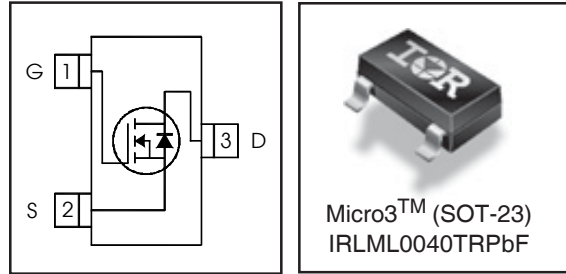


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HEXFET® Power MOSFET

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.

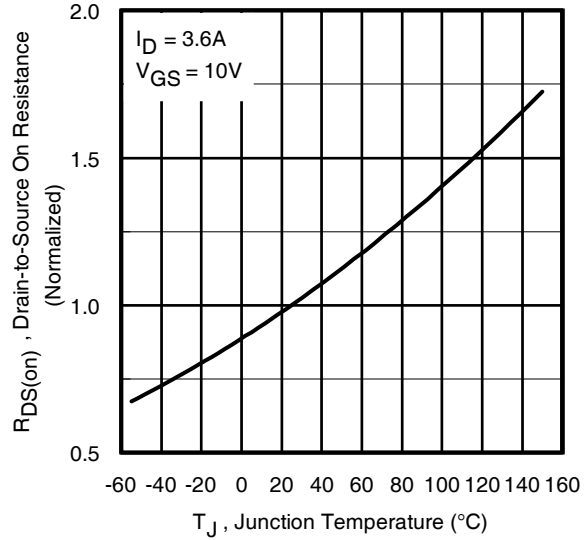
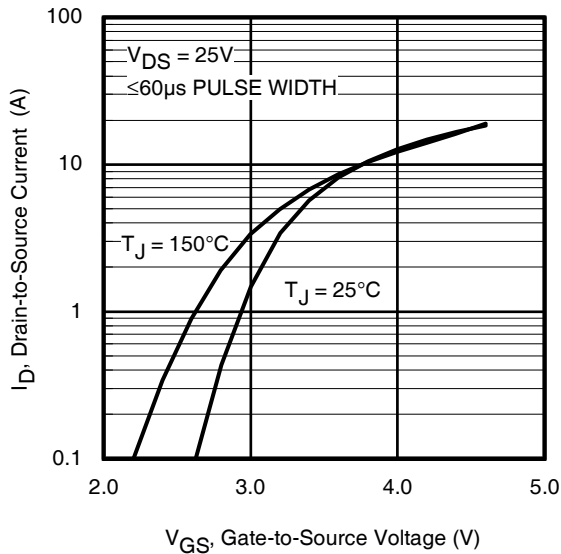
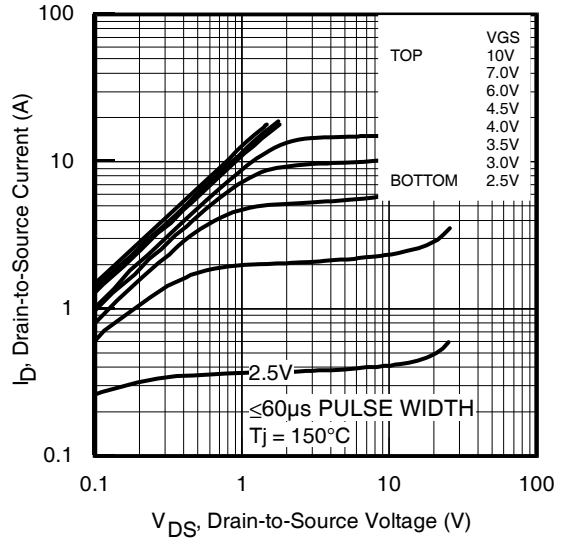
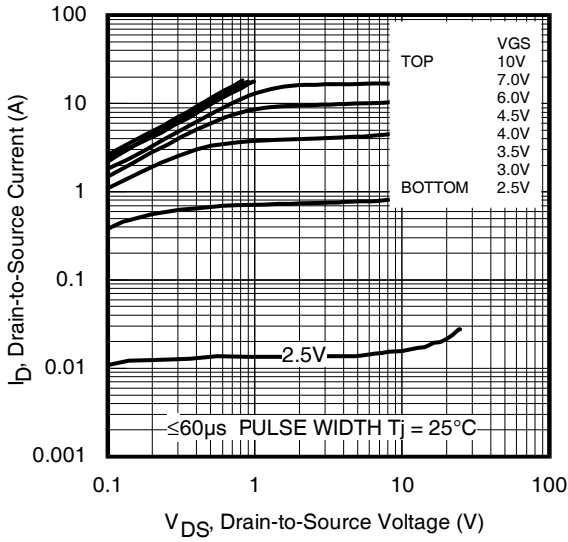
Notes ① through ④ are on page 10
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Electric Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	40	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.04	—	V/°C	Reference to $25^\circ\text{C}, I_D = 1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	44	56	m Ω	$V_{GS} = 10V, I_D = 3.6A$ 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	$V_{DS} = V_{GS}, I_D = 25\mu A$
I_{DSS}	Drain-to-Source Leakage Current	—	—	20	μA	$V_{DS} = 40V, V_{GS} = 0V$
		—	—	250		$V_{DS} = 40V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
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	—		$R_G = 6.8\ \Omega$
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	—		$f = 1.0\text{MHz}$

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	—	10	—	ns	$T_J = 25^\circ\text{C}, V_R = 32V, I_F = 1.3\text{A}$
Q_{rr}	Reverse Recovery Charge	—	9.3	—	nC	$di/dt = 100A/\mu s$ ②



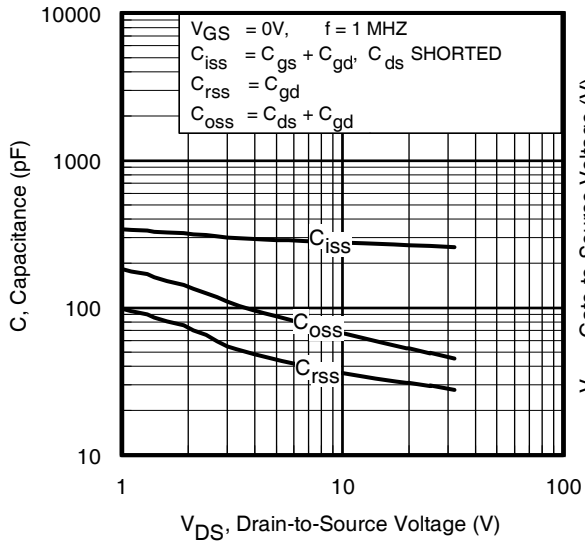


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

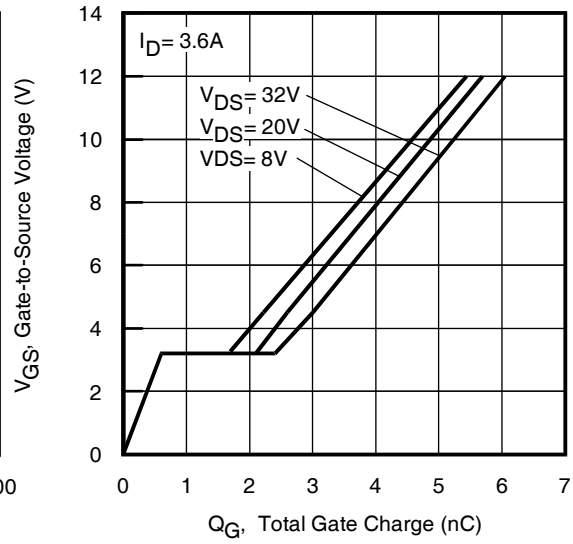


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

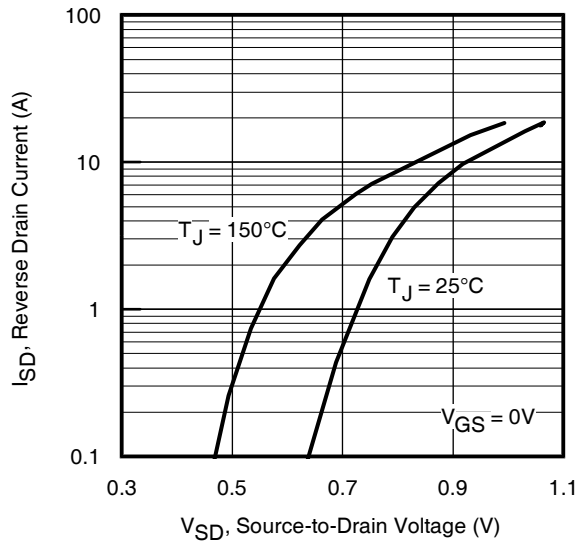


Fig 7. Typical Source-Drain Diode Forward Voltage

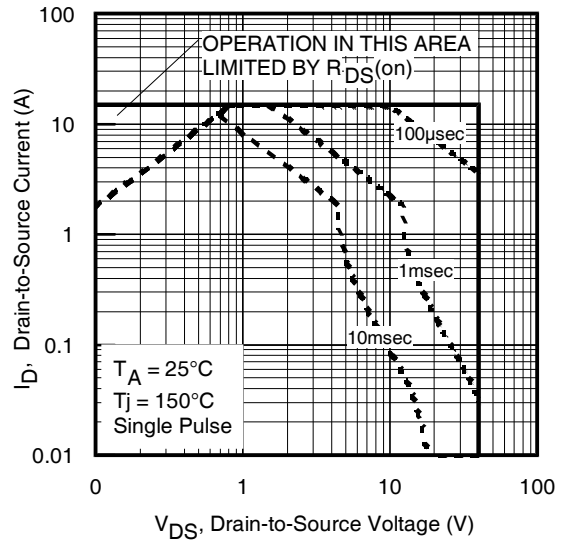


Fig 8. Maximum Safe Operating Area

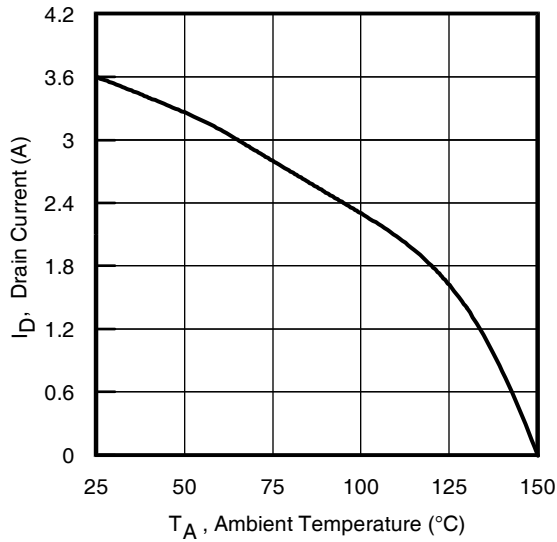


Fig 9. Maximum Drain Current Vs. Ambient Temperature

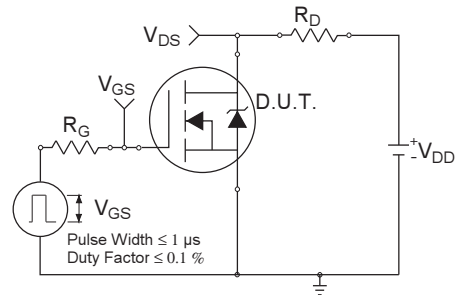


Fig 10a. Switching Time Test Circuit

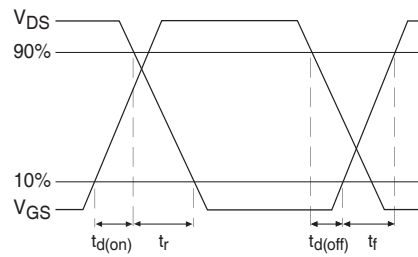


Fig 10b. Switching Time Waveforms

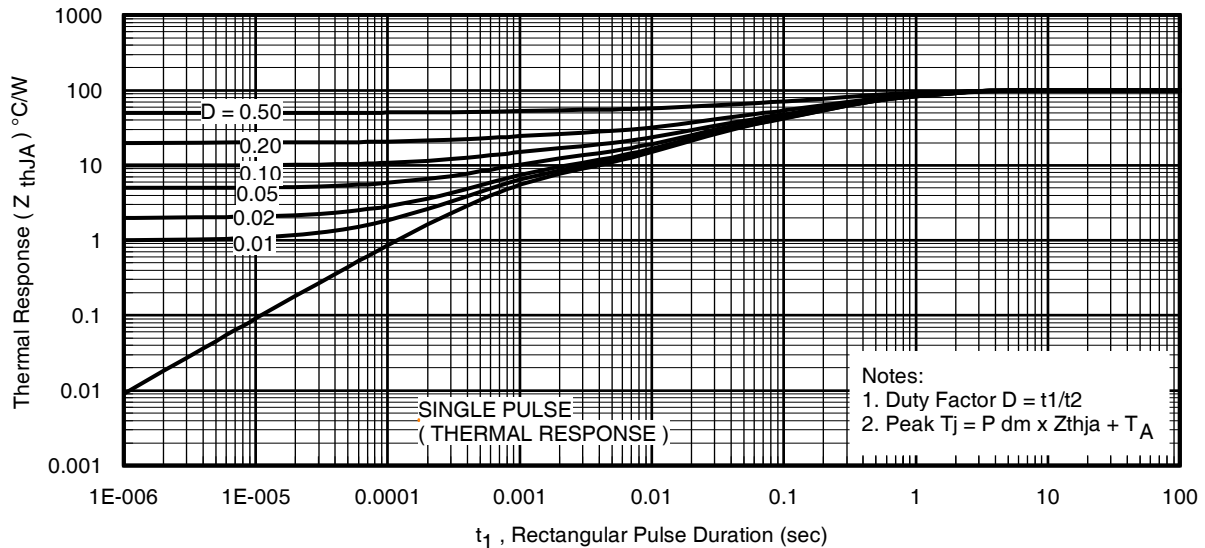


Fig 11. Typical Effective Transient Thermal Impedance, Junction-to-Ambient

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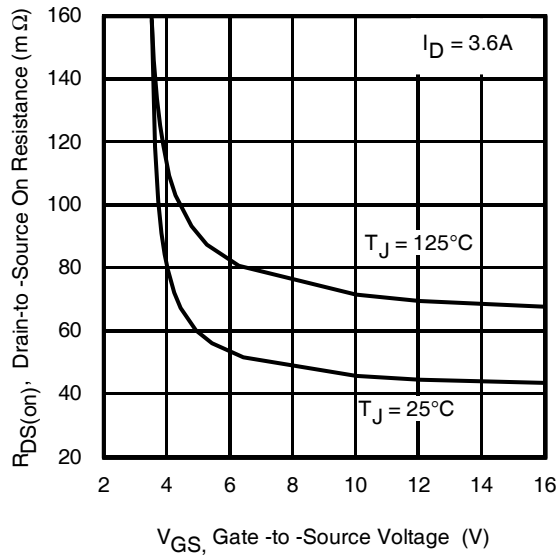


Fig 12. Typical On-Resistance Vs. Gate Voltage

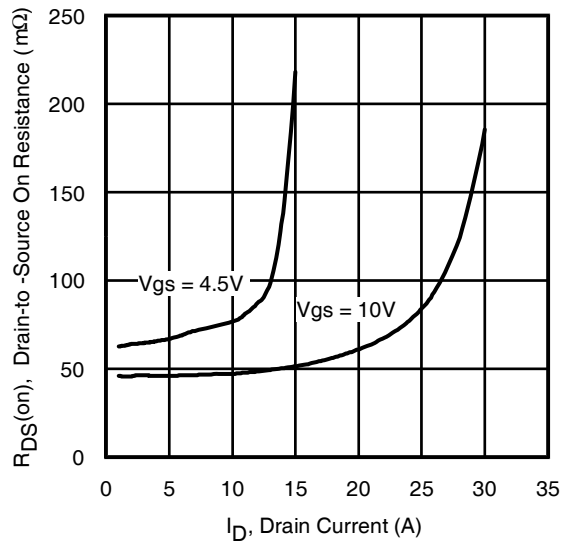


Fig 13. Typical On-Resistance Vs. Drain Current

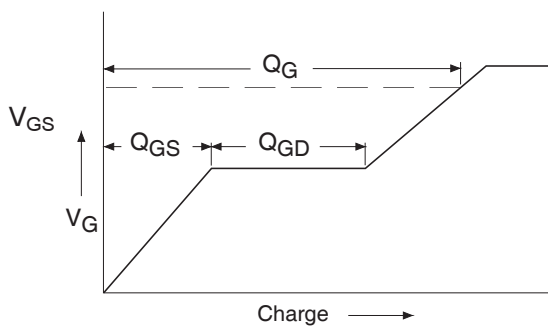


Fig 14a. Basic Gate Charge Waveform

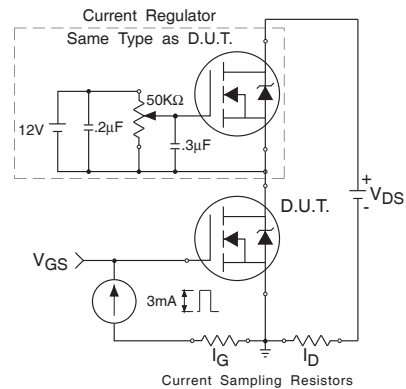


Fig 14b. Gate Charge Test Circuit

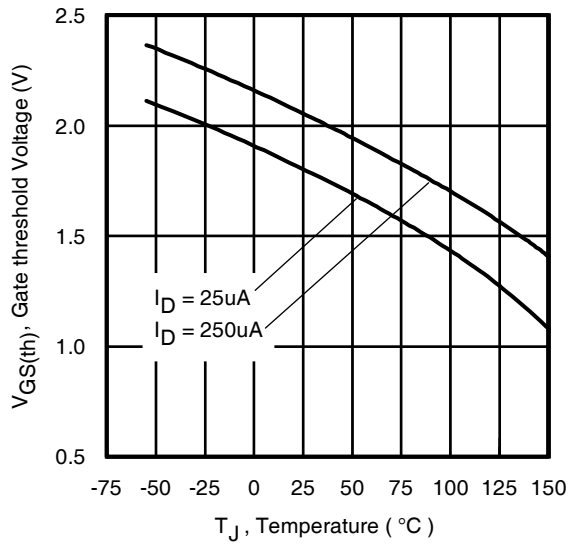


Fig 15. Typical Threshold Voltage Vs. Junction Temperature

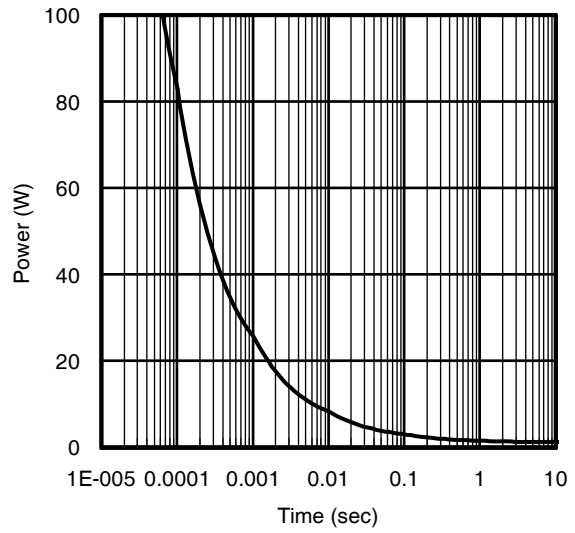
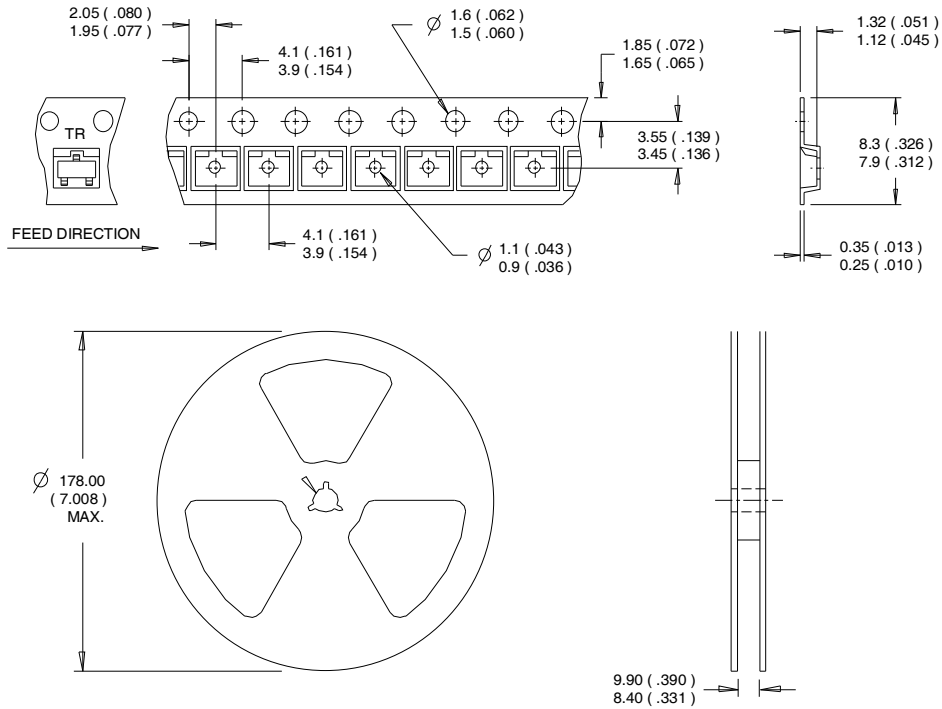


Fig 16. Typical Power Vs. Time

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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IR Rectifier

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.

International
IR Rectifier

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