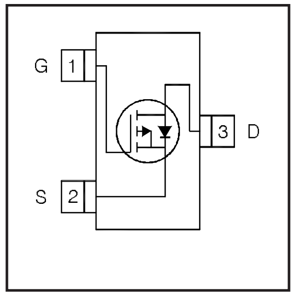
PD - 94947B

International
IOR Rectifier

IRLML6302PbF

HEXFET® Power MOSFET

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



V_{DSS} = -20V

$R_{DS(on)}$ = 0.60Ω

Micro3™

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°C	Continuous Drain Current, V_{GS} @ -4.5V	-0.78	A
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ -4.5V	-0.62	
I_{DM}	Pulsed Drain Current ①	-4.9	
P_D @ T_A = 25°C	Power Dissipation	540	mW
	Linear Derating Factor	4.3	mW/°C
V_{GS}	Gate-to-Source Voltage	± 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

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

08/27/07

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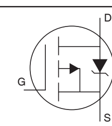
Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	-20	–––	–––	V	V_{GS} = 0V, I_D = -250µA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	–––	-4.9	–––	mV/°C	Reference to 25°C, I_D = -1mA
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	–––	–––	0.60	Ω	V_{GS} = -4.5V, I_D = -0.61A ③
		–––	–––	0.90		V_{GS} = -2.7V, I_D = -0.31A ③
$V_{GS(th)}$	Gate Threshold Voltage	-0.70	–––	-1.5	V	V_{DS} = V_{GS}, I_D = -250µA
g_{fs}	Forward Transconductance	0.56	–––	–––	S	V_{DS} = -10V, I_D = -0.31A
I_{DSS}	Drain-to-Source Leakage Current	–––	–––	-1.0	µA	V_{DS} = -16V, V_{GS} = 0V
		–––	–––	-25		V_{DS} = -16V, V_{GS} = 0V, T_J = 125°C
I_{GSS}	Gate-to-Source Forward Leakage	–––	–––	-100	nA	V_{GS} = -12V
	Gate-to-Source Reverse Leakage	–––	–––	100		V_{GS} = 12V
Q_g	Total Gate Charge	–––	2.4	3.6	nC	I_D = -0.61A
Q_{gs}	Gate-to-Source Charge	–––	0.56	0.84		V_{DS} = -16V
Q_{gd}	Gate-to-Drain ("Miller") Charge	–––	1.0	1.5		V_{GS} = -4.5V, See Fig. 6 and 9 ③
$t_{d(on)}$	Turn-On Delay Time	–––	13	–––	ns	V_{DD} = -10V
t_r	Rise Time	–––	18	–––		I_D = -0.61A
$t_{d(off)}$	Turn-Off Delay Time	–––	22	–––		R_G = 6.2Ω
t_f	Fall Time	–––	22	–––		R_D = 16Ω, See Fig. 10 ③
C_{iss}	Input Capacitance	–––	97	–––	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	–––	53	–––		V_{DS} = -15V
C_{rss}	Reverse Transfer Capacitance	–––	28	–––		f = 1.0MHz, 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_{SM}	Pulsed Source Current (Body Diode) ①	–––	–––	-4.9		
V_{SD}	Diode Forward Voltage	–––	–––	-1.2	V	T_J = 25°C, I_S = -0.61A, V_{GS} = 0V ④
t_{rr}	Reverse Recovery Time	–––	35	53	ns	T_J = 25°C, I_F = -0.61A
Q_{rr}	Reverse Recovery Charge	–––	26	39	nC	di/dt = -100A/µs ④

Notes:

① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)

② $I_{SD} \le$ -0.61A, di/dt $\le$ 76A/µs, $V_{DD} \le V_{(BR)DSS}$, $T_J \le$ 150°C

③ Pulse width $\le$ 300µs; duty cycle $\le$ 2%.

④ Surface mounted on FR-4 board, t $\le$ 5sec.

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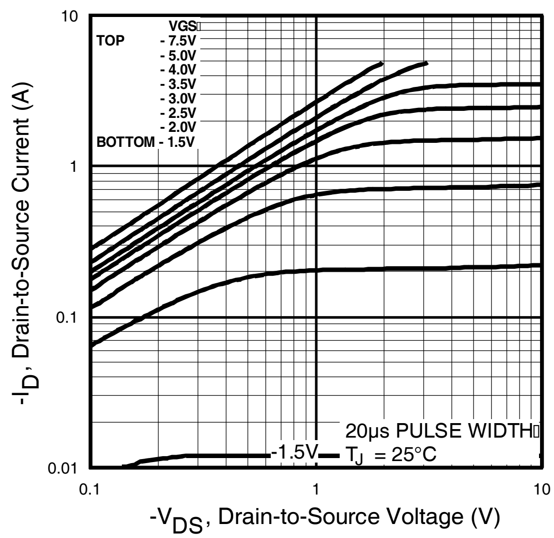

Fig 1. Typical Output Characteristics

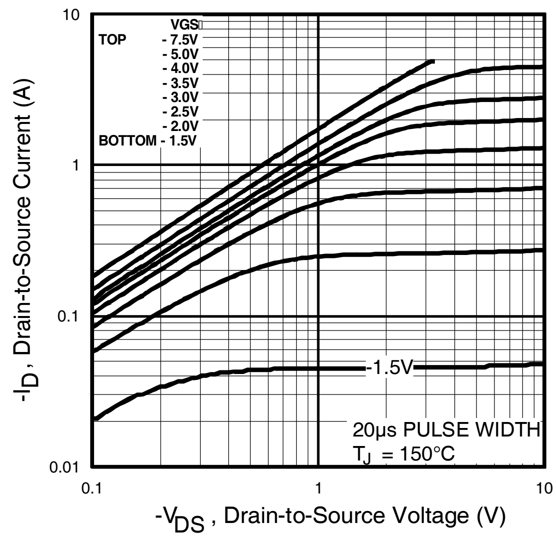

Fig 2. Typical Output Characteristics

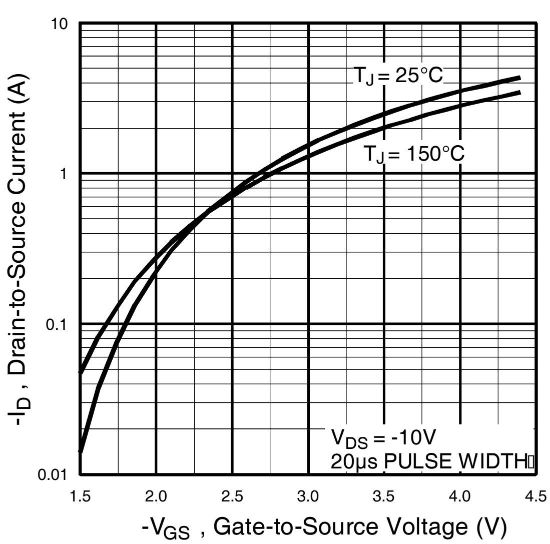

Fig 3. Typical Transfer Characteristics

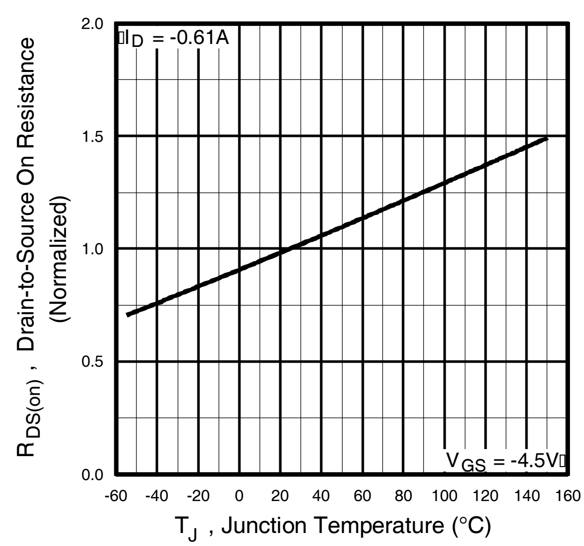

Fig 4. Normalized On-Resistance Vs. Temperature

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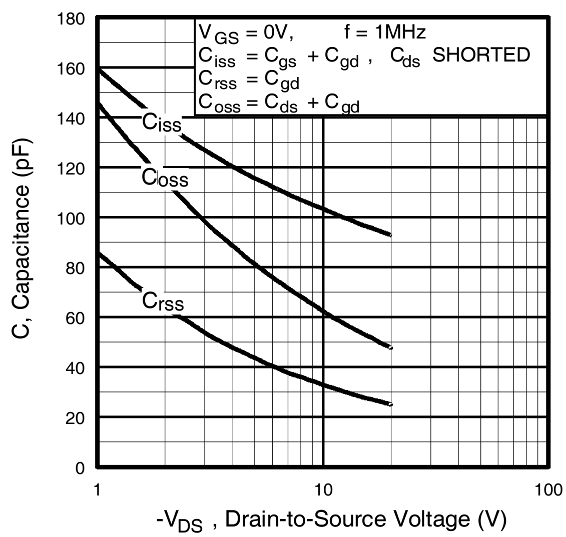

Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

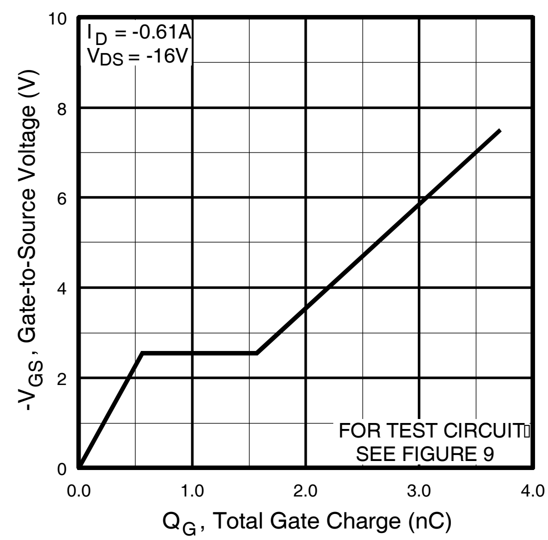

Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

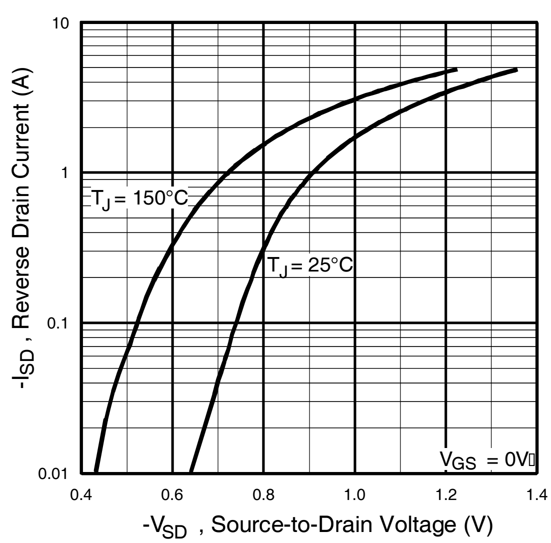

Fig 7. Typical Source-Drain Diode Forward Voltage

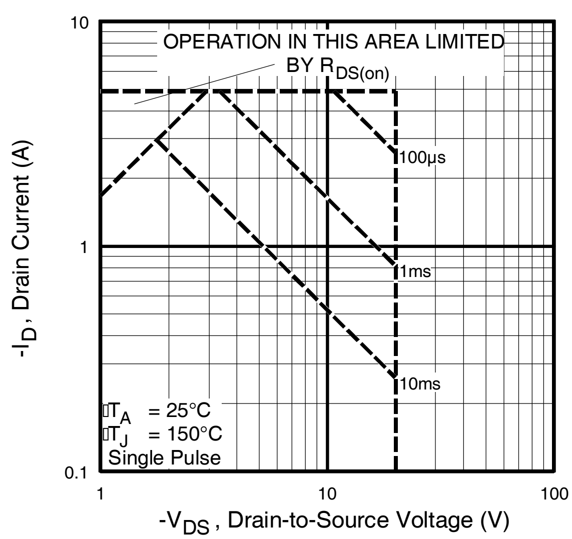

Fig 8. Maximum Safe Operating Area

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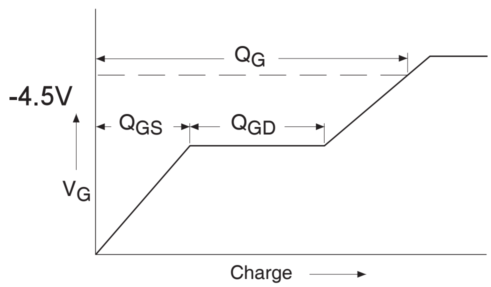

Fig 9a. Basic Gate Charge Waveform

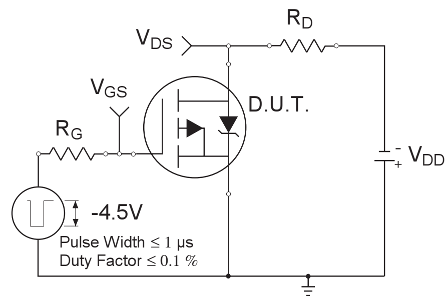

Fig 10a. Switching Time Test Circuit

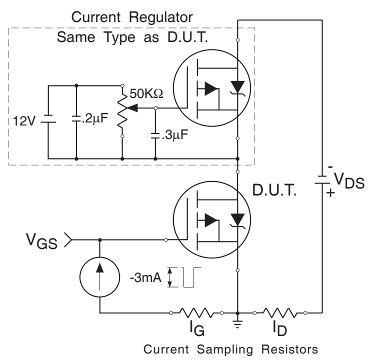

Fig 9b. Gate Charge Test Circuit

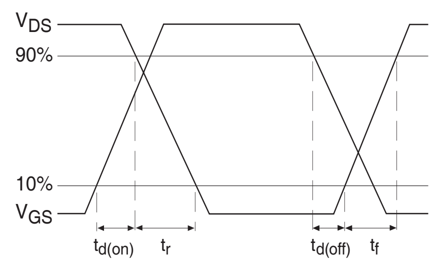

Fig 10b. Switching Time Waveforms

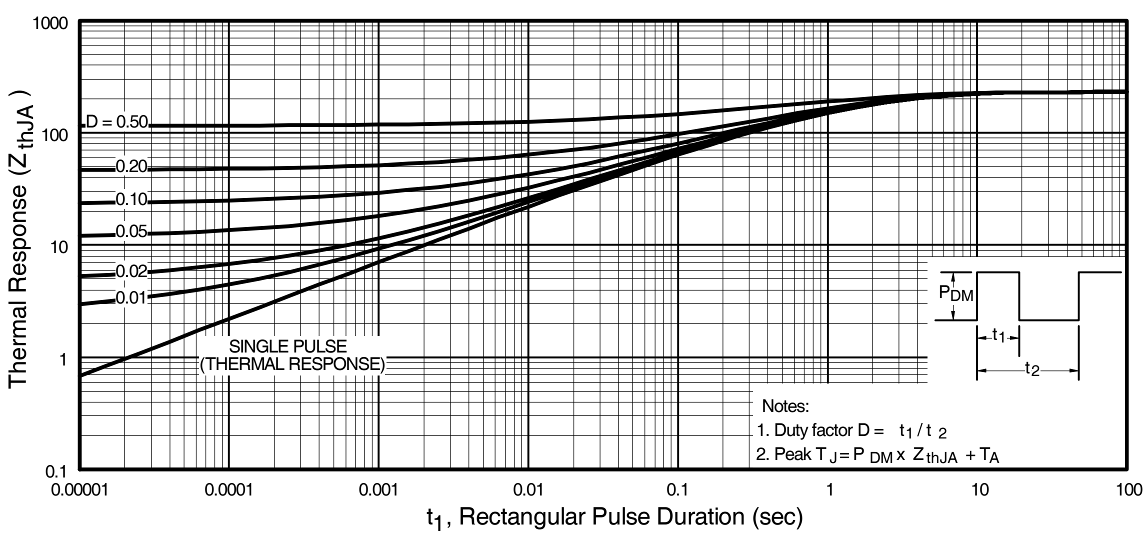

Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

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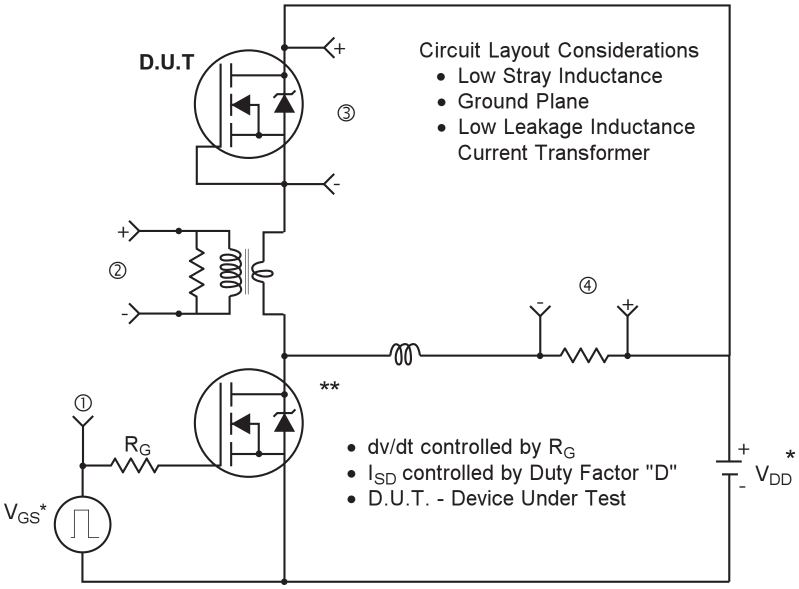
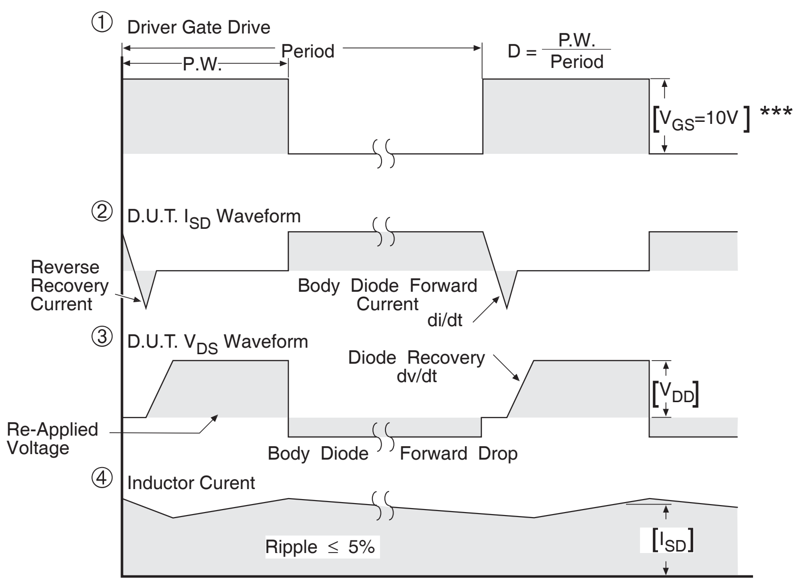
Peak Diode Recovery dv/dt Test Circuit



* 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 13. For P-Channel HEXFETS

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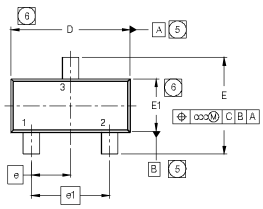
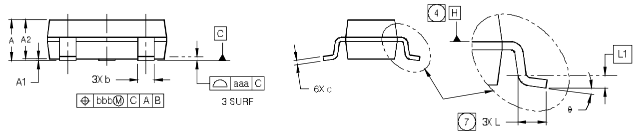
Micro3 (SOT-23) (Lead-Free) Package Outline

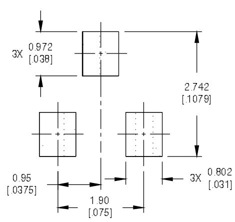
Dimensions are shown in millimeters (inches)



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	
θ	0°	8°	0°	8°
aaa	0.10		.004	
bbb	0.20		.008	
ccc	0.15		.006	



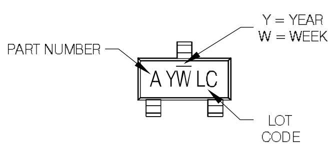
RECOMMENDED FOOTPRINT



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.

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

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

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: For the most current drawing please refer to IR website at http://www.irf.com/package

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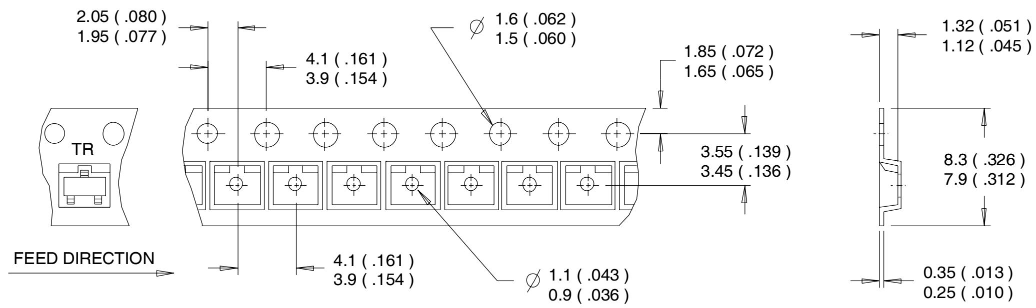
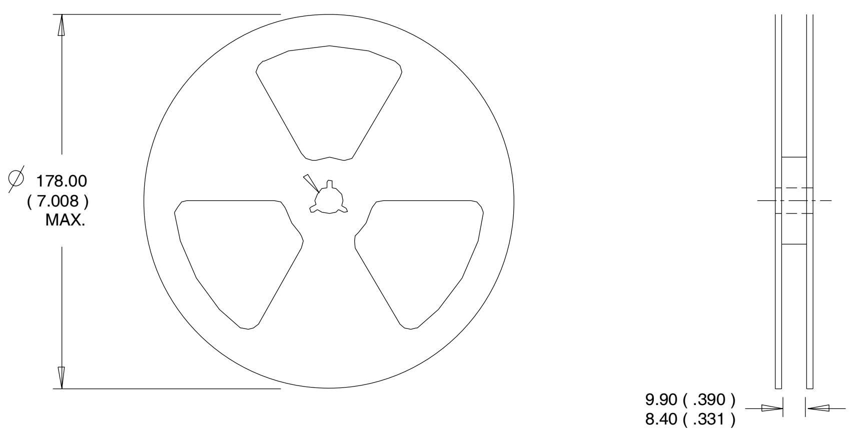
Micro3™ Tape & Reel Information

Dimensions are shown in millimeters (inches)





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

Note: For the most current drawing please refer to IR website at http://www.irf.com/package

Data and specifications subject to change without notice.

International
IOR Rectifier

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