

## Features

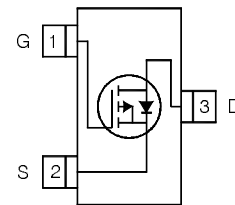
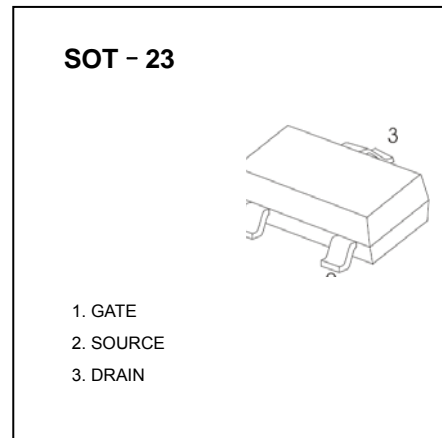
- $V_{DS} (V) = -20V$
- $I_D = 2A$
- $R_{DS(ON)} < 135m\Omega$  ( $V_{GS} = -4.5V$ )
- $R_{DS(ON)} < 236m\Omega$  ( $V_{GS} = -2.5V$ )
- Industry-standard pinout
- Compatible with existing Surface Mount Techniques
- RoHS compliant

## Application(s)

- System/Load Switch

## Benefits

- Multi-vendor compatibility
- Easier manufacturing
- Environmentally friendly
- Increased reliability



## Absolute Maximum Ratings

Symbol	Parameter		Units
$V_{DS}$	Drain-Source Voltage	-20	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -10V$	-2.6	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ -10V$	-2.1	
$I_{DM}$	Pulsed Drain Current	-11	
$P_D @ T_A = 25^\circ C$	Maximum Power Dissipation	1.3	W
$P_D @ T_A = 70^\circ C$	Maximum Power Dissipation	0.80	
	Linear Derating Factor	0.01	W/°C
$V_{GS}$	Gate-to-Source Voltage	$\pm 12$	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	

### 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 @  $T_J = 25^\circ\text{C}$  (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		9.5		mV/ $^\circ\text{C}$	Reference to $25^\circ\text{C}$ , $I_D = -1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance		90	135	m $\Omega$	$V_{GS} = -4.5V, I_D = -2.6A$ ②
			157	236		$V_{GS} = -2.5V, I_D = -2.1A$ 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			-1.0	$\mu A$	$V_{DS} = -16V, V_{GS} = 0V$
				-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		16		$\Omega$	
$g_{fs}$	Forward Transconductance	3.4			S	$V_{DS} = -10V, I_D = -2.6A$
$Q_g$	Total Gate Charge		2.9		nC	$I_D = -2.6A$
$Q_{gs}$	Gate-to-Source Charge		0.52			$V_{DS} = -10V$
$Q_{gd}$	Gate-to-Drain ("Miller") Charge		1.2			$V_{GS} = -4.5V$ ②
$t_{d(on)}$	Turn-On Delay Time		5.3		ns	$V_{DD} = -10V$ ②
$t_r$	Rise Time		7.7			$I_D = -1.0A$
$t_{d(off)}$	Turn-Off Delay Time		26			$R_G = 6.8\Omega$
$t_f$	Fall Time		16			$V_{GS} = -4.5V$
$C_{iss}$	Input Capacitance		220		pF	$V_{GS} = 0V$
$C_{oss}$	Output Capacitance		70			$V_{DS} = -16V$
$C_{rss}$	Reverse Transfer Capacitance		48			$f = 1.0\text{KHz}$

## 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			-11		
$V_{SD}$	Diode Forward Voltage			-1.2	V	$T_J = 25^\circ\text{C}, I_S = -2.6A, V_{GS} = 0V$ ②
$t_{rr}$	Reverse Recovery Time		17	26	ns	$T_J = 25^\circ\text{C}, V_R = -15V, I_F = -2.6A$
$Q_{rr}$	Reverse Recovery Charge		6.2	9.3	nC	$di/dt = 100A/\mu s$ ②

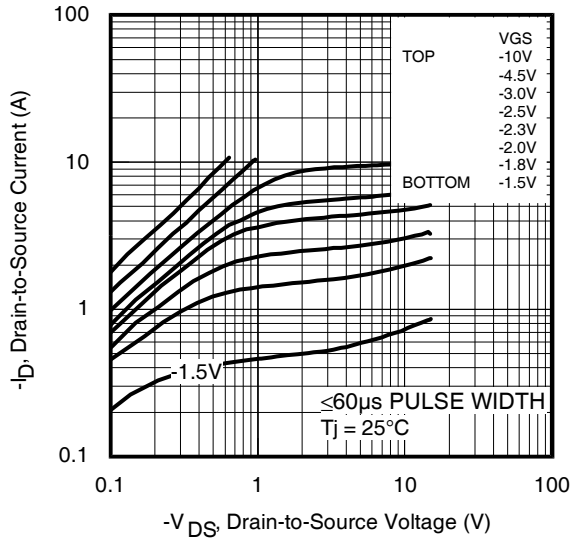


Fig 1. Typical Output Characteristics

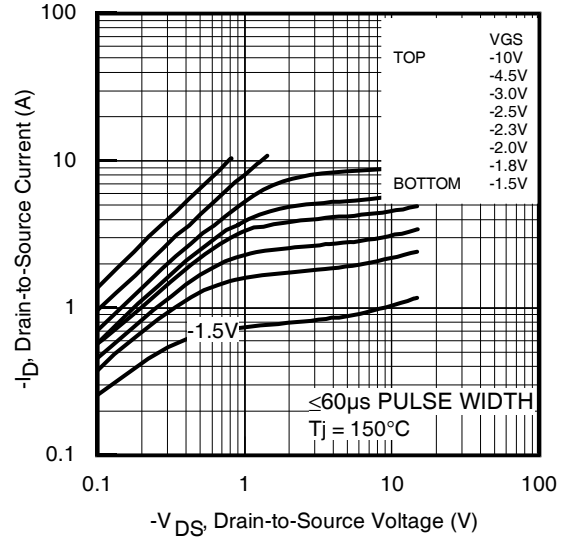


Fig 2. Typical Output Characteristics

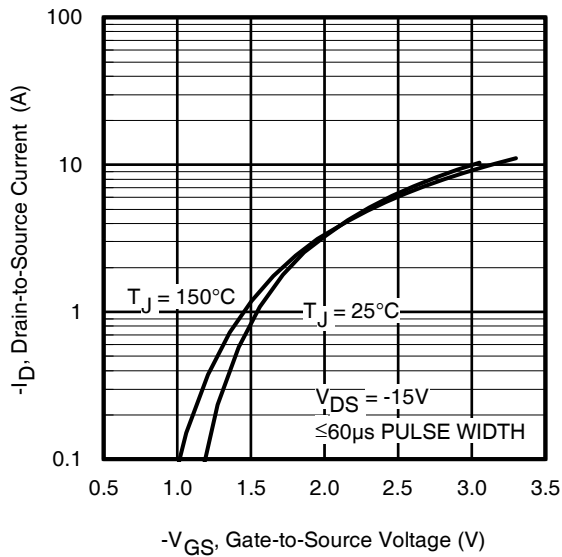


Fig 3. Typical Transfer Characteristics

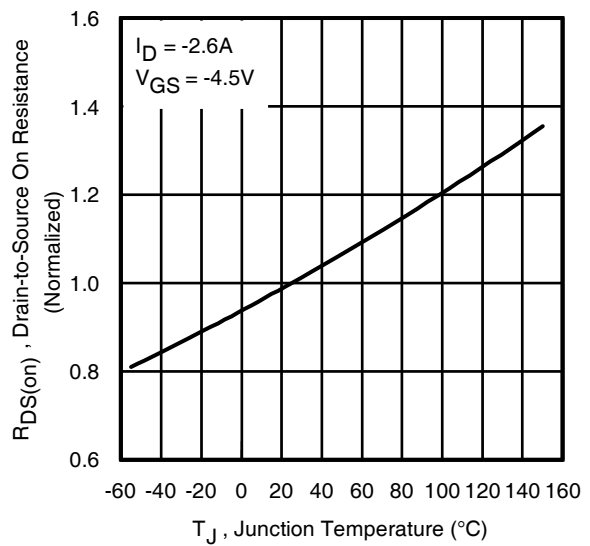


Fig 4. Normalized On-Resistance vs. Temperature

Typical Electrical Characteristics

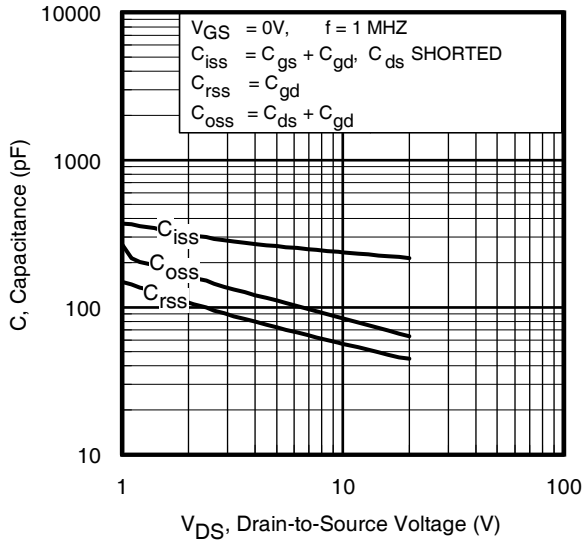


Fig 5. Typical Capacitance vs. Drain-to-Source Voltage

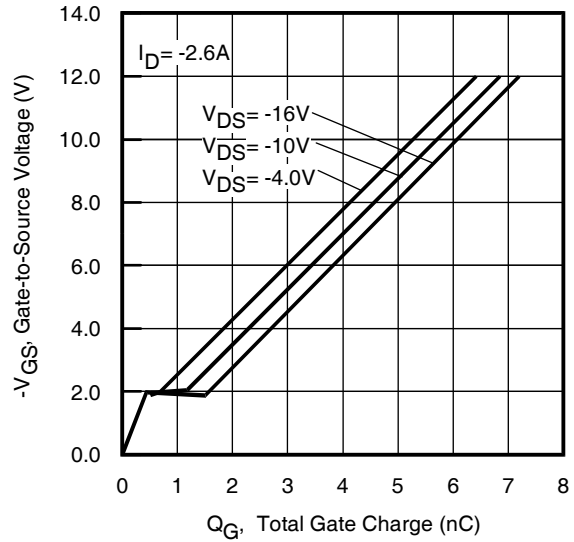


Fig 6. Typical Gate Charge vs. Gate-to-Source Voltage

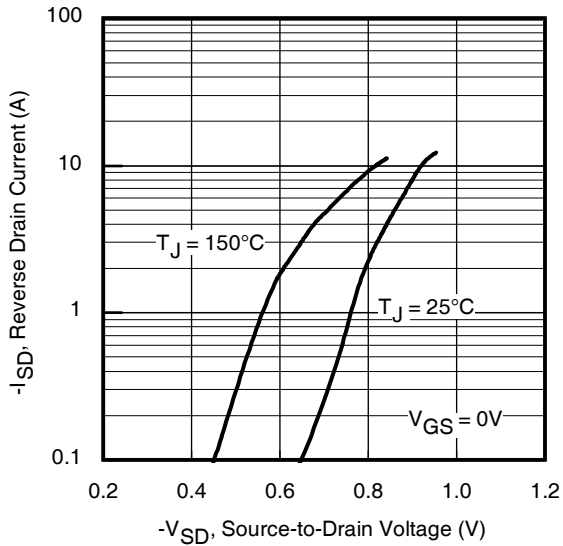


Fig 7. Typical Source-Drain Diode Forward Voltage

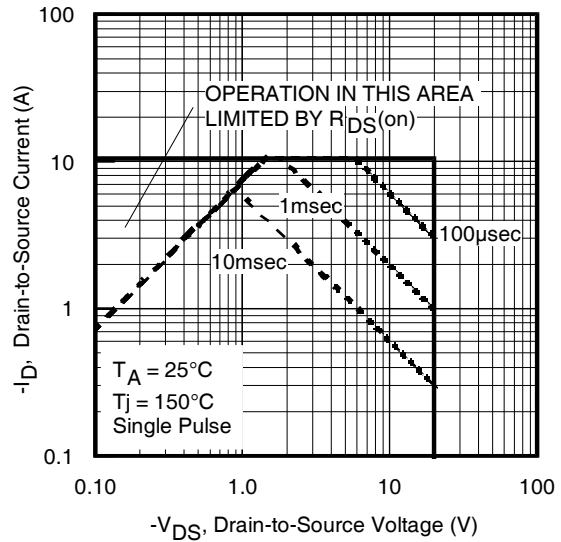


Fig 8. Maximum Safe Operating Area

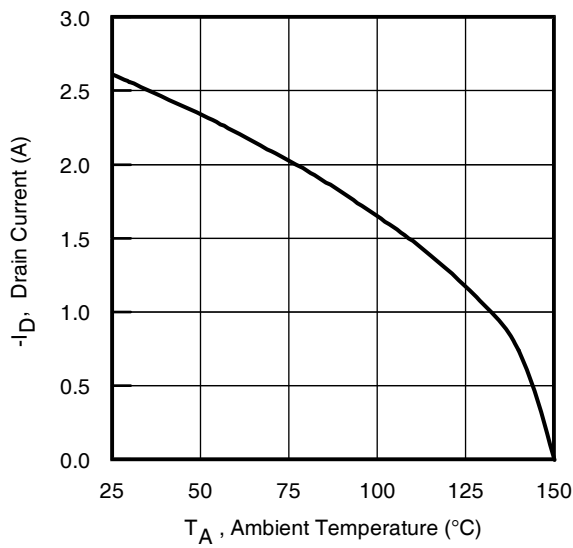


Fig 9. Maximum Drain Current vs. Ambient Temperature

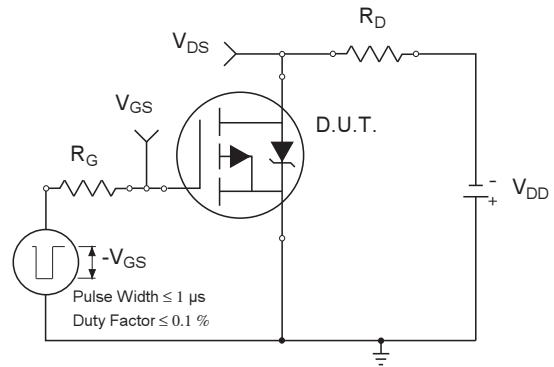


Fig 10a. Switching Time Test Circuit

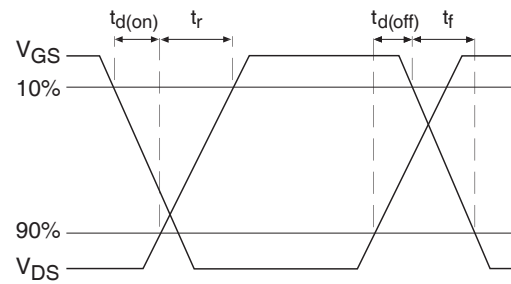


Fig 10b. Switching Time Waveforms

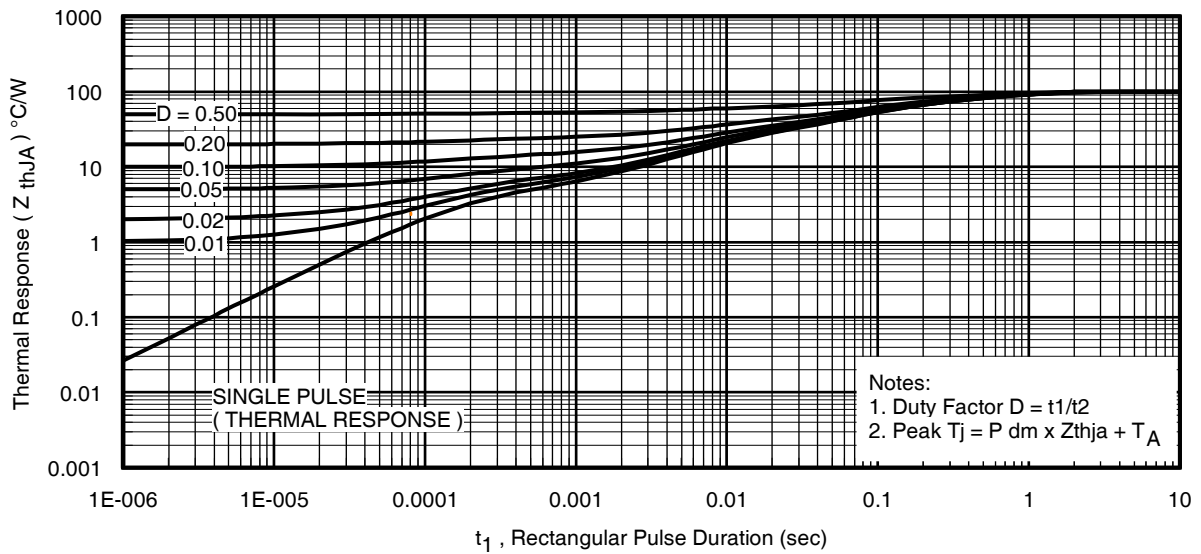


Fig 11. Typical Effective Transient Thermal Impedance, Junction-to-Ambient

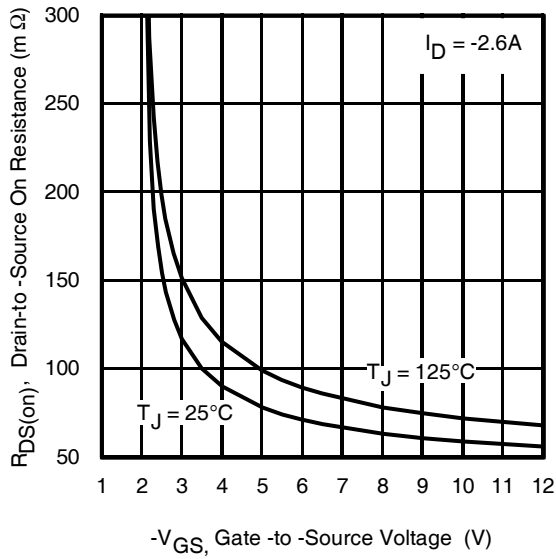


Fig 12. Typical On-Resistance vs. Gate Voltage

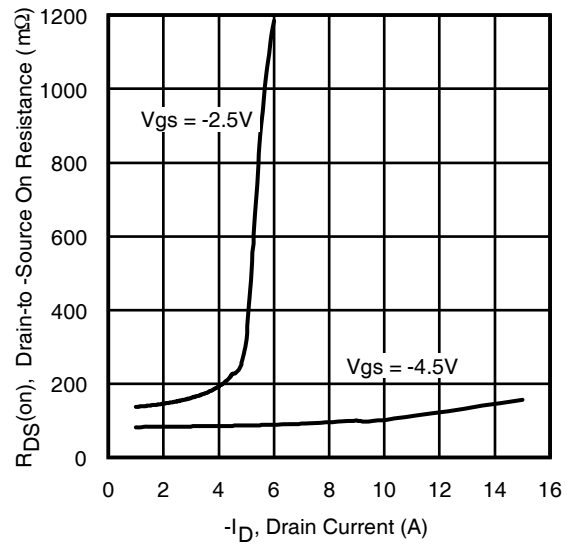


Fig 13. Typical On-Resistance vs. Drain Current

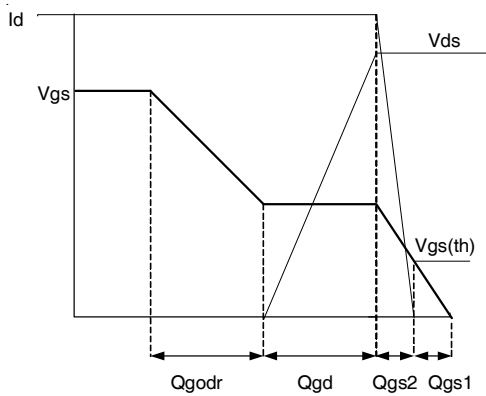


Fig 14a. Basic Gate Charge Waveform

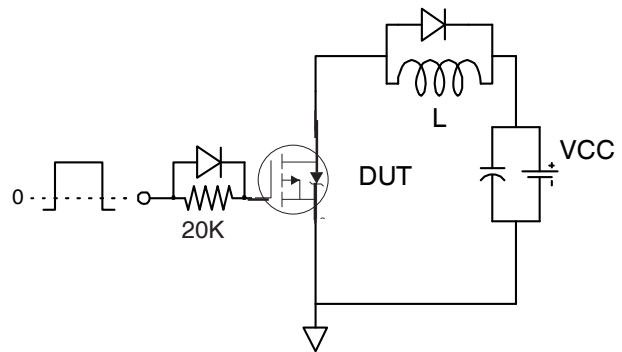
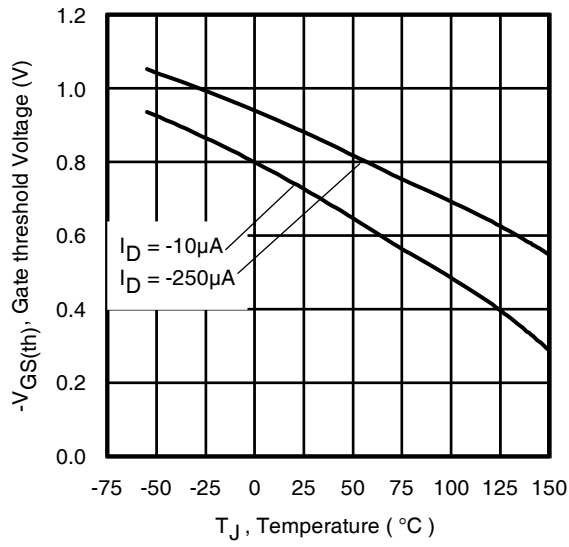
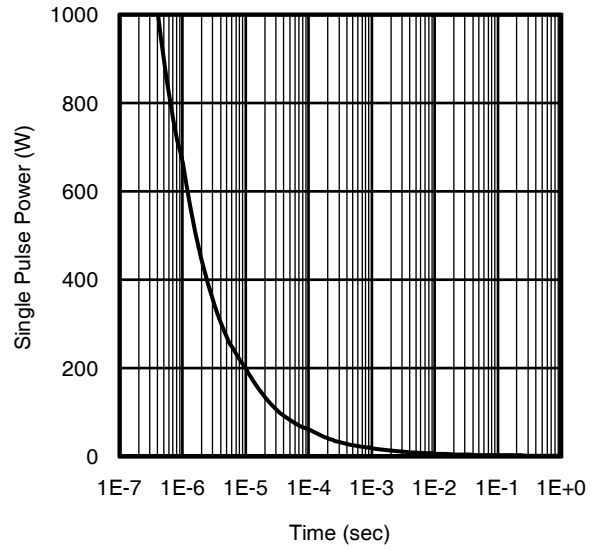


Fig 14b. Gate Charge Test Circuit

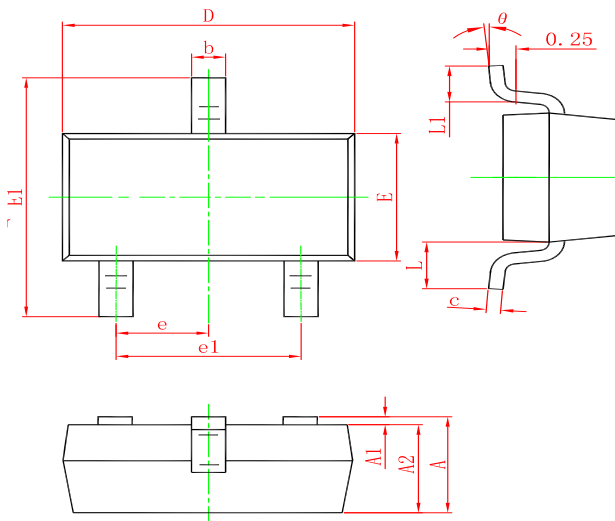


**Fig 15.** Typical Threshold Voltage vs. Junction Temperature



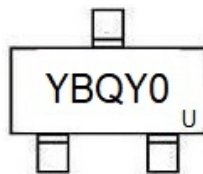
**Fig 16.** Typical Power vs. Time

## 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
theta	0°	8°	0°	8°

## Marking



## Ordering information

Order code	Package	Baseqty	Deliverymode
IRLML2246	SOT-23	3000	Tape and reel