

UV2301  
-20V / -2.8A P-Channel Mosfet

## General Description

The UV2301 uses advanced trench technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge.

This device is suitable for use in PWM, load switching and general purpose applications.

## Features

Enhancement Mode

Enhanced Body diode dv/dt capability

100% Avalanche Tested



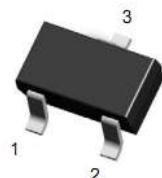
$V_{DS}$	-20	V
$R_{DS(on)\ TYP}@V_{GS}=-10V$	65	$m\Omega$
$R_{DS(on)\ TYP}@V_{GS}=-4.5V$	85	$m\Omega$
$R_{DS(on)\ TYP}@V_{GS}=-2.5V$	130	$m\Omega$
$I_D$	-2.8	A

## Applications

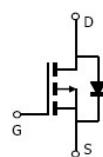
Power switching application

Hard Switched and High Frequency Circuits

Uninterruptible Power Supply



SOT23 Topview



Pin 1: Gate

2: Source

3: Drain

Schematic diagram

## Package Marking And Ordering Information

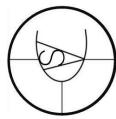
Part ID	Package Type	Marking	Tape and Reel information
UV2301	SOT23		3000pcs/Reel

## Maximum ratings, at $T_j=25^\circ C$ , unless otherwise specified

Symbol	Parameter		Rating	Unit
$V_{(BR)DSS}$	Drain –Source breakdown voltage		-20	V
$I_D$	Continuous drain current (Silicon Limited)	$T_c=25^\circ C$	-2.8	A
$I_{DM}$	Pulse drain current tested①	$T_c=25^\circ C$	-10	A
$P_D$	Maximum power dissipation		225	mW
$V_{GS}$	Gate-Source voltage		$\pm 8$	V
$T_{STG}\ T_J$	Storage and operating temperature range		-55 to 175	°C

## Thermal Characteristic

Symbol	Parameter	Typical	Unit
$R_{QJA}$	Thermal Resistance-Junction to Ambient	100	°C/W



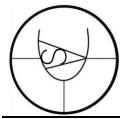
UV2301  
-20V/ -2.8A P-Channel Mosfet

## Typical Characteristics

Symbol	Parameter	Condition	Min	Type	Max	Unit
Static Electrical Characteristics @T <sub>j</sub> =25°C ( unless otherwise stated)						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V I <sub>D</sub> =250μA	-20			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =-16V, V <sub>GS</sub> =0V			-1	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±8V, V <sub>DS</sub> =0V			±100	nA
V <sub>GS(TH)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	-0.45		-1.3	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance③	V <sub>GS</sub> =-10V, I <sub>D</sub> =-2A		65	80	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-2.8A		85	125	mΩ
		V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-2A		130	155	mΩ
Dynamic Electrical Characteristics @T <sub>j</sub> =25°C ( unless otherwise stated )						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-6V, V <sub>GS</sub> =0V, F=1MHz		447		PF
C <sub>oss</sub>	Output Capacitance			124		PF
C <sub>rss</sub>	Reverse Transfer Capacitance			80		PF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =-6V, I <sub>D</sub> =-2.8A, V <sub>GS</sub> =-4.5V		5.4		nC
Q <sub>gs</sub>	Gate-Source Charge			0.8		nC
Q <sub>gd</sub>	Gate-Drain Charge			1.1		nC
Switching Characteristics						
t <sub>d(on)</sub>	Turn-on Delay time	V <sub>DD</sub> =-6V I <sub>D</sub> =-1A R <sub>G</sub> =6 Ω R <sub>L</sub> =10 Ω V <sub>GS</sub> =-4.5V		5		nS
t <sub>r</sub>	Turn-on Rise time			19		nS
t <sub>d(off)</sub>	Turn-off Delay time			95		nS
t <sub>f</sub>	Turn-off Fall time			65		nS
Source-Drain Diode Characteristics						
V <sub>SD</sub>	Forward on voltage	I <sub>SD</sub> =-1.25A, V <sub>GS</sub> =0V			-1.2	V

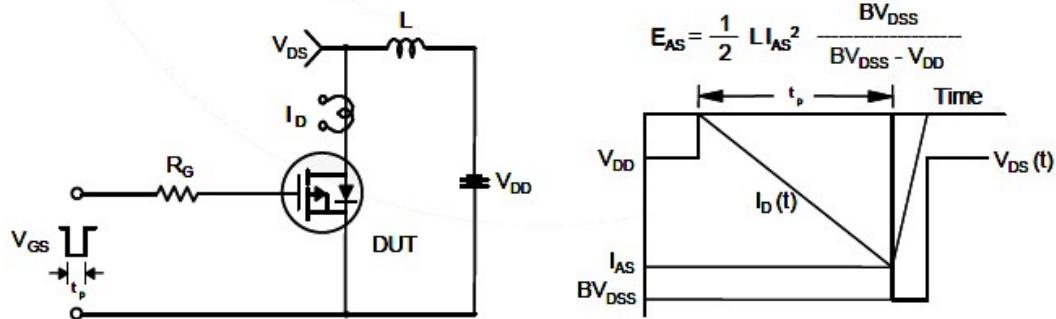
Note:

- ① Repetitive rating; pulse width limited by max, junction temperature.
- ② Limited by T<sub>jmax</sub>, starting T<sub>j</sub>=25°C, L=0.1mH, R<sub>G</sub>=6 Ω , I<sub>AS</sub>=-2A, V<sub>GS</sub>=-6V, Part not recommended for use above this value
- ③ Pulse width  $\leq 300\mu s$ ; duty cycle  $\leq 2\%$

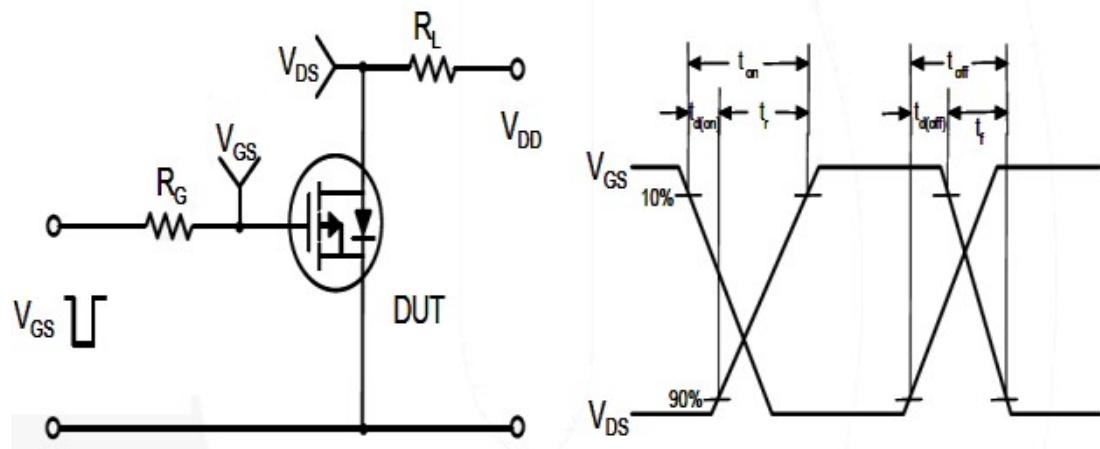


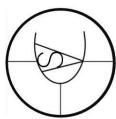
## Test circuit

### (1) Unclamped inductive test circuits and waveforms



### (2) Switching time test circuit and waveforms





◆ TYPICAL CHARACTERISTICS

Figure 1:Switching Test Circuit

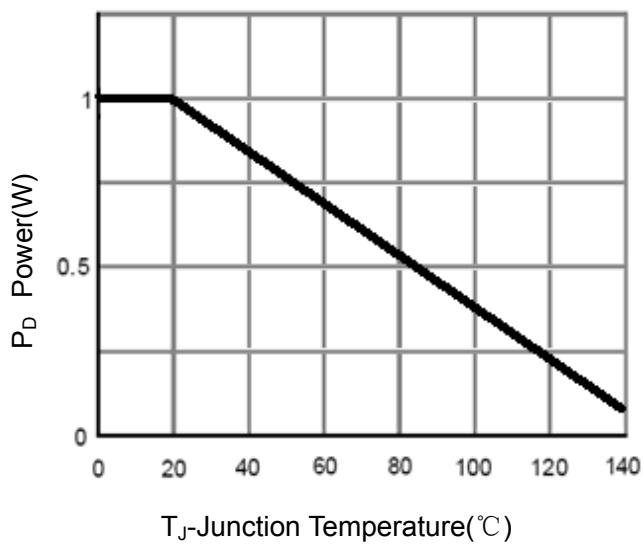


Figure 3 Power Dissipation

Figure 2:Switching Waveforms

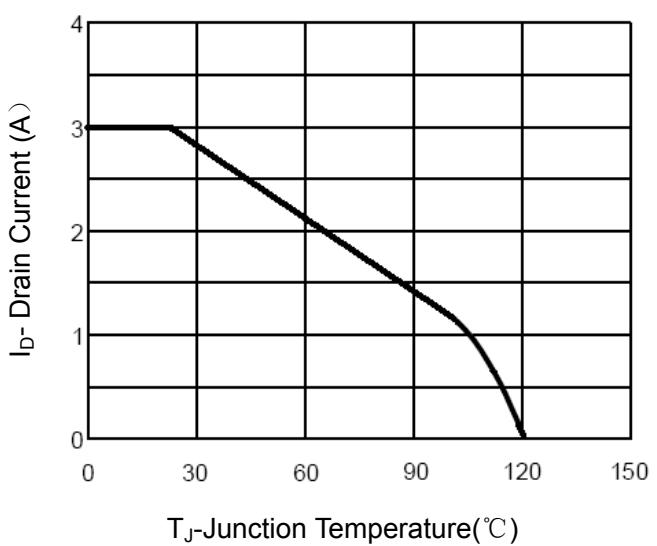


Figure 4 Drain Current

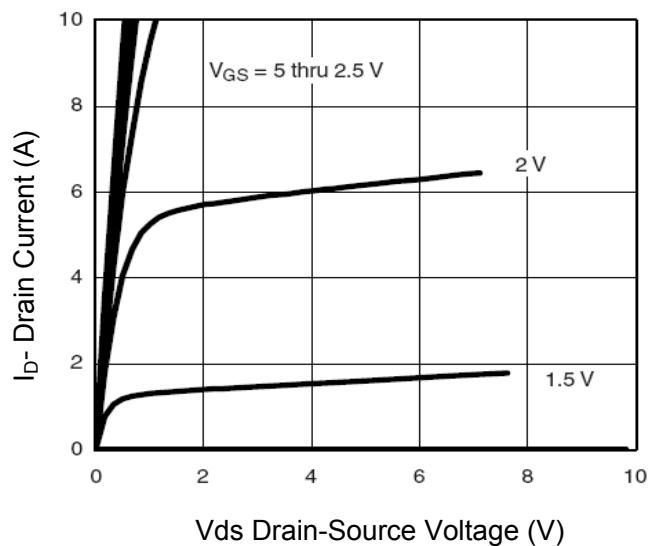


Figure 5 Output Characteristics

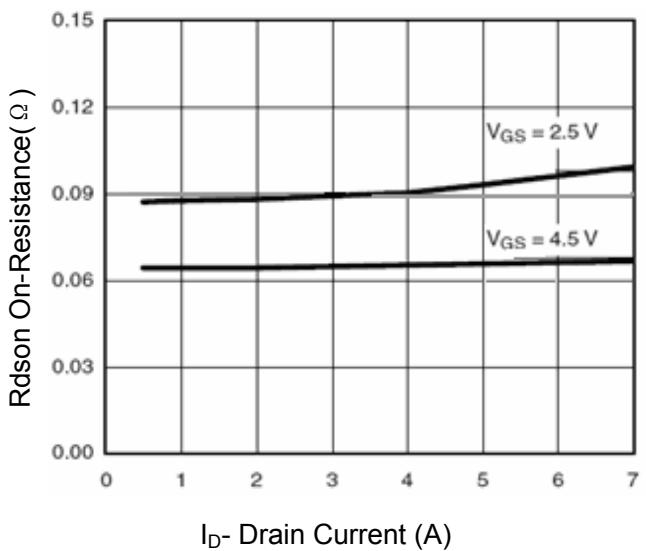
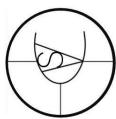
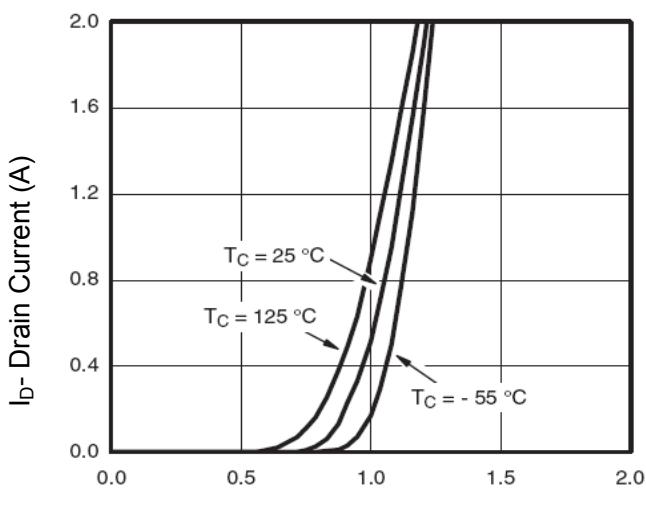


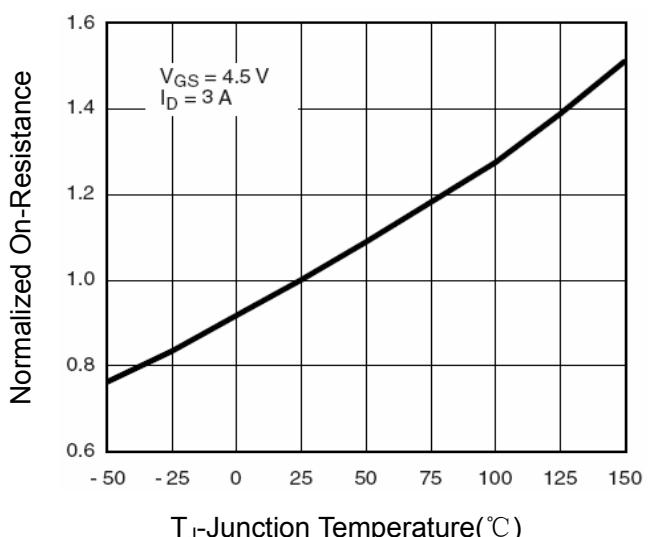
Figure 6 Drain-Source On-Resistance



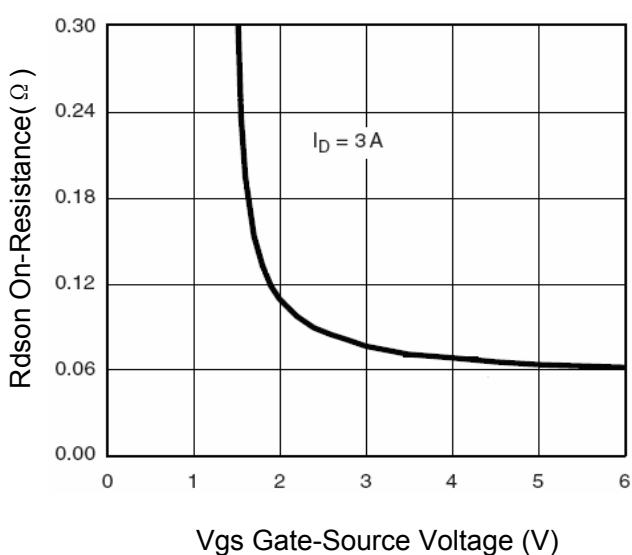
## ◆ TYPICAL CHARACTERISTICS



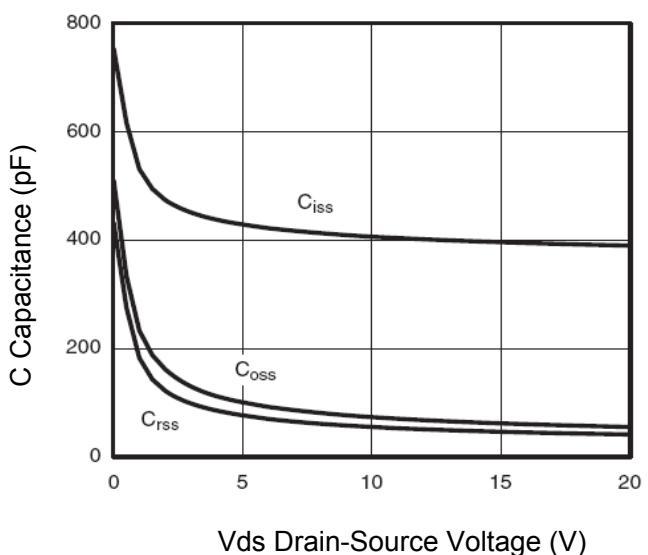
**Figure 7 Transfer Characteristics**



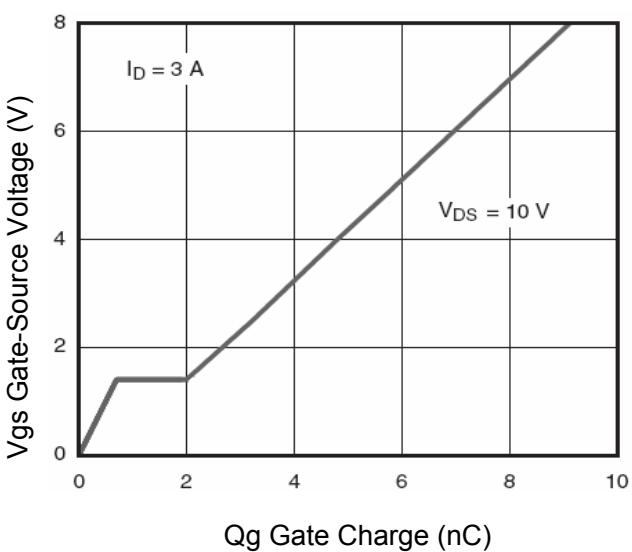
**Figure 8 Drain-Source On-Resistance**



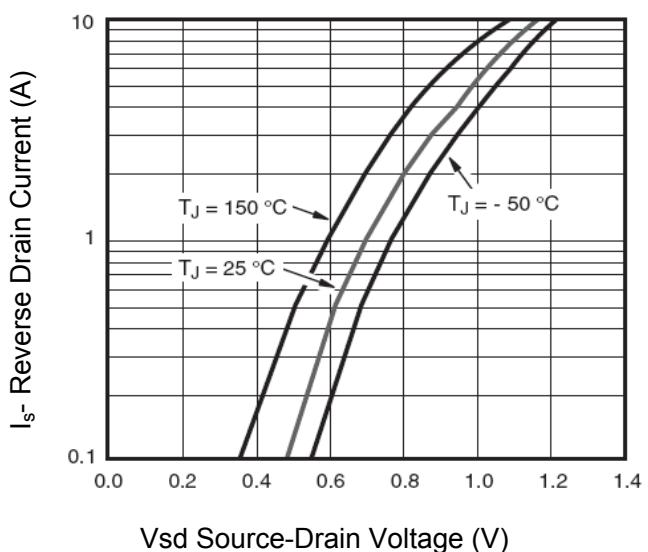
**Figure 9  $R_{DS(on)}$  vs  $V_{GS}$**



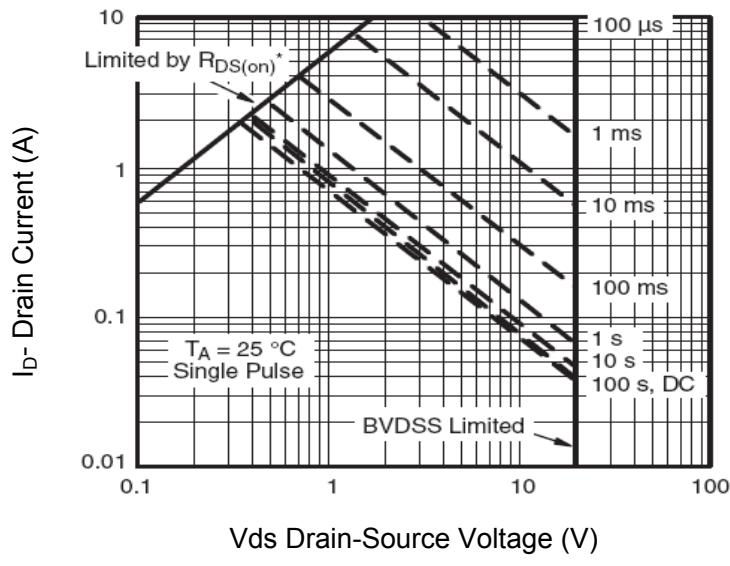
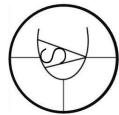
**Figure 10 Capacitance vs  $V_{DS}$**



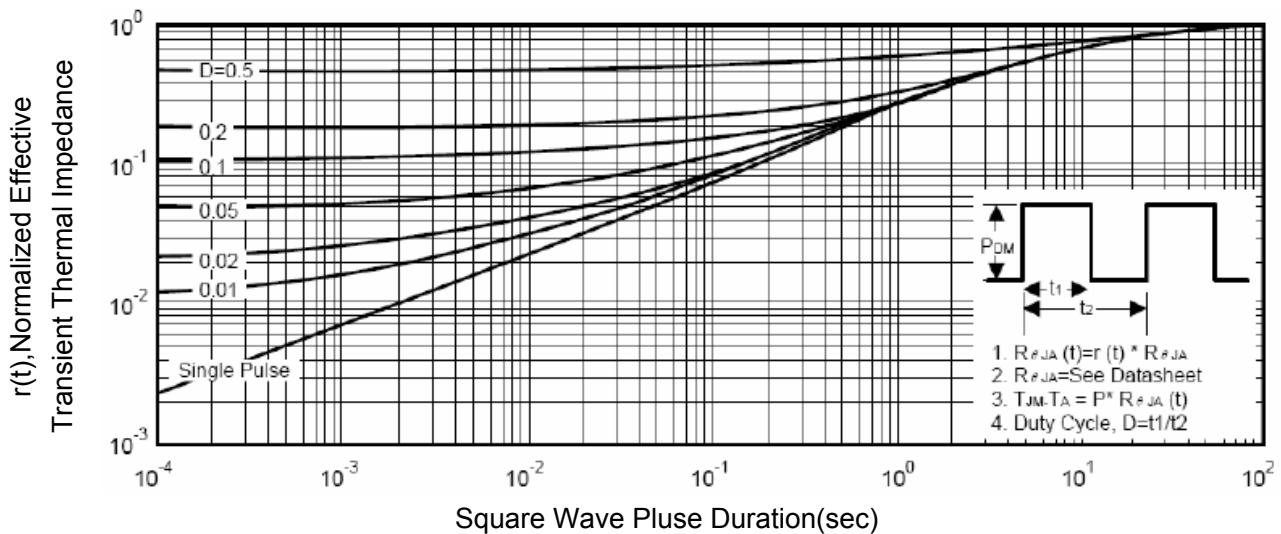
**Figure 11 Gate Charge**



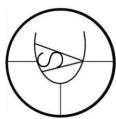
**Figure 12 Source-Drain Diode Forward**



**Figure 13 Safe Operation Area**

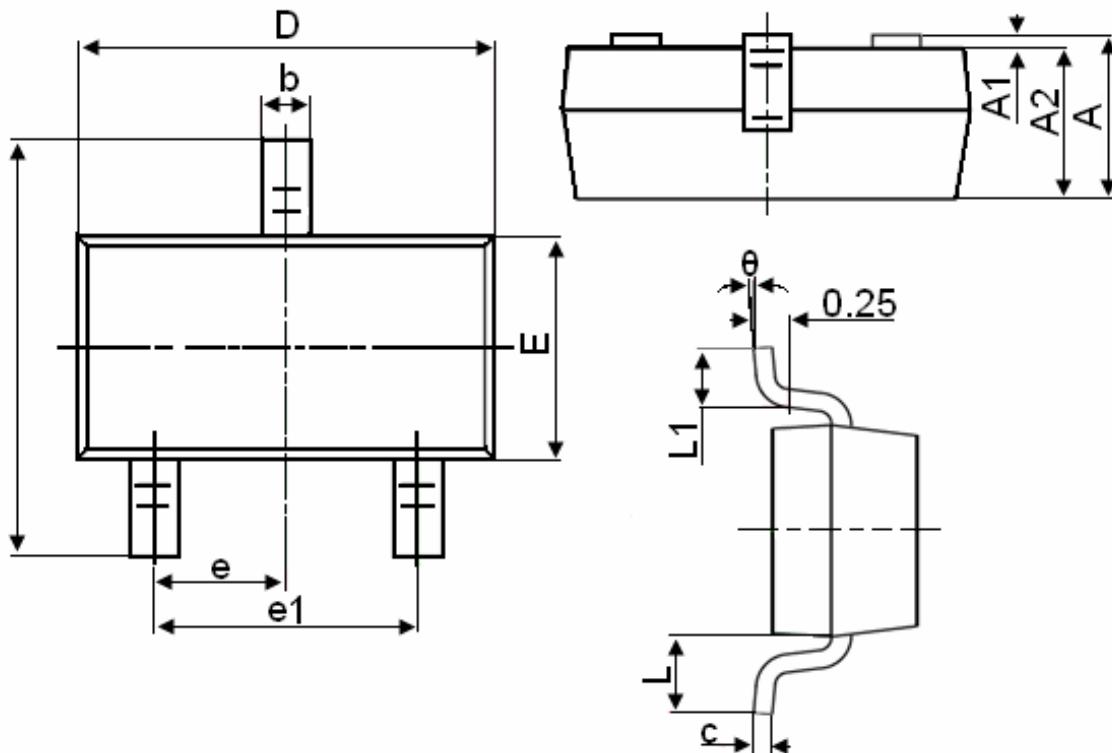


**Figure 14 Normalized Maximum Transient Thermal Impedance**



## ◆ PHYSICAL DIMENSIONS

3 Pin SOT-23



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°

### Notes

1. All dimensions are in millimeters.
2. Tolerance  $\pm 0.10\text{mm}$  (4 mil) unless otherwise specified
3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.
4. Dimension L is measured in gauge plane.
5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.