

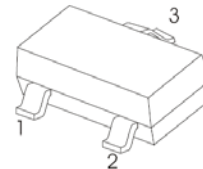
## Features

- $V_{DS} (V) = 30V$
- $R_{DS(ON)} < 27m\Omega$  ( $V_{GS} = 10V$ )
- $R_{DS(ON)} < 40m\Omega$  ( $V_{GS} = 4.5V$ )

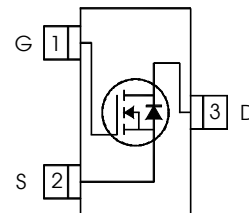
## Benefits

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

### SOT - 23



1. GATE
2. SOURCE
3. DRAIN



## Absolute Maximum Ratings

Symbol	Parameter	Max.	Units
$V_{DS}$	Drain-Source Voltage	30	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	5.3	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	4.3	
$I_{DM}$	Pulsed Drain Current	21	
$P_D @ T_A = 25^\circ C$	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	$\pm 20$	V
$T_J, T_{STG}$	Junction and Storage Temperature Range	-55 to + 150	$^\circ C$

## Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Junction-to-Ambient ③	—	100	$^\circ C/W$
$R_{\theta JA}$	Junction-to-Ambient ( $t < 10s$ ) ④	—	99	

### Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Pulse width  $\leq 400\mu s$ ; duty cycle  $\leq 2\%$ .
- ③ Surface mounted on 1 in square Cu board

**Electric Characteristics @ T<sub>J</sub> = 25°C (unless otherwise specified)**

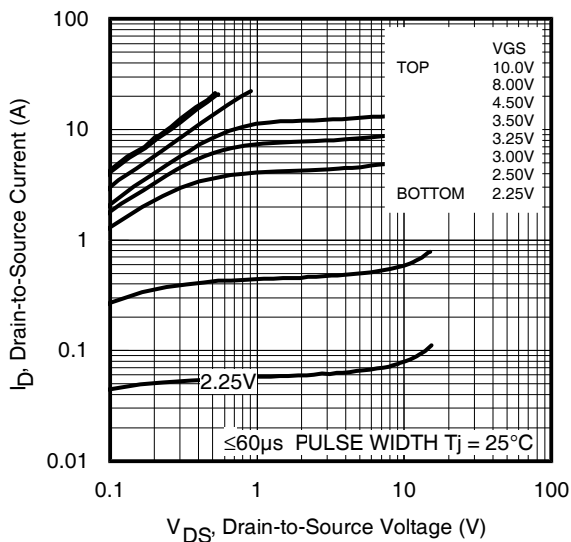
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
V <sub>(BR)DSS</sub>	Drain-to-Source Breakdown Voltage	30	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
ΔV <sub>(BR)DSS</sub> /ΔT <sub>J</sub>	Breakdown Voltage Temp. Coefficient	—	0.02	—	V/°C	Reference to 25°C, I <sub>D</sub> = 1mA
R <sub>DS(on)</sub>	Static Drain-to-Source On-Resistance	—	33	40	mΩ	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 4.2A ②
		—	22	27		V <sub>GS</sub> = 10V, I <sub>D</sub> = 5.2A ②
V <sub>GS(th)</sub>	Gate Threshold Voltage	1.3	1.7	2.3	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 25μA
I <sub>DSS</sub>	Drain-to-Source Leakage Current	—	—	1	μA	V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V
		—	—	150		V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 125°C
I <sub>GSS</sub>	Gate-to-Source Forward Leakage	—	—	100	nA	V <sub>GS</sub> = 20V
	Gate-to-Source Reverse Leakage	—	—	-100		V <sub>GS</sub> = -20V
R <sub>G</sub>	Internal Gate Resistance	—	2.3	—	Ω	
g <sub>fs</sub>	Forward Transconductance	9.5	—	—	S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 5.2A
Q <sub>g</sub>	Total Gate Charge	—	2.6	—	nC	I <sub>D</sub> = 5.2A
Q <sub>gs</sub>	Gate-to-Source Charge	—	0.8	—		V <sub>DS</sub> = 15V
Q <sub>gd</sub>	Gate-to-Drain ("Miller") Charge	—	1.1	—		V <sub>GS</sub> = 4.5V ②
t <sub>d(on)</sub>	Turn-On Delay Time	—	5.2	—	ns	V <sub>DD</sub> = 15V ②
t <sub>r</sub>	Rise Time	—	4.4	—		I <sub>D</sub> = 1.0A
t <sub>d(off)</sub>	Turn-Off Delay Time	—	7.4	—		R <sub>G</sub> = 6.8Ω
t <sub>f</sub>	Fall Time	—	4.4	—		V <sub>GS</sub> = 4.5V
C <sub>iss</sub>	Input Capacitance	—	382	—	pF	V <sub>GS</sub> = 0V
C <sub>oss</sub>	Output Capacitance	—	84	—		V <sub>DS</sub> = 15V
C <sub>rss</sub>	Reverse Transfer Capacitance	—	39	—		f = 1.0MHz

**Source - Drain Ratings and Characteristics**

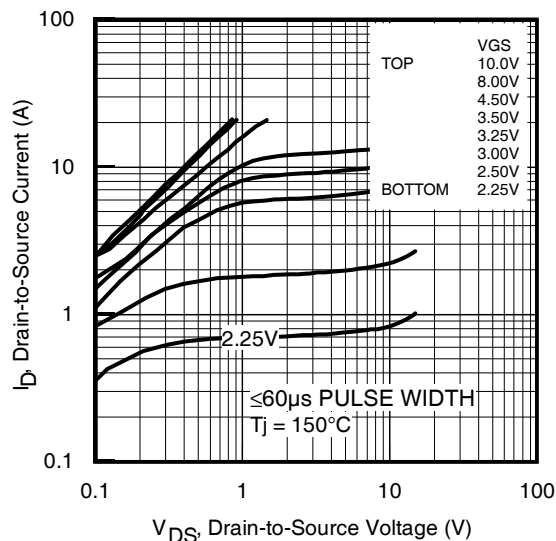
Symbol	Parameter	Min.	Typ.	Max.	Units	
I <sub>S</sub>	Continuous Source Current (Body Diode)	—	—	1.6	A	MOSFET symbol showing the integral reverse p-n junction diode.
I <sub>SM</sub>	Pulsed Source Current (Body Diode) ①	—	—	21		
V <sub>SD</sub>	Diode Forward Voltage	—	—	1.0	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = 1.6A, V <sub>GS</sub> = 0V ②
t <sub>rr</sub>	Reverse Recovery Time	—	11	17	ns	T <sub>J</sub> = 25°C, V <sub>R</sub> = 15V, I <sub>F</sub> = 1.6A
Q <sub>rr</sub>	Reverse Recovery Charge	—	4.0	6.0	nC	di/dt = 100A/μs ②



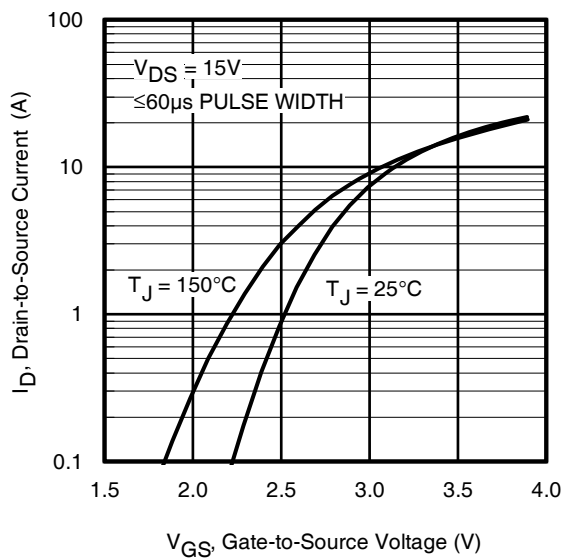
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



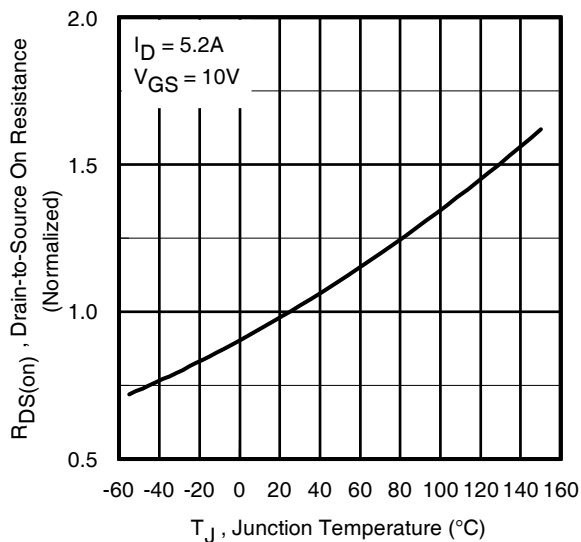
**Fig 1.** Typical Output Characteristics



**Fig 2.** Typical Output Characteristics

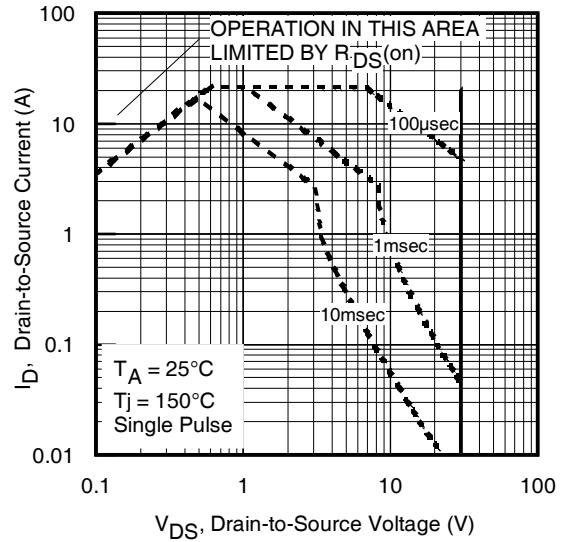
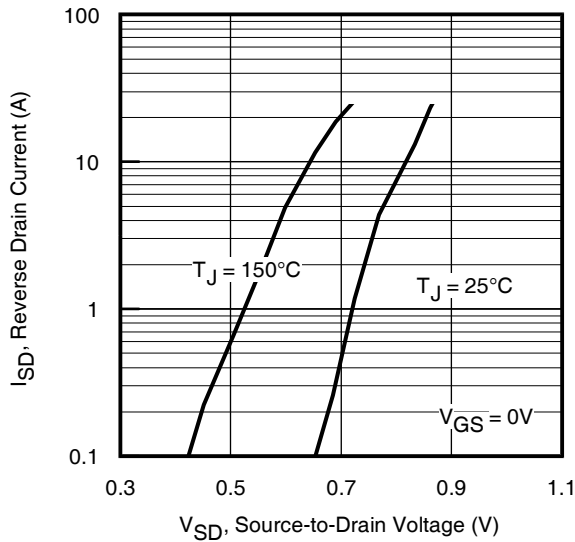
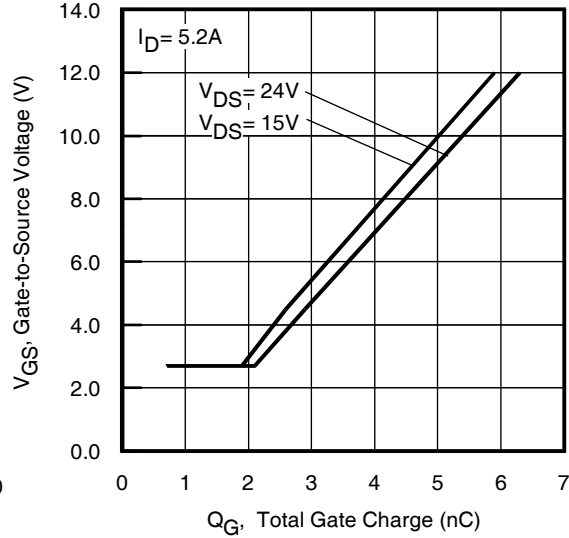
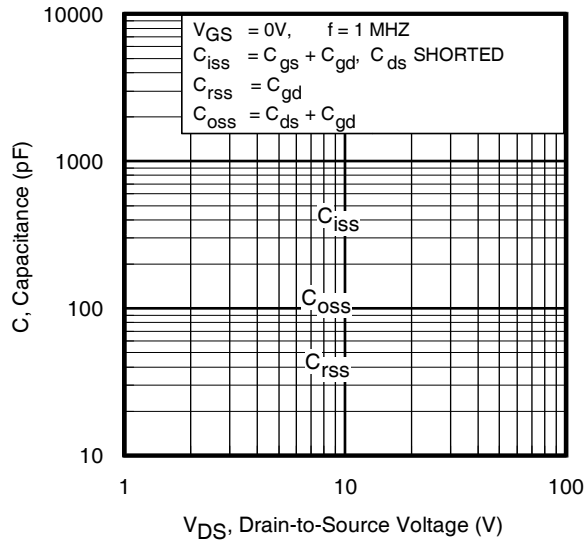


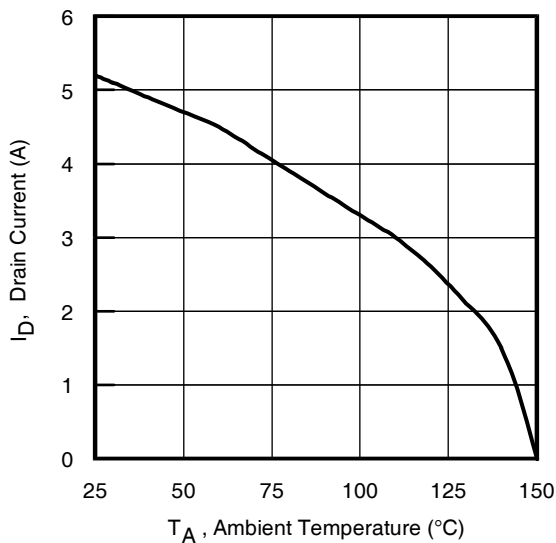
**Fig 3.** Typical Transfer Characteristics



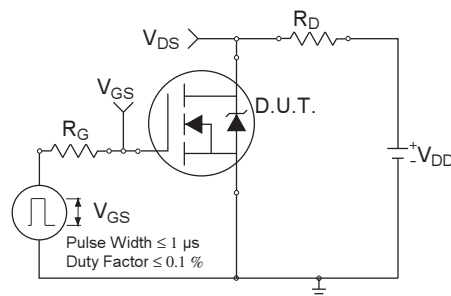
**Fig 4.** Normalized On-Resistance Vs. Temperature

**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted

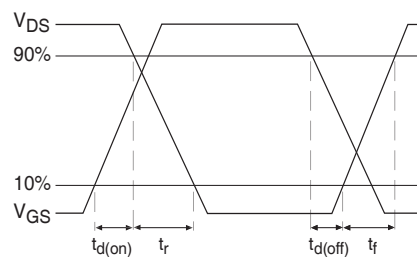




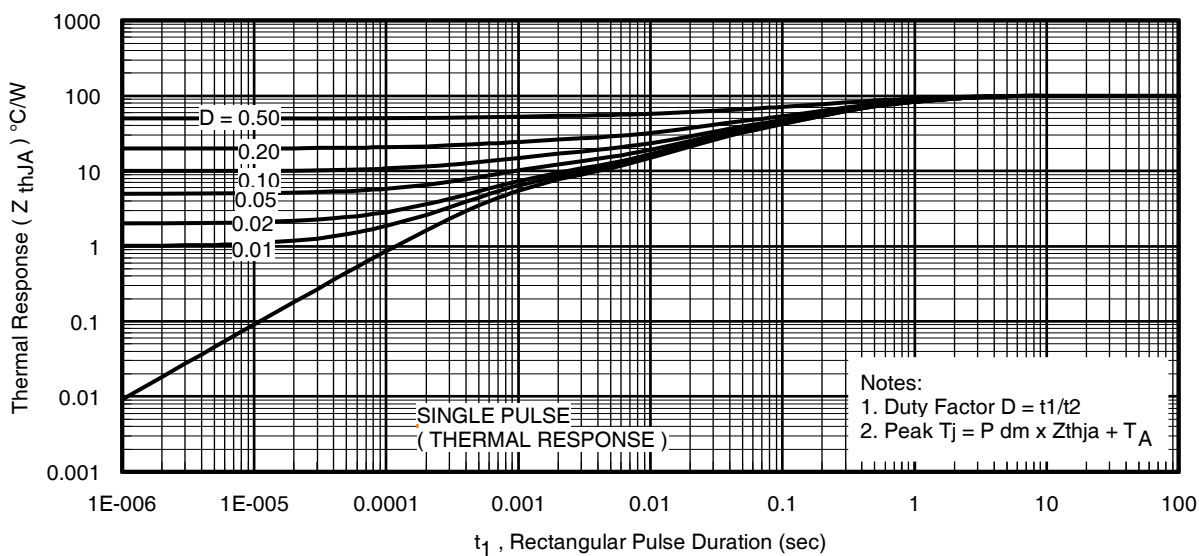
**Fig 9.** Maximum Drain Current Vs. Ambient Temperature



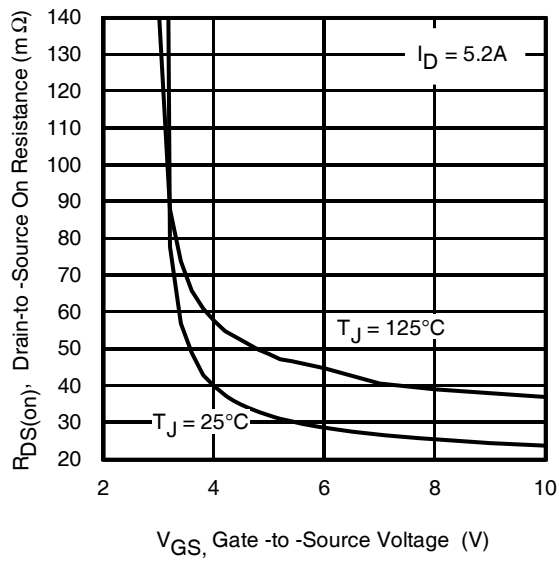
**Fig 10a.** Switching Time Test Circuit



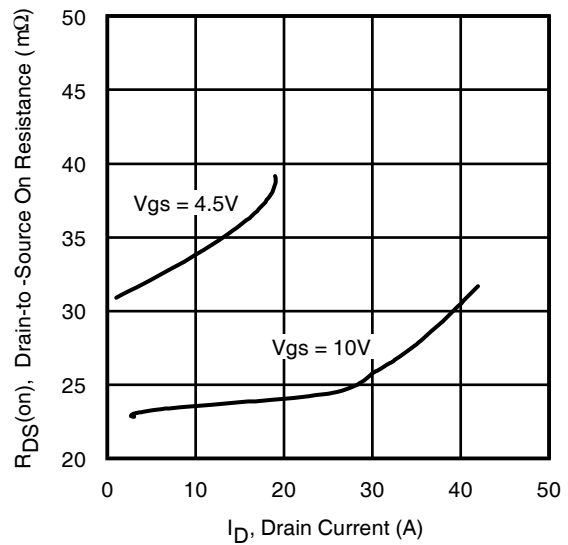
**Fig 10b.** Switching Time Waveforms



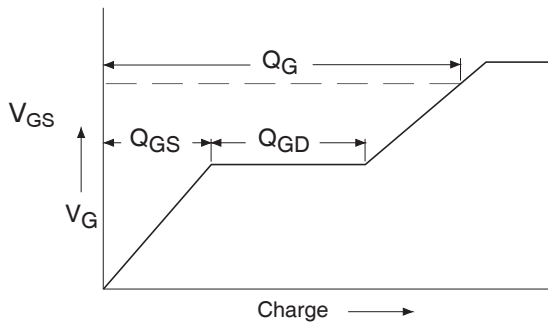
**Fig 11.** Typical Effective Transient Thermal Impedance, Junction-to-Ambient



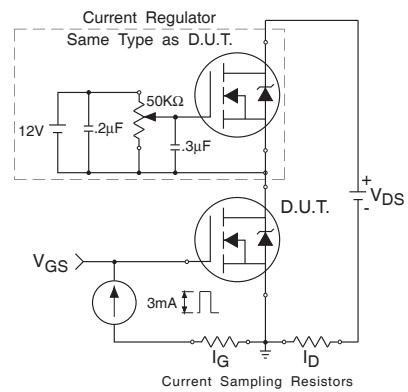
**Fig 12.** Typical On-Resistance Vs. Gate Voltage



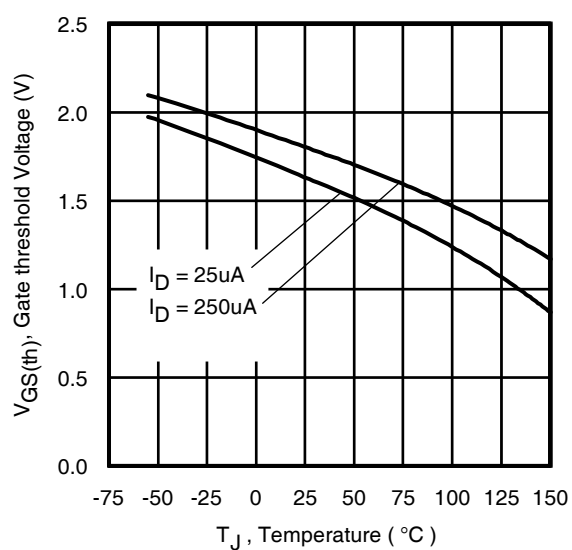
**Fig 13.** Typical On-Resistance Vs. Drain Current



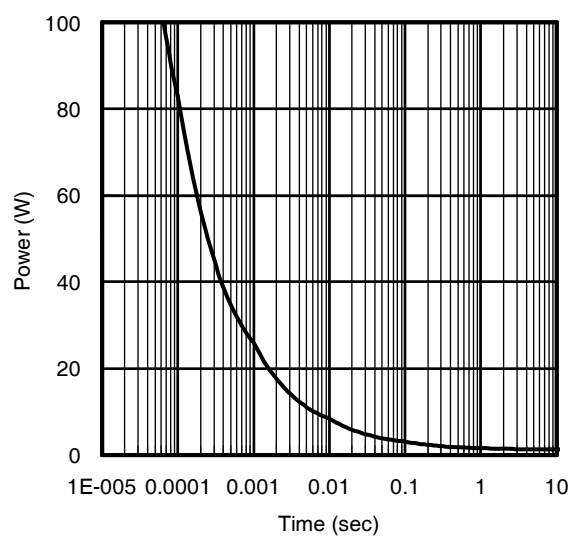
**Fig 14a.** Basic Gate Charge Waveform



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

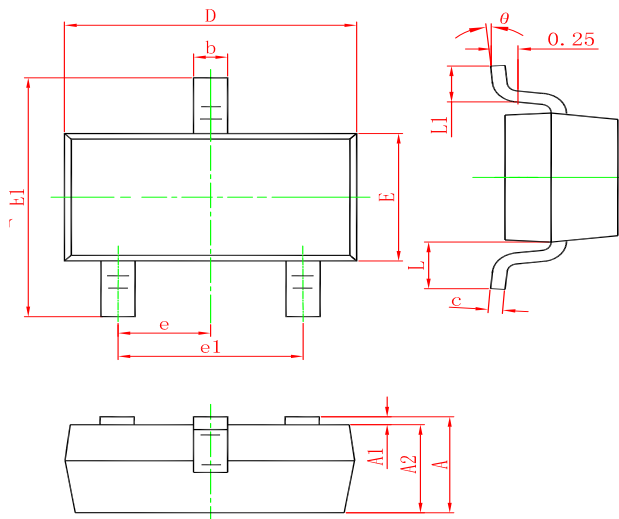


**Fig 15.** Typical Threshold Voltage Vs. Junction Temperature



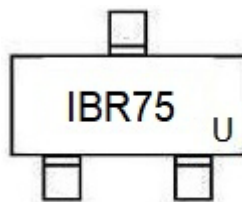
**Fig 16.** Typical Power Vs. Time

## SOT-23 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

## Marking



## Ordering information

Order code	Package	Baseqty	Deliverymode
UMW IRLML0030TR	SOT-23	3000	Tape and reel