

## N-Channel 60-V (D-S) MOSFET

### PRODUCT SUMMARY

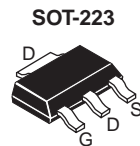
$V_{DS}$ (V)	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
60	0.072 at $V_{GS} = 10$ V	5

### FEATURES

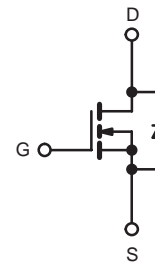
- DT-Trench Power MOSFET
- 100 % Rg and UIS Tested
- 175 °C Maximum Junction Temperature
- Compliant to RoHS Directive 2002/95/EC



**RoHS**  
COMPLIANT



Top View



N-Channel MOSFET

### ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current ( $T_J = 175$ °C) <sup>a</sup>	$I_D$	$T_A = 25$ °C	5
		$T_A = 70$ °C	3.1
Pulsed Drain Current	$I_{DM}$	20	A
Avalanche Current	$I_{AS}$	4.8	
Single Pulse Avalanche Energy	$E_{AS}$	8	mJ
Maximum Power Dissipation <sup>a</sup>	$P_D$	$T_A = 25$ °C	3.3
		$T_A = 70$ °C	2.3
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	- 55 to 175	°C

### THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>a</sup>	$R_{thJA}$	$t \leq 10$ s	36	°C/W
		Steady State	75	
Maximum Junction-to-Foot (Drain)	$R_{thJF}$	17	20	

Notes:

a. Surface Mounted on 1" x 1" FR4 board.

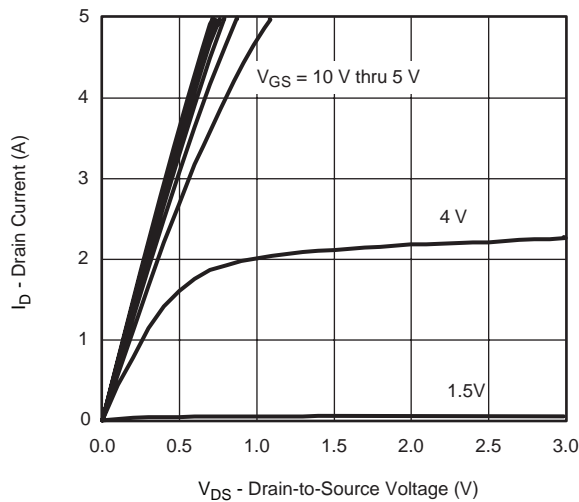
<b>SPECIFICATIONS</b> $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	60			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1		3	
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}$			1	$\mu\text{A}$
		$V_{DS} = 48\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			20	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	20			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 3\text{ A}$		0.072	0.089	$\Omega$
		$V_{GS} = 10\text{ V}, I_D = 2\text{ A}, T_J = 125\text{ }^\circ\text{C}$		0.090	0.120	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 15\text{ V}, I_D = 3\text{ A}$		7		S
Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$I_S = 3\text{ A}, V_{GS} = 0\text{ V}$		0.8	1.2	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = 30\text{ V}, V_{GS} = 10\text{ V}, I_D = 3\text{ A}$		16	27	nC
Gate-Source Charge	$Q_{gs}$			3.5		
Gate-Drain Charge	$Q_{gd}$			5.1		
Gate Resistance	$R_g$	$V_{GS} = 0.1\text{ V}, f = 5\text{ MHz}$	0.5	1.4	2.4	$\Omega$
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 30\text{ V}, R_L = 30\text{ }\Omega$ $I_D \approx 3\text{ A}, V_{GEN} = 10\text{ V}, R_g = 6\text{ }\Omega$		12	20	ns
Rise Time	$t_r$			10	20	
Turn-Off Delay Time	$t_{d(off)}$			28	50	
Fall Time	$t_f$			12	24	
Source-Drain Reverse Recovery Time	$t_{rr}$	$I_F = 3\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		55	80	

Notes:

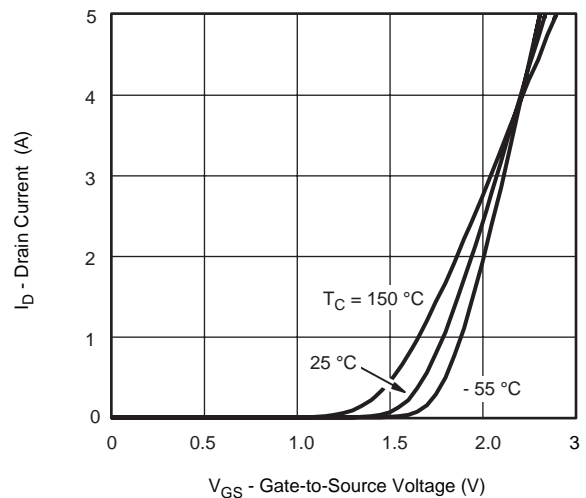
- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .
- b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

**TYPICAL CHARACTERISTICS**  $25\text{ }^\circ\text{C}$ , unless otherwise noted

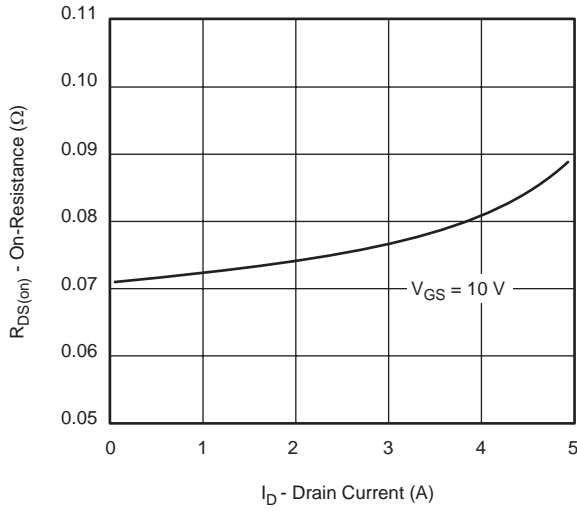


**Output Characteristics**

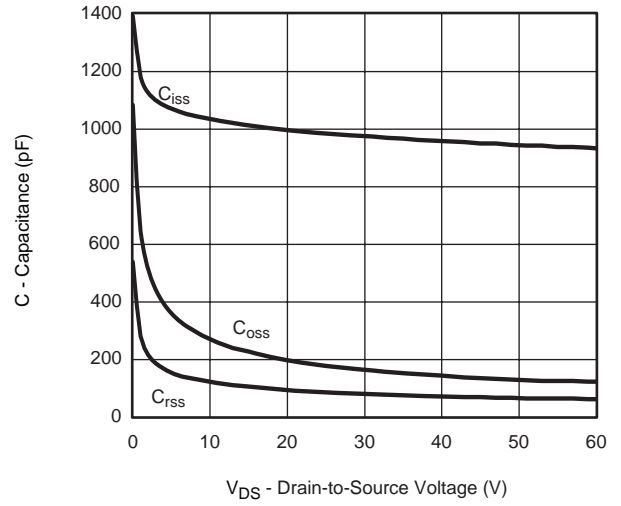


**Transfer Characteristics**

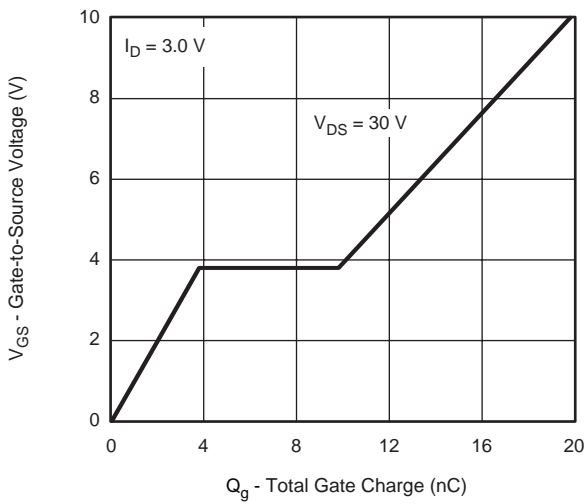
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



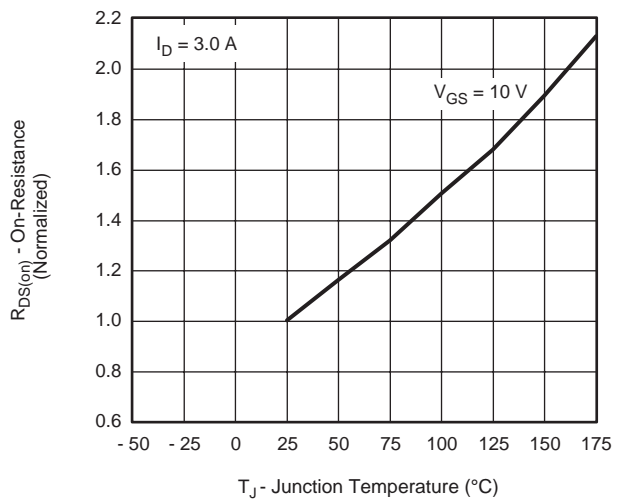
**On-Resistance vs. Drain Current**



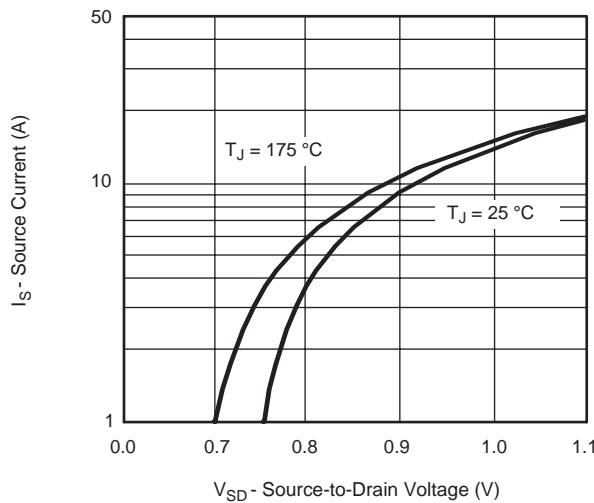
**Capacitance**



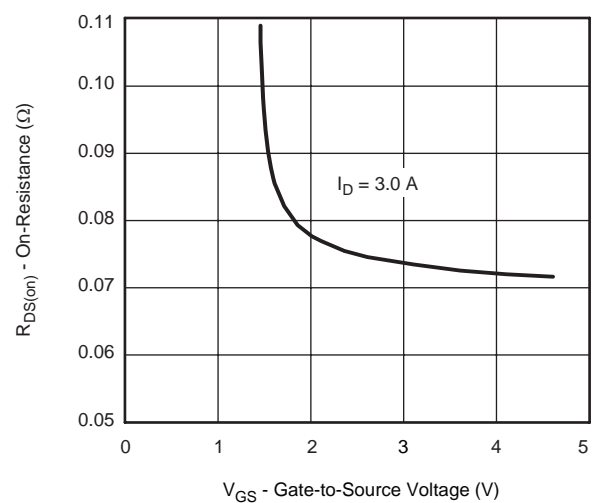
**Gate Charge**



**On-Resistance vs. Junction Temperature**

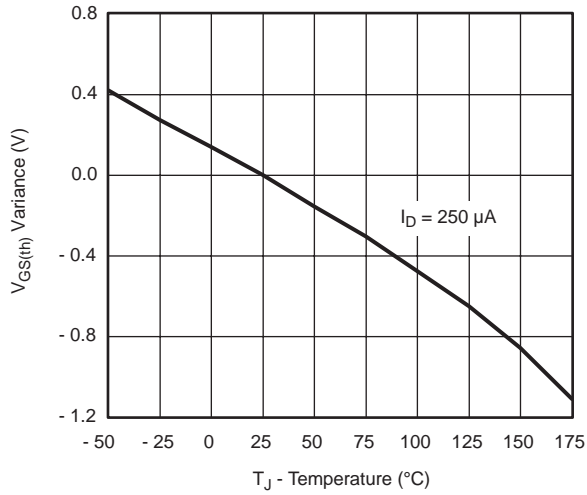


**Source-Drain Diode Forward Voltage**

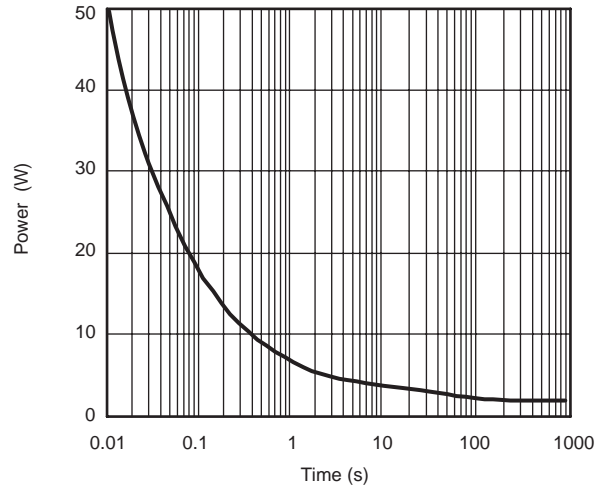


**On-Resistance vs. Gate-to-Source Voltage**

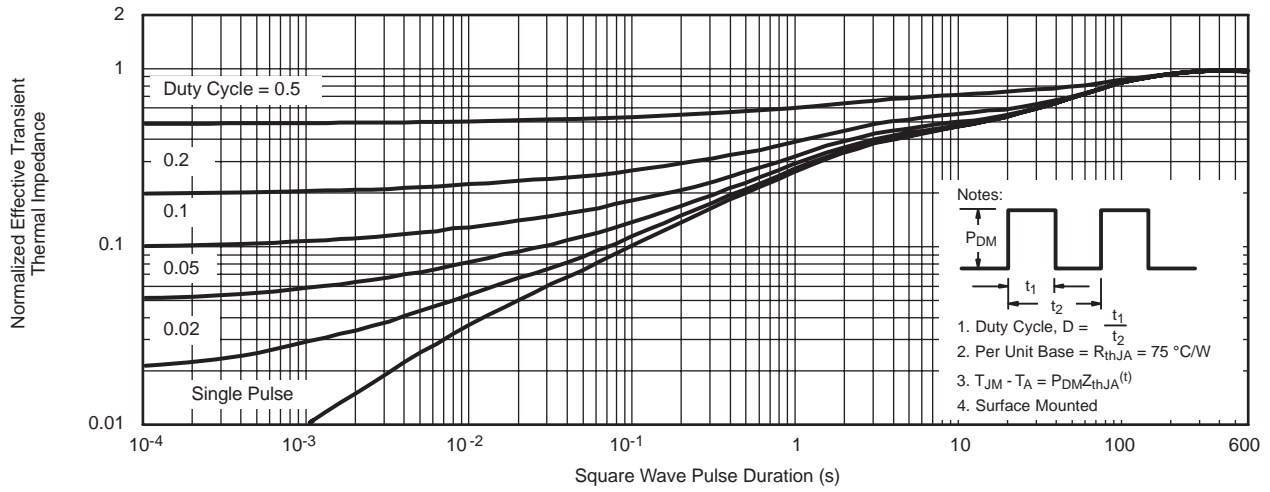
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



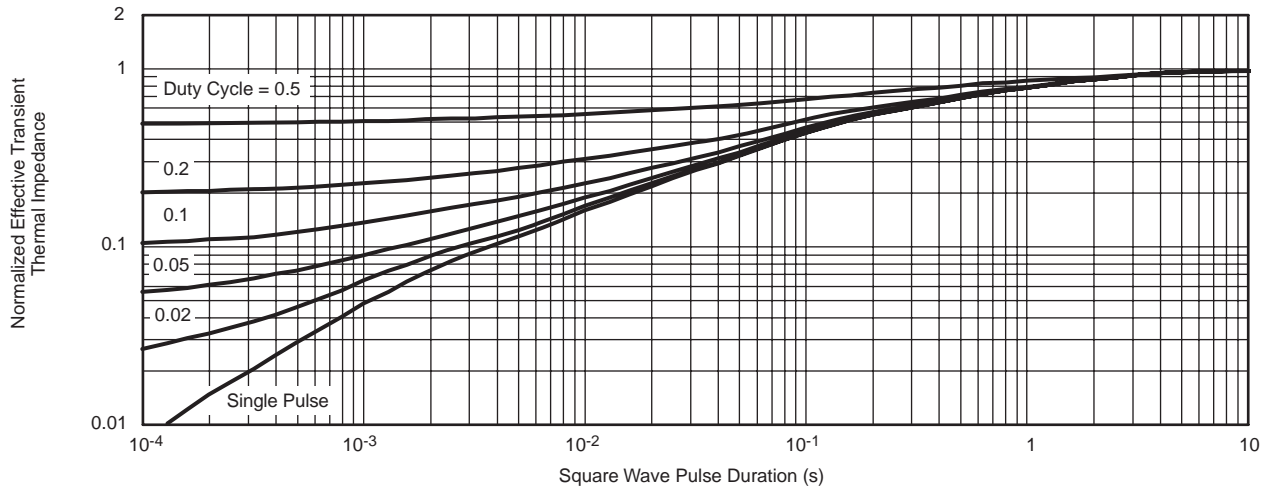
**Threshold Voltage**



**Single Pulse Power**

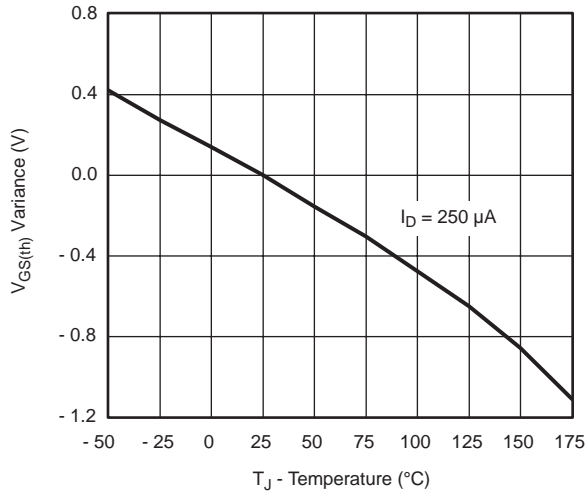


**Normalized Thermal Transient Impedance, Junction-to-Ambient**

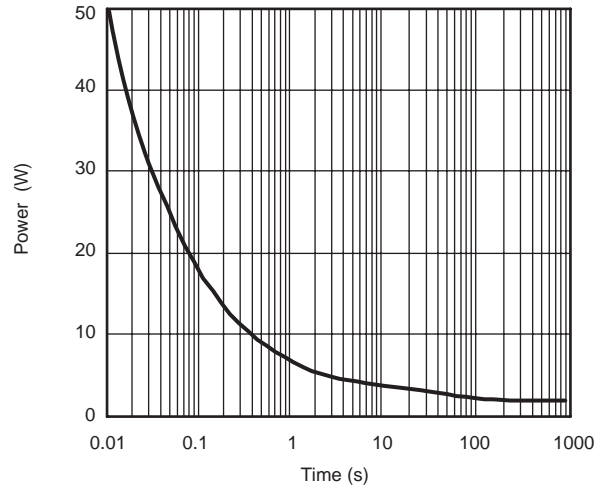


**Normalized Thermal Transient Impedance, Junction-to-Foot**

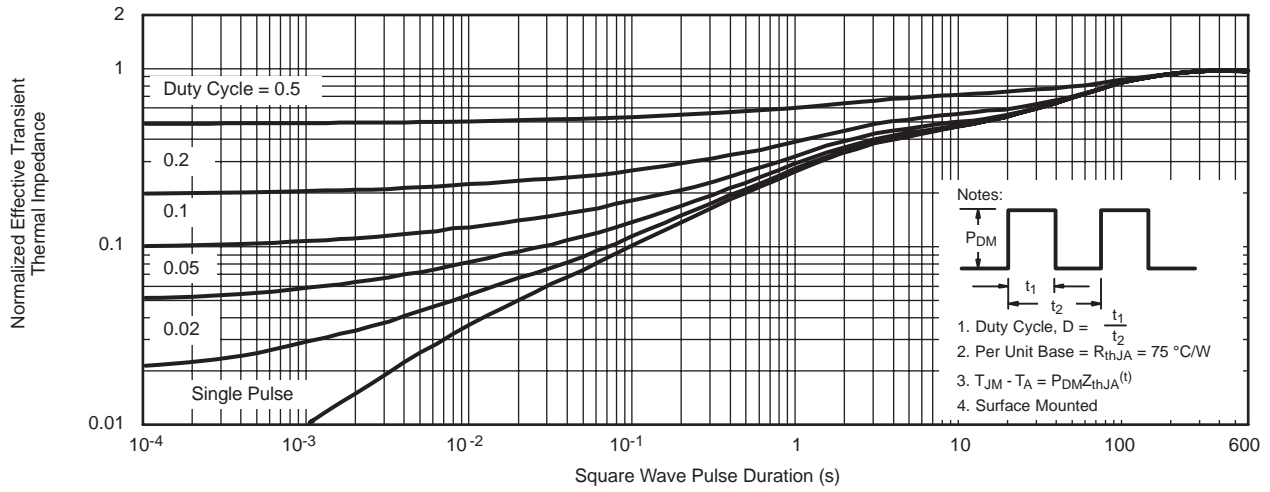
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



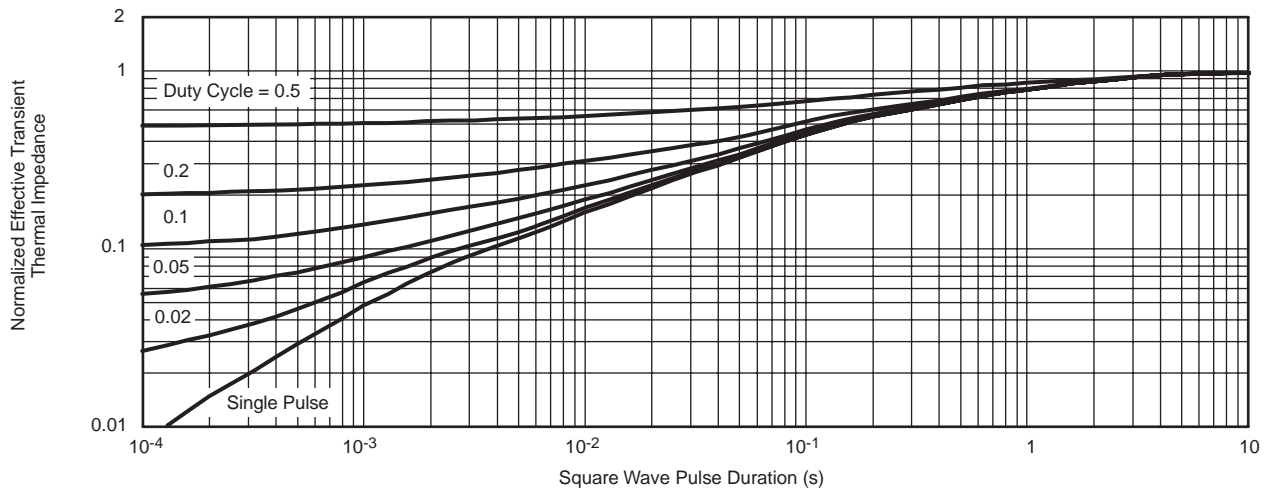
**Threshold Voltage**



**Single Pulse Power**

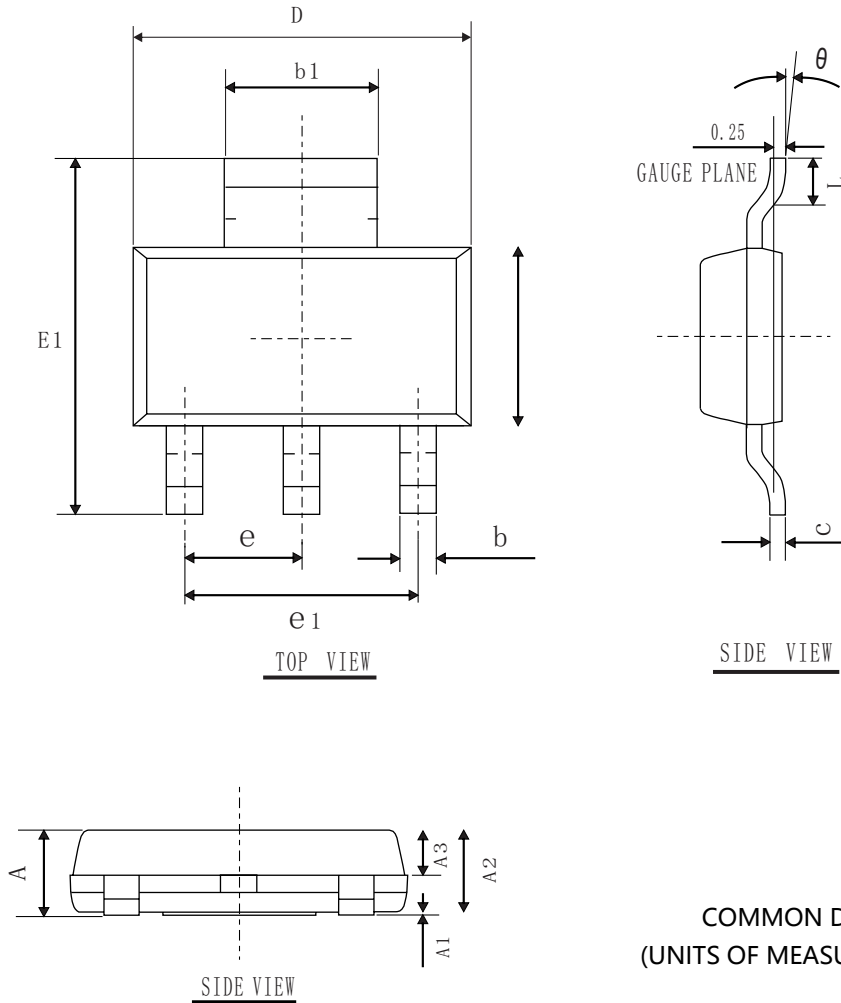


**Normalized Thermal Transient Impedance, Junction-to-Ambient**



**Normalized Thermal Transient Impedance, Junction-to-Foot**

## SOT-223-3L PACKAGE OUTLINE



COMMON DIMENSIONS  
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	TYP	MAX
A	-	-	1.95
A1	0.00	0.05	0.16
A2	1.35	1.60	1.85
A3	0.65	0.90	1.15
b	0.55	0.70	0.90
b1	2.75	3.00	3.30
C	0.18	0.30	0.42
D	6.00	6.50	7.00
E	3.10	3.50	3.90
E1	6.50	7.00	7.50
e1	4.20	4.60	5.00
L	0.78	-	1.28
$\theta$	0°	5°	10°
e	2.3BSC		

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