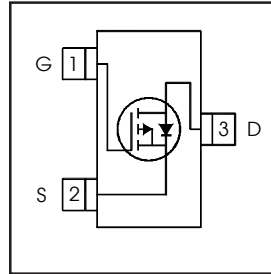


IRLML9301TRPbF

HEXFET® Power MOSFET

V_{DS}	-30	V
V_{GS} Max	± 20	V
R_{DS(on)} max (@ V _{GS} = -10V)	64	mΩ
R_{DS(on)} max (@ V _{GS} = -4.5V)	103	mΩ



Application(s)

- System/Load Switch

Features and Benefits

Features

Low R _{DS(on)} (≤ 64mΩ)
Industry-standard pinout
Compatible with existing Surface Mount Techniques
RoHS compliant containing no lead, no bromide and no halogen
MSL1, Consumer qualification

results in
⇒

Benefits

Lower switching losses
Multi-vendor compatibility
Easier manufacturing
Environmentally friendly
Increased reliability

Symbol	Parameter	Max.	Units
V _{DS}	Drain-Source Voltage	-30	V
I _D @ T _A = 25°C	Continuous Drain Current, V _{GS} @ 10V	-3.6	A
I _D @ T _A = 70°C	Continuous Drain Current, V _{GS} @ 10V	-2.9	
I _{DM}	Pulsed Drain Current	-15	
P _D @ T _A = 25°C	Maximum Power Dissipation	1.3	W
P _D @ T _A = 70°C	Maximum Power Dissipation	0.8	
	Linear Derating Factor	0.01	W/°C
V _{GS}	Gate-to-Source Voltage	± 20	V
T _J , T _{STG}	Junction and Storage Temperature Range	-55 to + 150	°C

Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units
R _{θJA}	Junction-to-Ambient ③	—	100	°C/W
R _{θJA}	Junction-to-Ambient (t<10s) ④	—	99	

ORDERING INFORMATION:

See detailed ordering and shipping information on the last page of this data sheet.

Notes ① through ④ are on page 10
www.irf.com

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

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	-30	—	—	V	$V_{GS} = 0V, I_D = -250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.02	—	V/ $^\circ\text{C}$	Reference to 25°C , $I_D = -1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	51	64	$\text{m}\Omega$	$V_{GS} = -10V, I_D = -3.6A$ ②
		—	82	103		$V_{GS} = -4.5V, I_D = -2.9A$ ②
$V_{GS(th)}$	Gate Threshold Voltage	-1.3	—	-2.4	V	$V_{DS} = V_{GS}, I_D = -10\mu A$
I_{DSS}	Drain-to-Source Leakage Current	—	—	1	μA	$V_{DS} = -24V, V_{GS} = 0V$
		—	—	150		$V_{DS} = -24V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	-100	nA	$V_{GS} = -20V$
	Gate-to-Source Reverse Leakage	—	—	100		$V_{GS} = 20V$
R_G	Internal Gate Resistance	—	12	—	Ω	
g_{fs}	Forward Transconductance	5.0	—	—	S	$V_{DS} = -10V, I_D = -3.6A$
Q_g	Total Gate Charge	—	4.8	—	nC	$I_D = -3.6A$
Q_{gs}	Gate-to-Source Charge	—	1.2	—		$V_{DS} = -15V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	2.5	—		$V_{GS} = -4.5V$ ②
$t_{d(on)}$	Turn-On Delay Time	—	9.6	—	ns	$V_{DD} = -15V$ ②
t_r	Rise Time	—	19	—		$I_D = -1A$
$t_{d(off)}$	Turn-Off Delay Time	—	16	—		$R_G = 6.8\Omega$
t_f	Fall Time	—	15	—		$V_{GS} = -4.5V$
C_{iss}	Input Capacitance	—	388	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	93	—		$V_{DS} = -25V$
C_{rss}	Reverse Transfer Capacitance	—	65	—		$f = 1.0\text{KHz}$

Source - Drain Ratings and Characteristics

Symbol	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	—	—	-15		
V_{SD}	Diode Forward Voltage	—	—	-1.2	V	$T_J = 25^\circ\text{C}, I_S = -1.3A, V_{GS} = 0V$ ②
t_{rr}	Reverse Recovery Time	—	14	21	ns	$T_J = 25^\circ\text{C}, V_R = -24V, I_F = -1.3A$
Q_{rr}	Reverse Recovery Charge	—	7.2	11	nC	$di/dt = 100A/\mu s$ ②



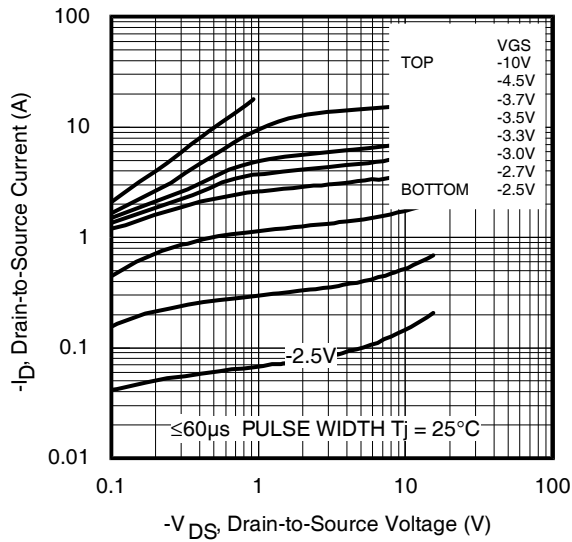


Fig 1. Typical Output Characteristics

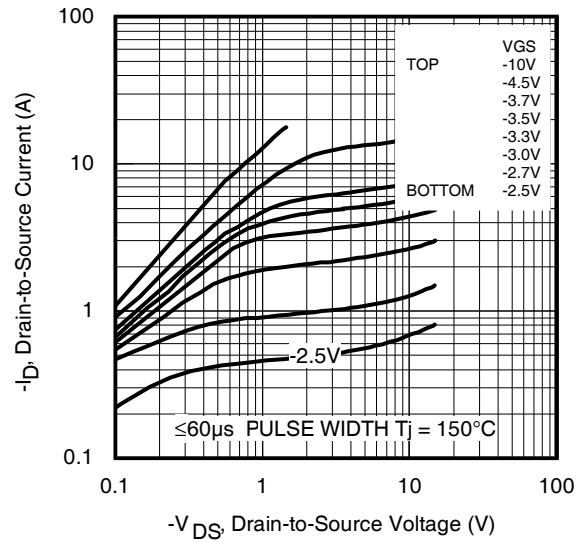


Fig 2. Typical Output Characteristics

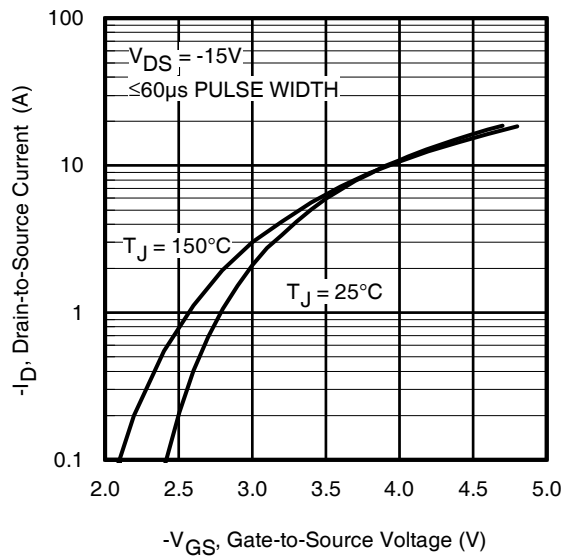


Fig 3. Typical Transfer Characteristics

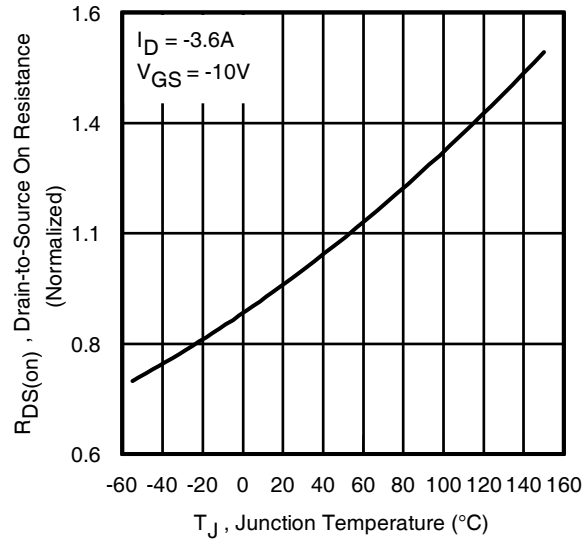
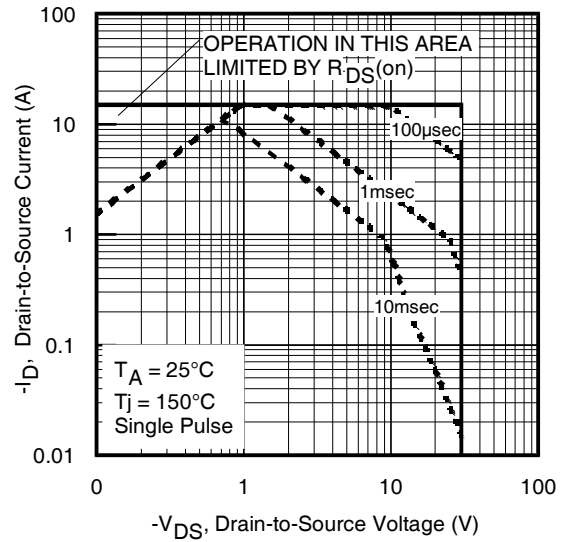
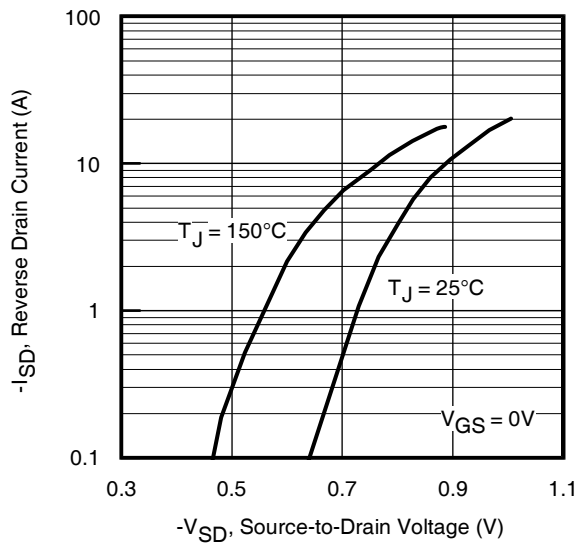
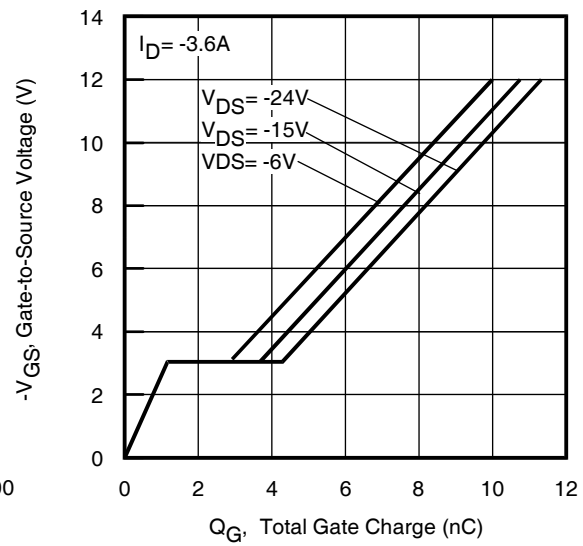
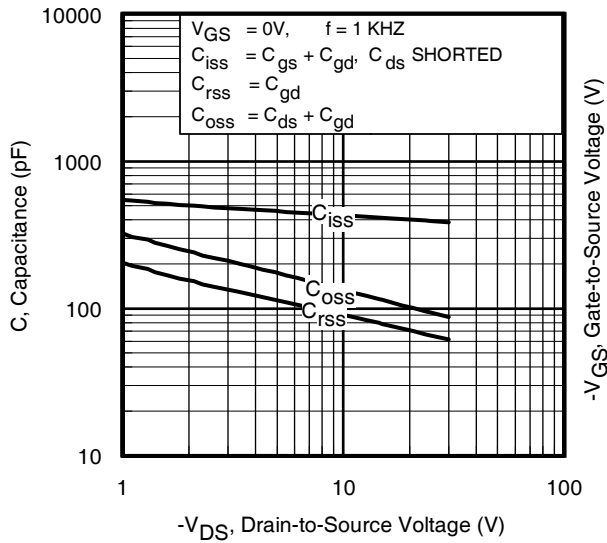


Fig 4. Normalized On-Resistance Vs. Temperature



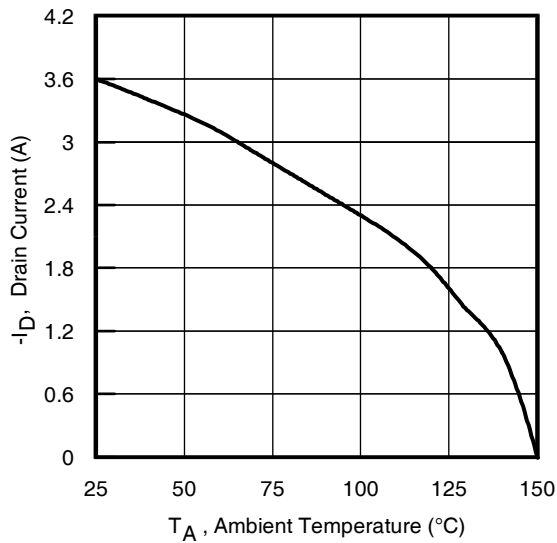


Fig 9. Maximum Drain Current Vs. Ambient Temperature

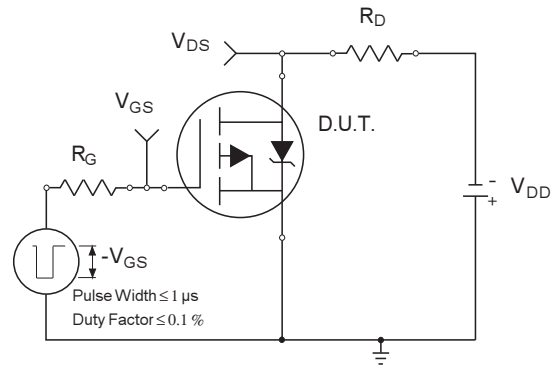


Fig 10a. Switching Time Test Circuit

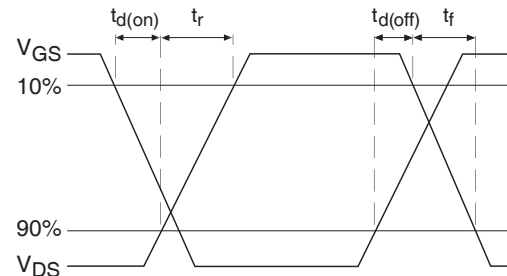


Fig 10b. Switching Time Waveforms

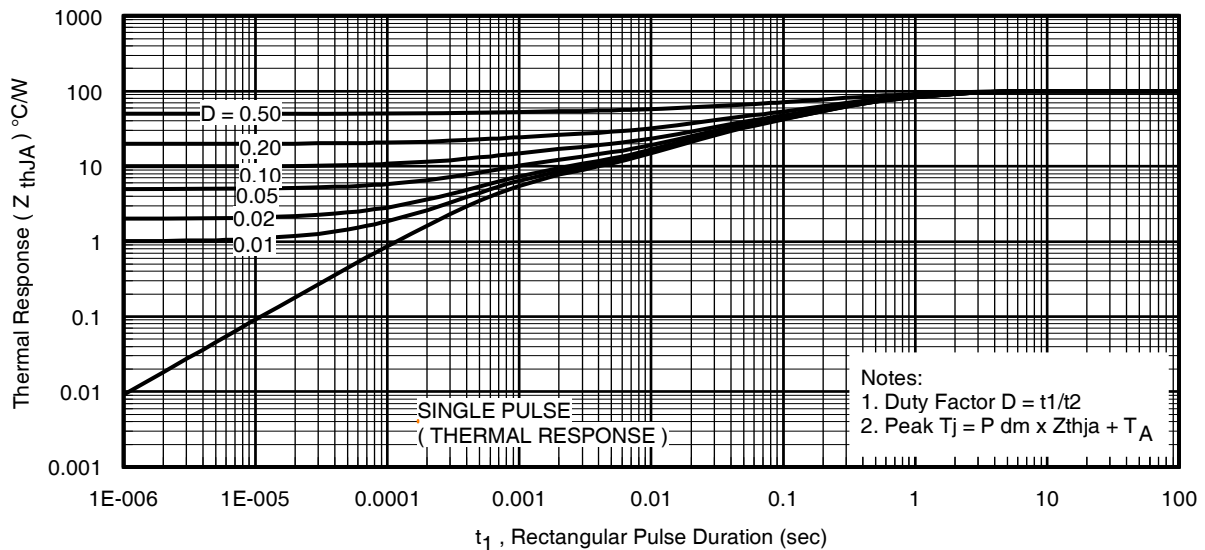


Fig 11. Typical Effective Transient Thermal Impedance, Junction-to-Ambient

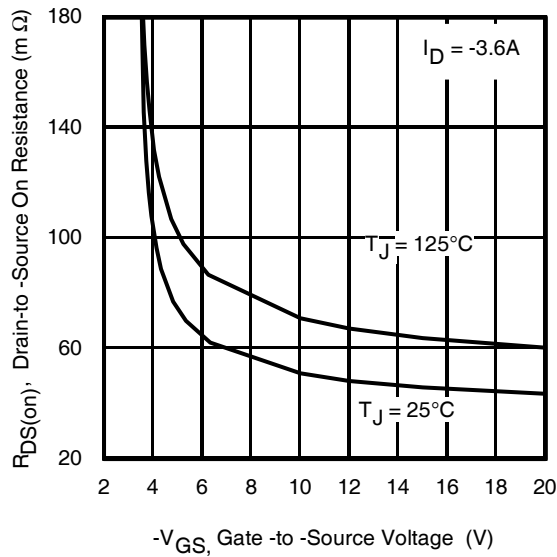


Fig 12. Typical On-Resistance Vs. Gate Voltage

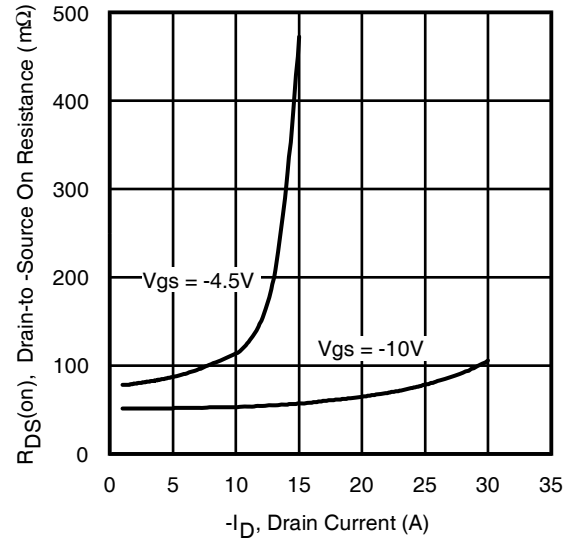


Fig 13. Typical On-Resistance Vs. Drain Current

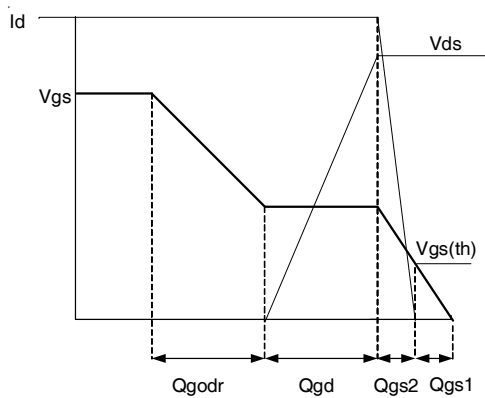


Fig 14a. Gate Charge Waveform

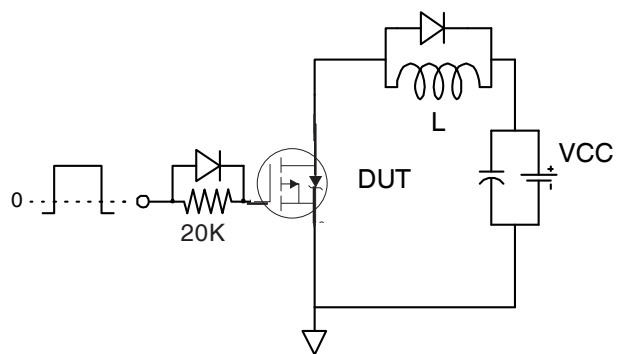


Fig 14b. Gate Charge Test Circuit

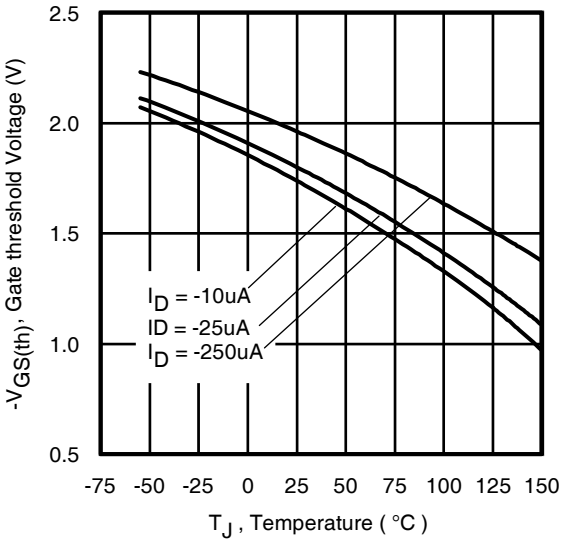


Fig 15. Typical Threshold Voltage Vs. Junction Temperature

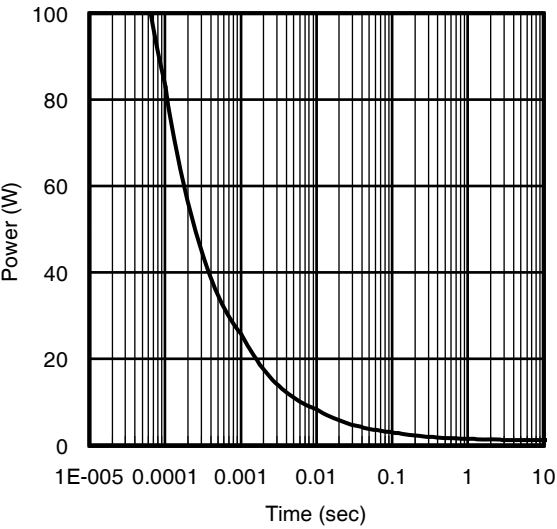


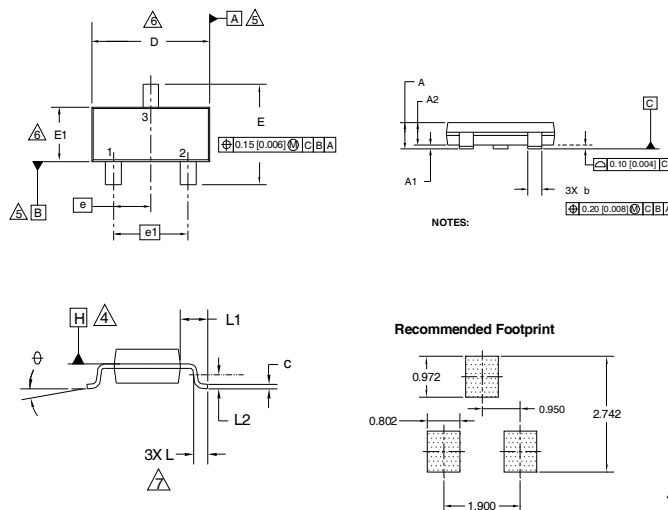
Fig 16. Typical Power Vs. Time

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Micro3 (SOT-23) Package Outline

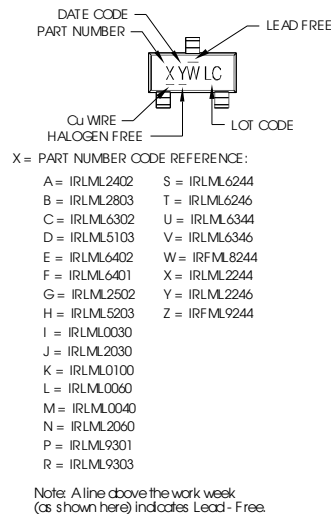
Dimensions are shown in millimeters (inches)



DIMENSIONS				
SYMBOL	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.89	1.12	0.035	0.044
A1	0.01	0.10	0.0004	0.004
A2	0.88	1.02	0.035	0.040
b	0.30	0.50	0.012	0.020
c	0.08	0.20	0.003	0.008
D	2.80	3.04	0.110	0.120
E	2.10	2.64	0.083	0.104
E1	1.20	1.40	0.047	0.055
e	0.95	BSC	0.037	BSC
e1	1.90	BSC	0.075	BSC
L	0.40	0.60	0.016	0.024
L1	0.54	REF	0.021	REF
L2	0.25	BSC	0.010	BSC
$\varnothing$	0	8	0	8

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

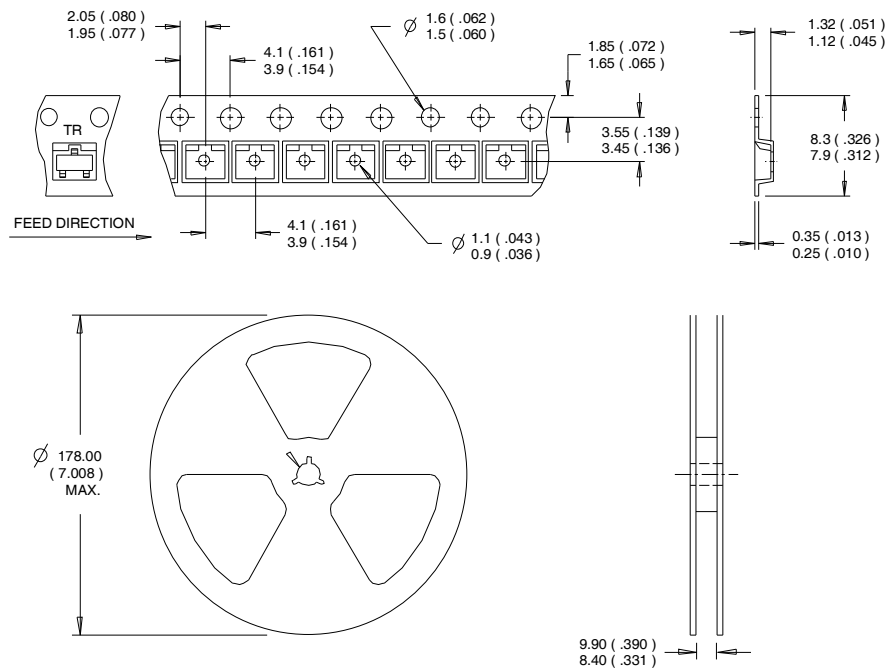
Notes: This part marking information applies to devices produced after 02/26/2001



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

Micro3™ (SOT-23) 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/>
www.irf.com

IRLML9301TRPbF

International
IR Rectifier

Orderable part number	Package Type	Standard Pack		Note
		Form	Quantity	
IRLML9301TRPbF	Micro3 (SOT-23)	Tape and Reel	3000	

Qualification information[†]

Qualification level	Consumer ^{††} (per JEDEC JESD47F ^{†††} guidelines)	
Moisture Sensitivity Level	Micro3 (SOT-23)	MSL1 (per IPC/JEDEC J-STD-020D ^{†††})
RoHS compliant	Yes	

- † Qualification standards can be found at International Rectifier's web site
<http://www.irf.com/product-info/reliability>
- †† Higher qualification ratings may be available should the user have such requirements.
Please contact your International Rectifier sales representative for further information:
<http://www.irf.com/whoto-call/salesrep/>
- ††† Applicable version of JEDEC standard at the time of product release.

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Pulse width ≤ 400μs; duty cycle ≤ 2%.
- ③ Surface mounted on 1 in square Cu board
- ④ Refer to [application note #AN-994](#).

Data and specifications subject to change without notice.

International
IR Rectifier

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