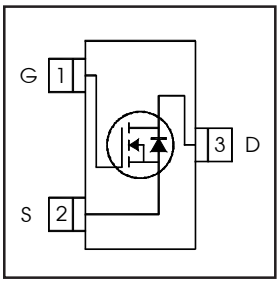
International
IOR Rectifier

PD - 97585

# IRLML6344TRPbF

HEXFET® Power MOSFET

| | | |
|---|---|---|
| $V_{DS}$ | 30 | V |
| $V_{GS\ Max}$ | ± 12 | V |
| $R_{DS(on)\ max}$ ($@V_{GS}$ = 4.5V) | 29 | mΩ |
| $R_{DS(on)\ max}$ ($@V_{GS}$ = 2.5V) | 37 | mΩ |




Micro3™ (SOT-23)
IRLML6344TRPbF

## Application(s)

- Load/ System Switch

## Features and Benefits

| | | |
|---|---|---|
| Low $R_{DSon}$ (<29mΩ) | results in | Lower Conduction Losses |
| Industry-standard SOT-23 Package | | Multi-vendor compatibility |
| RoHS compliant containing no lead, no bromide and no halogen | | Environmentally friendly |
| MSL1, Consumer Qualification | | Increased Reliability |

## Absolute Maximum Ratings

| Symbol | Parameter | Max. | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 30 | V |
| $I_D$ @ $T_A$ = 25°C | Continuous Drain Current, $V_{GS}$ @ 10V | 5.0 | A |
| $I_D$ @ $T_A$ = 70°C | Continuous Drain Current, $V_{GS}$ @ 10V | 4.0 | |
| $I_{DM}$ | Pulsed Drain Current | 25 | |
| $P_D$ @$T_A$ = 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 | ± 12 | V |
| $T_J$, $T_{STG}$ | Junction and Storage Temperature Range | -55 to + 150 | °C |

## Thermal Resistance

| Symbol | Parameter | Typ. | Max. | Units |
|---|---|---|---|---|
| $R_{\theta JA}$ | Junction-to-Ambient ③ | —— | 100 | °C/W |
| $R_{\theta JA}$ | 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

## Electric Characteristics @ $T_J$ = 25°C (unless otherwise specified)

| Symbol | Parameter | Min. | Typ. | Max. | Units | Conditions |
|---|---|---|---|---|---|---|
| $V_{(BR)DSS}$ | Drain-to-Source Breakdown Voltage | 30 | — | — | V | $V_{GS}$ = 0V, $I_D$ = 250µA |
| $\Delta V_{(BR)DSS}/\Delta T_J$ | Breakdown Voltage Temp. Coefficient | — | 0.02 | — | V/°C | Reference to 25°C, $I_D$ = 1mA |
| $R_{DS(on)}$ | Static Drain-to-Source On-Resistance | — | 22 | 29 | mΩ | $V_{GS}$ = 4.5V, $I_D$ = 5.0A ② |
| | | — | 27 | 37 | | $V_{GS}$ = 2.5V, $I_D$ = 4.0A ② |
| $V_{GS(th)}$ | Gate Threshold Voltage | 0.5 | 0.8 | 1.1 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = 10µA |
| $I_{DSS}$ | Drain-to-Source Leakage Current | — | — | 1.0 | µA | $V_{DS}$ =24V, $V_{GS}$ = 0V |
| | | — | — | 150 | | $V_{DS}$ = 24V, $V_{GS}$ = 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 |
| $R_G$ | Internal Gate Resistance | — | 1.7 | — | Ω | |
| gfs | Forward Transconductance | 19 | — | — | S | $V_{DS}$ = 10V, $I_D$ = 5.0A |
| $Q_g$ | Total Gate Charge | — | 6.8 | — | nC | $I_D$ = 5.0A |
| $Q_{gs}$ | Gate-to-Source Charge | — | 0.3 | — | | $V_{DS}$ =15V |
| $Q_{gd}$ | Gate-to-Drain ("Miller") Charge | — | 2.4 | — | | $V_{GS}$ = 4.5V ② |
| $t_{d(on)}$ | Turn-On Delay Time | — | 4.2 | — | ns | $V_{DD}$ =15V ② |
| $t_r$ | Rise Time | — | 5.6 | — | | $I_D$ = 1.0A |
| $t_{d(off)}$ | Turn-Off Delay Time | — | 22 | — | | $R_G$ = 6.8Ω |
| $t_f$ | Fall Time | — | 9.1 | — | | $V_{GS}$ = 4.5V |
| $C_{iss}$ | Input Capacitance | — | 650 | — | pF | $V_{GS}$ = 0V |
| $C_{oss}$ | Output Capacitance | — | 65 | — | | $V_{DS}$ = 25V |
| $C_{rss}$ | Reverse Transfer Capacitance | — | 46 | — | | $f$ = 1.0MHz |

## 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 | — | — | 25 | | |
| $V_{SD}$ | Diode Forward Voltage | — | — | 1.2 | V | $T_J$ = 25°C, $I_S$ = 5.0A, $V_{GS}$ = 0V ② |
| $t_{rr}$ | Reverse Recovery Time | — | 10 | 15 | ns | $T_J$ = 25°C, $V_R$ = 15V, $I_F$=1.3A |
| $Q_{rr}$ | Reverse Recovery Charge | — | 3.8 | 5.7 | nC | di/dt = 100A/µs ② |

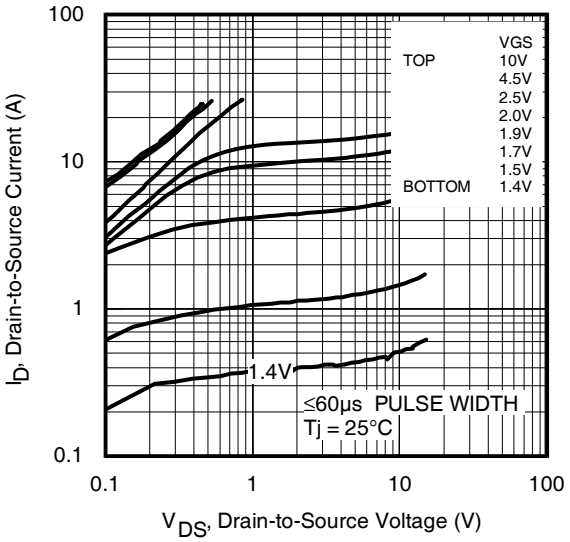



**Fig 1.** Typical Output Characteristics

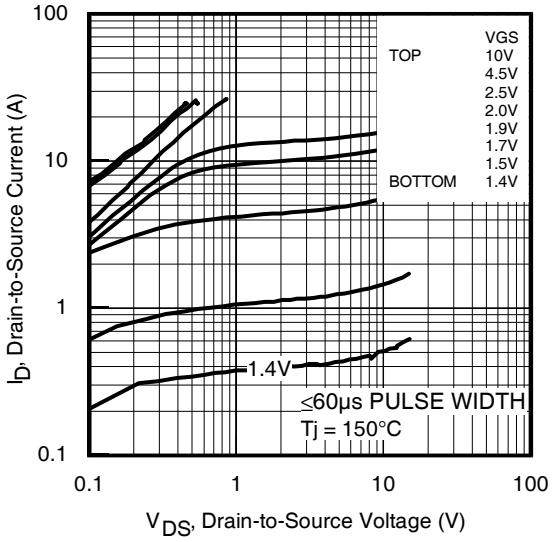



**Fig 2.** Typical Output Characteristics

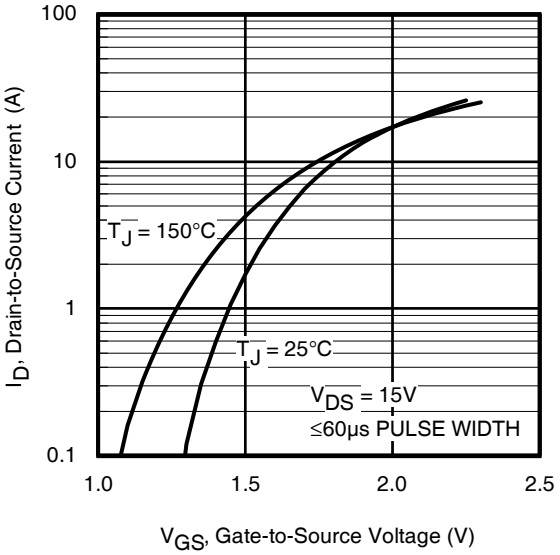



**Fig 3.** Typical Transfer Characteristics

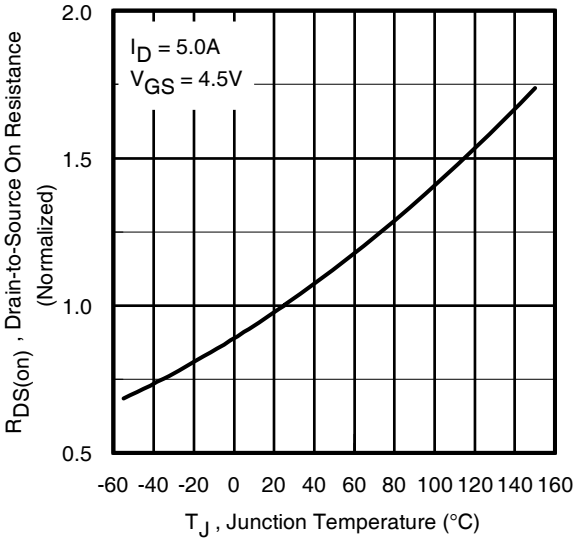



**Fig 4.** Normalized On-Resistance Vs. Temperature

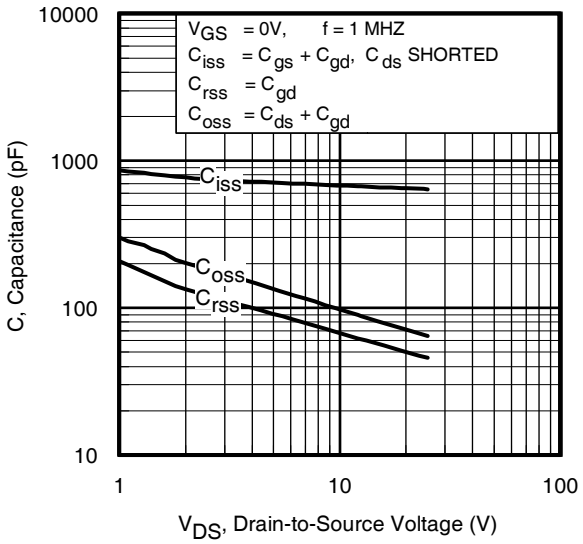



**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage

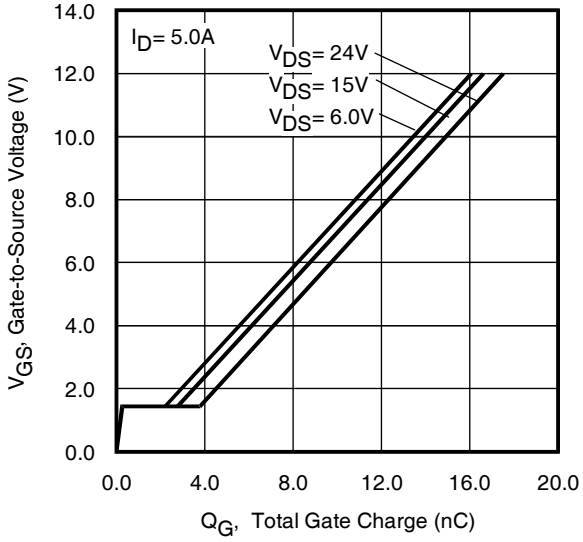



**Fig 6.** Typical Gate Charge Vs. Gate-to-Source Voltage

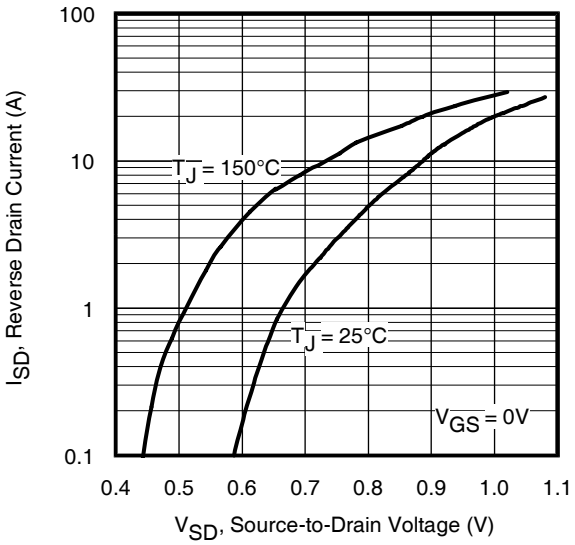



**Fig 7.** Typical Source-Drain Diode Forward Voltage

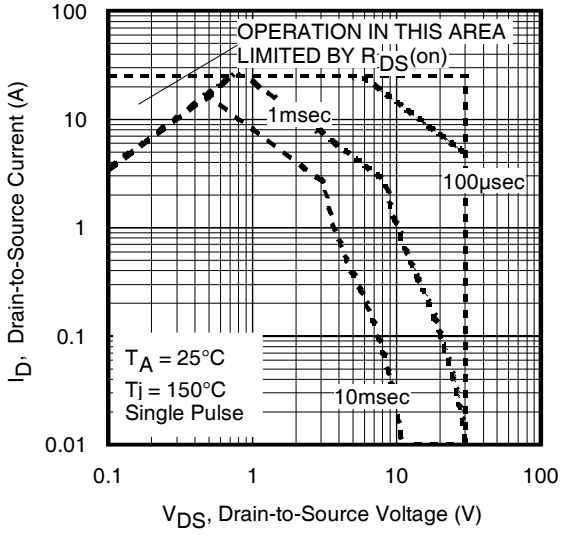



**Fig 8.** Maximum Safe Operating Area

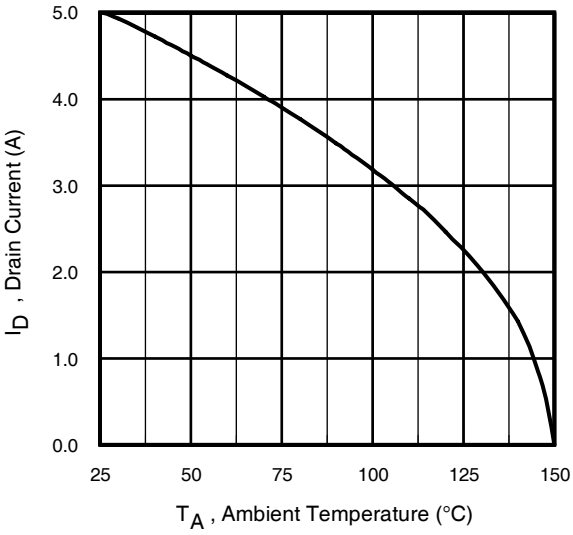



**Fig 9.** Maximum Drain Current Vs. Ambient Temperature

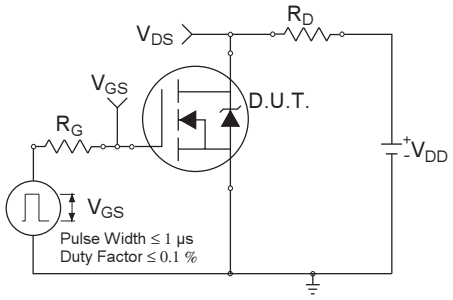



**Fig 10a.** Switching Time Test Circuit

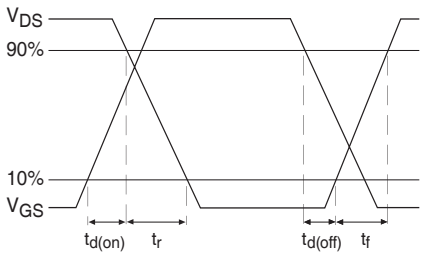



**Fig 10b.** Switching Time Waveforms

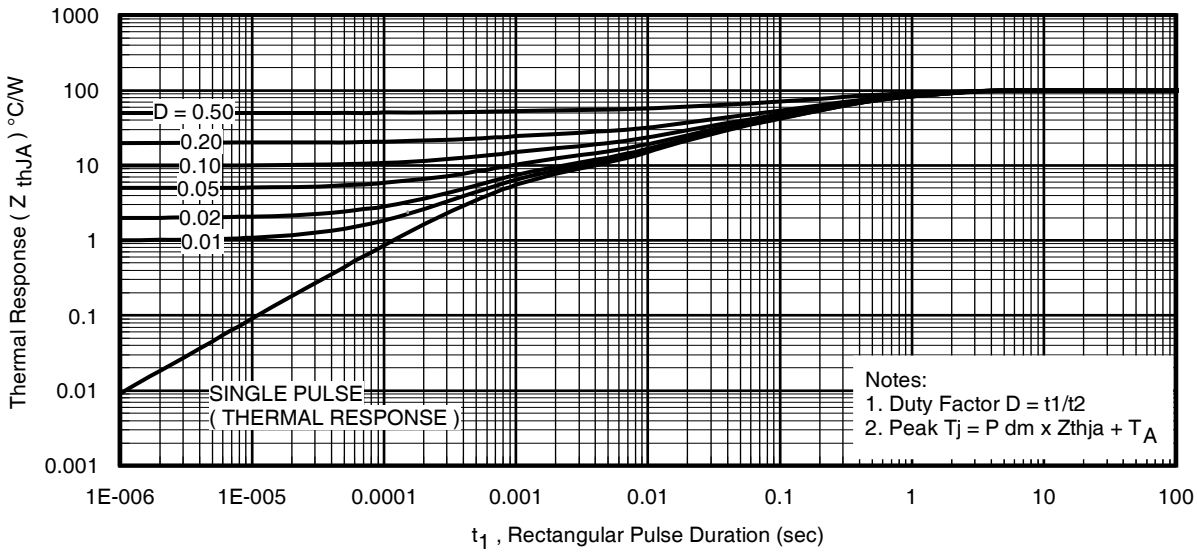



**Fig 11.** Typical Effective Transient Thermal Impedance, Junction-to-Ambient

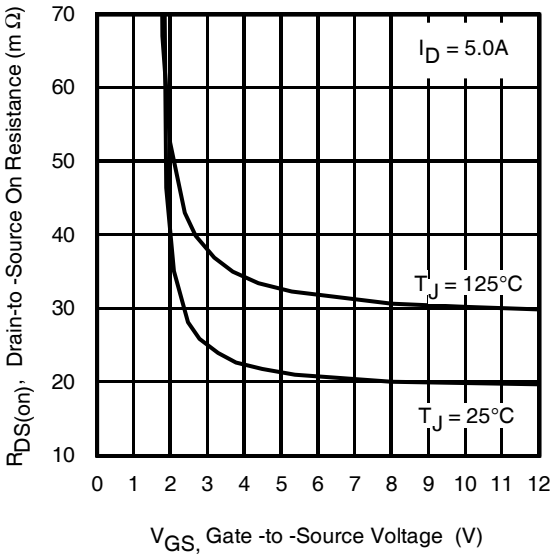



**Fig 12.** Typical On-Resistance Vs. Gate Voltage

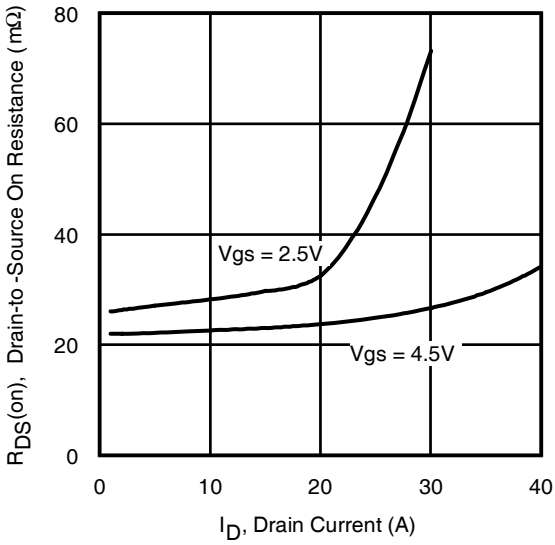



**Fig 13.** Typical On-Resistance Vs. Drain Current

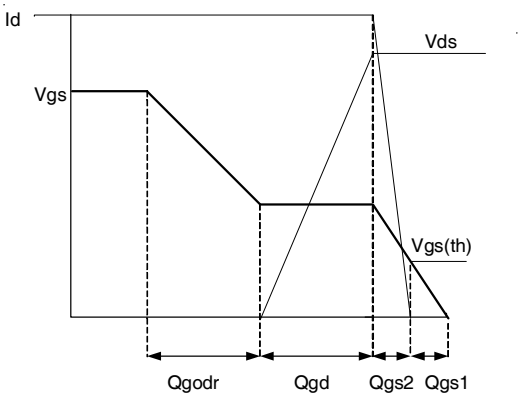



**Fig 14a.** Basic Gate Charge Waveform

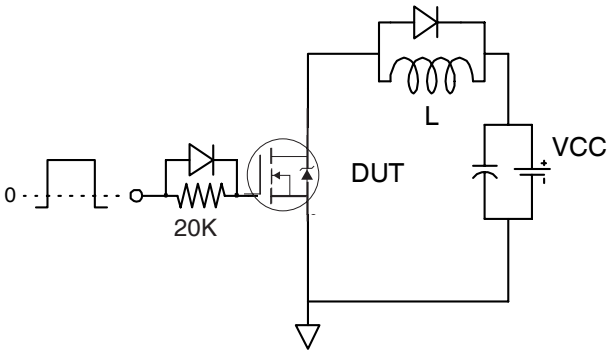



**Fig 14b.** Gate Charge Test Circuit

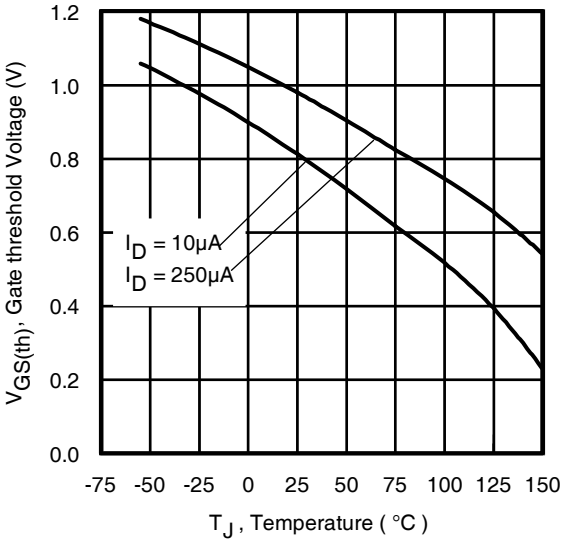



**Fig 15.** Typical Threshold Voltage Vs. Junction Temperature

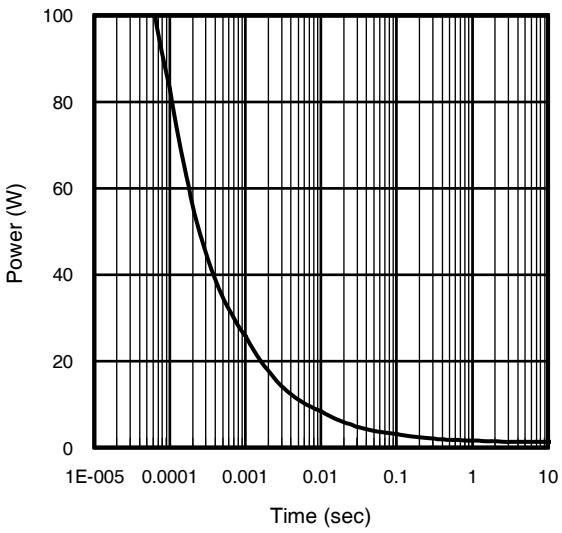
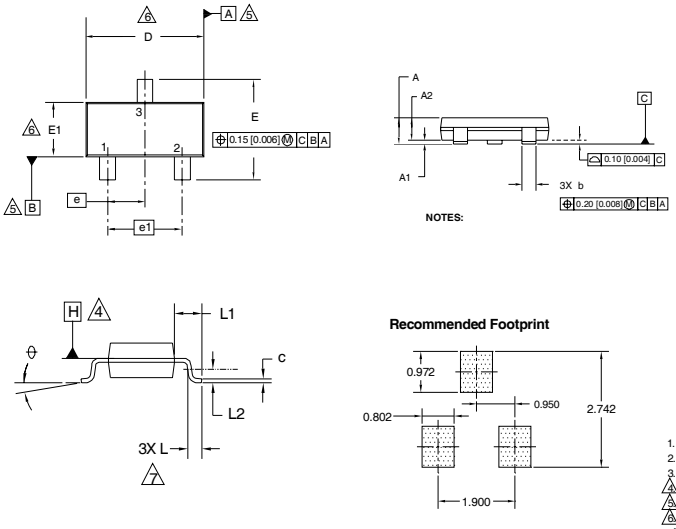



**Fig 16.** Typical Power Vs. Time

## Micro3™(SOT-23) Package Outline

Dimensions are shown in millimeters (inches)



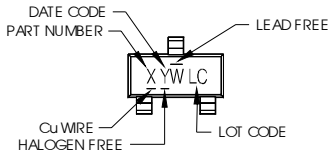

**Recommended Footprint**




| 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 |
| θ | 0 | 8 | 0 | 8 |

1. DIMENSIONING & TOLERANCING PER ANSI Y14.5M-1994
2. DIMENSIONS ARE SHOWN IN MILLIMETERS [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. DIMENSIONS DOES NOT INCLUDE MOLD PROTRUSIONS OR INTERLEAD FLASH. MOLD PROTRUSIONS OR INTERLEAD FLASH SHALL NOT EXCEED 0.25 MM [0.010 INCH] PER SIDE.
7. DIMENSION L IS THE LEAD LENGTH FOR SOLDERING TO A SUBSTRATE.
8. OUTLINE CONFORMS TO JEDEC OUTLINE TO-236 AB.

## Micro3™(SOT-23) Part Marking Information




X = PART NUMBER CODE REFERENCE:

| | |
|---|---|
| A = IRLML2402 | S = IRLML6244 |
| B = IRLML2803 | T = IRLML6246 |
| C = IRLML6302 | U = IRLML6344 |
| D = IRLML5103 | V = IRLML6346 |
| E = IRLML6402 | |
| F = IRLML6401 | |
| G = IRLML2502 | |
| H = IRLML5203 | |
| I = IRLML0030 | |
| J = IRLML2030 | |
| K = IRLML0100 | |
| L = IRLML0060 | |
| M = IRLML0040 | |
| N = IRLML2060 | |
| P = IRLML9301 | |
| R = IRLML9303 | |

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 |

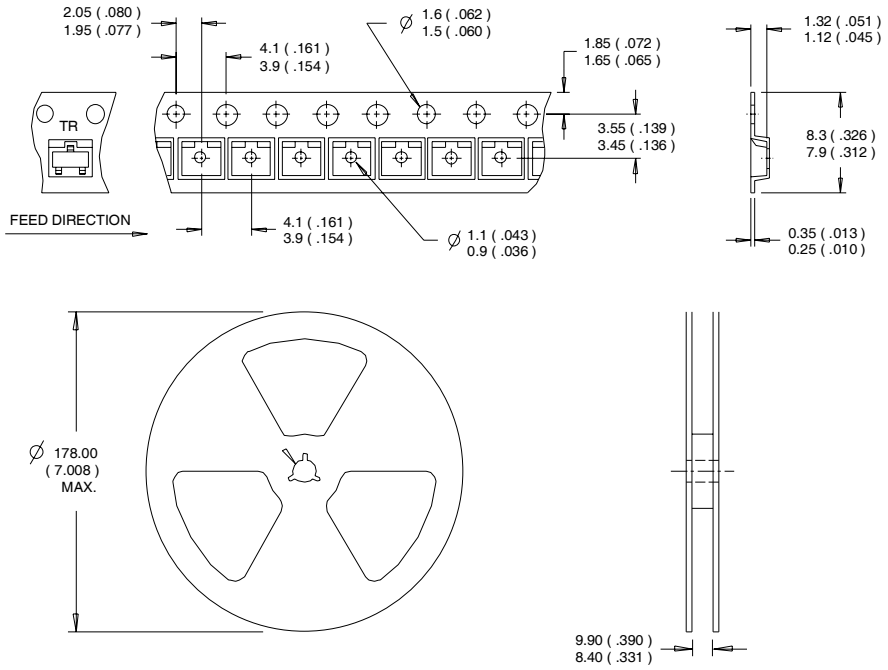
W = (27-52) IF PRECEDED BY A LETTER

| 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/**

## 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/**

| Orderable part number | Package Type | Standard Pack | | Note |
|---|---|---|---|---|
| | | Form | Quantity | |
| IRLML6344TRPbF | 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
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**IR WORLD HEADQUARTERS:** 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
TAC Fax: (310) 252-7903
Visit us at www.irf.com for sales contact information.10/2010