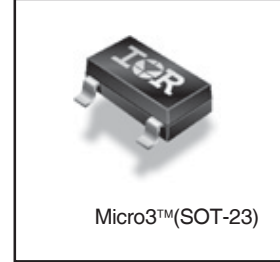
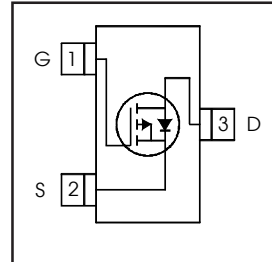


$V_{DS}$	-20	V
$R_{DS(on) max}$ (@ $V_{GS} = -4.5V$ )	0.065	$\Omega$
$Q_g$ (typical)	8.0	nC
$I_D$ (@ $T_A = 25^\circ C$ )	-3.7	A

### HEXFET® Power MOSFET



### Features

Industry-standard pinout SOT-23 Package
Compatible with Existing Surface Mount Techniques
RoHS Compliant, Halogen-Free
MSL1, Industrial qualification



### Benefits

Multi-Vendor Compatibility
Easier Manufacturing
Environmentally Friendlier
Increased Reliability

Base Part Number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
IRLML6402TRPbF-1	Micro3™ (SOT-23)	Tape and Reel	3000	IRLML6402TRPbF-1

### Absolute Maximum Ratings

	Parameter	Max.	Units
$V_{DS}$	Drain- Source Voltage	-20	V
$I_D$ @ $T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} = -4.5V$	-3.7	A
$I_D$ @ $T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} = -4.5V$	-2.2	
$I_{DM}$	Pulsed Drain Current ①	-22	
$P_D$ @ $T_A = 25^\circ C$	Power Dissipation	1.3	W
$P_D$ @ $T_A = 70^\circ C$	Power Dissipation	0.8	
	Linear Derating Factor	0.01	W/°C
$E_{AS}$	Single Pulse Avalanche Energy④	11	mJ
$V_{GS}$	Gate-to-Source Voltage	± 12	V
$T_J, T_{STG}$	Junction and Storage Temperature Range	-55 to + 150	°C

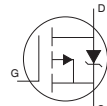
### Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient③	75	100	°C/W

**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	-20	—	—	V	$V_{GS} = 0V, I_D = -250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	-0.009	—	V/°C	Reference to $25^\circ\text{C}$ , $I_D = -1mA$ ②
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	0.050	0.065	$\Omega$	$V_{GS} = -4.5V, I_D = -3.7A$ ②
		—	0.080	0.135		$V_{GS} = -2.5V, I_D = -3.1A$ ②
$V_{GS(th)}$	Gate Threshold Voltage	-0.40	-0.55	-1.2	V	$V_{DS} = V_{GS}, I_D = -250\mu A$
$g_{fs}$	Forward Transconductance	6.0	—	—	S	$V_{DS} = -10V, I_D = -3.7A$ ②
$I_{DSS}$	Drain-to-Source Leakage Current	—	—	-1.0	$\mu A$	$V_{DS} = -20V, V_{GS} = 0V$
		—	—	-25		$V_{DS} = -20V, V_{GS} = 0V, T_J = 70^\circ\text{C}$
$I_{GSS}$	Gate-to-Source Forward Leakage	—	—	-100	nA	$V_{GS} = -12V$
	Gate-to-Source Reverse Leakage	—	—	100		$V_{GS} = 12V$
$Q_g$	Total Gate Charge	—	8.0	12	nC	$I_D = -3.7A$
$Q_{gs}$	Gate-to-Source Charge	—	1.2	1.8		$V_{DS} = -10V$
$Q_{gd}$	Gate-to-Drain ("Miller") Charge	—	2.8	4.2		$V_{GS} = -5.0V$ ②
$t_{d(on)}$	Turn-On Delay Time	—	350	—	ns	$V_{DD} = -10V$
$t_r$	Rise Time	—	48	—		$I_D = -3.7A$
$t_{d(off)}$	Turn-Off Delay Time	—	588	—		$R_G = 89\Omega$
$t_f$	Fall Time	—	381	—		$R_D = 2.7\Omega$
$C_{iss}$	Input Capacitance	—	633	—	pF	$V_{GS} = 0V$
$C_{oss}$	Output Capacitance	—	145	—		$V_{DS} = -10V$
$C_{rss}$	Reverse Transfer Capacitance	—	110	—		$f = 1.0MHz$

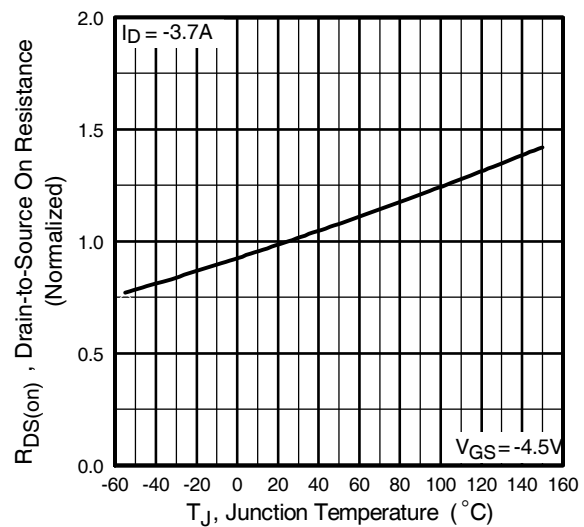
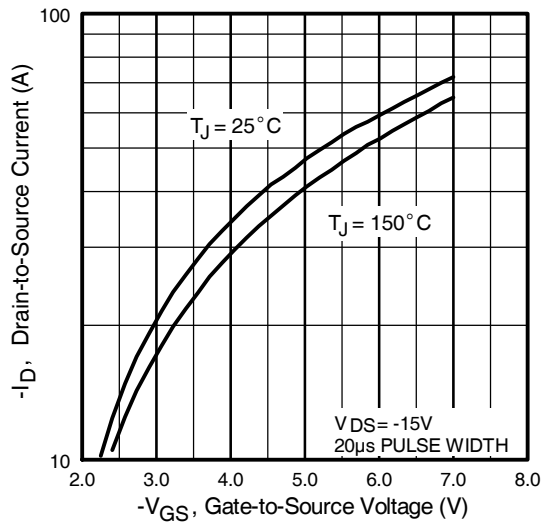
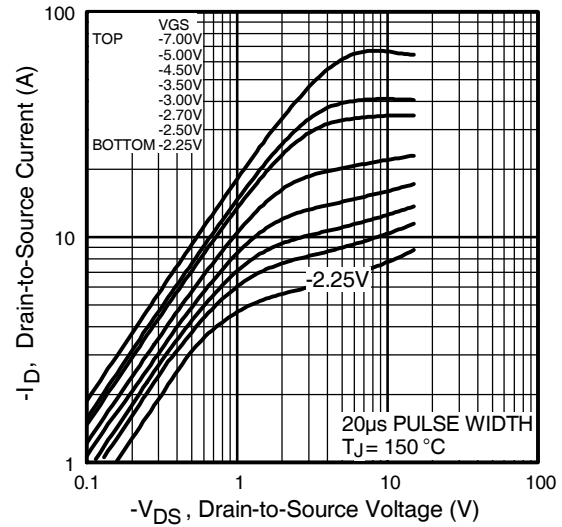
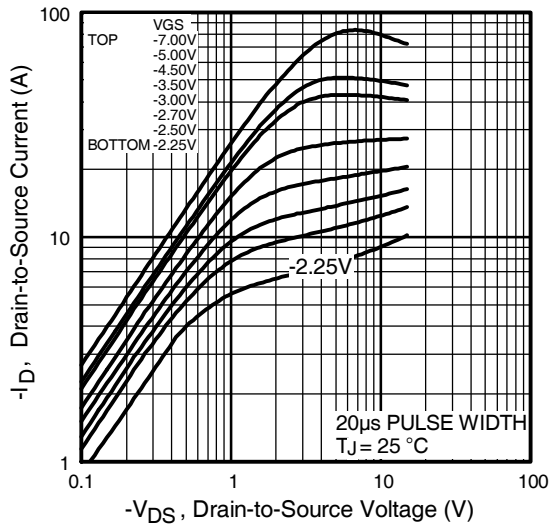
**Source-Drain Ratings and Characteristics**

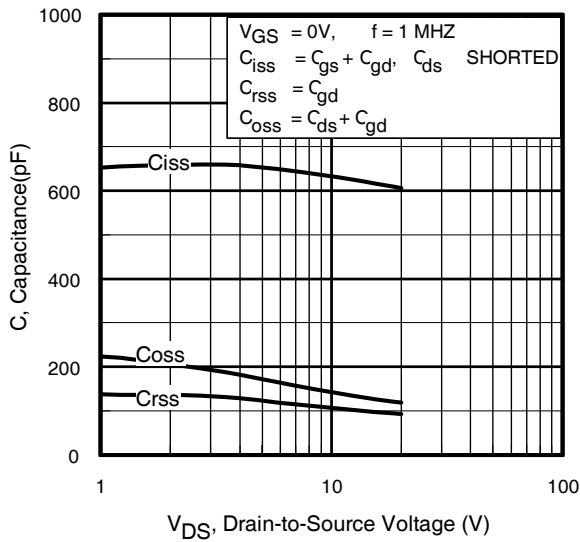
	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_S$	Continuous Source Current (Body Diode)	—	—	-1.3	A	MOSFET symbol showing the integral reverse p-n junction diode. 
$I_{SM}$	Pulsed Source Current (Body Diode) ①	—	—	-22		
$V_{SD}$	Diode Forward Voltage	—	—	-1.2	V	$T_J = 25^\circ\text{C}, I_S = -1.0A, V_{GS} = 0V$ ②
$t_{rr}$	Reverse Recovery Time	—	29	43	ns	$T_J = 25^\circ\text{C}, I_F = -1.0A$
$Q_{rr}$	Reverse Recovery Charge	—	11	17	nC	$di/dt = -100A/\mu s$ ②

**Notes:**

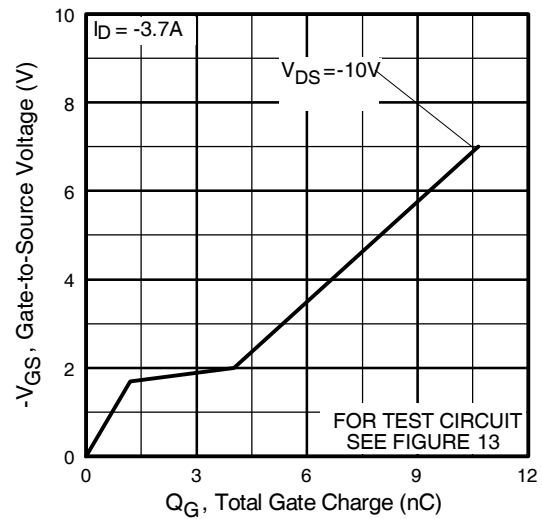
- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Pulse width  $\leq 400\mu s$ ; duty cycle  $\leq 2\%$ .
- ③ Surface mounted on 1" square single layer 1oz. copper FR4 board, steady state.
- ④ Starting  $T_J = 25^\circ\text{C}$ ,  $L = 1.65mH$   
 $R_G = 25\Omega, I_{AS} = -3.7A$ .

\*\* For recommended footprint and soldering techniques refer to application note #AN-994.

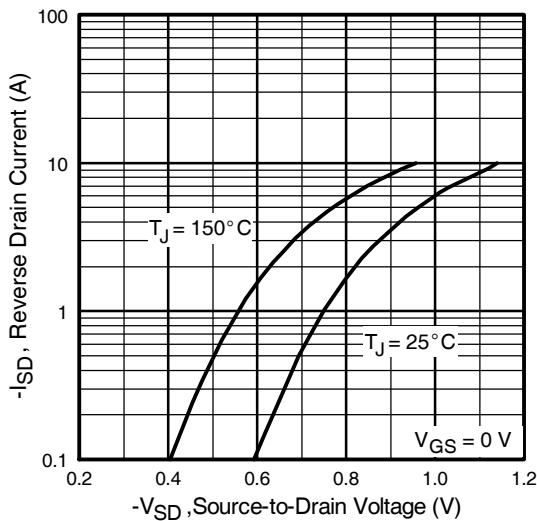




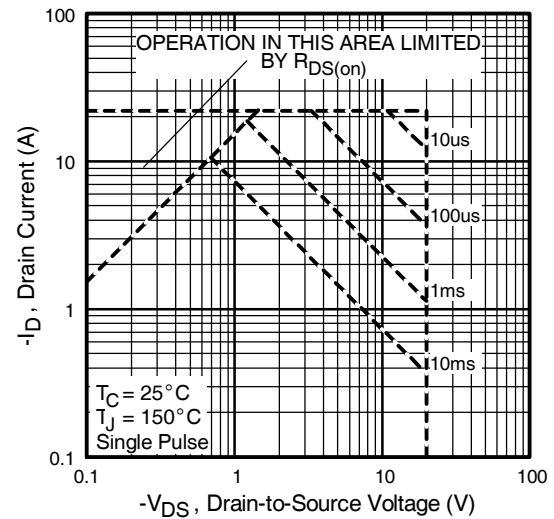
**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage



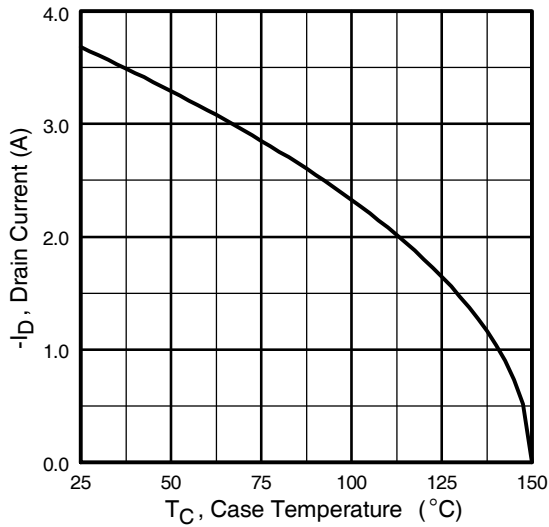
**Fig 6.** Typical Gate Charge Vs. Gate-to-Source Voltage



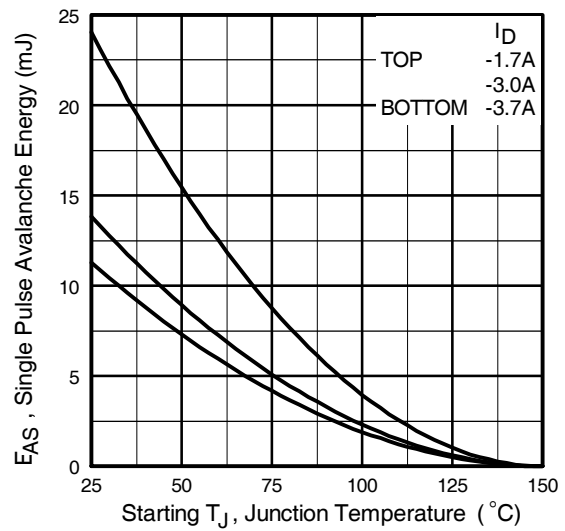
**Fig 7.** Typical Source-Drain Diode Forward Voltage



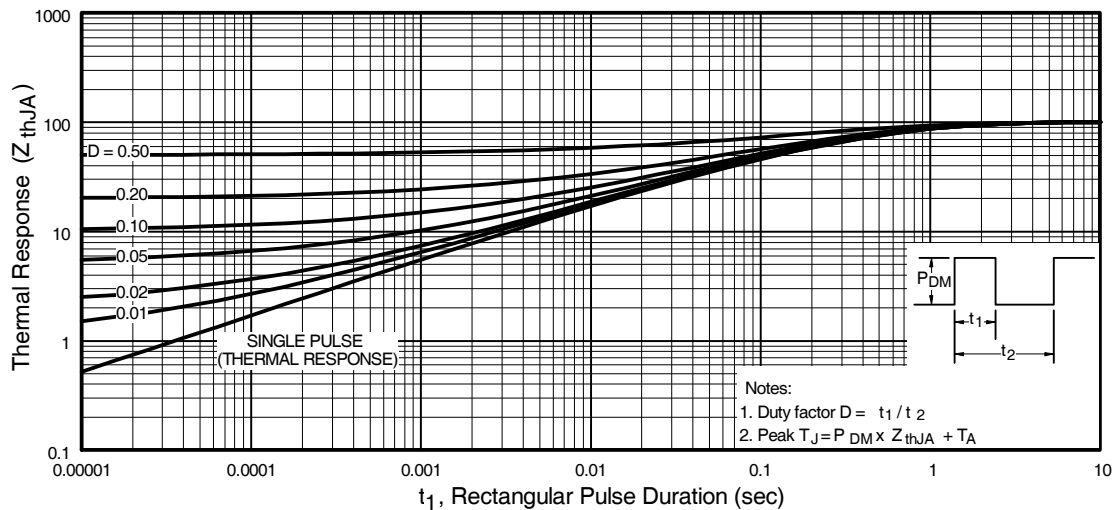
**Fig 8.** Maximum Safe Operating Area



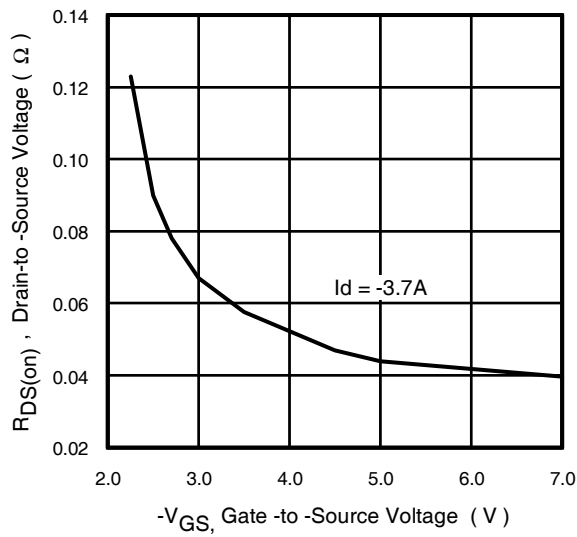
**Fig 9.** Maximum Drain Current Vs. Case Temperature



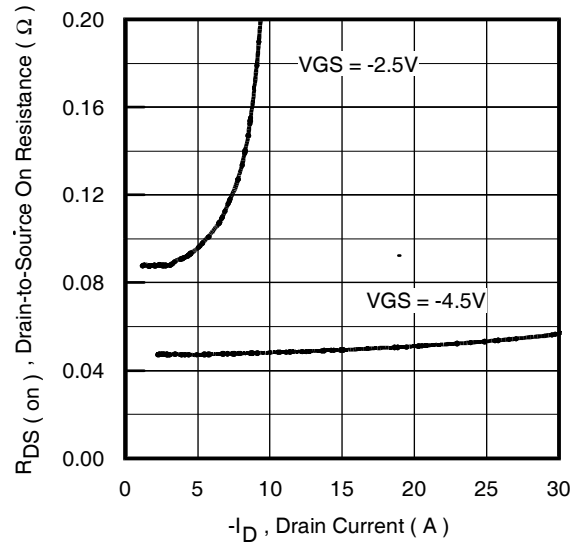
**Fig 10.** Maximum Avalanche Energy Vs. Drain Current



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



**Fig 12.** Typical On-Resistance Vs. Gate Voltage



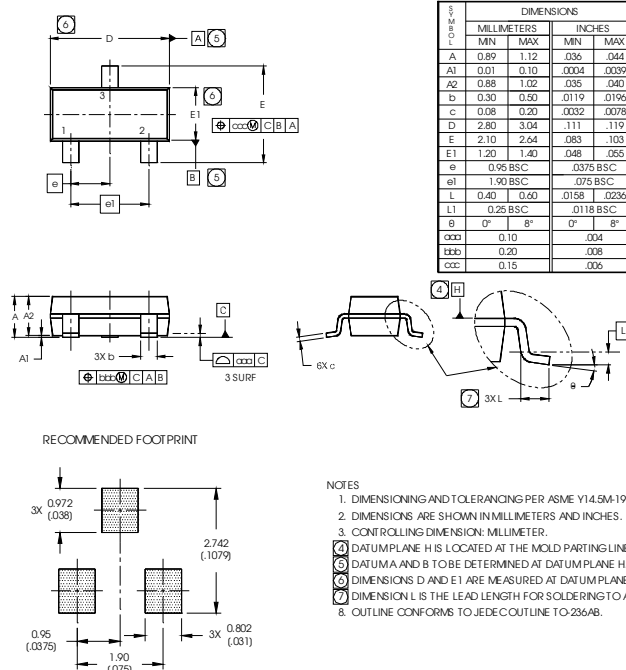
**Fig 13.** Typical On-Resistance Vs. Drain Current



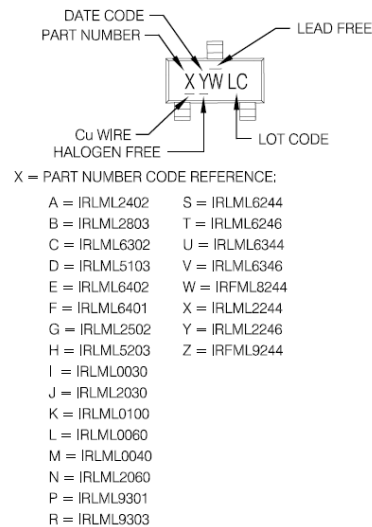
# IRLML6402PbF-1

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

Dimensions are shown in millimeters (inches)



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



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
2011	2001	1	01	A
2012	2002	2	02	B
2013	2003	3	03	C
2014	2004	4	04	D
2015	2005	5		
2016	2006	6		
2017	2007	7		
2018	2008	8		
2019	2009	9		
2020	2010	0	24	X
			25	Y
			26	Z

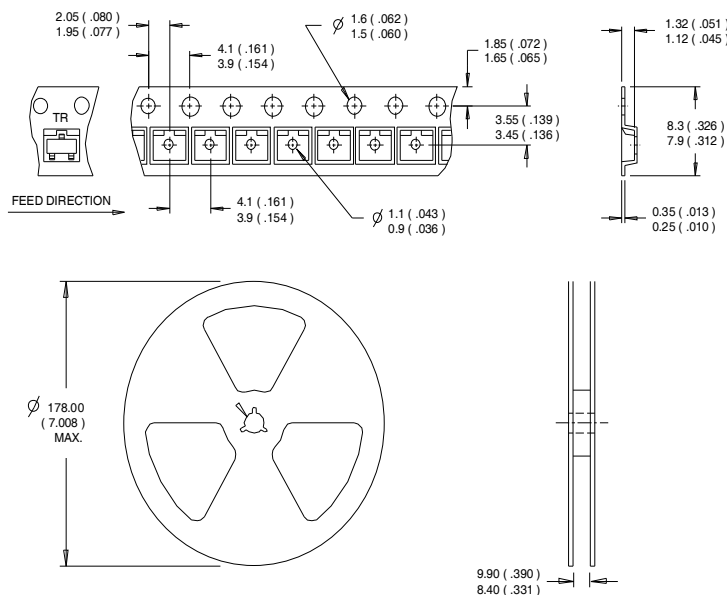
W = (27-52) IF PRECEDED BY A LETTER

YEAR		Y	WORK WEEK	W
2011	2001	A	27	A
2012	2002	B	28	B
2013	2003	C	29	C
2014	2004	D	30	D
2015	2005	E		
2016	2006	F		
2017	2007	G		
2018	2008	H		
2019	2009	J		
2020	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/>

## Micro3™(SOT-23/TO-263AB) 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/>

### Qualification information<sup>†</sup>

Qualification level	Industrial (per JEDEC JESD47F <sup>††</sup> guidelines)	
Moisture Sensitivity Level	Micro3™ (SOT-23)	MSL1 (per JEDEC J-STD-020D <sup>††</sup> )
RoHS compliant	Yes	

<sup>†</sup> Qualification standards can be found at International Rectifier's web site: <http://www.irf.com/product-info/reliability>

<sup>††</sup> Applicable version of JEDEC standard at the time of product release

International  
 Rectifier

**IR WORLD HEADQUARTERS:** 101 N. Sepulveda Blvd., El Segundo, California 90245, USA

To contact International Rectifier, please visit <http://www.irf.com/whoto-call/>