

### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D$
60V	23mΩ@10V	7A
	30mΩ@4.5V	
-60V	30mΩ@-10V	-10A
	35mΩ@-4.5V	

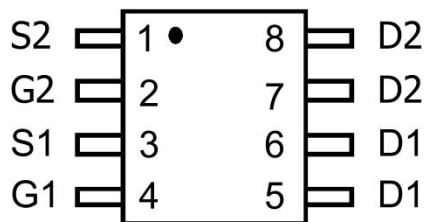
### Feature

- TrenchFET Power MOSFET
- Excellent RDS(on) and Low Gate Charge
- Fast Switching Speed

### Application

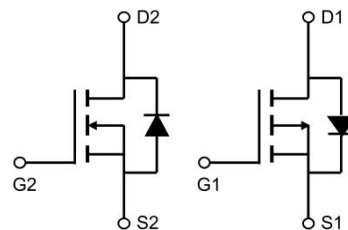
- Motor Control
- DC-DC Converters
- Power Management

### Package

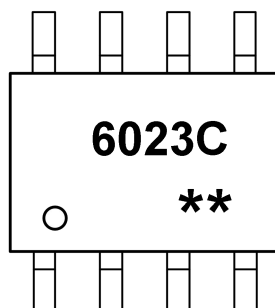


SOP-8L

### Circuit diagram



### Marking



6023C = Device code  
\*\* = Week Code

**Absolute maximum ratings (Ta=25°C unless otherwise noted)**

Parameter	Symbol	Value		Unit
		N-Channel	P-Channel	
Drain-Source Voltage	$V_{DS}$	60	-60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	$\pm 20$	V
Continuous Drain Current	$I_D$	7	-10	A
Power Dissipation	$P_D$	1.5	3.6	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	83	34	$^{\circ}C/W$
Junction Temperature	$T_J$	150		$^{\circ}C$
Storage Temperature	$T_{STG}$	-55~ +150		$^{\circ}C$

**N-Channel Electrical characteristics (T<sub>A</sub>=25 °C, unless otherwise noted)**

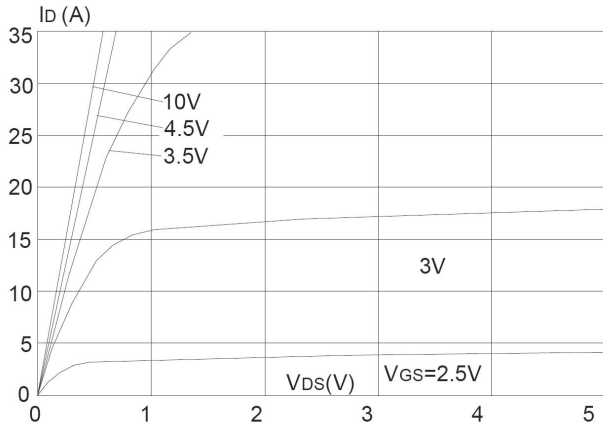
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	60	-	-	V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 80V, V_{GS} = 0V$	-	-	1	$\mu A$
Gate-body leakage current	$I_{GSS}$	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	$\pm 0.1$	$\mu A$
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	1.6	2.5	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 2A$	-	23	29	m $\Omega$
		$V_{GS} = 4.5V, I_D = 1A$	-	30	40	
<b>Dynamic characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=15V, V_{GS}=0V, f=1MHz$	-	1640	-	pF
Output Capacitance	$C_{oss}$		-	120	-	
Reverse Transfer Capacitance	$C_{rss}$		-	126	-	
<b>Switching Characteristics</b>						
Total gate charge	$Q_g$	$V_{DS}=48V, V_{GS}=4.5V, I_D=10A$	-	42	-	nC
Gate-source charge	$Q_{gs}$		-	8	-	
Gate-drain charge	$Q_{gd}$		-	11.5	-	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=30V, V_{GS}=10V, RG=3.3W, I_D=10A$	---	9	-	ns
Turn-on rise time	$t_r$		---	10.5	-	
Turn-off delay time	$t_{d(off)}$		---	36	-	
Turn-off fall time	$t_f$		---	5	-	
<b>Diode Characteristics</b>						
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=1A, T_J=25^{\circ}C$	-	-	1.2	V

**P-Channel Electrical characteristics (T<sub>A</sub>=25 °C, unless otherwise noted)**

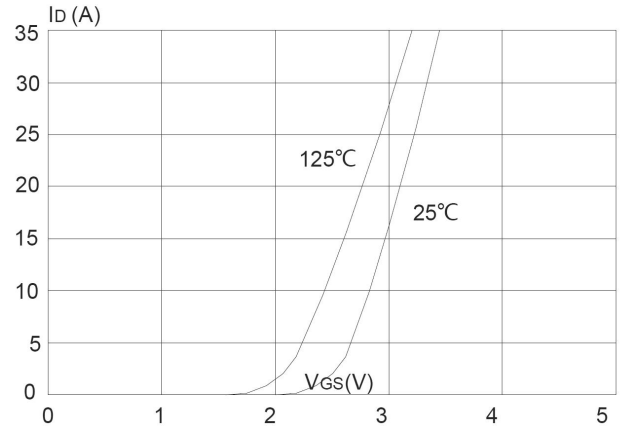
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA	-60	-	-	V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> = -80V, V <sub>GS</sub> = 0V	-	-	-1	μA
Gate-body leakage current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V	-	-	±100	nA
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA	-1	-1.7	-2.5	V
Drain-source on-resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = -10V, I <sub>D</sub> = -2A	-	30	38	mΩ
		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -1A	-	35	47	
<b>Dynamic characteristics</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = -30V, V <sub>GS</sub> = 0V, f = 1MHz	-	2417	-	pF
Output Capacitance	C <sub>oss</sub>		-	179	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	120	-	
<b>Switching Characteristics</b>						
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> = -30V, R <sub>L</sub> = 4.7Ω V <sub>GEN</sub> = -10V, R <sub>GEN</sub> = 3Ω	-	9.8	-	ns
Turn-on rise time	t <sub>r</sub>		-	6.1	-	
Turn-off delay time	t <sub>d(off)</sub>		-	44	-	
Turn-off fall time	t <sub>f</sub>		-	12.7	-	
Total gate charge	Q <sub>g</sub>	V <sub>DS</sub> = -30V, V <sub>GS</sub> = -10V, I <sub>D</sub> = -6.2A	-	46.5	-	nC
Gate-source charge	Q <sub>gs</sub>		-	9.1	-	
Gate-drain charge	Q <sub>gd</sub>		-	9.2	-	
<b>Source-Drain Diode Characteristics</b>						
Body Diode Voltage	V <sub>SD</sub>	I <sub>S</sub> = -1A, V <sub>GS</sub> = 0V	-	-	-1.2	V

**N-Channel Typical Characteristics**

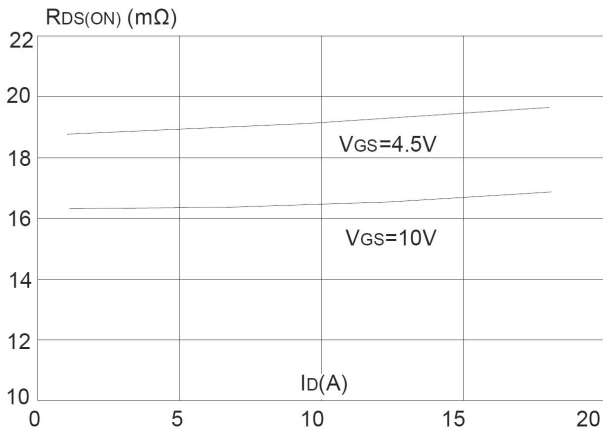
Output Characteristics



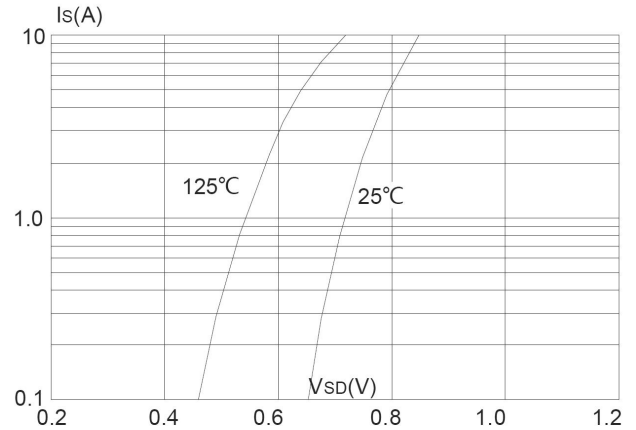
Typical Transfer Characteristics



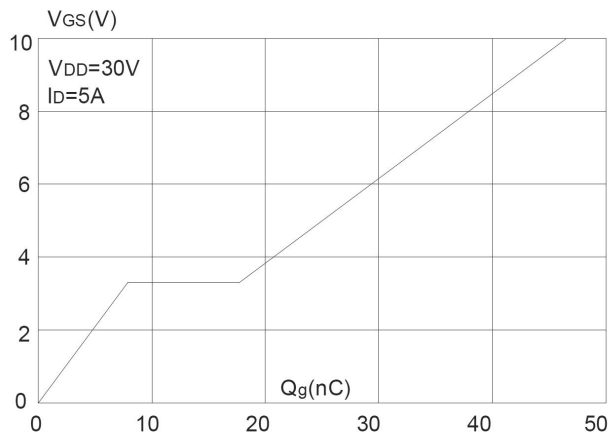
On-resistance vs. Drain Current



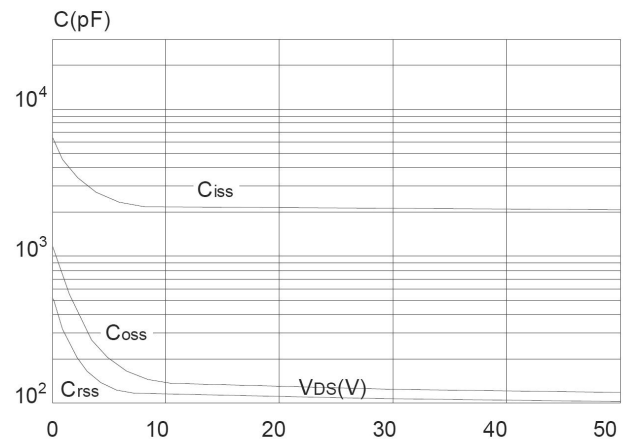
Body Diode Characteristics



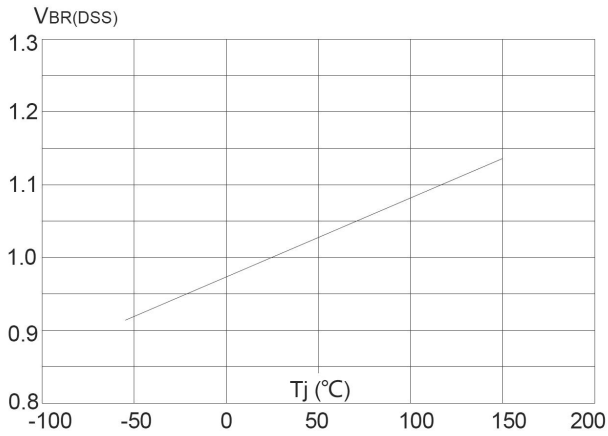
Gate Charge Characteristics



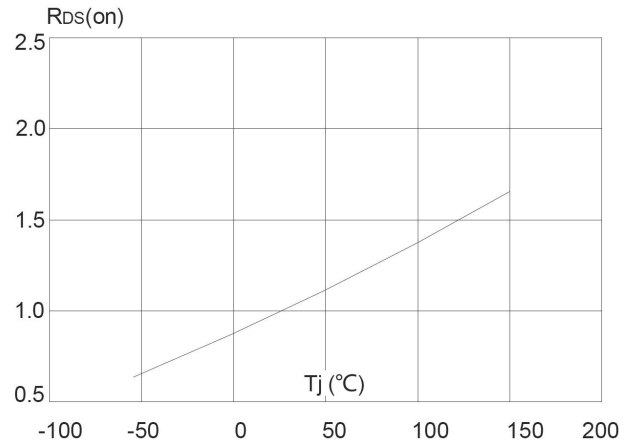
Capacitance Characteristics



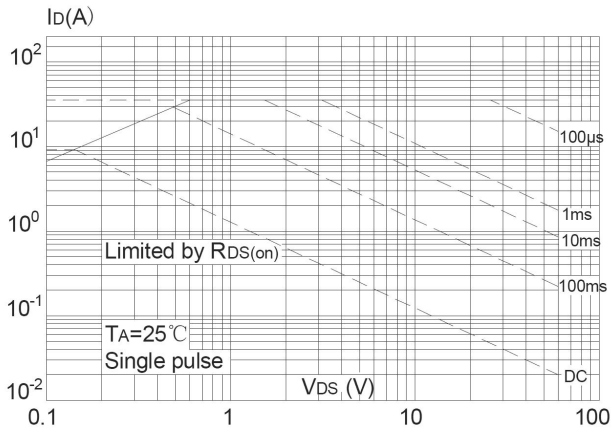
Normalized Breakdown Voltage vs. Junction Temperature



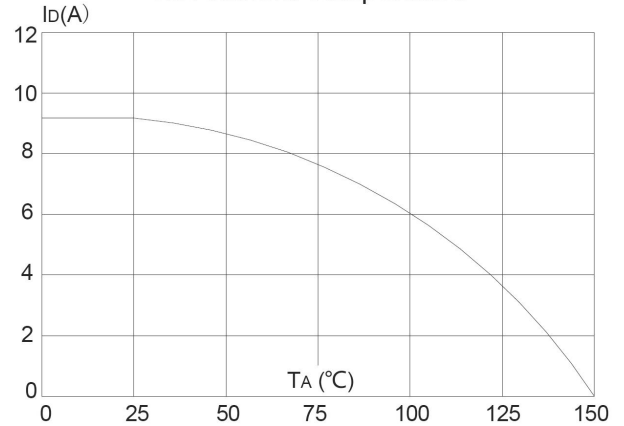
Normalized on Resistance vs. Junction Temperature



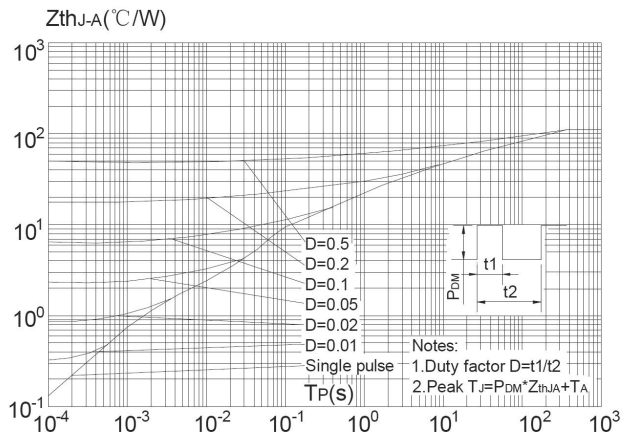
Maximum Safe Operating Area



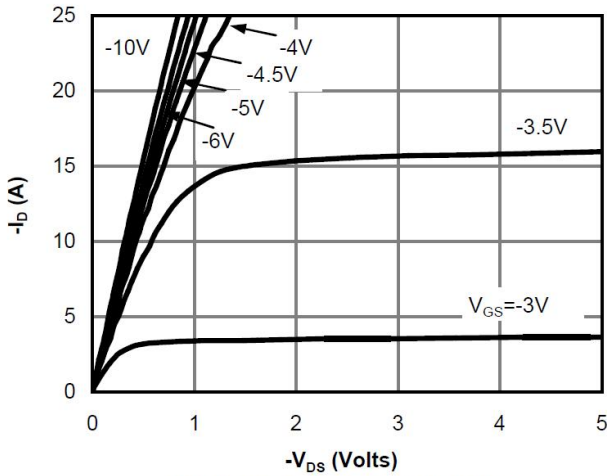
Maximum Continuous Drain Current vs. Ambient Temperature



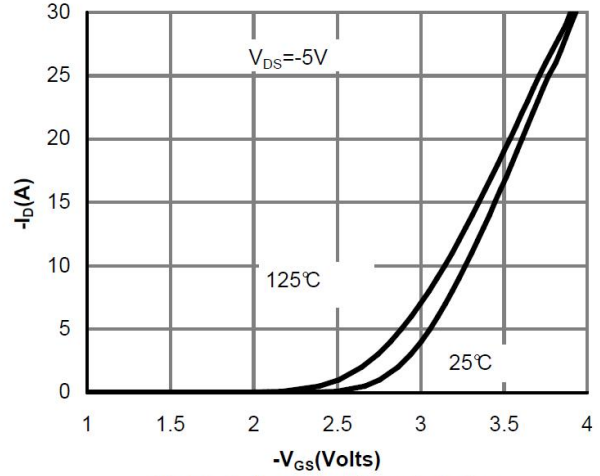
Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



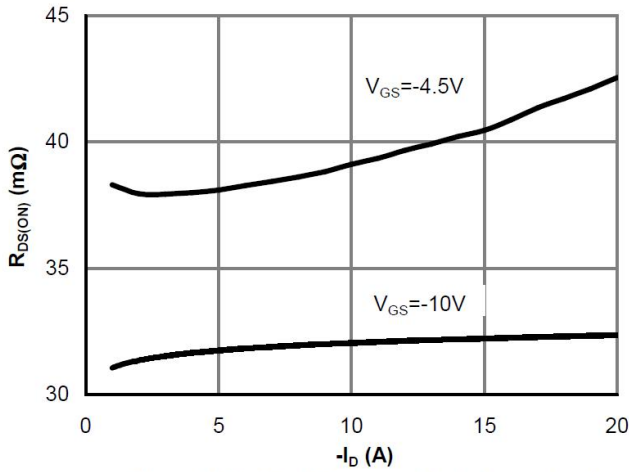
**P-Channel Typical Characteristics**



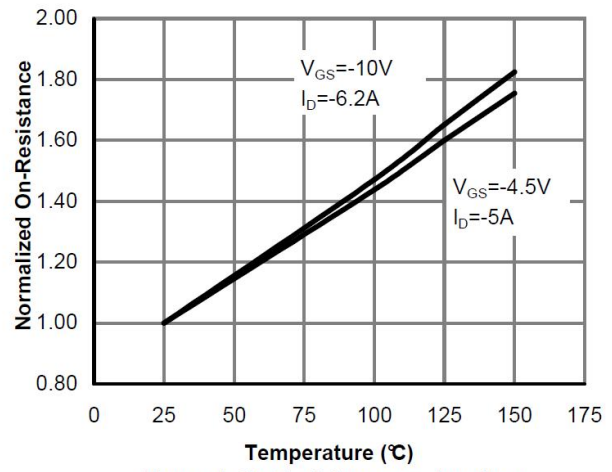
**Fig 1: On-Region Characteristics**



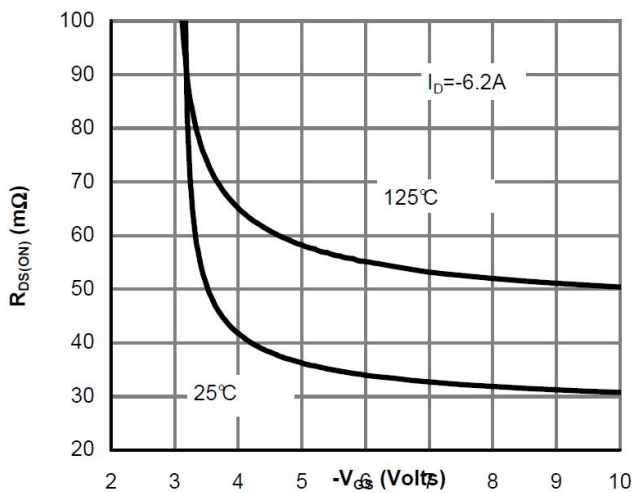
**Figure 2: Transfer Characteristics**



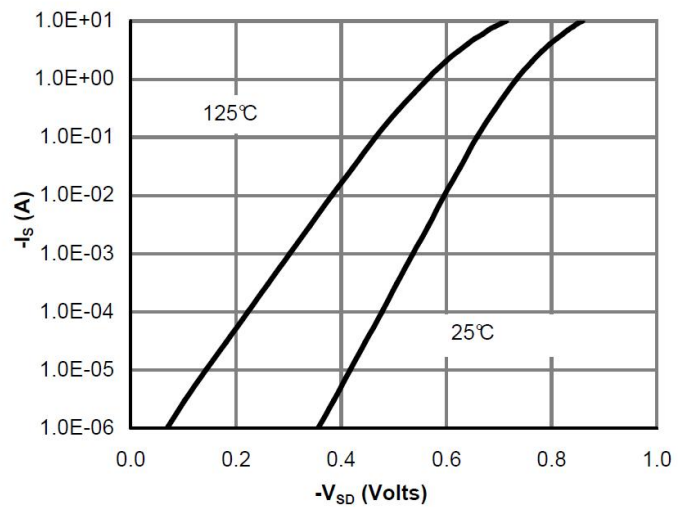
**Figure 3: On-Resistance vs. Drain Current and Gate Voltage**



**Figure 4: On-Resistance vs. Junction Temperature**



**Figure 5: On-Resistance vs. Gate-Source Voltage**



**Figure 6: Body-Diode Characteristics**

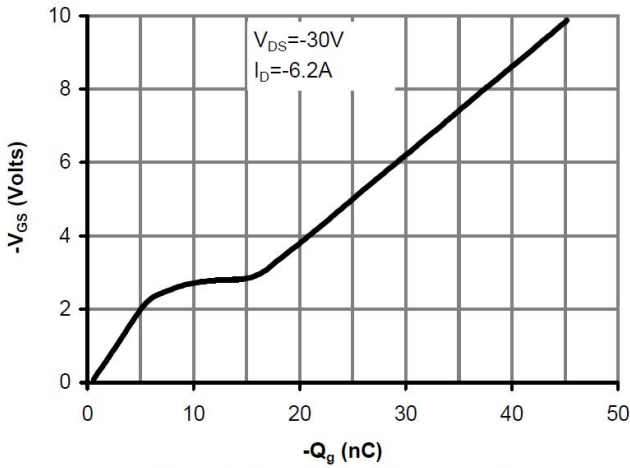


Figure 7: Gate-Charge Characteristics

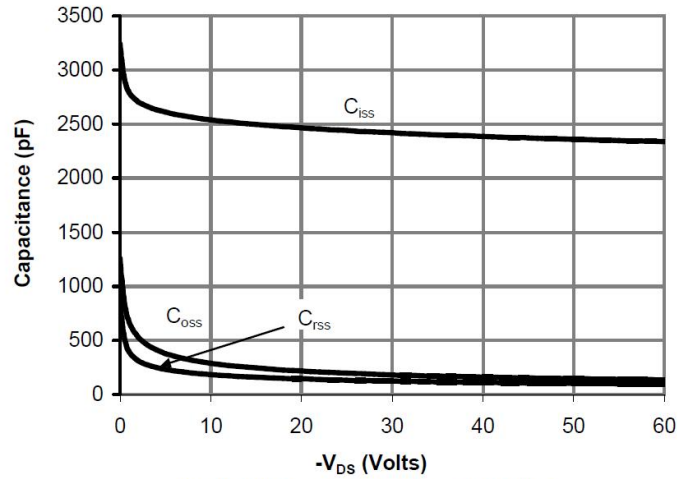


Figure 8: Capacitance Characteristics

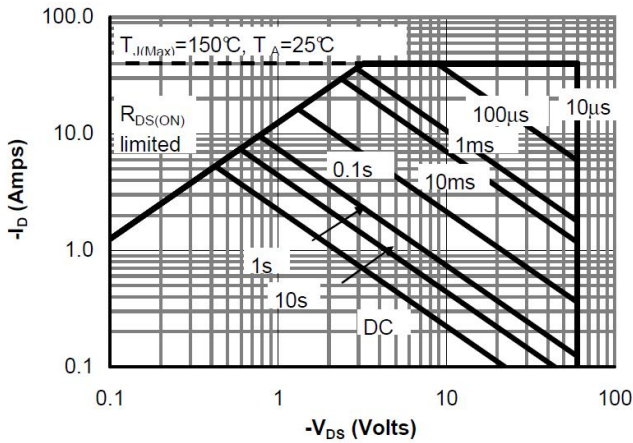


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

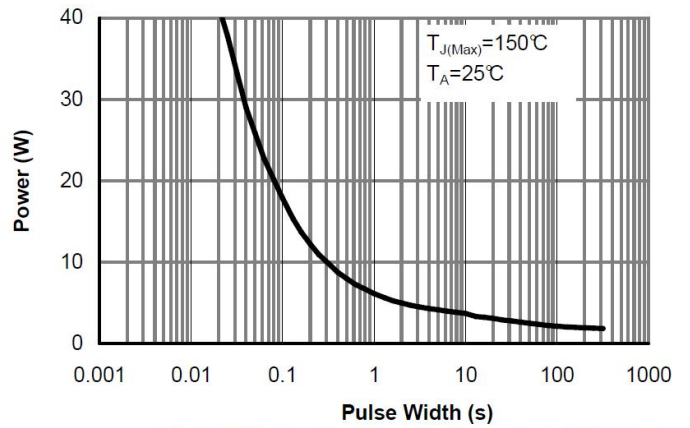


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

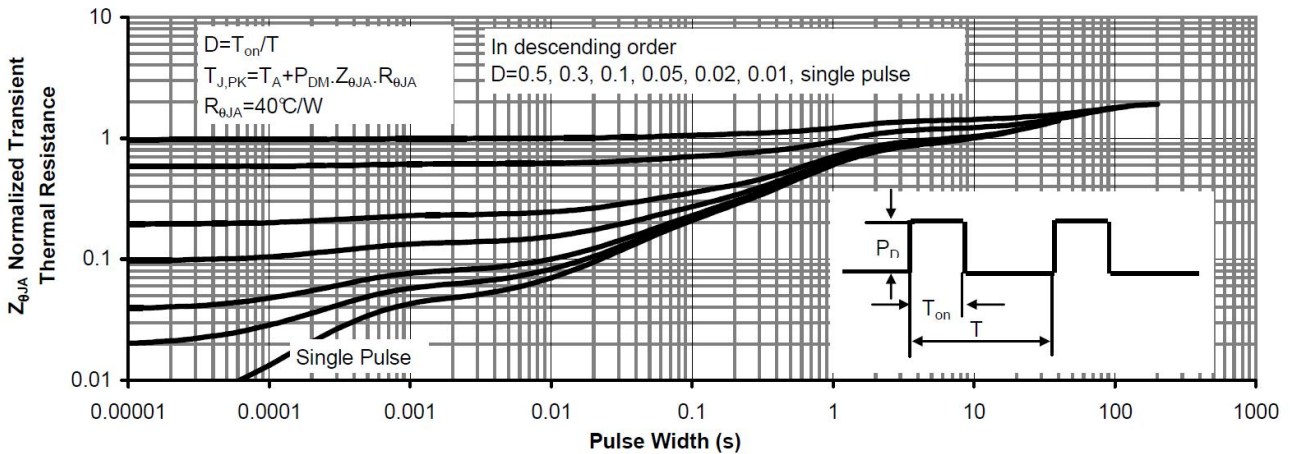
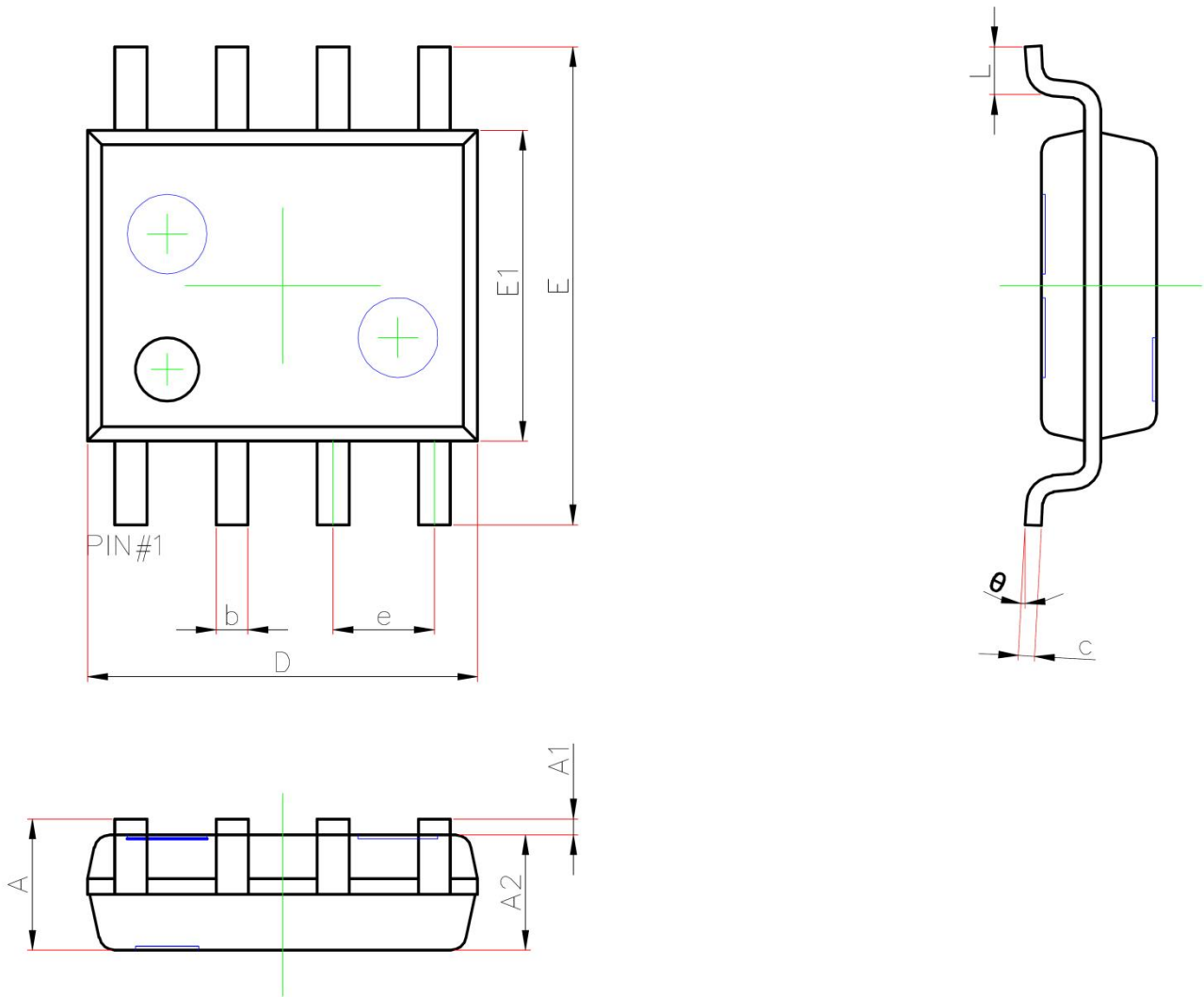


Figure 11: Normalized Maximum Transient Thermal Impedance



**SOP-8L Package Information**


Symbol	Dimensions In Millimeters	
	Min.	Max.
A	1.35	1.75
A1	0.10	0.25
A2	1.35	1.55
b	0.33	0.51
c	0.17	0.25
D	4.80	5.00
e	1.27 REF.	
E	5.80	6.20
E1	3.80	4.00
L	0.40	1.27
$\theta$	0°	8°



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