

**Features**

- VDS = 20V
- RDS(ON) = 300mΩ (typ.) @ VGS= 2.5V
- RDS(ON) = 250mΩ (typ.) @ VGS= 4.5V
- ESD Protected up to 2KV

**Application**

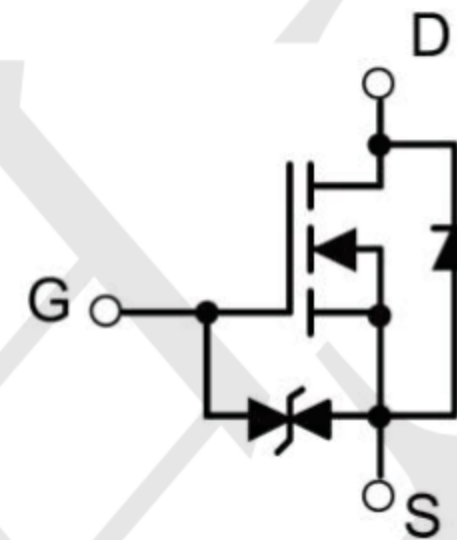
- Load/Power Switching
- Interfacing Switching
- Battery Management for Ultra Small Portable Electronics
- Logic Level Shift

**Package and Pin Configuration**



SOT323

**Circuit diagram**



**Marking: 21P**

**Absolute Maximum Ratings (T<sub>A</sub>=25°C unless otherwise noted)**

TECH PUBLIC Parameter	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DS</sub>	20	V
Gate-Source Voltage	V <sub>GS</sub>	±8	V
Continuous Drain Current	I <sub>D</sub>	0.9	A
Pulsed Drain Current (t=300μs) <sup>(1)</sup>	I <sub>DM</sub>	1.5	A
Power Dissipation <sup>(2)</sup>	P <sub>D</sub>	0.35	W
Thermal Resistance from Junction to Ambient	R <sub>θJA</sub>	357	°C/W
Junction Temperature	T <sub>J</sub>	150	°C
Storage Temperature	T <sub>STG</sub>	-55~ +150	°C

**Electrical Characteristics (  $T_A = 25^\circ\text{C}$  unless otherwise noted )**

TECH PUBLIC Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	20	25		V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 20V, V_{GS} = 0V$			1	$\mu A$
Gate-body leakage current	$I_{GSS}$	$V_{GS} = \pm 18V, V_{DS} = 0V$			$\pm 10$	$\mu A$
Gate threshold voltage <sup>(3)</sup>	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	0.5	0.7	1.1	V
Drain-source on-resistance <sup>(3)</sup>	$R_{DS(on)}$	$V_{GS} = 4.5V, I_D = 500mA$		250	400	m $\Omega$
		$V_{GS} = 2.5V, I_D = 500mA$		300	500	
Forward tranconductance	$g_{FS}$	$V_{DS} = 10V, I_D = 500mA$			1.2	S
<b>Dynamic characteristics<sup>(4)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 10V, V_{GS} = 0V, f = 1MHz$		45		pF
Output Capacitance	$C_{oss}$			9		
Reverse Transfer Capacitance	$C_{rss}$			6		
<b>Switching Characteristics<sup>(4)</sup></b>						
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 10V, I_D = 500mA,$ $V_{GS} = 4.5V, R_G = 6\Omega$		20		ns
Turn-on rise time	$t_r$			90		
Turn-off delay time	$t_{d(off)}$			750		
Turn-off fall time	$t_f$			400		
<b>Source-Drain Diode characteristics</b>						
Diode Forward voltage <sup>(3)</sup>	$V_{DS}$	$I_S = 0.15A, V_{GS} = 0V$			1.3	V



## Characteristic Curves

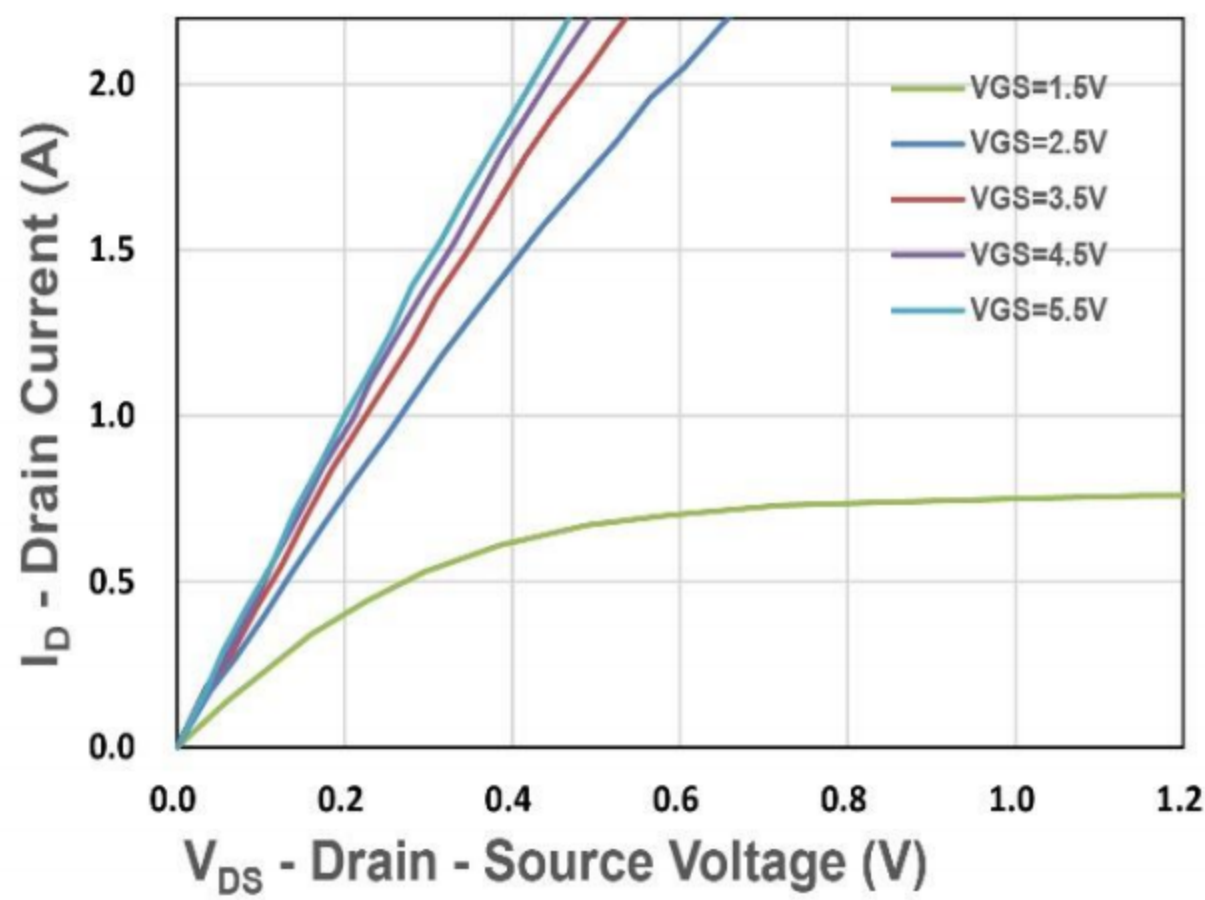


Figure 1. Output Characteristics

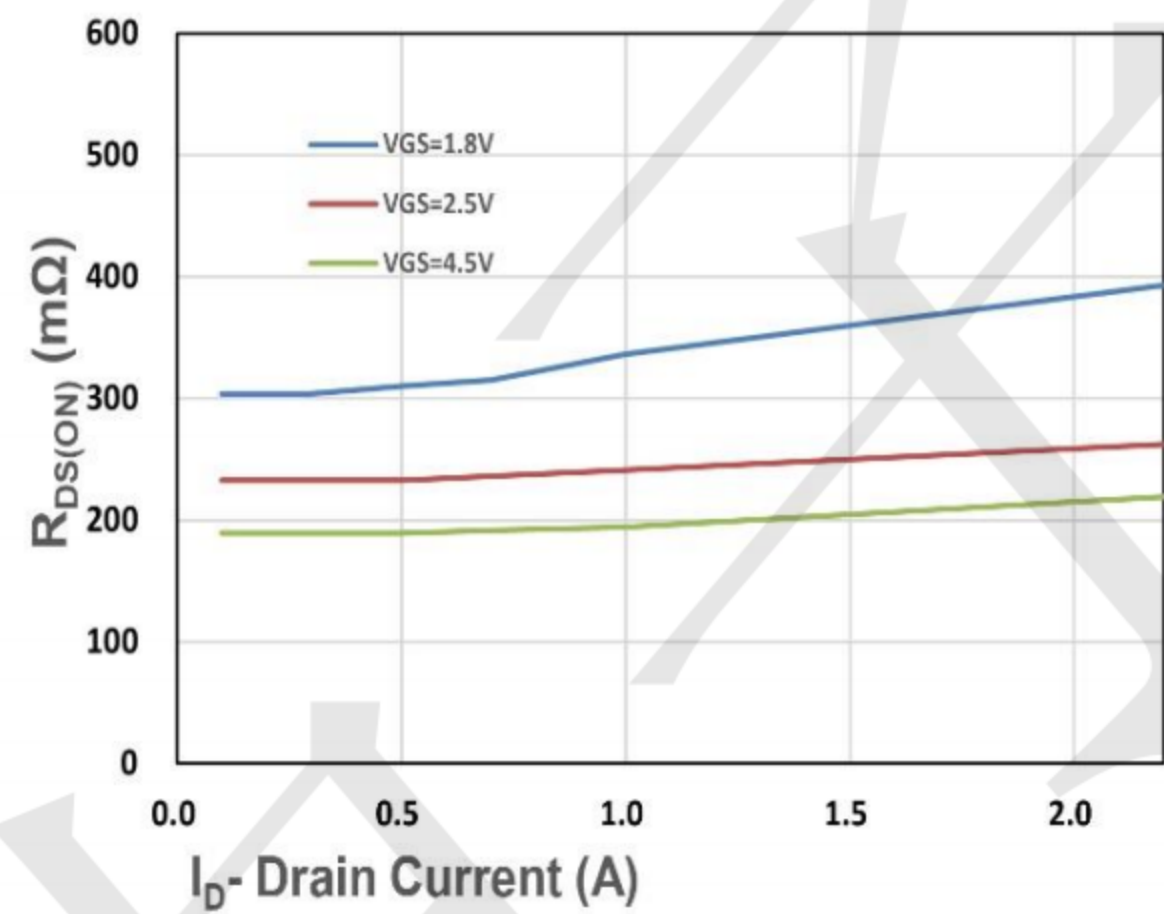


Figure 2. On-Resistance vs.  $I_D$

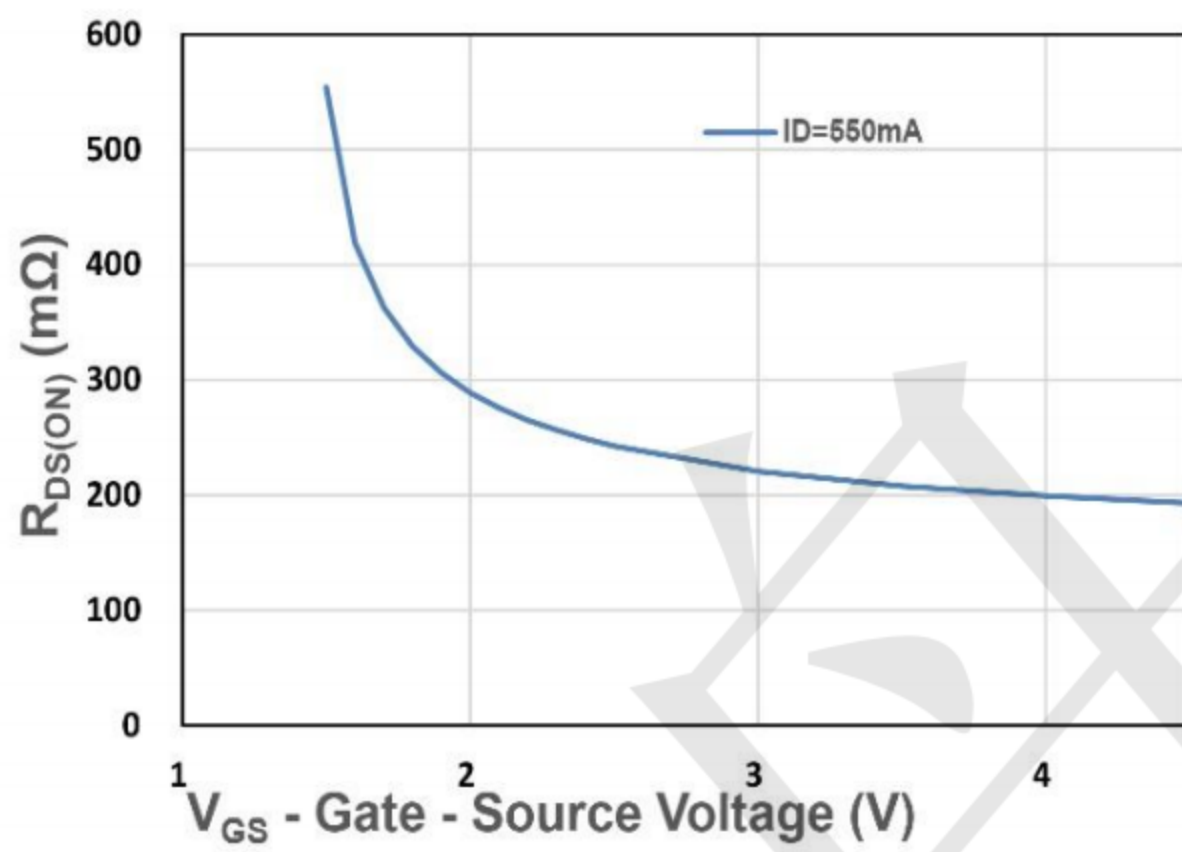


Figure 3. On-Resistance vs.  $V_{GS}$

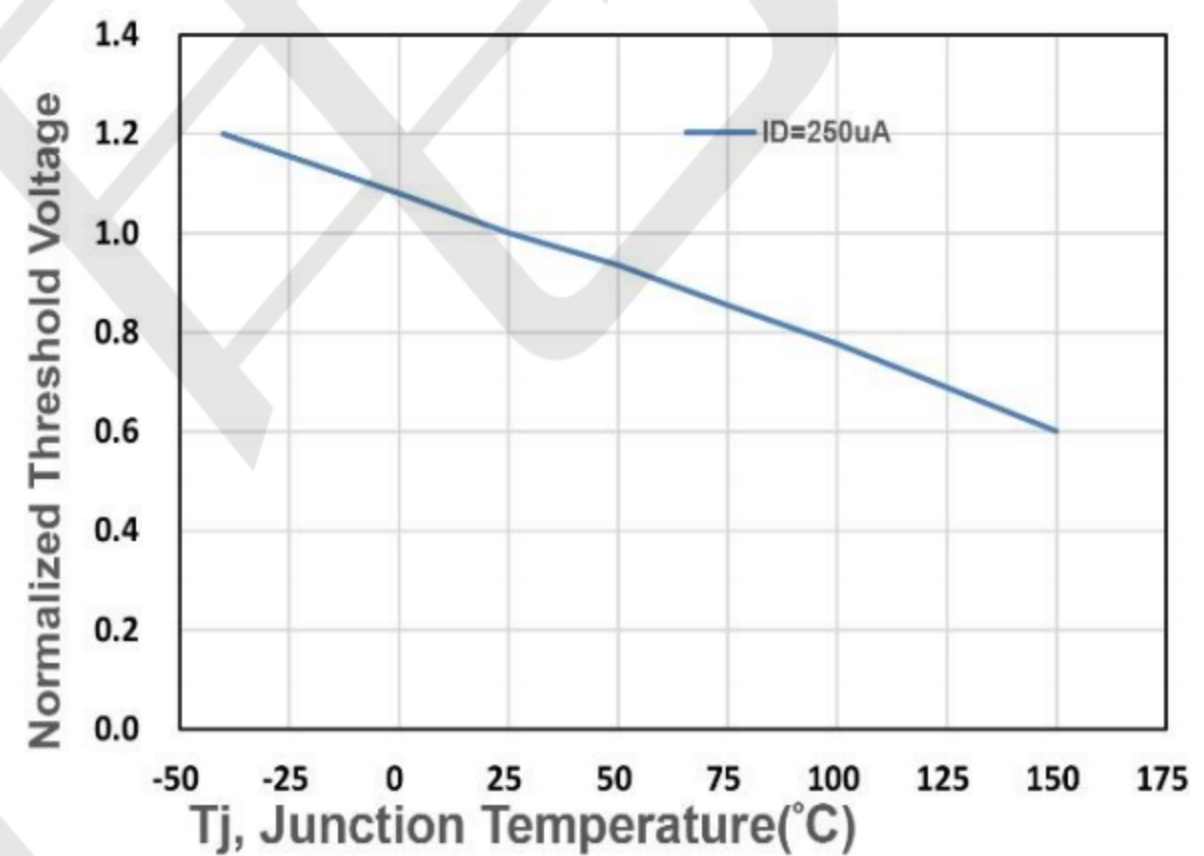


Figure 4. Gate Threshold Voltage

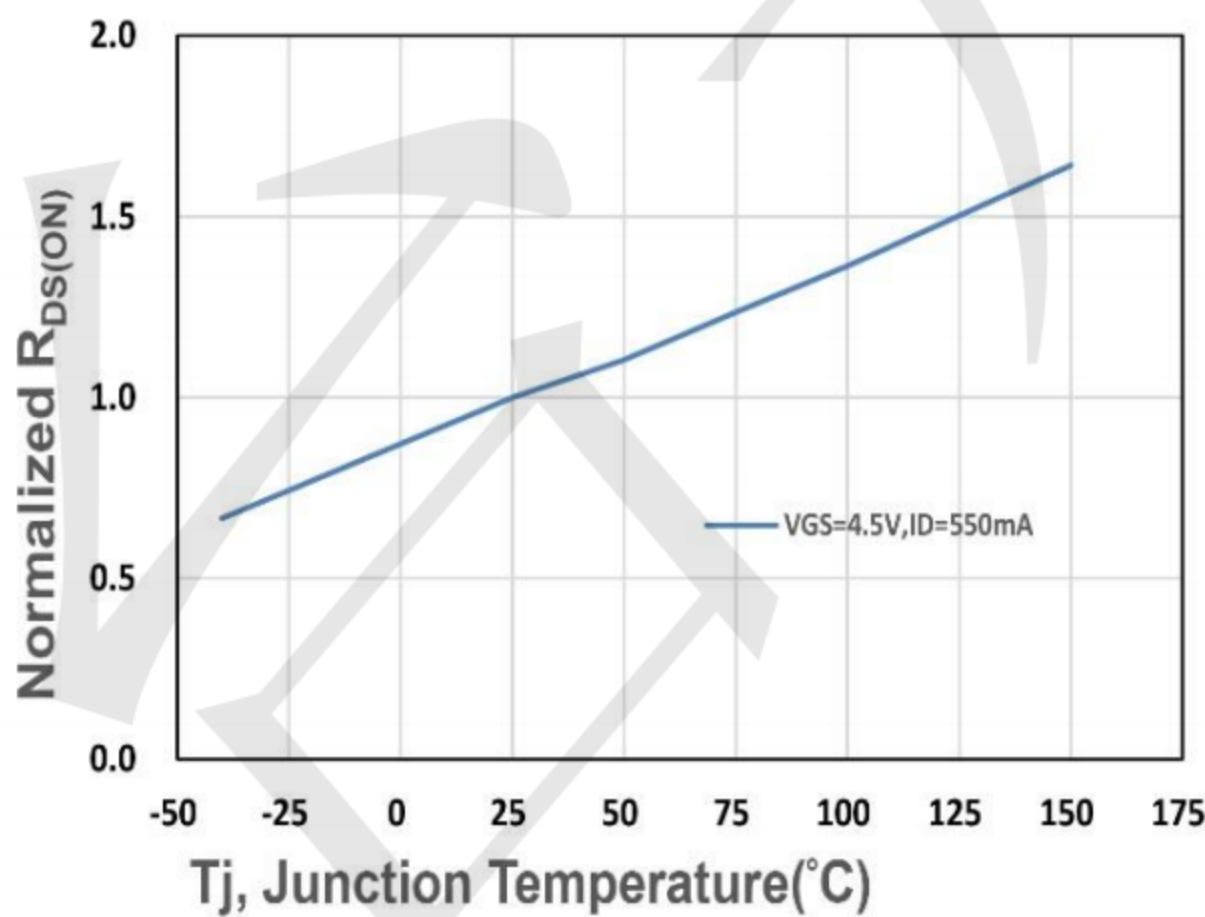


Figure 5. Drain-Source On Resistance

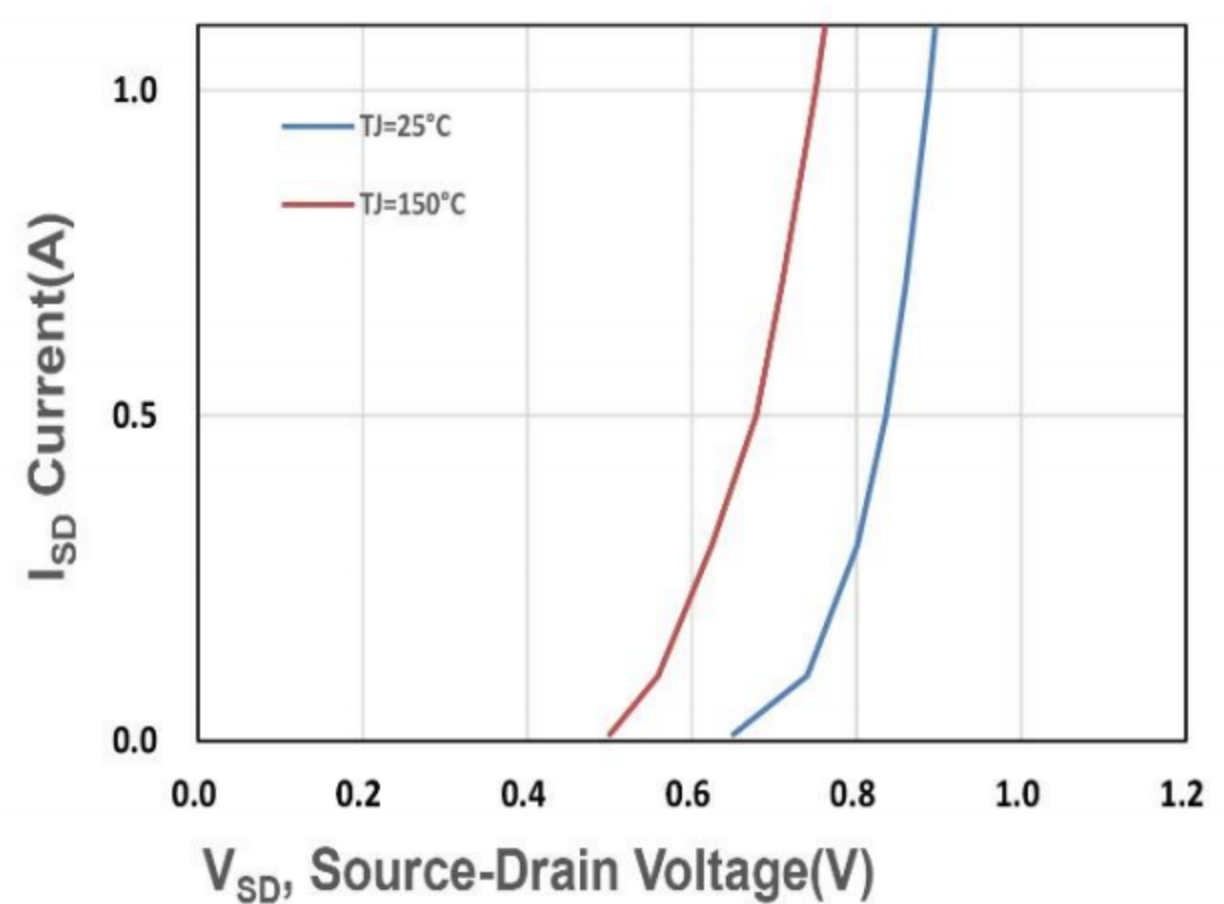
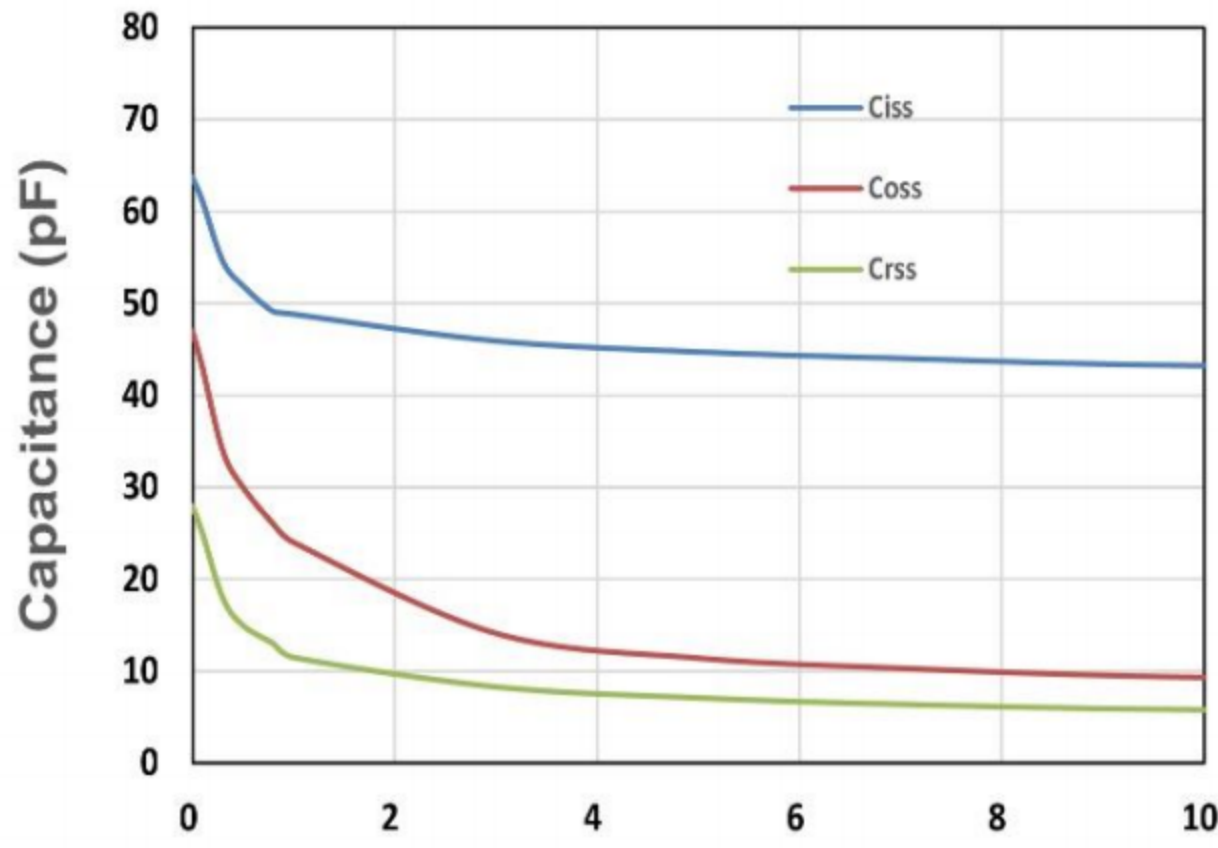


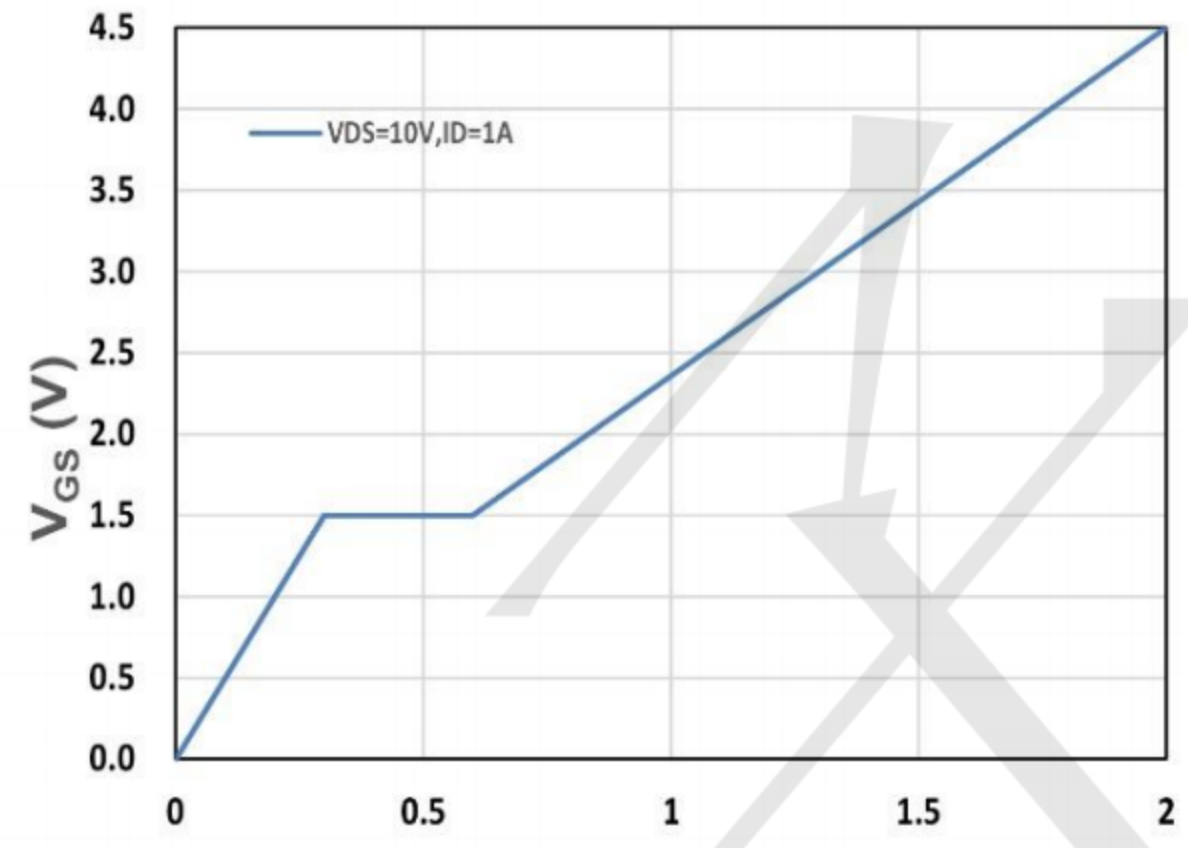
Figure 6. Source-Drain Diode Forward





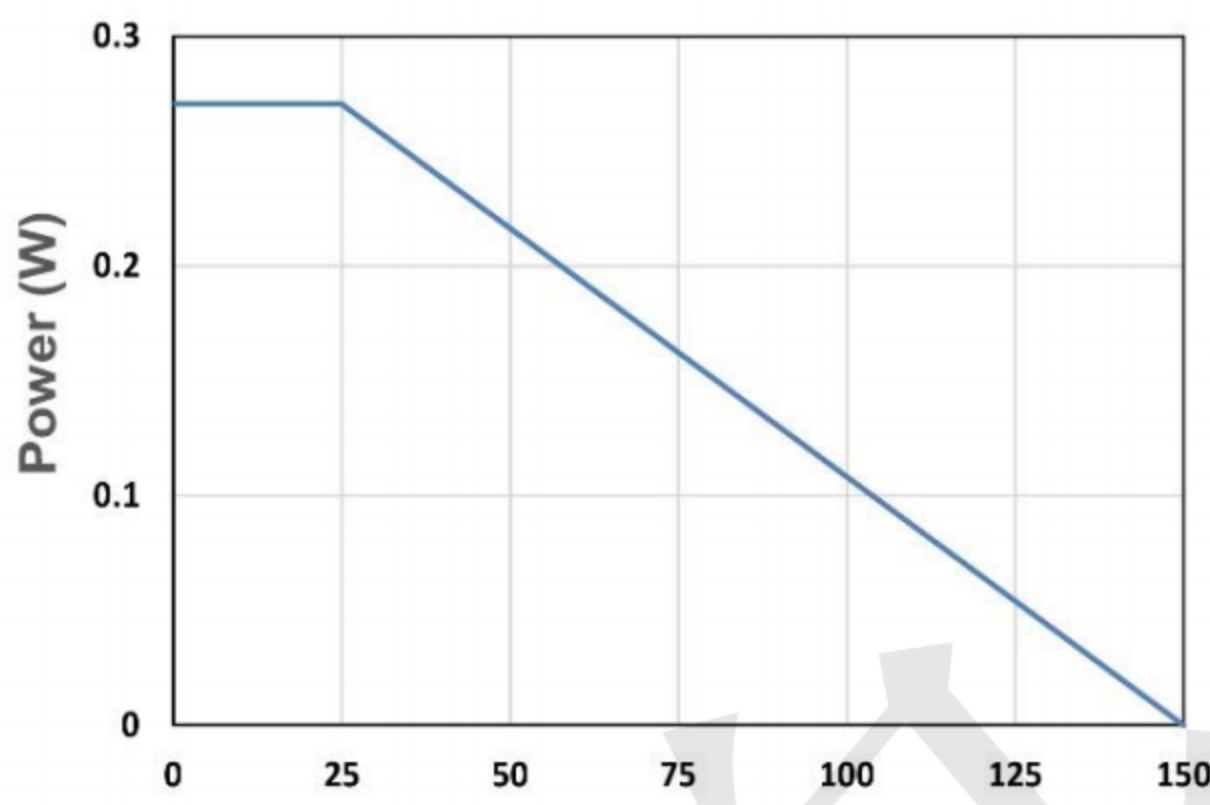
V<sub>DS</sub> - Drain - Source Voltage (V)

Figure 7. Capacitance



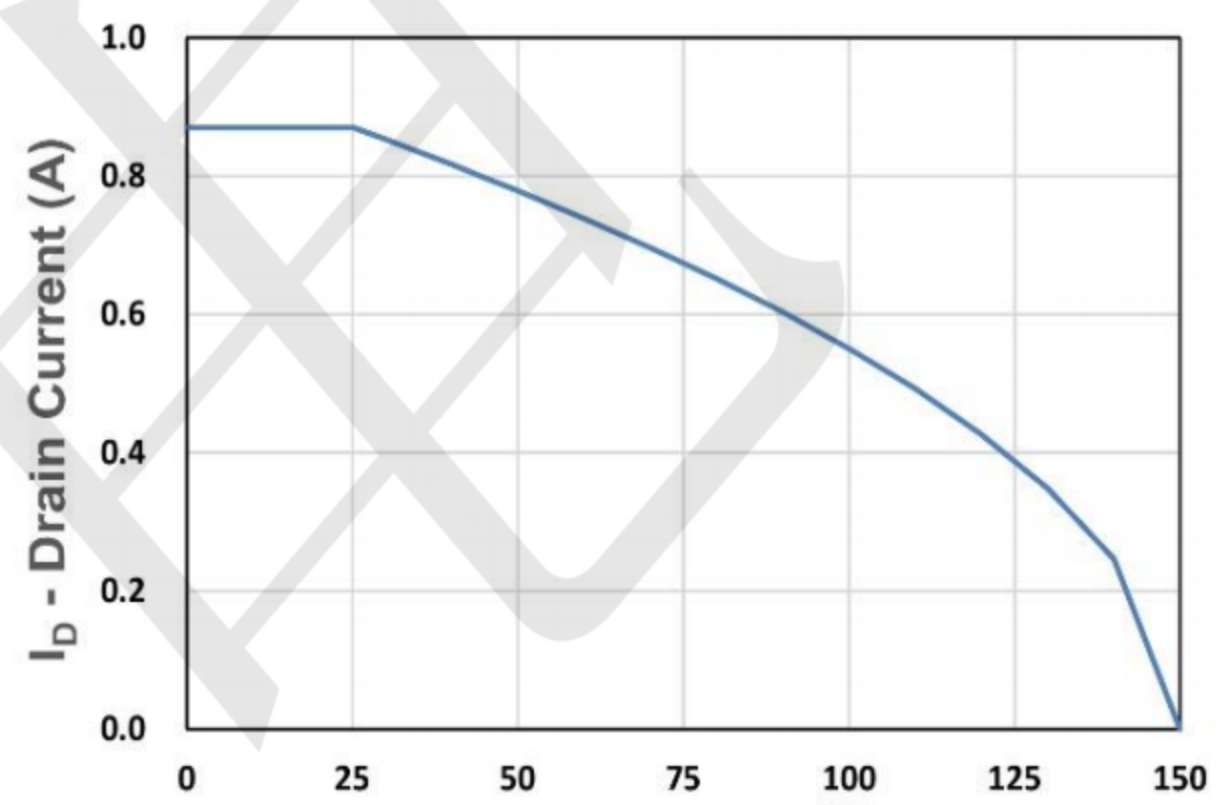
Qg, Total Gate Charge (nC)

Figure 8. Gate Charge Characteristics



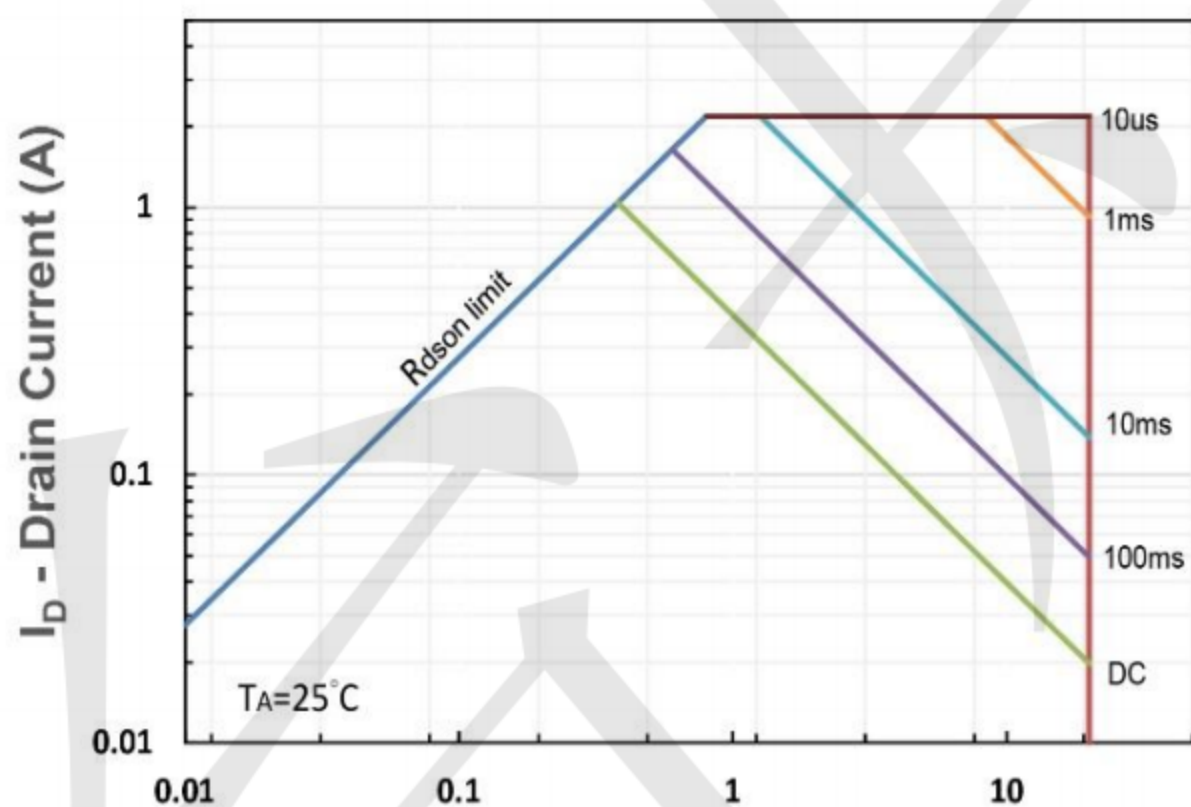
T<sub>A</sub> - Ambient Temperature (°C)

Figure 9. Power Dissipation



T<sub>A</sub> - Ambient Temperature (°C)

Figure 10. Drain Current



V<sub>DS</sub> - Drain-Source Voltage (V)

Figure 11. Safe Operating Area

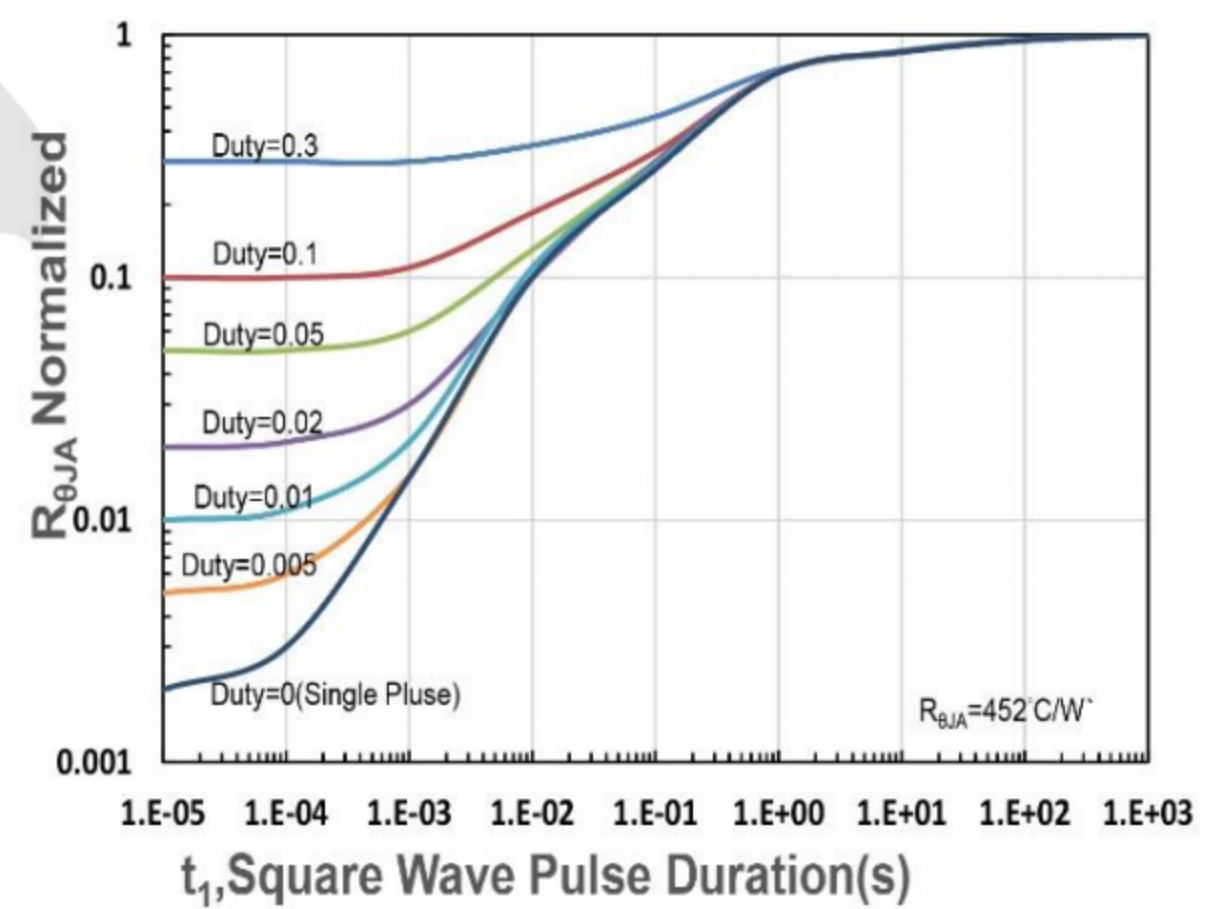
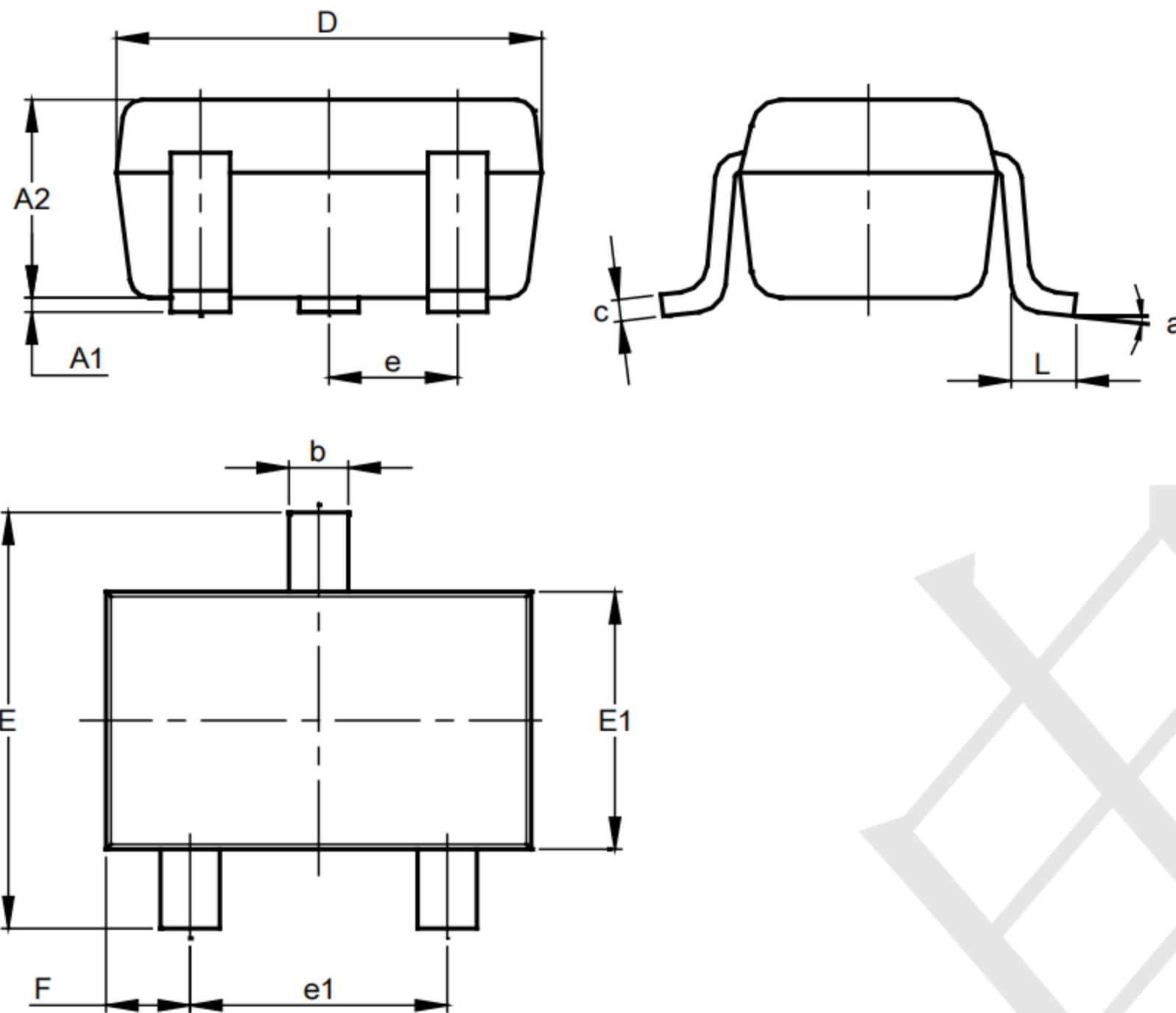


Figure 12. R<sub>θJA</sub> Transient Thermal Impedance

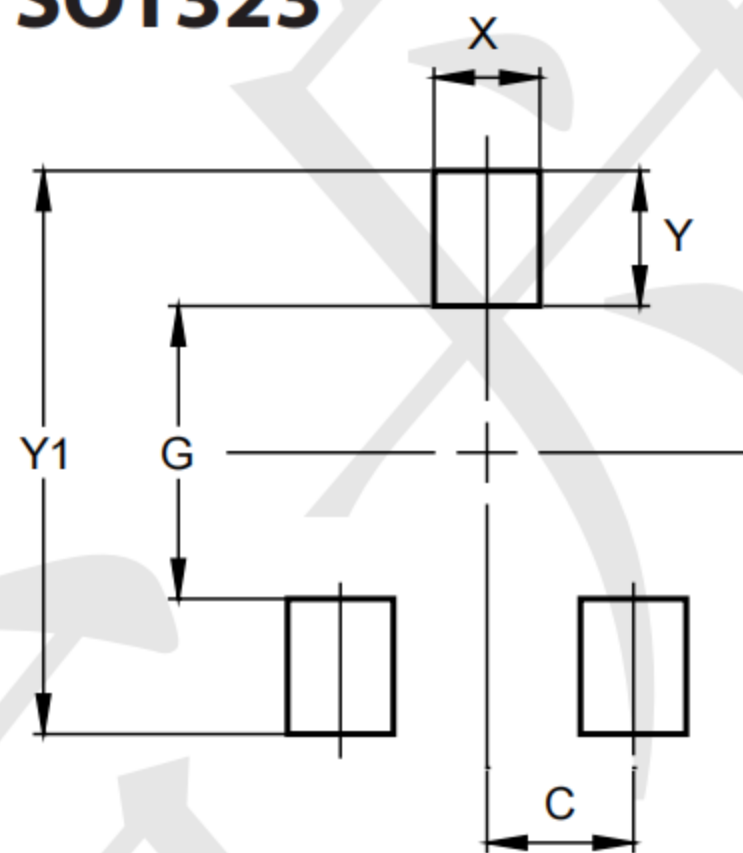


**Outline Drawing - SOT323(SC70-3)**



SOT323			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.25	0.40	0.30
c	0.10	0.18	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		
e1	1.20	1.40	1.30
F	0.375	0.475	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

**Land Pattern - SOT323**



Dimensions	Value (in mm)
C	0.650
G	1.300
X	0.470
Y	0.600
Y1	2.500