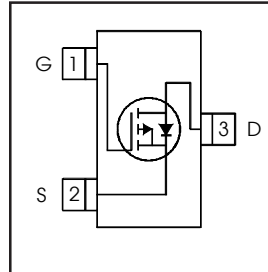


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HEXFET® Power MOSFET

V_{DS}	-20	V
V_{GS} Max	± 12	V
$R_{DS(on)}$ max (@ $V_{GS} = -4.5V$)	54	mΩ
$R_{DS(on)}$ max (@ $V_{GS} = -2.5V$)	95	mΩ



Application(s)

- System/Load Switch

Features and Benefits

Features

Low $R_{DS(on)}$ ($\leq 54m\Omega$)
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	-20	V
I_D @ $T_A = 25^\circ C$	Continuous Drain Current, V_{GS} @ -4.5V	-4.3	A
I_D @ $T_A = 70^\circ C$	Continuous Drain Current, V_{GS} @ -4.5V	-3.4	
I_{DM}	Pulsed Drain Current	-18	
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	± 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
www.irf.com


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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	-20	—	—	V	$V_{GS} = 0V, I_D = -250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.01	—	V/ $^\circ\text{C}$	Reference to $25^\circ\text{C}, I_D = -1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	42	54	m Ω	$V_{GS} = -4.5V, I_D = -4.3A$ ②
		—	71	95		$V_{GS} = -2.5V, I_D = -3.4A$ ②
$V_{GS(th)}$	Gate Threshold Voltage	-0.4	—	-1.1	V	$V_{DS} = V_{GS}, I_D = -10\mu A$
I_{DSS}	Drain-to-Source Leakage Current	—	—	1	μA	$V_{DS} = -16V, V_{GS} = 0V$
		—	—	150		$V_{DS} = -16V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
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	—	8.9	—	Ω	
g_{fs}	Forward Transconductance	6.5	—	—	S	$V_{DS} = -10V, I_D = -4.3A$
Q_g	Total Gate Charge	—	6.9	—	nC	$I_D = -4.3A$
Q_{gs}	Gate-to-Source Charge	—	1.0	—		$V_{DS} = -10V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	2.9	—		$V_{GS} = -4.5V$ ②
$t_{d(on)}$	Turn-On Delay Time	—	7.0	—	ns	$V_{DD} = -10V$ ②
t_r	Rise Time	—	12	—		$I_D = -1A$
$t_{d(off)}$	Turn-Off Delay Time	—	34	—		$R_G = 6.8\Omega$
t_f	Fall Time	—	25	—		$V_{GS} = -4.5V$
C_{iss}	Input Capacitance	—	570	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	160	—		$V_{DS} = -16V$
C_{rss}	Reverse Transfer Capacitance	—	110	—		$f = 1.0\text{KHz}$

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	—	—	-18		
V_{SD}	Diode Forward Voltage	—	—	-1.2	V	$T_J = 25^\circ\text{C}, I_S = -4.3A, V_{GS} = 0V$ ②
t_{rr}	Reverse Recovery Time	—	21	32	ns	$T_J = 25^\circ\text{C}, V_R = -16V, I_F = -4.3A$
Q_{rr}	Reverse Recovery Charge	—	9.0	14	nC	$di/dt = 100A/\mu s$ ②

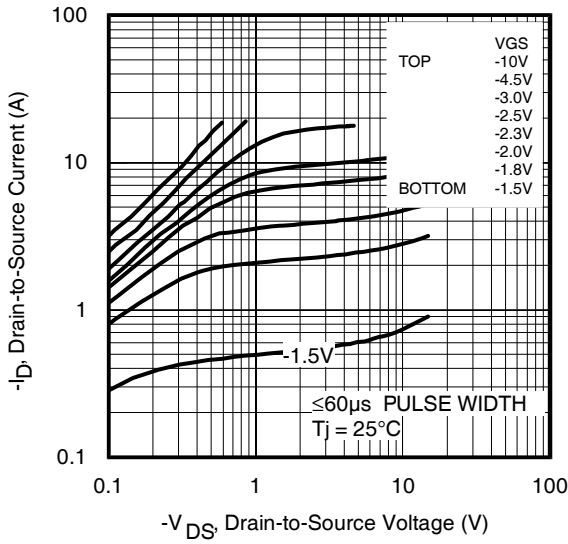


Fig 1. Typical Output Characteristics

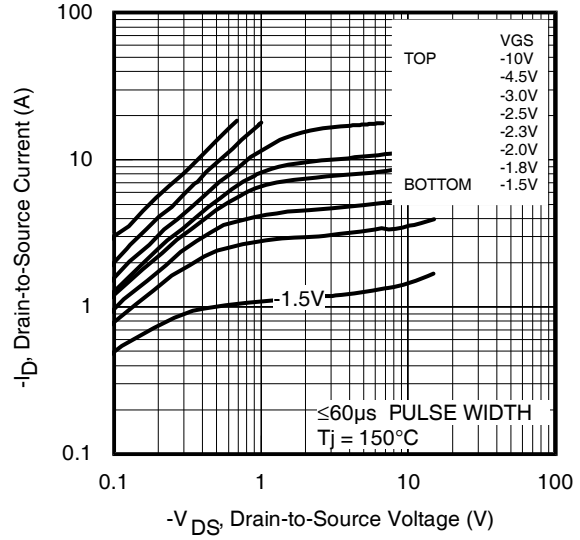


Fig 2. Typical Output Characteristics

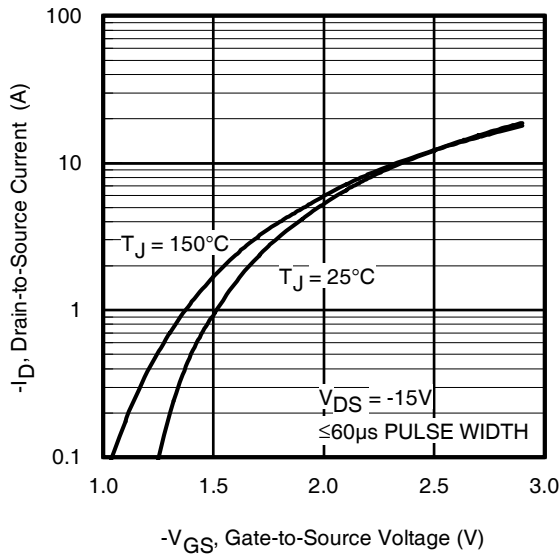


Fig 3. Typical Transfer Characteristics

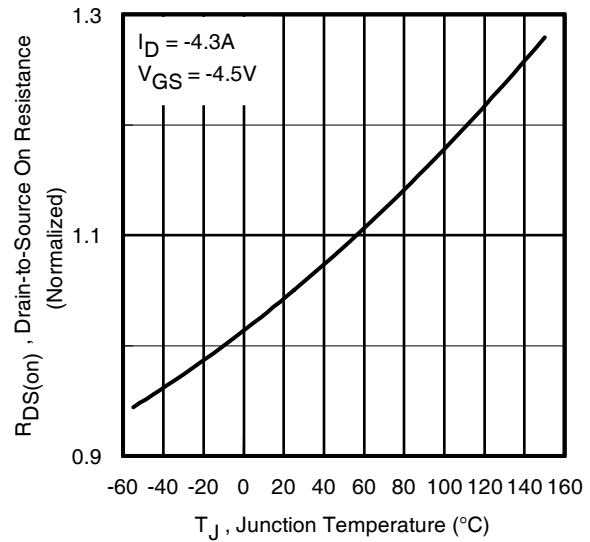


Fig 4. Normalized On-Resistance Vs. Temperature

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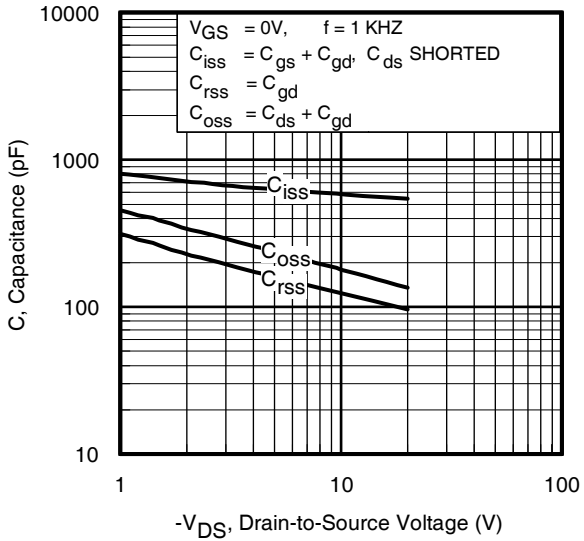


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

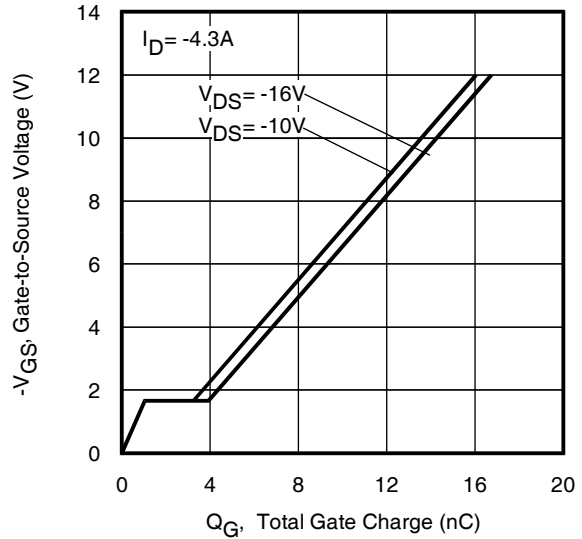


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

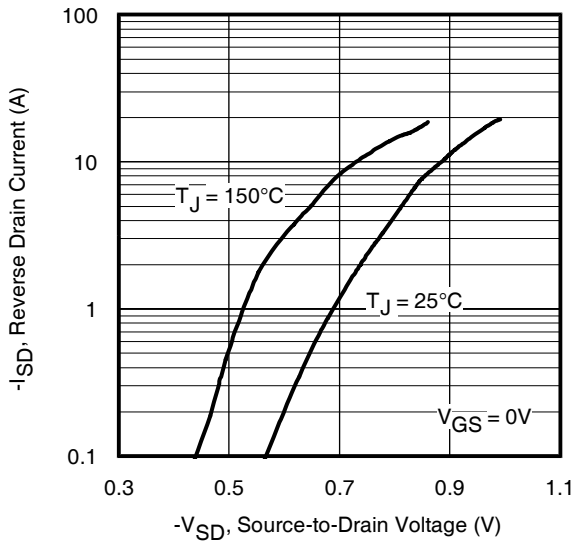


Fig 7. Typical Source-Drain Diode Forward Voltage

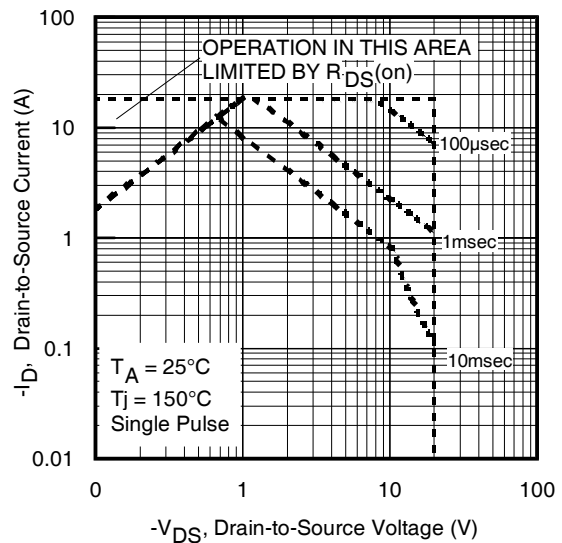


Fig 8. Maximum Safe Operating Area

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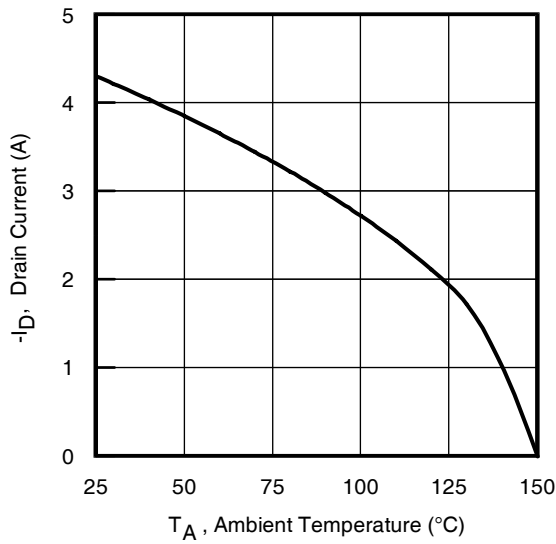


Fig 9. Maximum Drain Current Vs. Ambient Temperature

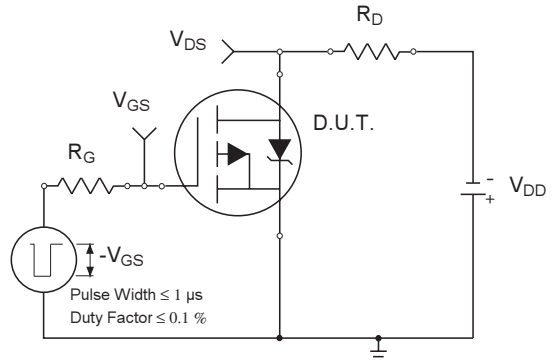


Fig 10a. Switching Time Test Circuit

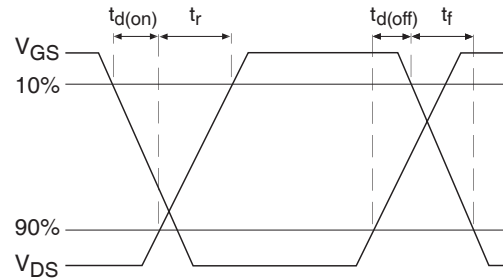


Fig 10b. Switching Time Waveforms

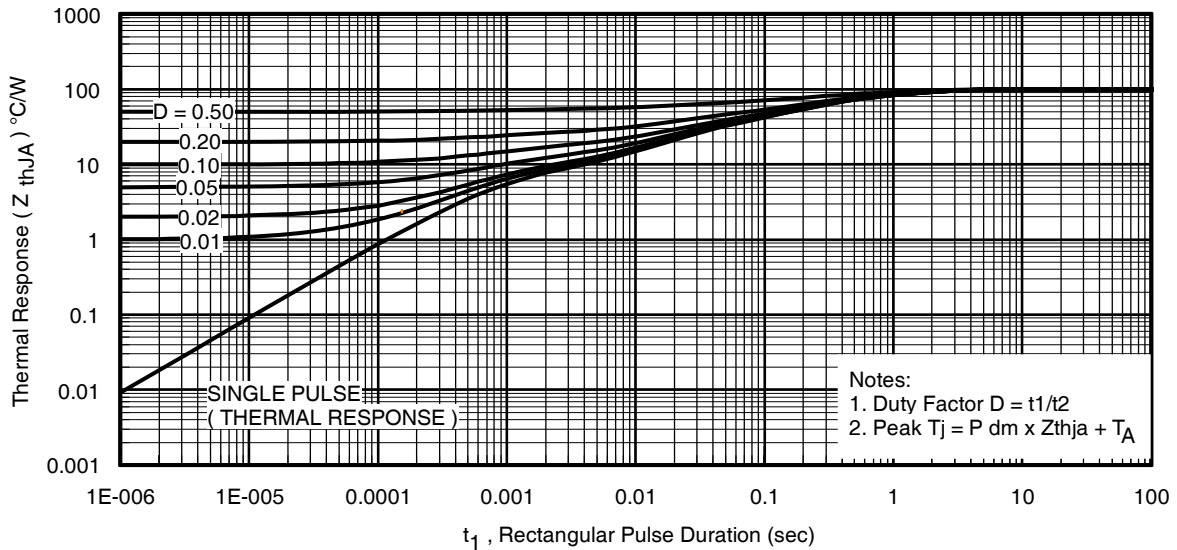


Fig 11. Typical Effective Transient Thermal Impedance, Junction-to-Ambient

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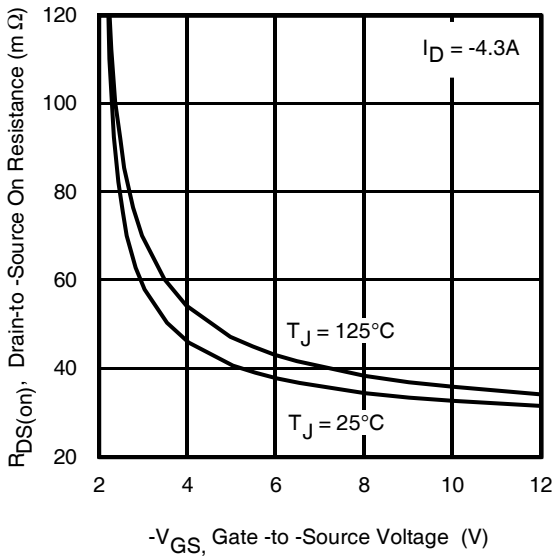


Fig 12. Typical On-Resistance Vs. Gate Voltage

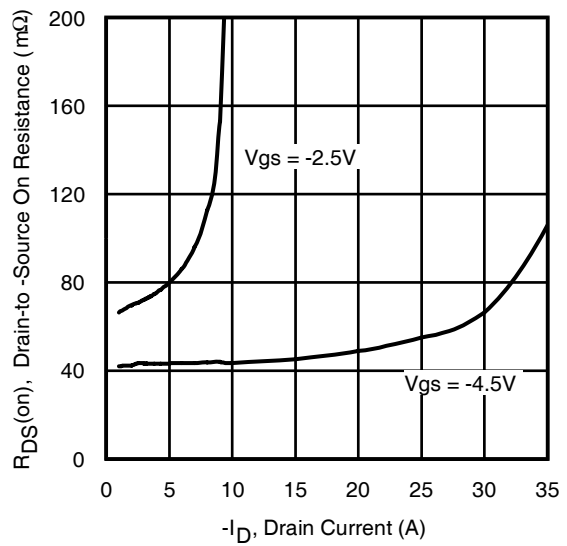


Fig 13. Typical On-Resistance Vs. Drain Current

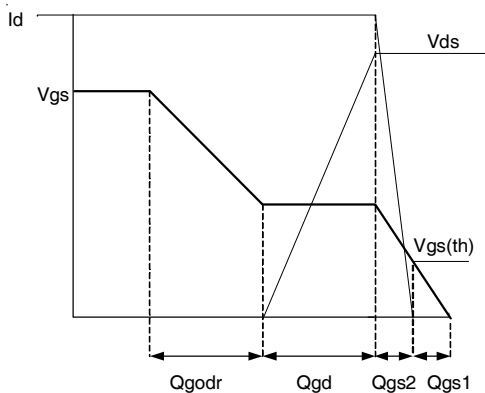


Fig 14a. Basic Gate Charge Waveform

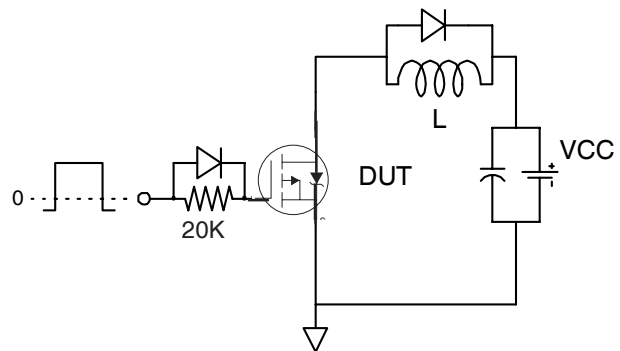


Fig 14b. Gate Charge Test Circuit

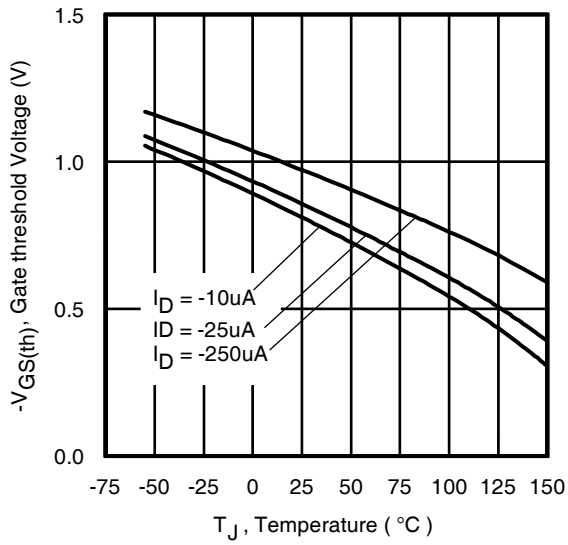


Fig 15. Typical Threshold Voltage Vs. Junction Temperature

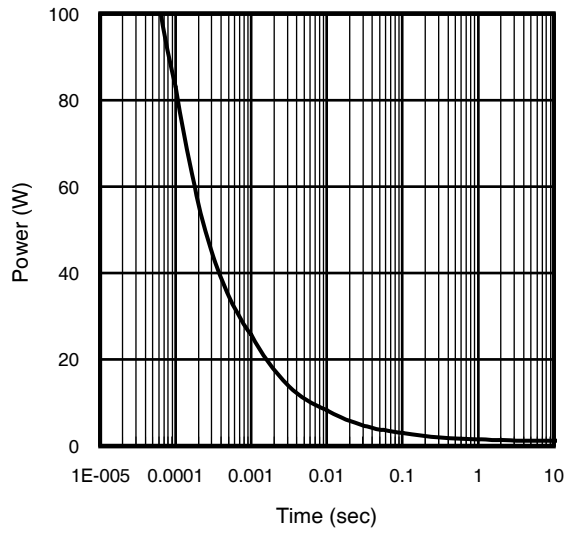


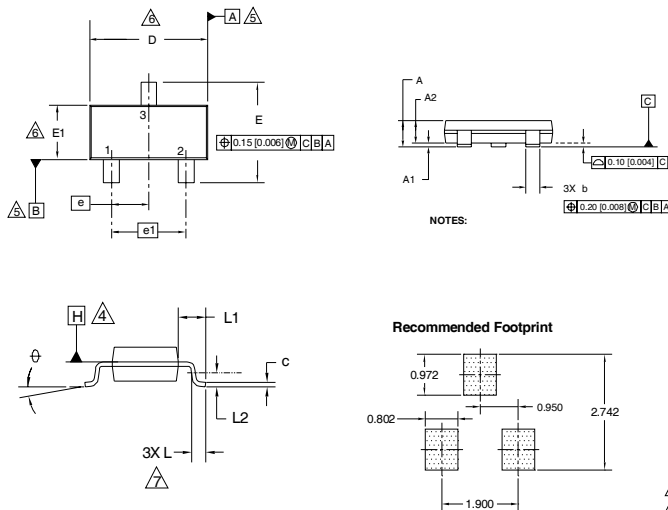
Fig 16. Typical Power Vs. Time

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Micro3 (SOT-23) Package Outline

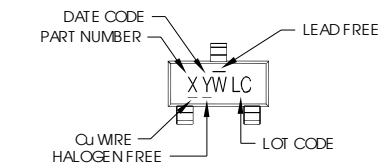
Dimensions are shown in millimeters (inches)



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
⌀	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/TO-236AB) 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 | W = IRFML8244 |
| F = IRLML6401 | X = IRLML2244 |
| G = IRLML2502 | Y = IRLML2246 |
| H = IRLML5203 | Z = IRFML9244 |
| 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

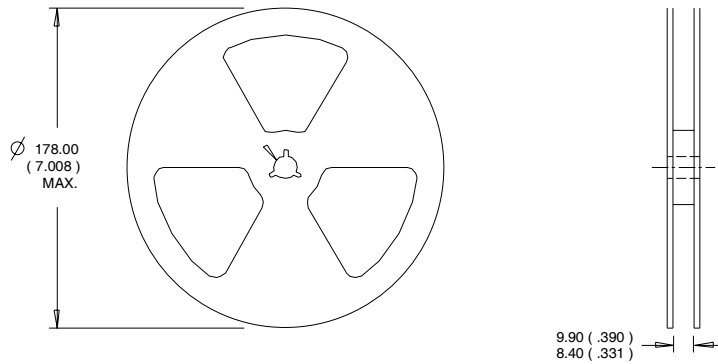
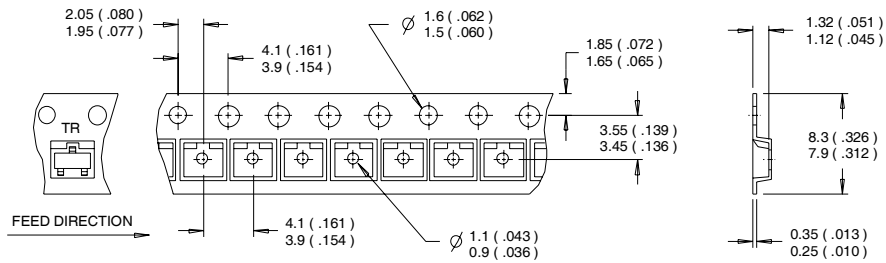
W = (27-52) IF PRECEDED BY A LETTER

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™ 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

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Orderable part number	Package Type	Standard Pack		Note
		Form	Quantity	
IRLML2244TRPbF	Micro3	Tape and Reel	3000	

Qualification information[†]

Qualification level	Consumer ^{††} (per JEDEC JESD47F ^{†††} guidelines)		
Moisture Sensitivity Level	Micro3	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 $\leq 400\mu\text{s}$; duty cycle $\leq 2\%$.
- 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: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
TAC Fax: (310) 252-7903

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