



YOUSHANG SEMICONDUCTOR

**设计研发新型功率器件**

**各类小信号开关**

**中低压及高压大电流等场效应管**

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## Product Summary

Device	BV <sub>DSS</sub>	R <sub>DS(ON)</sub> max	I <sub>D</sub> max T <sub>A</sub> = +25°C
N-Channel	30V	0.4Ω @ V <sub>GS</sub> = 10V	0.8A
		0.7Ω @ V <sub>GS</sub> = 4.5V	0.57A

## Features and Benefits


- Dual N-Channel MOSFET
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed

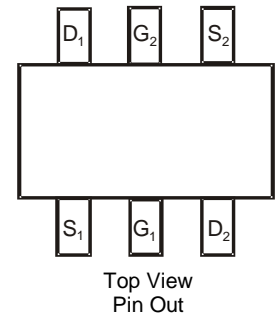
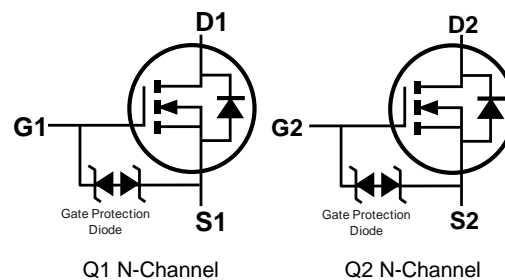
## Description and Applications

This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

- Motor Control
- Power Management Functions
- DC-DC Converters

## Mechanical Data

- Case: SOT363
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminals: Finish—Matte Tin Annealed over Copper Lead-Frame. Solderable per MIL-STD-202, Method 208 
- Weight: 0.027 grams (Approximate)



**Maximum Ratings** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	30	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current (Note 6) $V_{GS} = 10\text{V}$	$I_D$	0.8	A
		0.6	
Maximum Continuous Body Diode Forward Current (Note 6)	$I_S$	0.4	A
Pulsed Drain Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%)	$I_{DM}$	4	A

**Thermal Characteristics** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	$P_D$	0.29	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	433	$^\circ\text{C/W}$
Steady State			
Total Power Dissipation (Note 6)	$P_D$	0.35	W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	360	$^\circ\text{C/W}$
Steady State			
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

**Electrical Characteristics** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	30	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	1.0	$\mu\text{A}$	$V_{DS} = 30\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	0.8	—	1.6	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	0.2	0.4	$\Omega$	$V_{GS} = 10\text{V}, I_D = 0.59\text{A}$
		—	0.3	0.7		$V_{GS} = 4.5\text{V}, I_D = 0.2\text{A}$
Diode Forward Voltage	$V_{SD}$	—	0.7	1.2	V	$V_{GS} = 0\text{V}, I_S = 10\text{mA}$
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	$C_{iss}$	—	50	—	pF	$V_{DS} = 15\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	—	12	—	pF	
Reverse Transfer Capacitance	$C_{rss}$	—	10	—	pF	
Gate Resistance	$R_g$	—	58	—	$\Omega$	$V_{DS} = V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Total Gate Charge ( $V_{GS} = 4.5\text{V}$ )	$Q_g$	—	0.5	—	nC	$V_{DS} = 10\text{V}, V_{GS} = 10\text{V}, I_D = 250\text{mA}$
Total Gate Charge ( $V_{GS} = 10\text{V}$ )	$Q_g$	—	1.2	—	nC	
Gate-Source Charge	$Q_{gs}$	—	0.2	—	nC	
Gate-Drain Charge	$Q_{gd}$	—	0.1	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	3.5	—	ns	$V_{GS} = 10\text{V}, V_{DS} = 30\text{V}, I_D = 100\text{mA}, R_G = 25\Omega$
Turn-On Rise Time	$t_R$	—	3.3	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	16.8	—	ns	
Turn-Off Fall Time	$t_F$	—	13.8	—	ns	

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

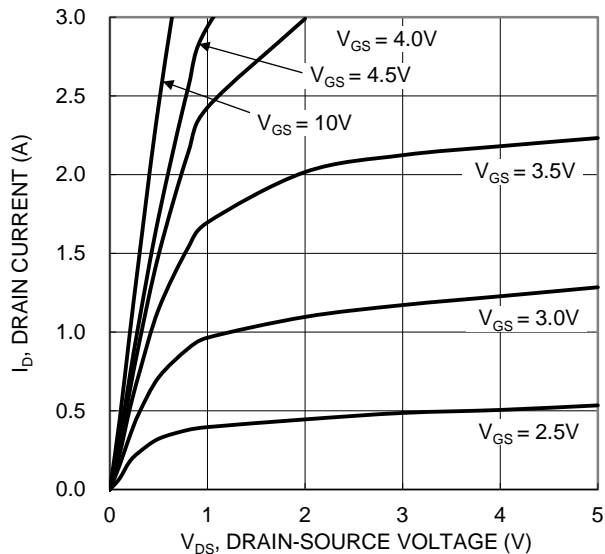


Figure 1. Typical Output Characteristic

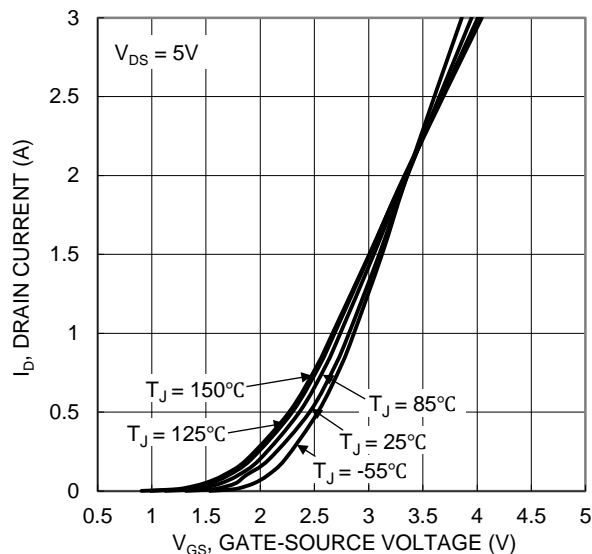


Figure 2. Typical Transfer Characteristic

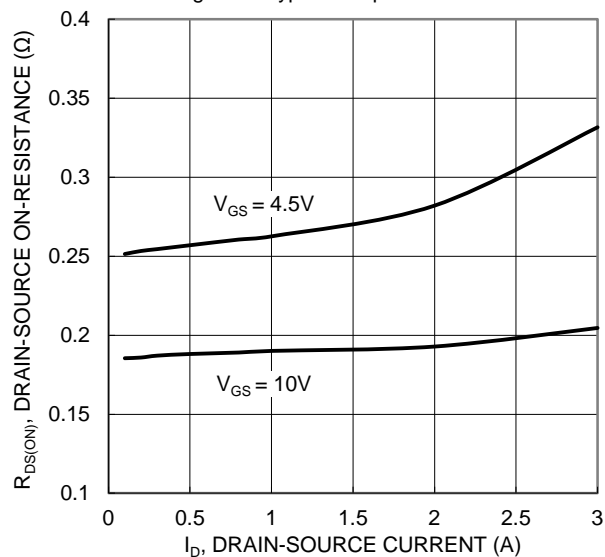


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

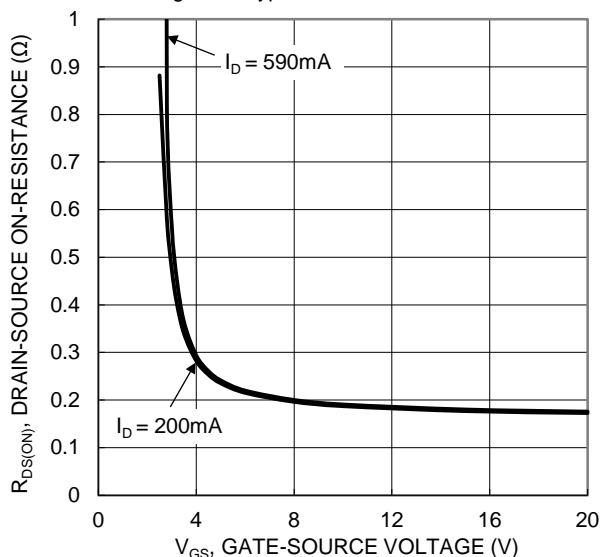


Figure 4. Typical Transfer Characteristic

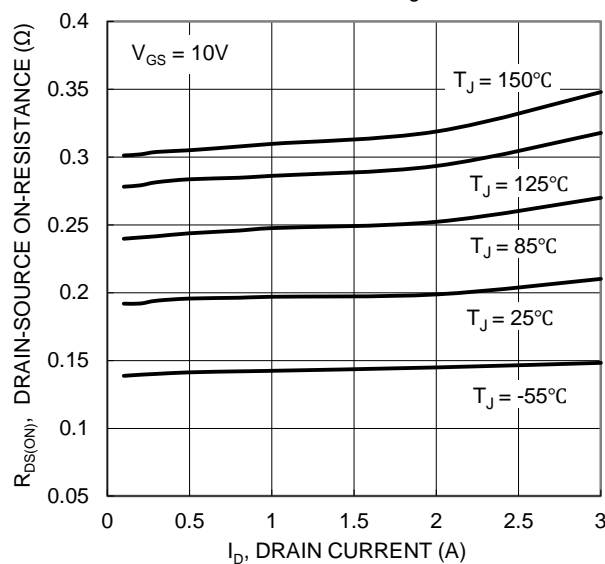


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

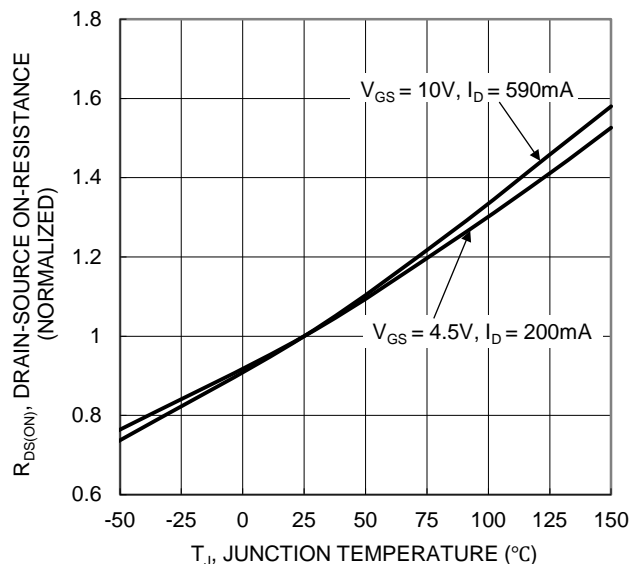


Figure 6. On-Resistance Variation with Junction Temperature

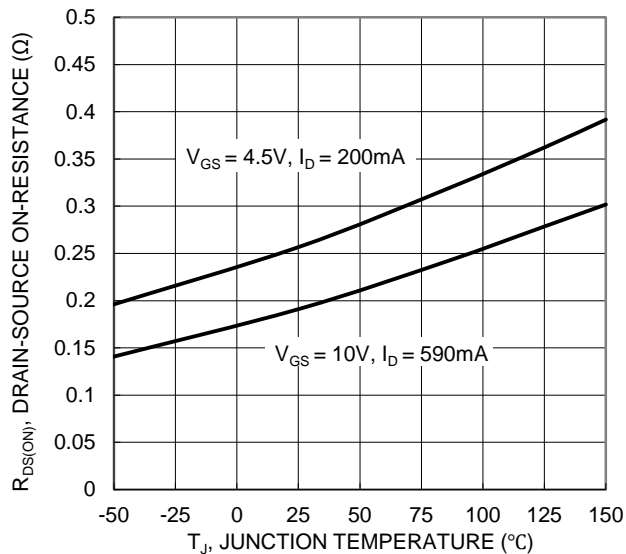


Figure 7. On-Resistance Variation with Junction Temperature

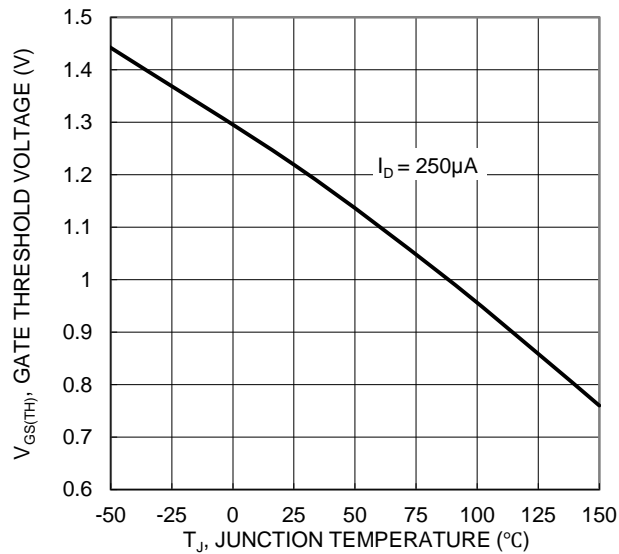


Figure 8. Gate Threshold Variation vs. Junction Temperature

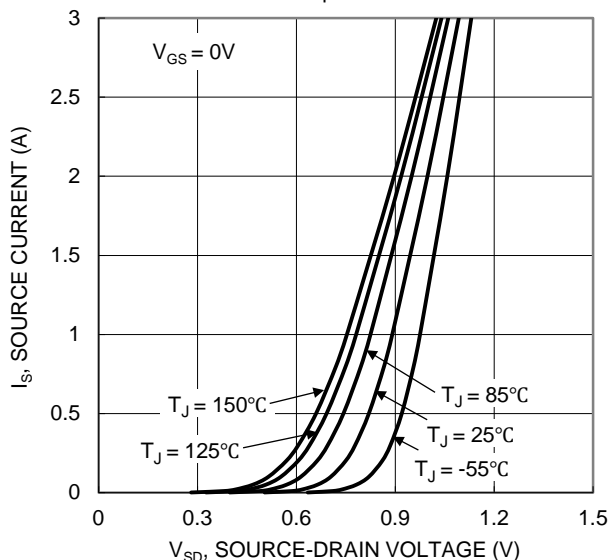


Figure 9. Diode Forward Voltage vs. Current

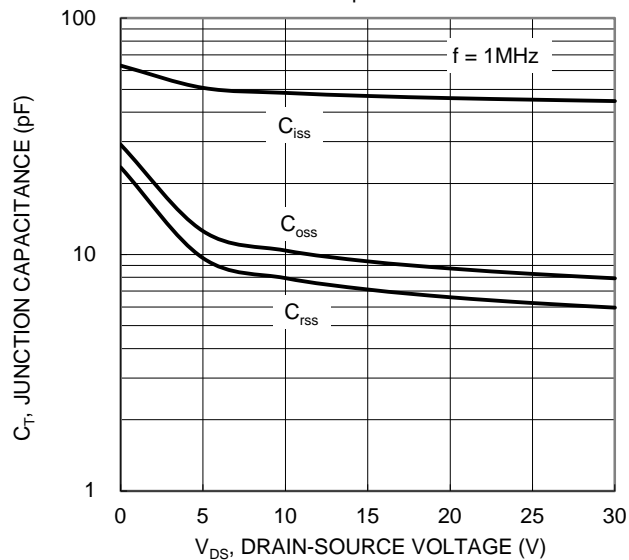


Figure 10. Typical Junction Capacitance

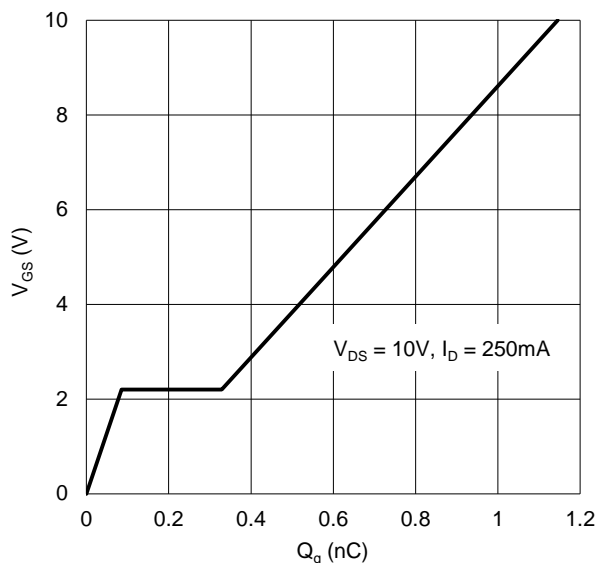


Figure 11. Gate Charge

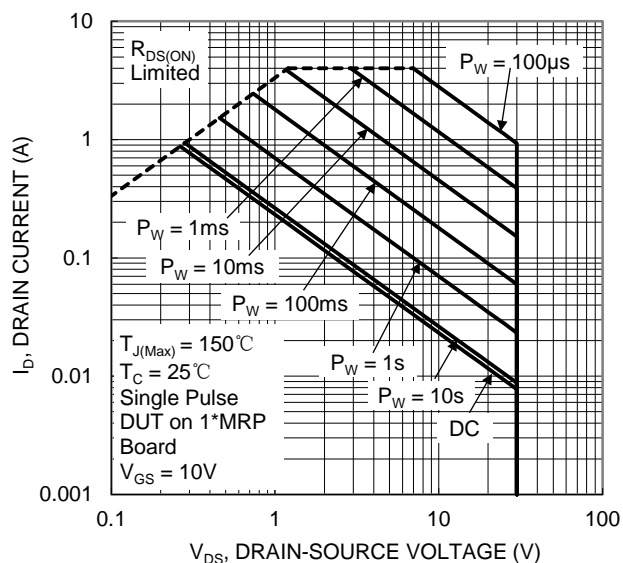


Figure 12. SOA, Safe Operation Area

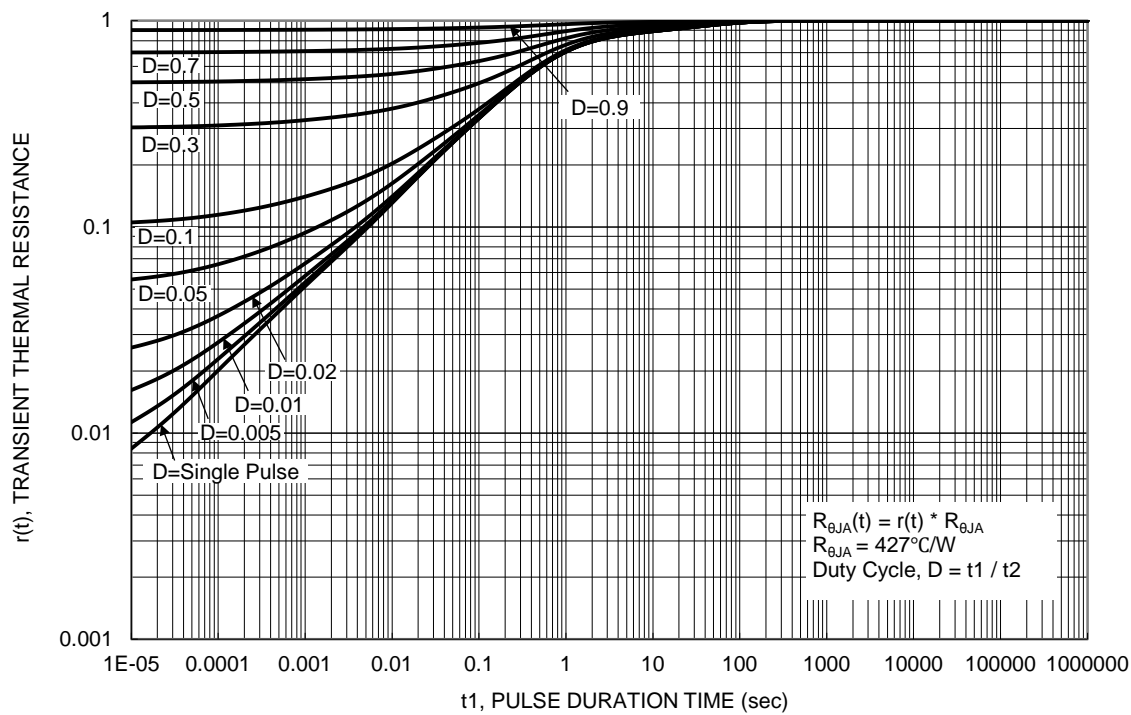
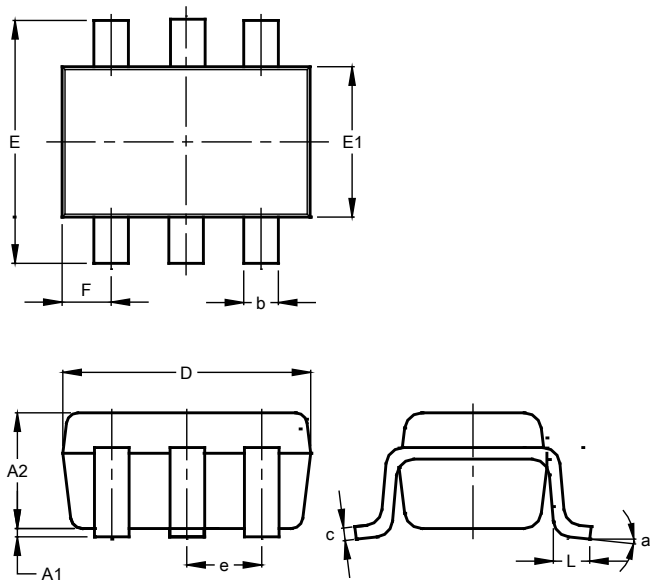


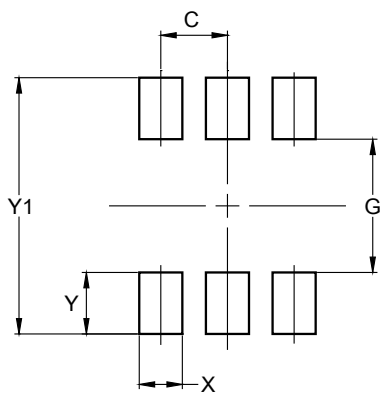
Figure 13. Transient Thermal Resistance

### Package Outline Dimensions



SOT363			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

### Suggested Pad Layout



Dimensions	Value (in mm)
C	0.650
G	1.300
X	0.420
Y	0.600
Y1	2.500