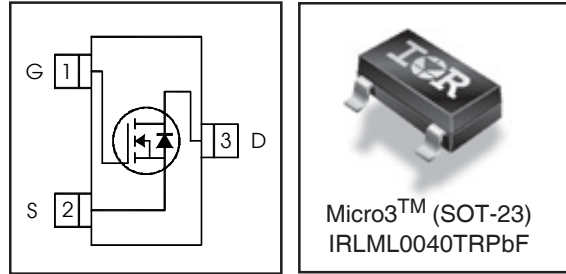


IRLML0040TRPbF

HEXFET® Power MOSFET

V_{DSS}	40	V
$V_{GS\ Max}$	± 16	V
$R_{DS(on)\ max}$ (@ $V_{GS} = 10V$)	56	mΩ
$R_{DS(on)\ max}$ (@ $V_{GS} = 4.5V$)	78	mΩ



Application(s)

- Load/ System Switch
- DC Motor Drive

Features and Benefits

Features

Low $R_{DS(on)}$ ($\leq 56m\Omega$)
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

Absolute Maximum Ratings

Symbol	Parameter	Max.	Units
V_{DS}	Drain-Source Voltage	40	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	3.6	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	2.9	
I_{DM}	Pulsed Drain Current	15	
$P_D @ T_A = 25^\circ C$	Maximum Power Dissipation	1.3	W
$P_D @ T_A = 70^\circ C$	Maximum Power Dissipation	0.8	
	Linear Derating Factor	0.01	
V_{GS}	Gate-to-Source Voltage	± 16	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
www.irf.com

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

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
V _{(BR)DSS}	Drain-to-Source Breakdown Voltage	40	—	—	V	V _{GS} = 0V, I _D = 250μA
ΔV _{(BR)DSS} /ΔT _J	Breakdown Voltage Temp. Coefficient	—	0.04	—	V/°C	Reference to 25°C, I _D = 1mA
R _{DS(on)}	Static Drain-to-Source On-Resistance	—	44	56	mΩ	V _{GS} = 10V, I _D = 3.6A ②
		—	62	78		V _{GS} = 4.5V, I _D = 2.9A ②
V _{GS(th)}	Gate Threshold Voltage	1.0	1.8	2.5	V	V _{DS} = V _{GS} , I _D = 25μA
I _{DSS}	Drain-to-Source Leakage Current	—	—	20	μA	V _{DS} = 40V, V _{GS} = 0V
		—	—	250		V _{DS} = 40V, V _{GS} = 0V, T _J = 125°C
I _{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	V _{GS} = 16V
	Gate-to-Source Reverse Leakage	—	—	-100		V _{GS} = -16V
R _G	Internal Gate Resistance	—	1.1	—	Ω	
g _{fs}	Forward Transconductance	6.2	—	—	S	V _{DS} = 10V, I _D = 3.6A
Q _g	Total Gate Charge	—	2.6	3.9	nC	I _D = 3.6A
Q _{gs}	Gate-to-Source Charge	—	0.7	—		V _{DS} = 20V
Q _{gd}	Gate-to-Drain ("Miller") Charge	—	1.4	—		V _{GS} = 4.5V ②
t _{d(on)}	Turn-On Delay Time	—	5.1	—	ns	V _{DD} = 20V
t _r	Rise Time	—	5.4	—		I _D = 1.0A
t _{d(off)}	Turn-Off Delay Time	—	6.4	—		R _G = 6.8 Ω
t _f	Fall Time	—	4.3	—		V _{GS} = 4.5V
C _{iss}	Input Capacitance	—	266	—	pF	V _{GS} = 0V
C _{oss}	Output Capacitance	—	49	—		V _{DS} = 25V
C _{riss}	Reverse Transfer Capacitance	—	29	—		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	—	—	15		
V _{SD}	Diode Forward Voltage	—	—	1.2	V	T _J = 25°C, I _S = 1.3A, V _{GS} = 0V ②
t _{rr}	Reverse Recovery Time	—	10	—	ns	T _J = 25°C, V _R = 32V, I _F = 1.3 A
Q _{rr}	Reverse Recovery Charge	—	9.3	—	nC	di/dt = 100A/μs ②

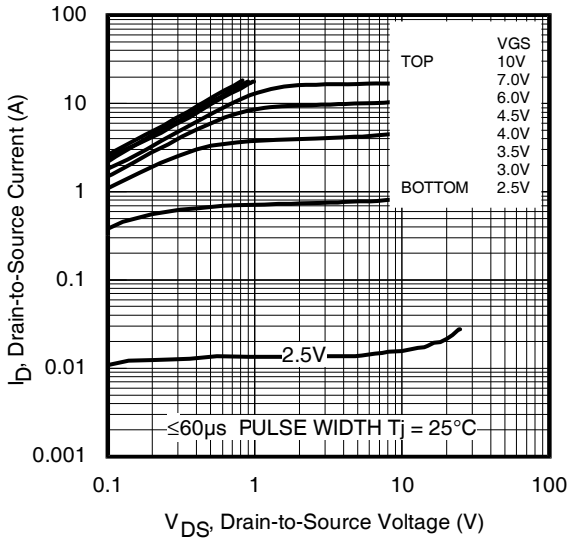


Fig 1. Typical Output Characteristics

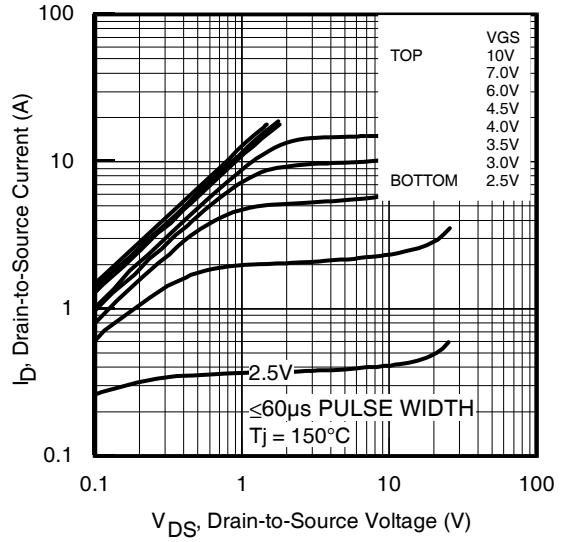


Fig 2. Typical Output Characteristics

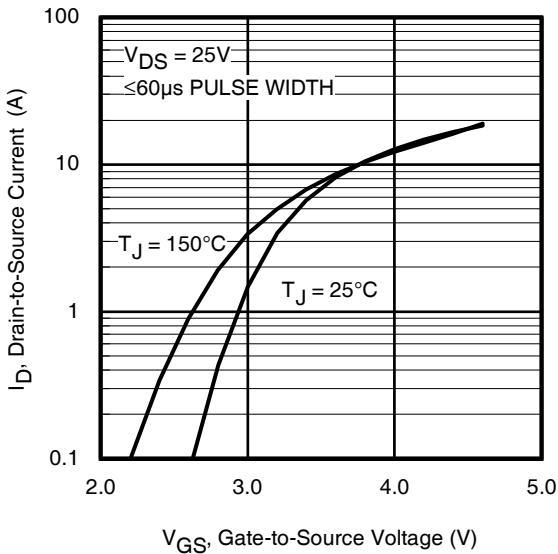


Fig 3. Typical Transfer Characteristics

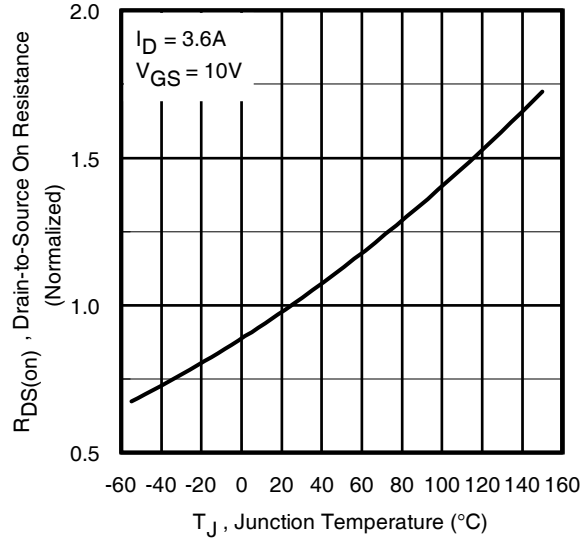


Fig 4. Normalized On-Resistance Vs. Temperature

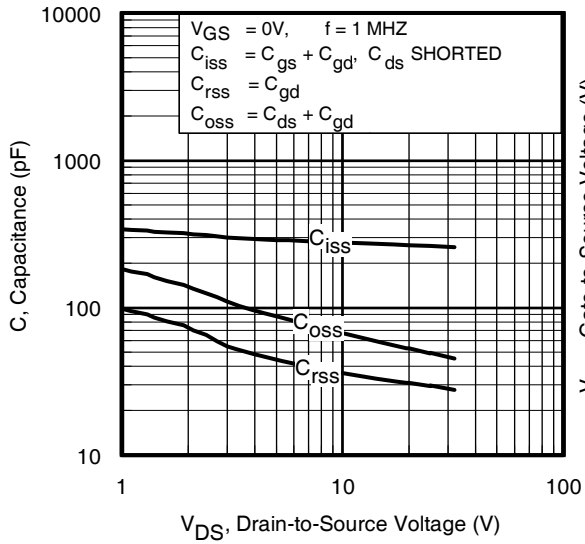


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

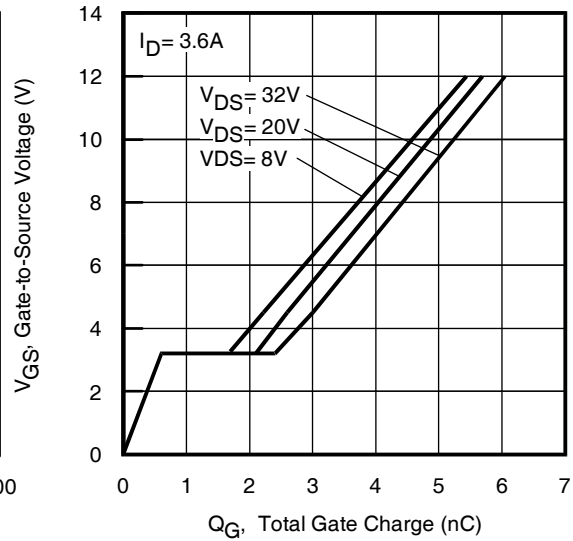


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

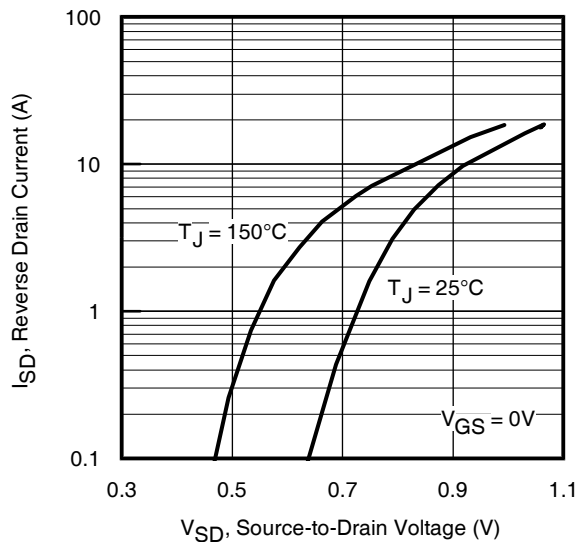


Fig 7. Typical Source-Drain Diode Forward Voltage

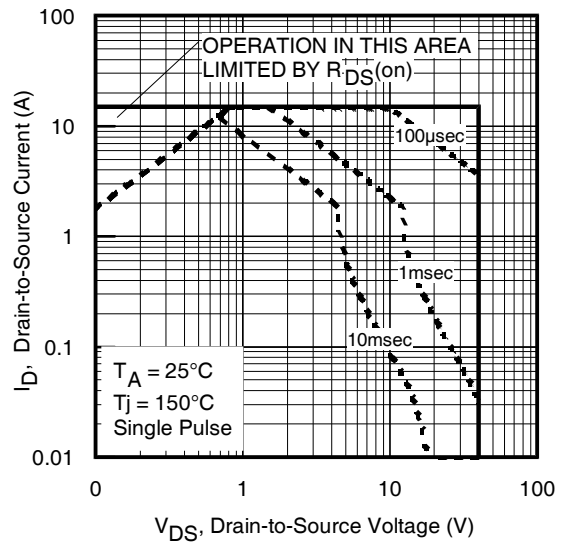


Fig 8. Maximum Safe Operating Area

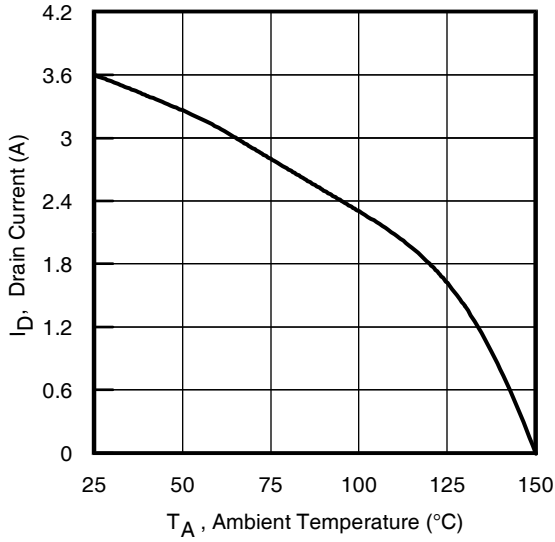


Fig 9. Maximum Drain Current Vs. Ambient Temperature

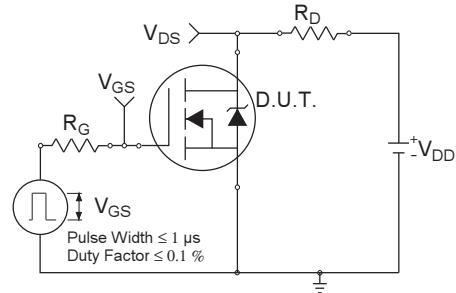


Fig 10a. Switching Time Test Circuit



Fig 10b. Switching Time Waveforms

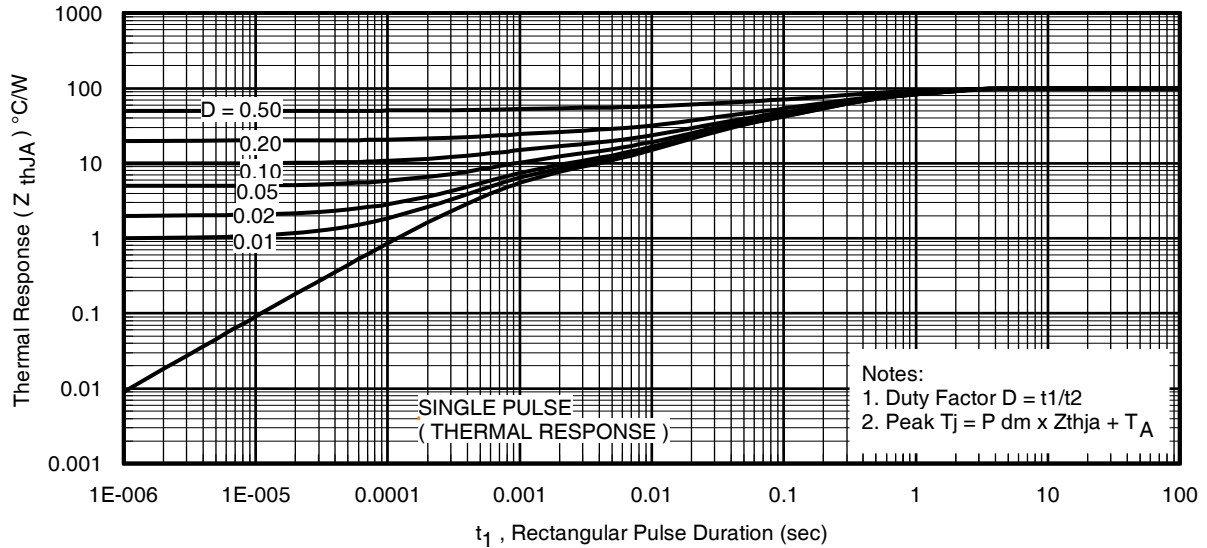


Fig 11. Typical Effective Transient Thermal Impedance, Junction-to-Ambient

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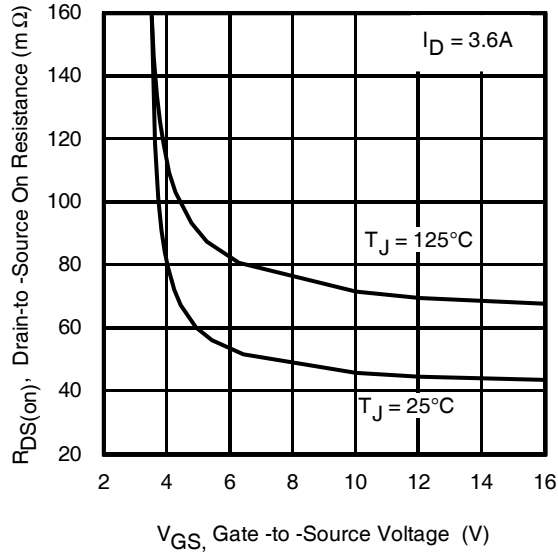


Fig 12. Typical On-Resistance Vs. Gate Voltage

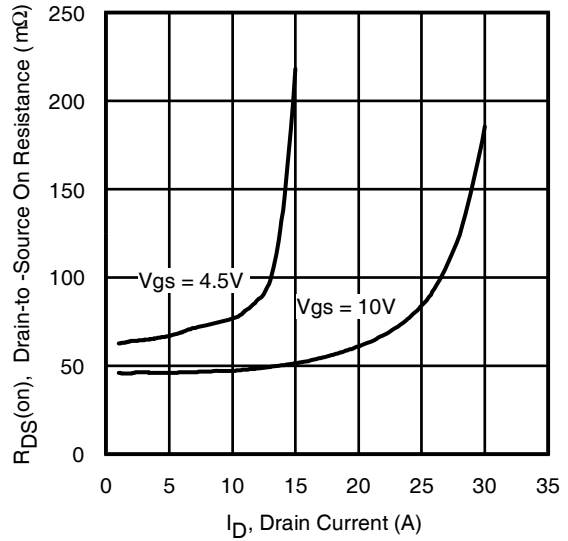


Fig 13. Typical On-Resistance Vs. Drain Current

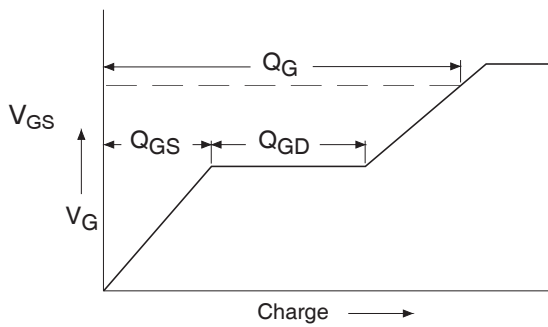


Fig 14a. Basic Gate Charge Waveform

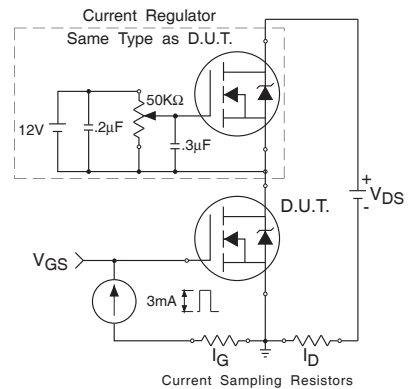


Fig 14b. Gate Charge Test Circuit

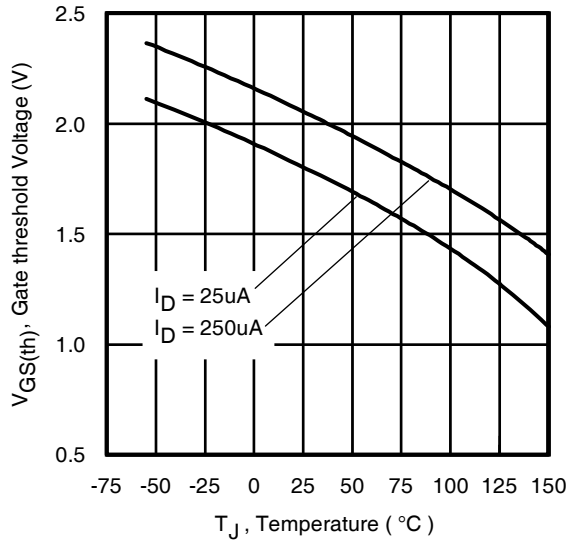


Fig 15. Typical Threshold Voltage Vs. Junction Temperature

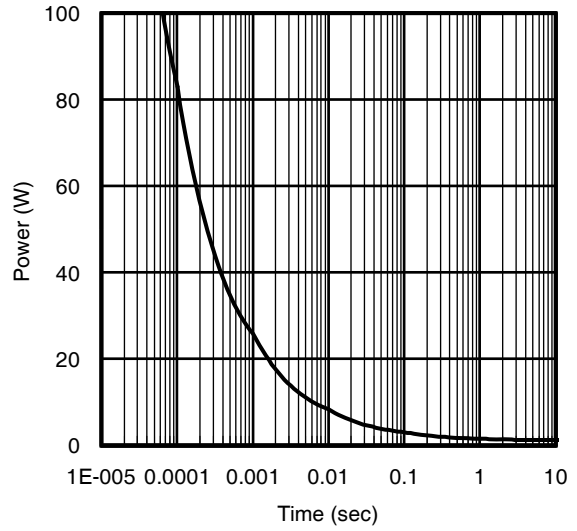
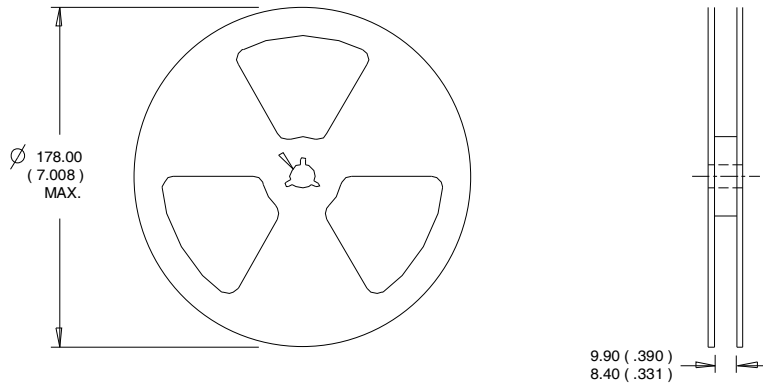
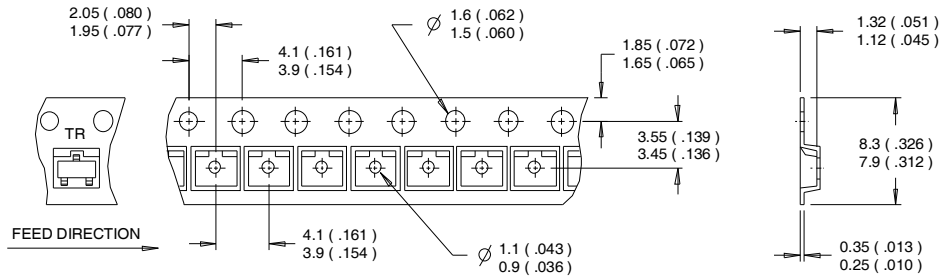


Fig 16. Typical Power Vs. Time

Micro3™ (SOT-23) 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/>
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Orderable part number	Package Type	Standard Pack		Note
		Form	Quantity	
IRLML0040TRPbF	Micro3 (SOT-23)	Tape and Reel	3000	

Qualification information[†]

Qualification level	Consumer ^{††} (per JEDEC JES D47F ^{†††} 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.

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IR WORLD HEADQUARTERS: 101N.Sepulveda blvd, El Segundo, California 90245, USA Tel: (310) 252-7105

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