	$V_{\text{DS}} = 24\text{V}$ , $V_{\text{GS}} = 0\text{V}$
		—	—	25		$V_{\text{DS}} = 24\text{V}$ , $V_{\text{GS}} = 0\text{V}$ , $T_J = 125^\circ\text{C}$
$I_{\text{GSS}}$	Gate-to-Source Forward Leakage	—	—	-100	nA	$V_{\text{GS}} = -20\text{V}$
	Gate-to-Source Reverse Leakage	—	—	100		$V_{\text{GS}} = 20\text{V}$
$Q_g$	Total Gate Charge	—	3.3	5.0	nC	$I_D = 0.91\text{A}$
$Q_{\text{gs}}$	Gate-to-Source Charge	—	0.48	0.72		$V_{\text{DS}} = 24\text{V}$
$Q_{\text{gd}}$	Gate-to-Drain ("Miller") Charge	—	1.1	1.7		$V_{\text{GS}} = 10\text{V}$ , See Fig. 6 and 9 ③
$t_{\text{d}(\text{on})}$	Turn-On Delay Time	—	3.9	—	ns	$V_{\text{DD}} = 15\text{V}$
$t_r$	Rise Time	—	4.0	—		$I_D = 0.91\text{A}$
$t_{\text{d}(\text{off})}$	Turn-Off Delay Time	—	9.0	—		$R_G = 6.2\Omega$
$t_f$	Fall Time	—	1.7	—		$R_D = 16\Omega$ , See Fig. 10 ③
$C_{\text{iss}}$	Input Capacitance	—	85	—	pF	$V_{\text{GS}} = 0\text{V}$
$C_{\text{oss}}$	Output Capacitance	—	34	—		$V_{\text{DS}} = 25\text{V}$
$C_{\text{rss}}$	Reverse Transfer Capacitance	—	15	—		$f = 1.0\text{MHz}$ , See Fig. 5

## Source-Drain Ratings and Characteristics

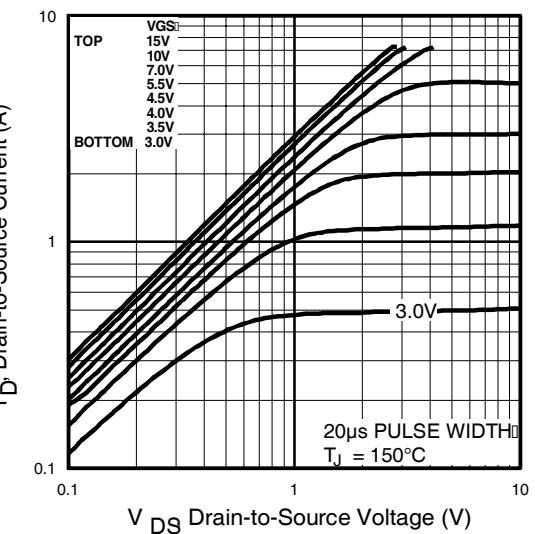
	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_S$	Continuous Source Current (Body Diode)	—	—	0.54	A	MOSFET symbol showing the integral reverse p-n junction diode.
$I_{\text{SM}}$	Pulsed Source Current (Body Diode) ①	—	—	7.3		
$V_{\text{SD}}$	Diode Forward Voltage	—	—	1.2	V	$T_J = 25^\circ\text{C}$ , $I_S = 0.91\text{A}$ , $V_{\text{GS}} = 0\text{V}$ ③
$t_{\text{rr}}$	Reverse Recovery Time	—	26	40	ns	$T_J = 25^\circ\text{C}$ , $I_F = 0.91\text{A}$
$Q_{\text{rr}}$	Reverse Recovery Charge	—	22	32	nC	$di/dt = 100\text{A}/\mu\text{s}$ ③

### Notes:

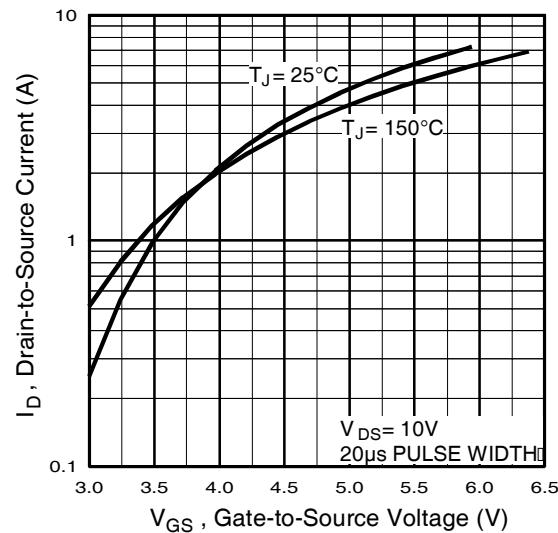
- ① Repetitive rating; pulse width limited by max. junction temperature. ( See fig. 11 )
- ②  $I_{\text{SD}} \leq 0.91\text{A}$ ,  $di/dt \leq 120\text{A}/\mu\text{s}$ ,  $V_{\text{DD}} \leq V_{(\text{BR})\text{DSS}}$ ,  $T_J \leq 150^\circ\text{C}$
- ③ Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .
- ④ Surface mounted on FR-4 board,  $t \leq 5\text{sec}$ .
- ⑤ Limited by  $T_{\text{Jmax}}$ , starting  $T_J = 25^\circ\text{C}$ ,  $L = 9.4\text{mH}$ ,  $R_G = 25\Omega$ ,  $I_{\text{AS}} = 0.9\text{A}$ .



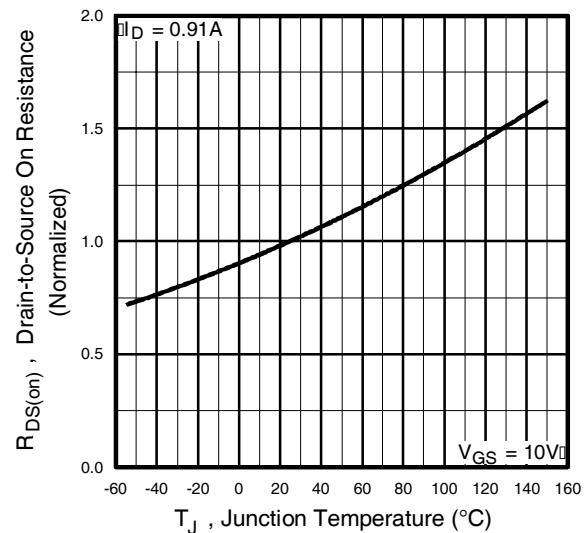
**Fig 1.** Typical Output Characteristics



**Fig 2.** Typical Output Characteristics



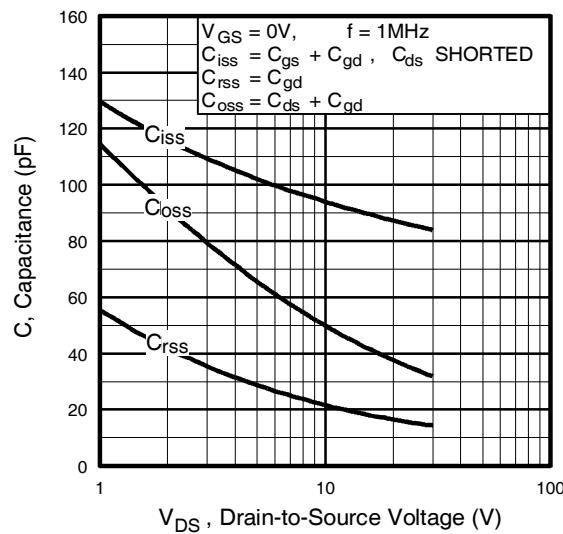
**Fig 3.** Typical Transfer Characteristics



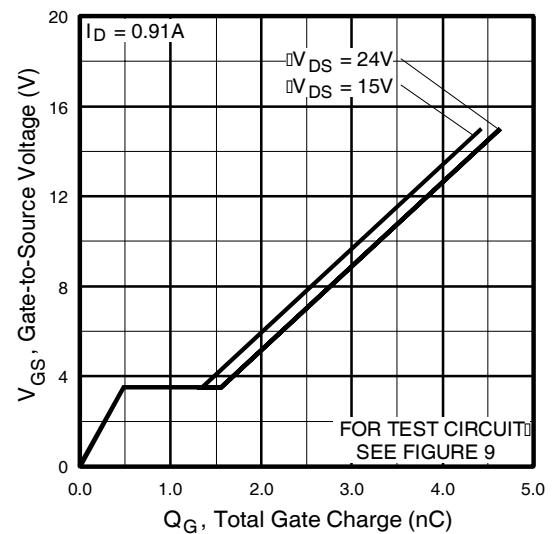
**Fig 4.** Normalized On-Resistance  
Vs. Temperature

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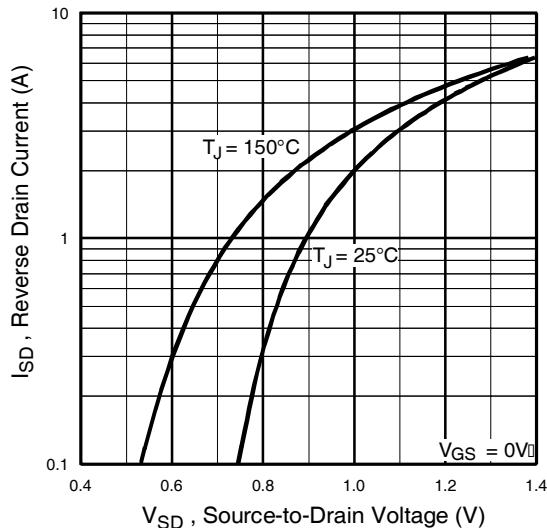
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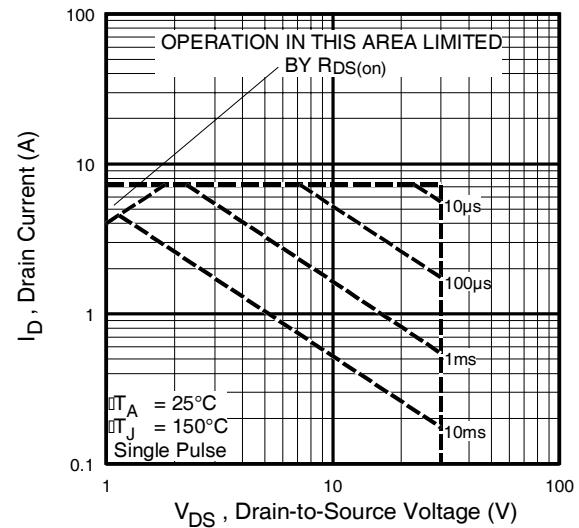
**Fig 5.** Typical Capacitance Vs.  
Drain-to-Source Voltage



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



**Fig 7.** Typical Source-Drain Diode  
Forward Voltage



**Fig 8.** Maximum Safe Operating Area

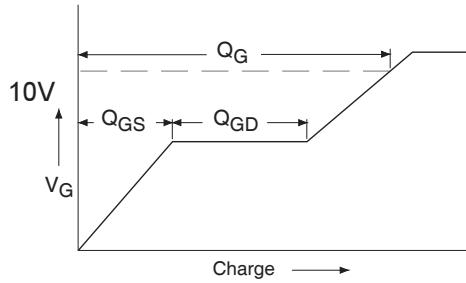


Fig 9a. Basic Gate Charge Waveform

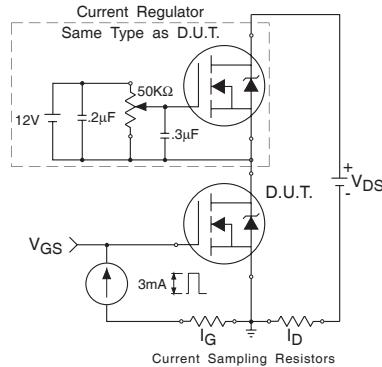


Fig 9b. Gate Charge Test Circuit

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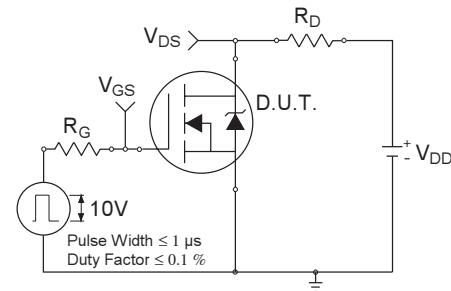


Fig 10a. Switching Time Test Circuit

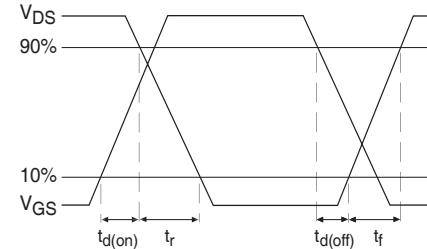


Fig 10b. Switching Time Waveforms

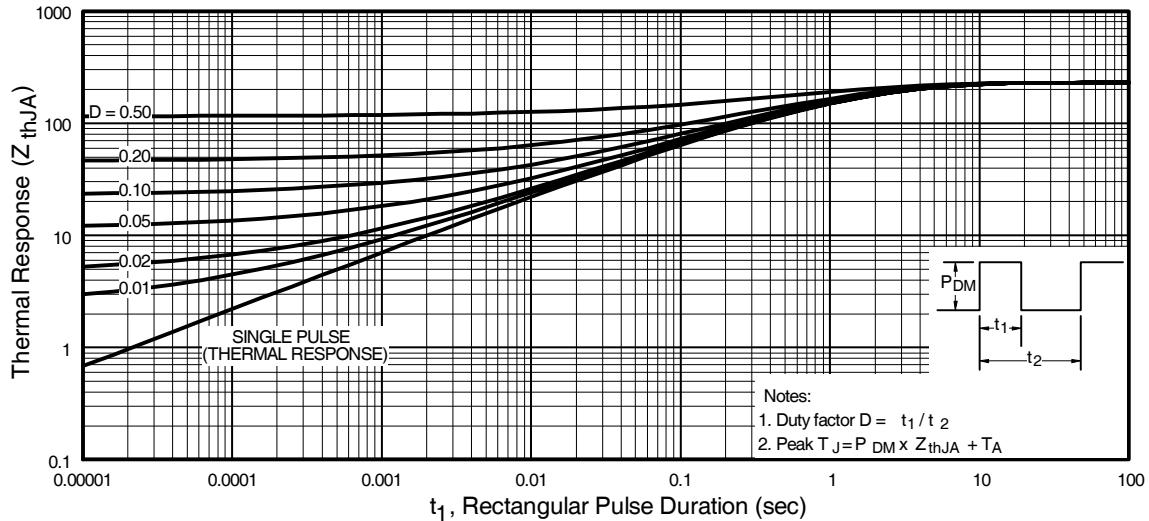
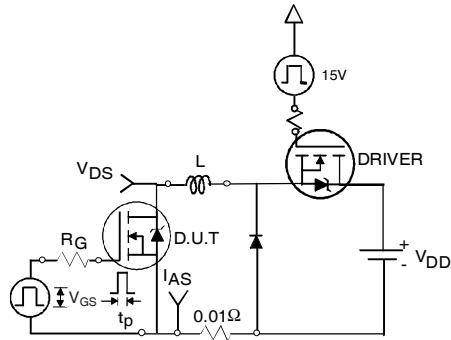
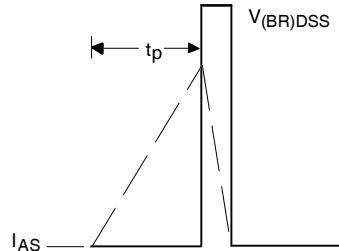


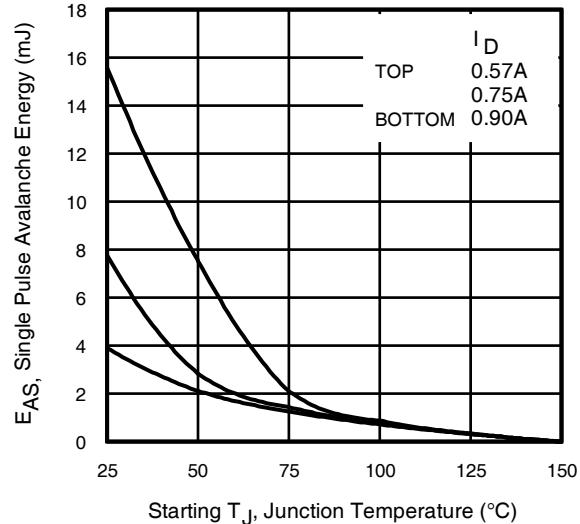
Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



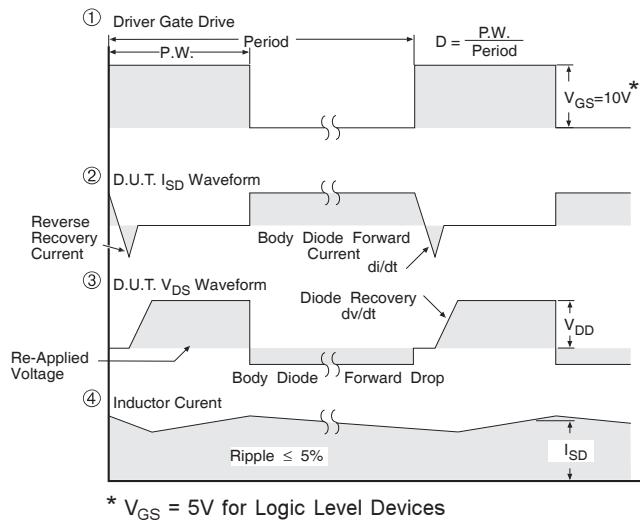
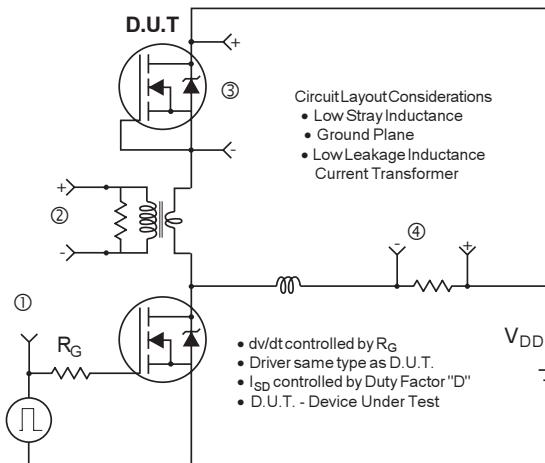
**Fig 12a.** Unclamped Inductive Test Circuit



**Fig 12b.** Unclamped Inductive Waveforms



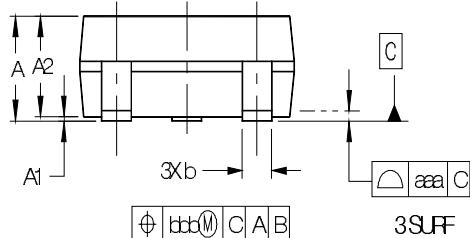
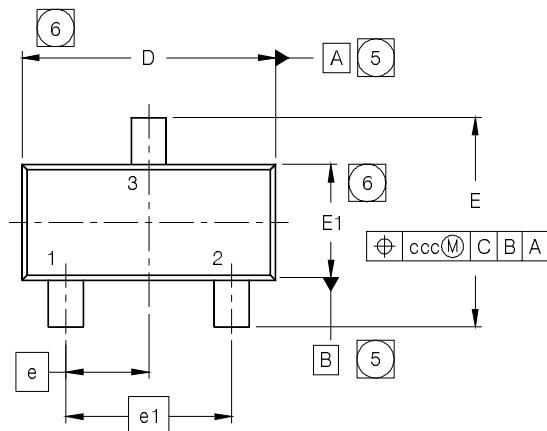
**Fig 12c.** Maximum Avalanche Energy vs. Drain Current



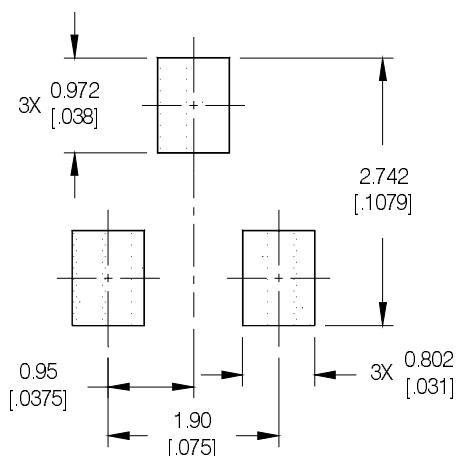
**Fig 13.** Peak Diode Recovery  $dv/dt$  Test Circuit for N-Channel HEXFET® Power MOSFETs

## Package Outline

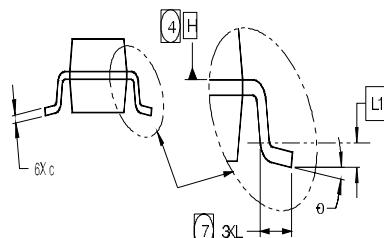
Dimensions are shown in millimeters (inches)



RECOMMENDED FOOTPRINT



SYMBOL	DIMENSIONS			
	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.89	1.12	.036	.044
A1	0.01	0.10	.0004	.0039
A2	0.88	1.02	.035	.040
b	0.30	0.50	.0119	.0196
c	0.08	0.20	.0032	.0078
D	2.80	3.04	.111	.119
E	2.10	2.64	.083	.103
E1	1.20	1.40	.048	.055
e	0.95 BSC		.0375 BSC	
e1	1.90 BSC		.075 BSC	
L	0.40	0.60	.0158	.0236
L1	0.25 BSC		.0118 BSC	
$\theta$	$0^\circ$	$8^\circ$	$0^\circ$	$8^\circ$
aaa	0.10		.004	
bbb	0.20		.008	
ccc	0.15		.006	



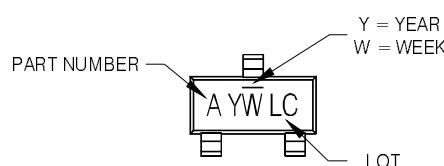
NOTES

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
  2. DIMENSIONS ARE SHOWN IN MILLIMETERS AND INCHES.
  3. CONTROLLING DIMENSION: MILLIMETER.
- ④ DATUM PLANE H IS LOCATED AT THE MOLD PARTING LINE.  
 ⑤ DATUM A AND B TO BE DETERMINED AT DATUM PLANE H.  
 ⑥ DIMENSIONS D AND E1 ARE MEASURED AT DATUM PLANE H.  
 ⑦ DIMENSION L IS THE LEAD LENGTH FOR SOLDERING TO A SUBSTRATE.  
 8. OUTLINE CONFORMS TO JEDEC OUTLINE TO-236AB.

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## Micro3 (SOT-23/TO-236AB) Part Marking Information



### PART NUMBER CODE REFERENCE:

A = IRLML2402

B = IRLML2803

C = IRLML6302

D = IRLML5103

E = IRLML6402

F = IRLML6401

G = IRLML2502

H = IRLML5203

W = (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

W = (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

Note: A line above the work week (as shown here) indicates Lead - Free.

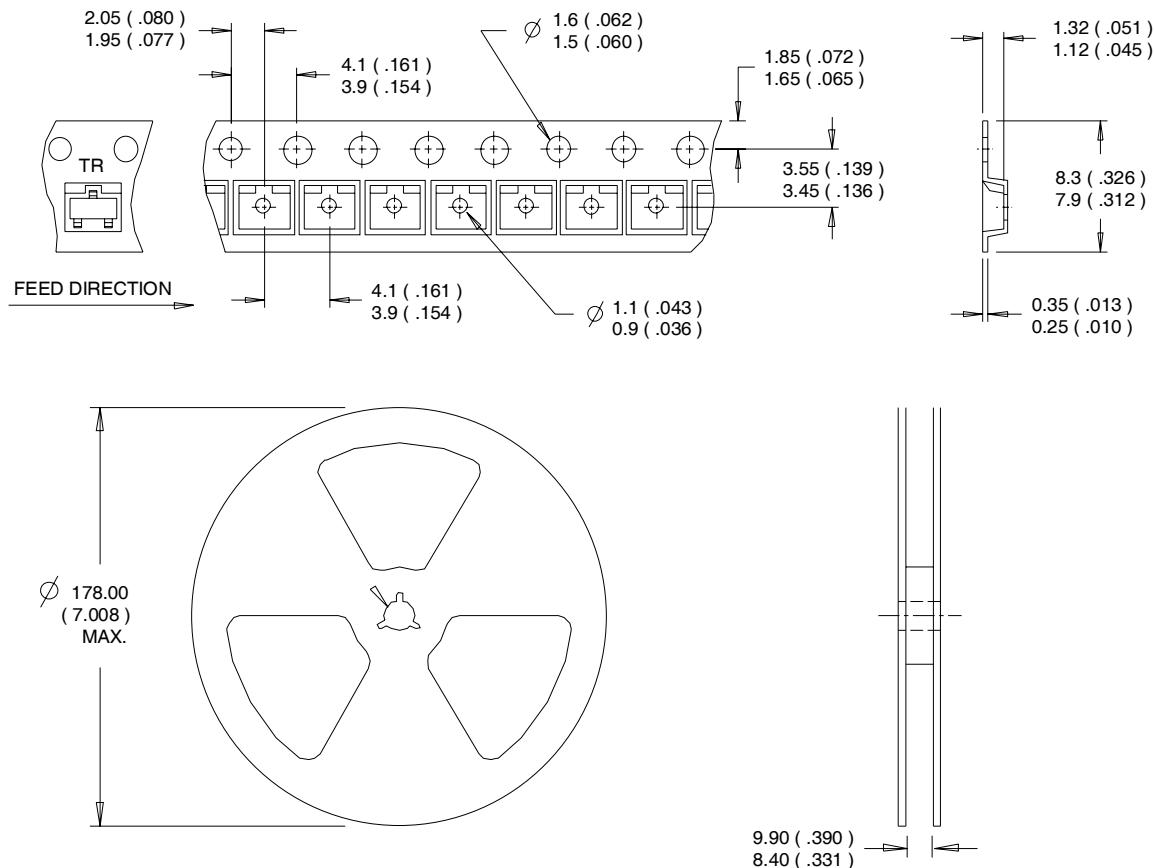
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**IRLML2803PbF**

## Tape & Reel Information

**SOT-23**

Dimensions are shown in millimeters (inches)



NOTES:

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

Data and specifications subject to change without notice.

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**IR WORLD HEADQUARTERS:** 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105  
TAC Fax: (310) 252-7903

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