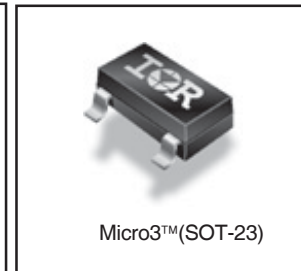
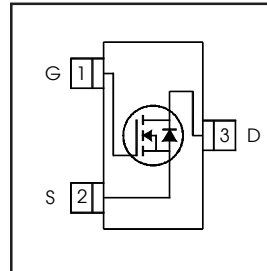


HEXFET® Power MOSFET

$V_{DS}$	<b>20</b>	<b>V</b>
$R_{DS(on) \max}$ (@ $V_{GS} = 4.5V$ )	<b>0.045</b>	<b><math>\Omega</math></b>
$Q_g$ (typical)	<b>8.0</b>	<b>nC</b>
$I_D$ (@ $T_A = 25^\circ C$ )	<b>4.2</b>	<b>A</b>



**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	
IRLML2502TRPbF-1	Micro3™ (SOT-23)	Tape and Reel	3000	IRLML2502TRPbF-1

**Absolute Maximum Ratings**

	Parameter	Max.	Units
$V_{DS}$	Drain- Source Voltage	20	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 4.5V$	4.2	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 4.5V$	3.4	
$I_{DM}$	Pulsed Drain Current ①	33	
$P_D @ T_A = 25^\circ C$	Power Dissipation	1.25	W
$P_D @ T_A = 70^\circ C$	Power Dissipation	0.8	
	Linear Derating Factor	0.01	
$V_{GS}$	Gate-to-Source Voltage	$\pm 12$	V
$T_J, T_{STG}$	Junction and Storage Temperature Range	-55 to + 150	$^\circ C$

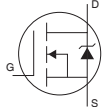
**Thermal Resistance**

	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient②	75	100	$^\circ C/W$

**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
ΔV <sub>(BR)DSS</sub> /ΔT <sub>J</sub>	Breakdown Voltage Temp. Coefficient	—	0.01	—	V/°C	Reference to 25°C, I <sub>D</sub> = 1.0mA
R <sub>DS(on)</sub>	Static Drain-to-Source On-Resistance	—	0.035	0.045	Ω	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 4.2A ②
		—	0.050	0.080		V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 3.6A ②
V <sub>GS(th)</sub>	Gate Threshold Voltage	0.60	—	1.2	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
ΔV <sub>GS(th)</sub>	Gate Threshold Voltage Coefficient	—	-3.2	—	mV/°C	
g <sub>fs</sub>	Forward Transconductance	5.8	—	—	S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 4.0A
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> = 70°C
I <sub>GSS</sub>	Gate-to-Source Forward Leakage	—	—	100	nA	V <sub>GS</sub> = 12V
	Gate-to-Source Reverse Leakage	—	—	-100		V <sub>GS</sub> = -12V
Q <sub>g</sub>	Total Gate Charge	—	8.0	12	nC	I <sub>D</sub> = 4.0A
Q <sub>gs</sub>	Gate-to-Source Charge	—	1.8	2.7		V <sub>DS</sub> = 10V
Q <sub>gd</sub>	Gate-to-Drain ("Miller") Charge	—	1.7	2.6		V <sub>GS</sub> = 5.0V ②
t <sub>d(on)</sub>	Turn-On Delay Time	—	7.5	—	ns	V <sub>DD</sub> = 10V
t <sub>r</sub>	Rise Time	—	10	—		I <sub>D</sub> = 1.0A
t <sub>d(off)</sub>	Turn-Off Delay Time	—	54	—		R <sub>G</sub> = 6Ω
t <sub>f</sub>	Fall Time	—	26	—		R <sub>D</sub> = 10Ω ②
C <sub>iss</sub>	Input Capacitance	—	740	—	pF	V <sub>GS</sub> = 0V
C <sub>oss</sub>	Output Capacitance	—	90	—		V <sub>DS</sub> = 15V
C <sub>rss</sub>	Reverse Transfer Capacitance	—	66	—		f = 1.0MHz

**Source-Drain Rating and Characteristics**

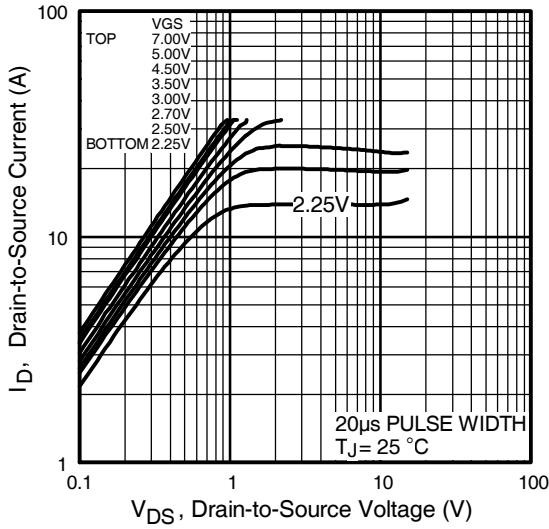
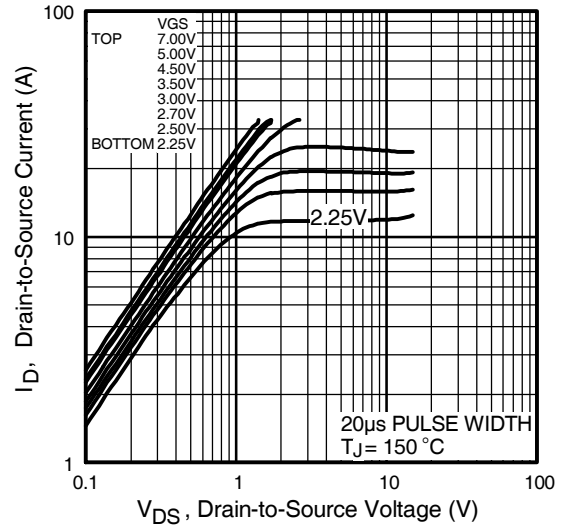
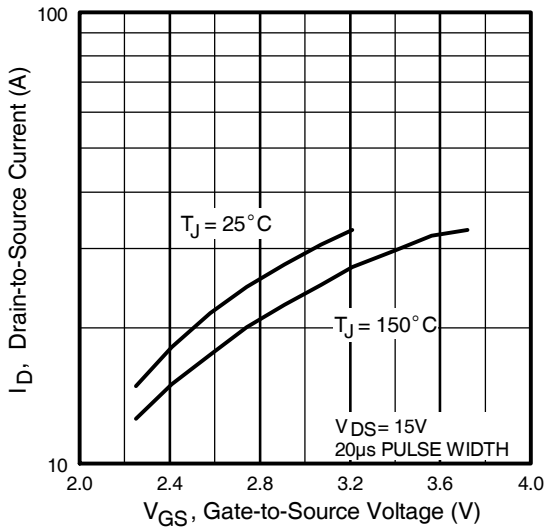
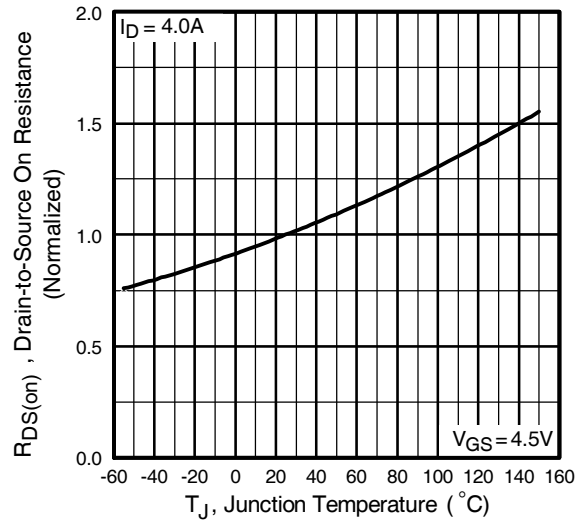
	Parameter	Min.	Typ.	Max.	Units	Conditions
I <sub>S</sub>	Continuous Source Current (Body Diode)	—	—	1.3	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I <sub>SM</sub>	Pulsed Source Current (Body Diode) ①	—	—	33		
V <sub>SD</sub>	Diode Forward Voltage	—	—	1.2	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = 1.3A, V <sub>GS</sub> = 0V ②
t <sub>rr</sub>	Reverse Recovery Time	—	16	24	ns	T <sub>J</sub> = 25°C, I <sub>F</sub> = 1.3A
Q <sub>rr</sub>	Reverse Recovery Charge	—	8.6	13	nC	di/dt = 100A/μs ②

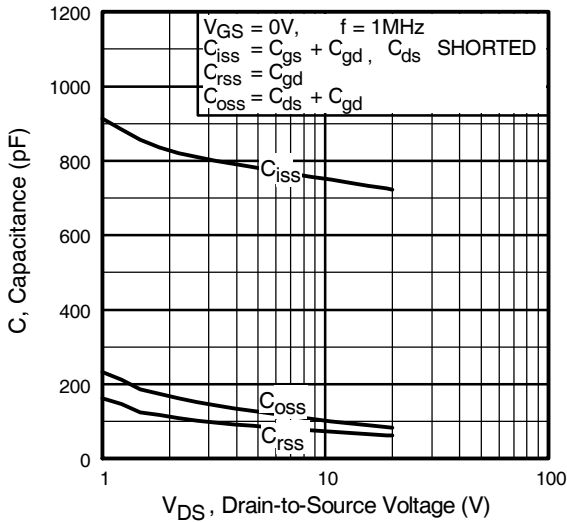
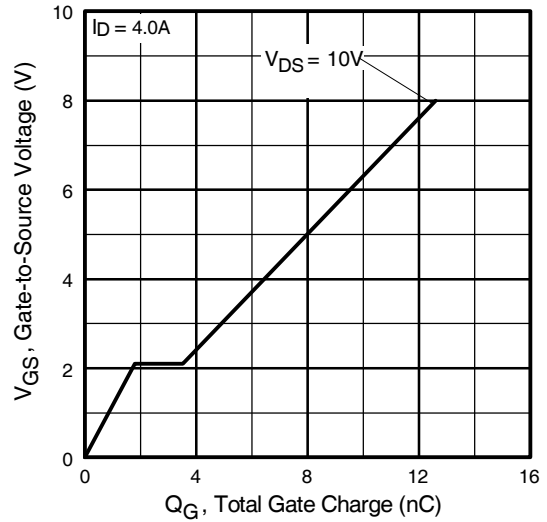
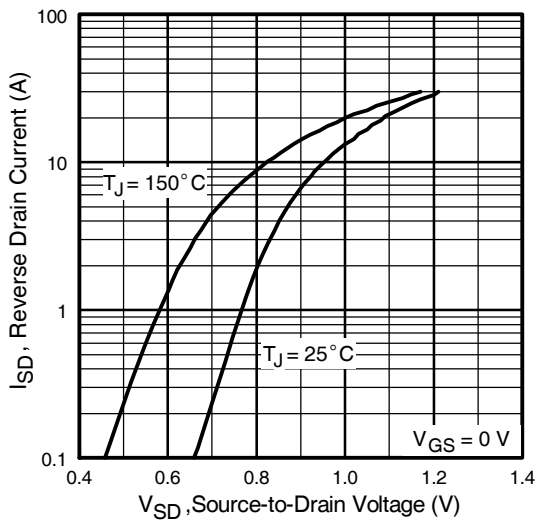
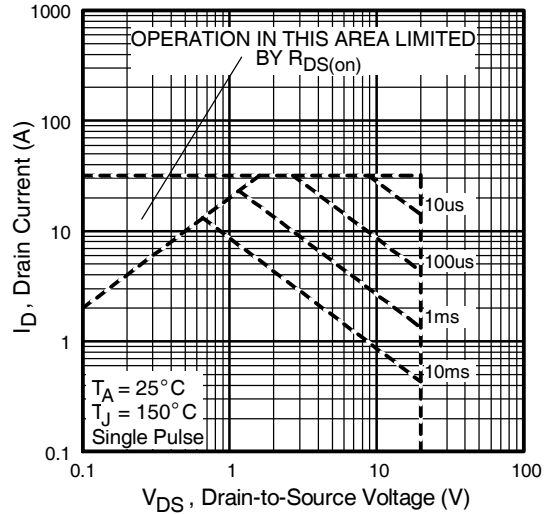
**Notes:**

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

② Pulse width ≤ 300μs; duty cycle ≤ 2%.

③ Surface mounted on FR-4 board, t ≤ 5sec.


**Fig 1.** Typical Output Characteristics

**Fig 2.** Typical Output Characteristics

**Fig 3.** Typical Transfer Characteristics

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


**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

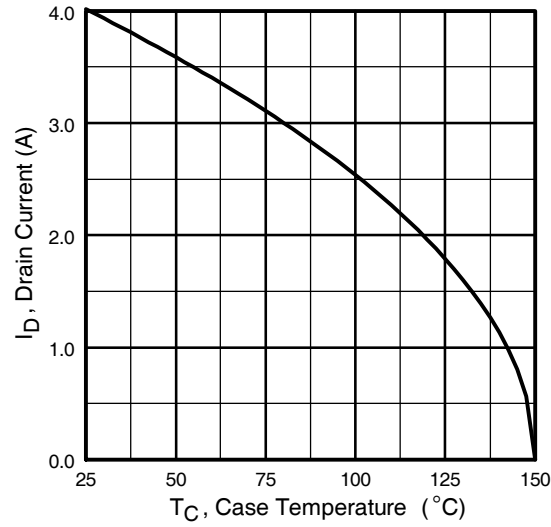


Fig 9. Maximum Drain Current Vs. Case Temperature

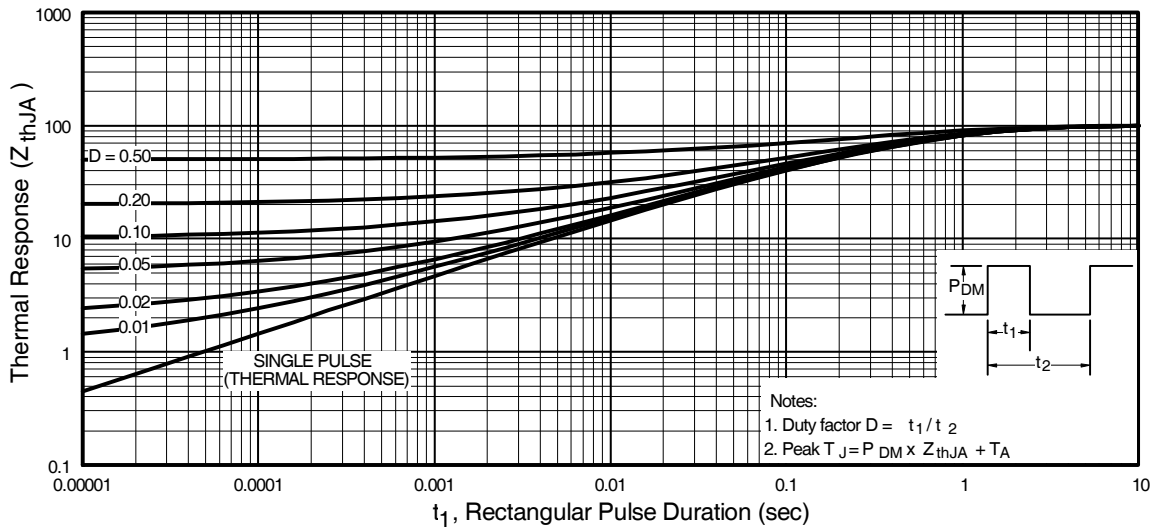
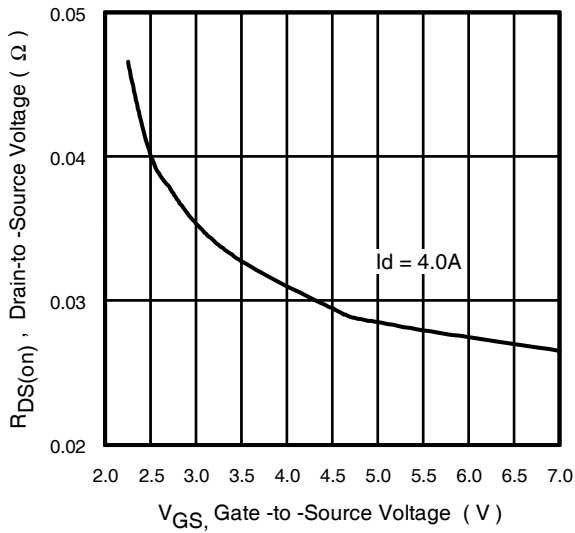
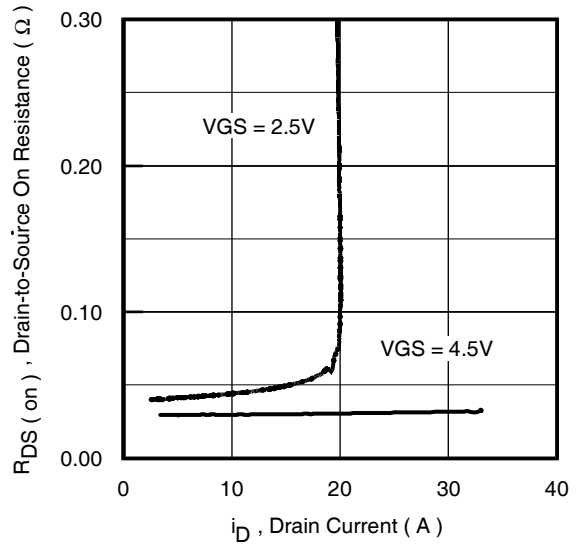
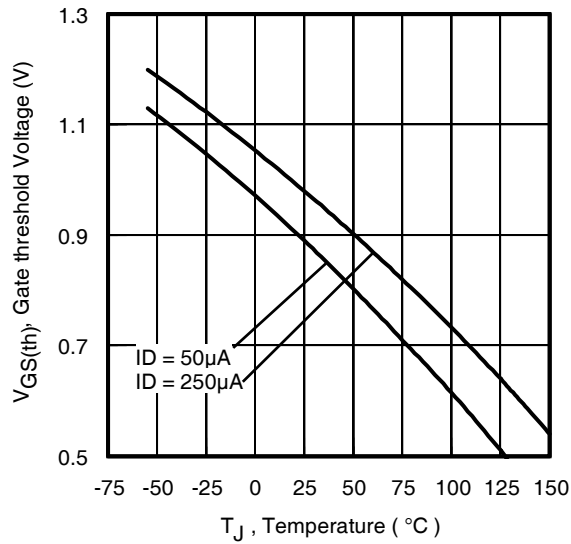


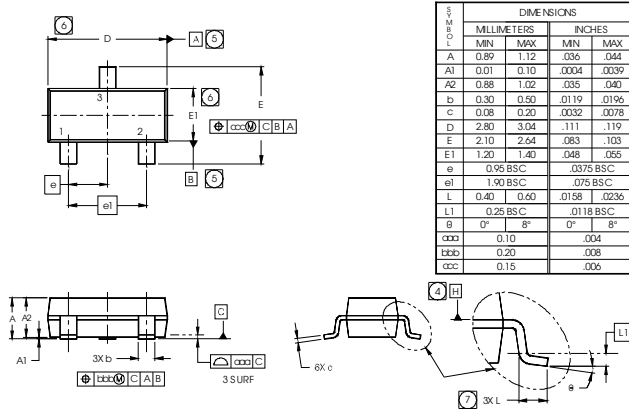
Fig 10. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient


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

**Fig 12. On-Resistance Vs. Drain Current**

**Fig 13. Threshold Voltage Vs. Temperature**

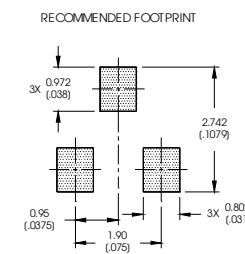


Micro3 (SOT-23) (Lead-Free) Package Outline

Dimensions are shown in millimeters (inches)

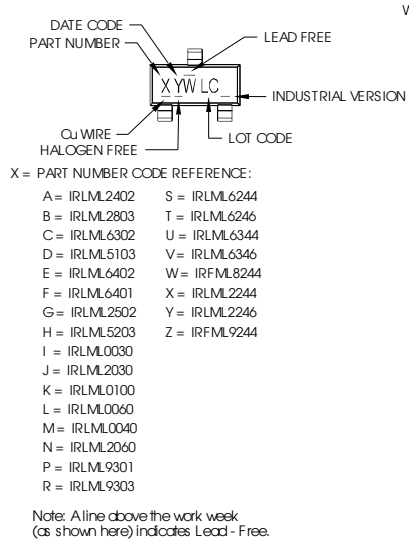


DIMENSIONS	DIMENSIONS			
	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.89	1.12	.036	.044
A1	0.01	0.10	.0004	.0039
A2	0.88	1.02	.035	.040
b	0.30	0.50	.0119	.0196
c	0.08	0.20	.0032	.0078
D	2.80	3.04	.111	.119
E	2.10	2.64	.083	.103
E1	1.20	1.40	.048	.055
e	0.95 BSC		.0375 BSC	
e1	1.90 BSC		.075 BSC	
L	0.40	0.60	.0158	.0236
L1	0.25 BSC		.0118 BSC	
B	0°	8°	0°	8°
ccc	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 T-236AB.

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



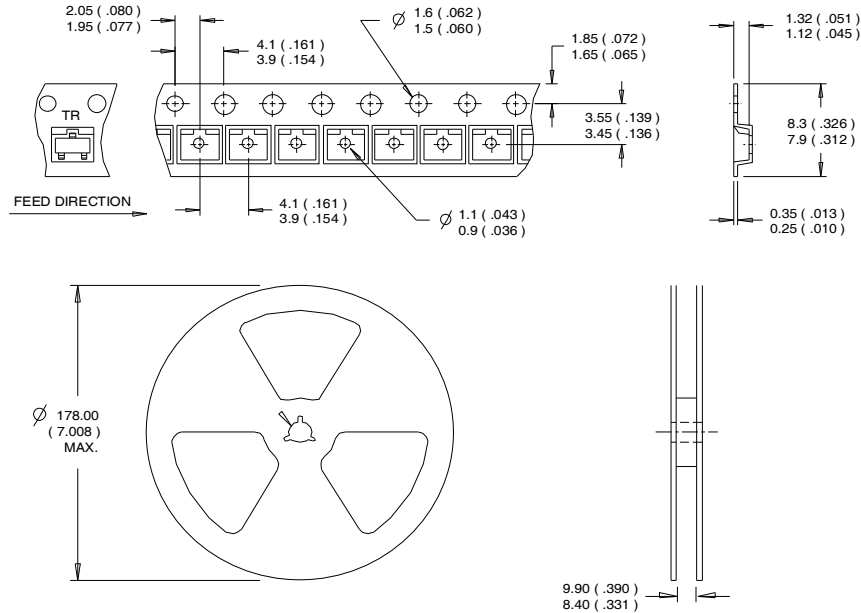
W = (1-26) IF PRECEDED BY LAST DIGIT OF CALENDAR YEAR

YEAR	Y	WORK WEEK	W
2011	2001	01	A
2012	2002	02	B
2013	2003	03	C
2014	2004	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™ 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†**

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	

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

†† Applicable version of JEDEC standard at the time of product release

**Revision History**

Date	Comment
10/28/2014	• Updated partmarking to reflect Industrial partmarking on page 7.

International  
 Rectifier

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