

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
40V	18mΩ@10V	7A
	24mΩ@4.5V	
-40V	33mΩ@-10V	-6A
	44mΩ@-4.5V	



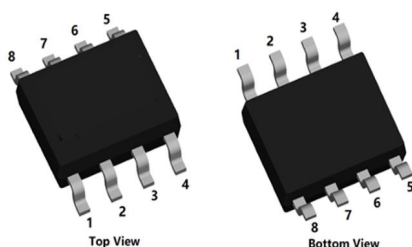
Feature

- High power and current handing capability
- Lead free product is acquired
- Surface mount package
- 100% Single Pluse avalanche energy Test

Applications

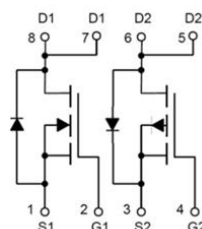
- Battery Protection
- Load Switch
- Power Management

Package

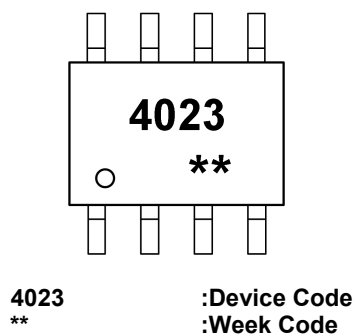


SOP-8L

Circuit diagram



Marking



Order Information

Device	Package	Unit/Tape
SP4023CP8	SOP-8L	4000

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

Parameter	Symbol	Value		Units
		N-Channel	P-Channel	
Drain-Source Voltage	V_{DS}	40	-40	V
Gate-Source Voltage	V_{GS}	± 20	± 20	V
Continuous Drain Current	I_D	7	-6	A
Pulsed Drain Current	I_{DM}	28	-24	A
Single Pulse Avalanche Energy ¹	E_{AS}	18	30	mJ
Power Dissipation	P_D	2		W
Thermal Resistance Junction-to-Ambient	$R_{\theta JA}$	62.5		°C/W
Storage Temperature Range	T_{STG}	-55 to 150		°C
Operating Junction Temperature Range	T_J	-55 to 150		°C

N-Channel Electrical characteristics (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	VGS=0V , ID=250uA	40	-	-	V
Drain-Source Leakage Current	IDSS	VDS=32V , VGS=0V , TJ=25℃	-	-	1	uA
Gate-Source Leakage Current	IGSS	VGS=±20V , VDS=0V	-	-	±100	nA
Gate Threshold Voltage	VGS(th)	VGS=VDS , ID =250uA	1.0	1.5	2.5	V
Static Drain-Source On-Resistance	RDS(ON)	VGS=10V , ID=5A	-	18	25	mΩ
		VGS=4.5V , ID=3A	-	24	35	
Dynamic characteristics						
Input Capacitance	Ciss	VDS=20V , VGS=0V , f=1MHz	-	834	-	pF
Output Capacitance	Coss		-	51	-	
Reverse Transfer Capacitance	Crss		-	45	-	
Total Gate Charge	Qg	VDS=20V , VGS=4.5V , ID=7A	-	16.2	-	nC
Gate-Source Charge	Qgs		-	4.1	-	
Gate-Drain Charge	Qgd		-	3.1	-	
Switching Characteristics						
Turn-On Delay Time	Td(on)	VDD=20V, VGS=10V , RG=3Ω, ID=5A	-	5.3	-	nS
Rise Time	Tr		-	7.1	-	
Turn-Off Delay Time	Td(off)		-	15.8	-	
Fall Time	Tf		-	4.8	-	
Diode Characteristics						
Diode Forward Voltage	VSD	VGS=0V , IS=1A , TJ=25℃	-	-	1.2	V
Maximum Body-Diode Continuous Current	IS		-	-	7	A
Reverse Recovery Time	Trr	IS=6A, di/dt=100A/us, TJ=25℃	-	16	-	nS
Reverse Recovery Charge	Qrr		-	8	-	nC

Note :

1. The EAS test condition is $V_{DD}=20V, V_{GS}=10V, L=0.5mH, R_G=25\Omega$

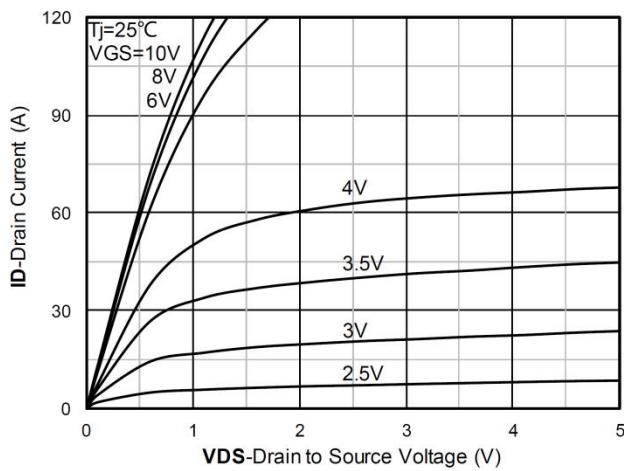
P-Channel Electrical characteristics (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	VGS=0V , ID=-250uA	-40	-	-	V
Drain-Source Leakage Current	IDSS	VDS=-32V , VGS=0V , TJ=25℃	-	-	-1	uA
Gate-Source Leakage Current	IGSS	VGS=±20V , VDS=0V	-	-	±100	nA
Gate Threshold Voltage	VGS(th)	VGS=VDS , ID =-250uA	-1.0	-1.5	-2.5	V
Static Drain-Source On-Resistance	RDS(ON)	VGS=-10V , ID=-5A	-	33	45	mΩ
		VGS=-4.5V , ID=-3A	-	44	60	
Dynamic characteristics						
Input Capacitance	Ciss	VDS=-20V , VGS=0V , f=1MHz	-	1215	-	pF
Output Capacitance	Coss		-	184	-	
Reverse Transfer Capacitance	Crss		-	102	-	
Total Gate Charge	Qg	VDS=-20V , VGS=-10V , ID=-5A	-	20	-	nC
Gate-Source Charge	Qgs		-	3.5	-	
Gate-Drain Charge	Qgd		-	4.2	-	
Switching Characteristics						
Turn-On Delay Time	Td(on)	VDD=-20V VGS=-10V , RG=3Ω, ID=-5A	-	8	-	nS
Rise Time	Tr		-	15	-	
Turn-Off Delay Time	Td(off)		-	23	-	
Fall Time	Tf		-	9	-	
Diode Characteristics						
Diode Forward Voltage	VSD	VGS=0V , IS=-1A , TJ=25℃	-	-	-1.2	V
Maximum Body-Diode Continuous Current	IS		-	-	-6	A
Reverse Recovery Time	Trr	IS=-5A, di/dt=-100A/us, Tj=25℃	-	11	-	nS
Reverse Recovery Charge	Qrr		-	7		nC

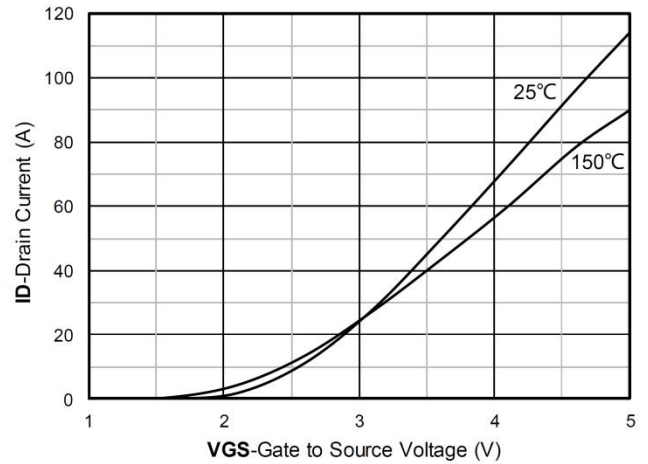
Note :

1.The EAS test condition is $V_{DD}=-20V$, $V_{GS}=-10V$, $L=0.5mH$, $R_G=25\Omega$

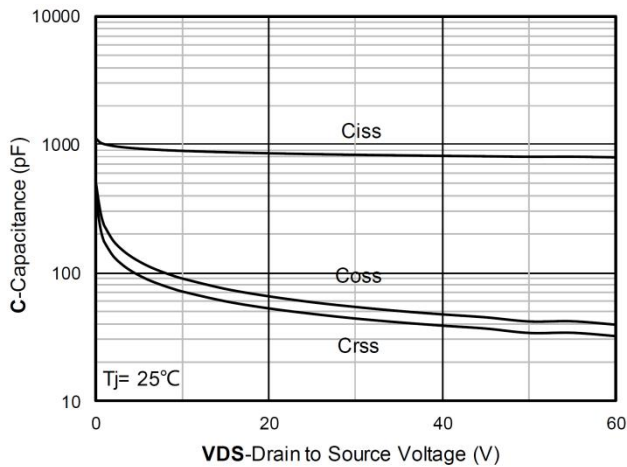
N-Channel Typical Characteristics



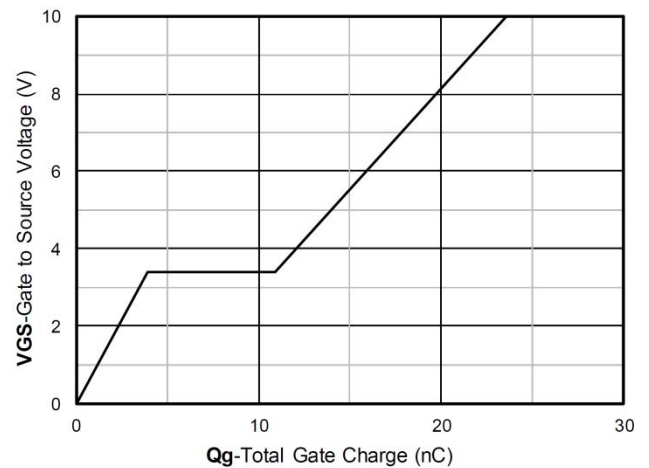
Output Characteristics



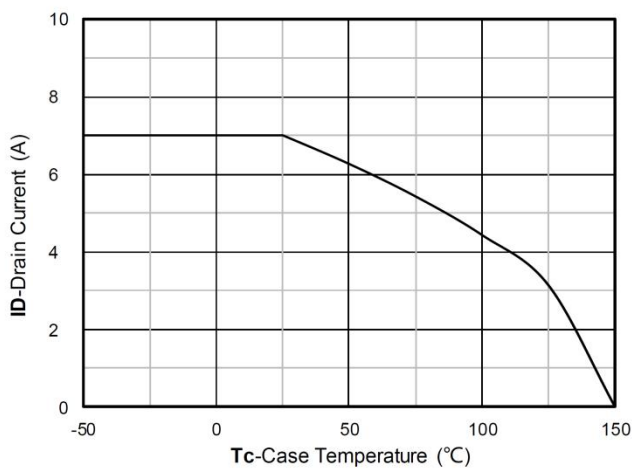
Transfer Characteristics



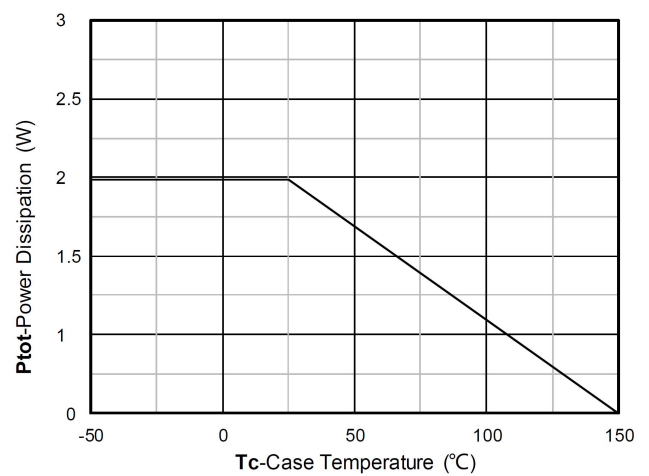
Capacitance Characteristics



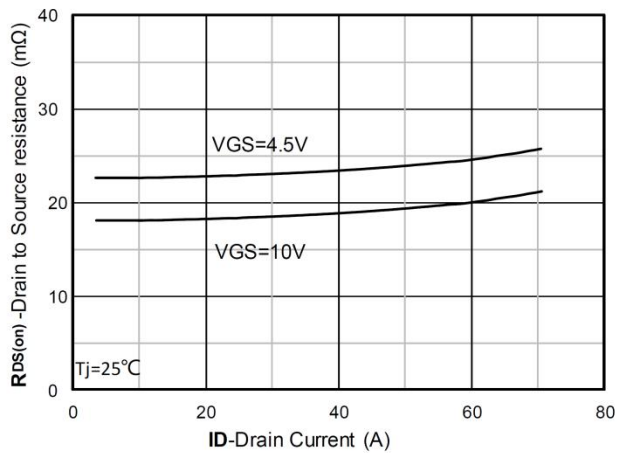
Gate Charge



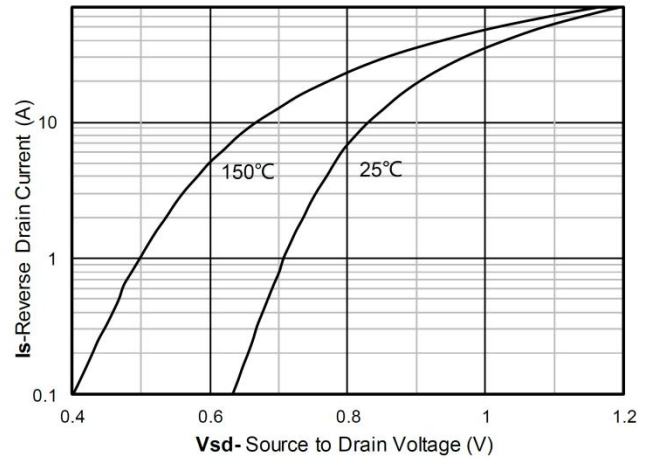
Current dissipation



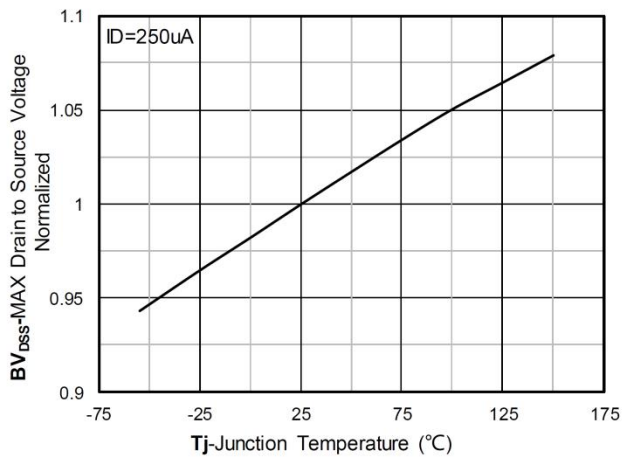
Power dissipation



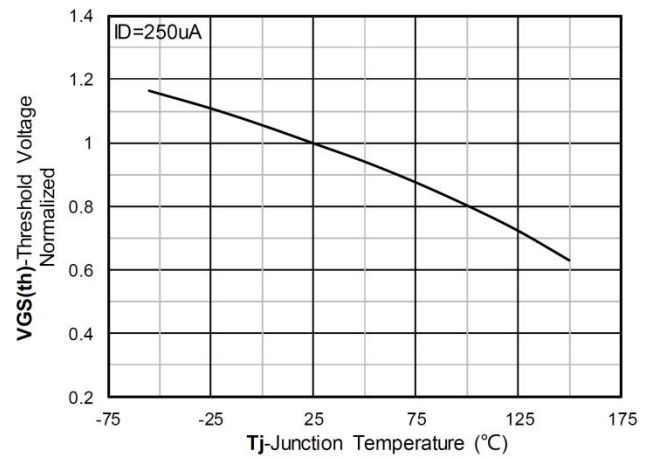
$R_{DS(on)}$ VS Drain Current



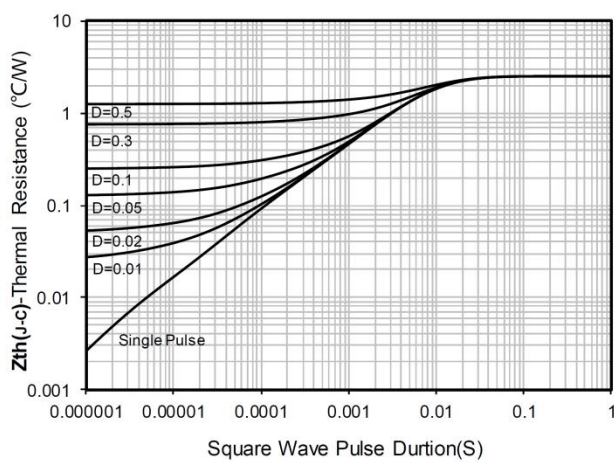
Forward characteristics of reverse diode



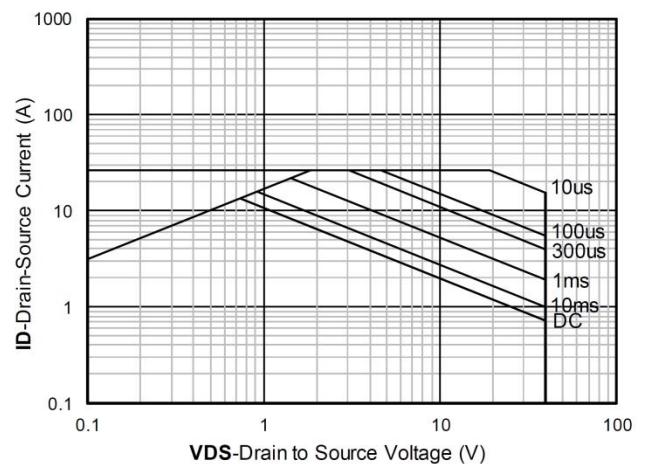
Normalized breakdown voltage



Normalized Threshold voltage

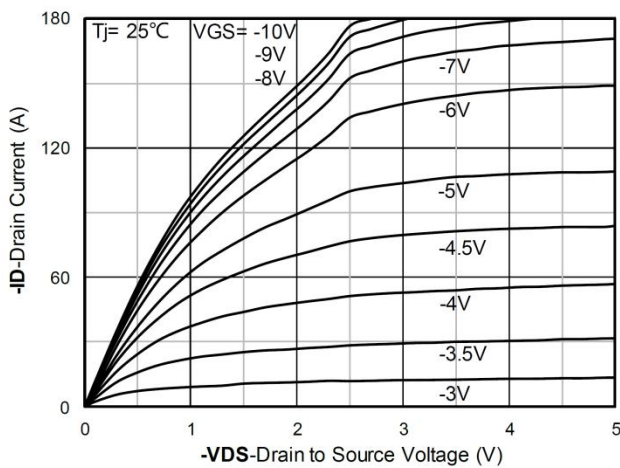


Maximum Transient Thermal Impedance

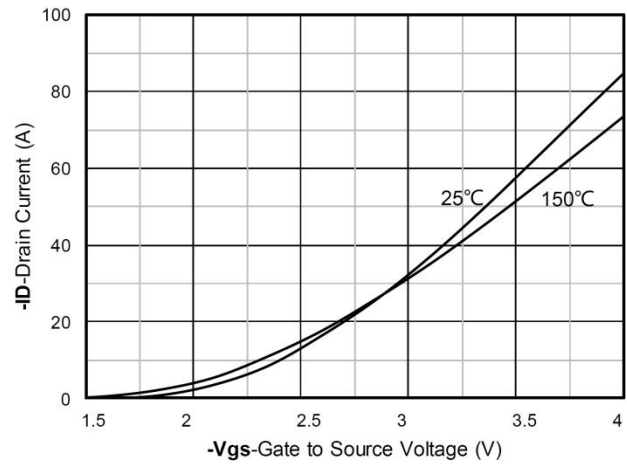


Safe Operation Area

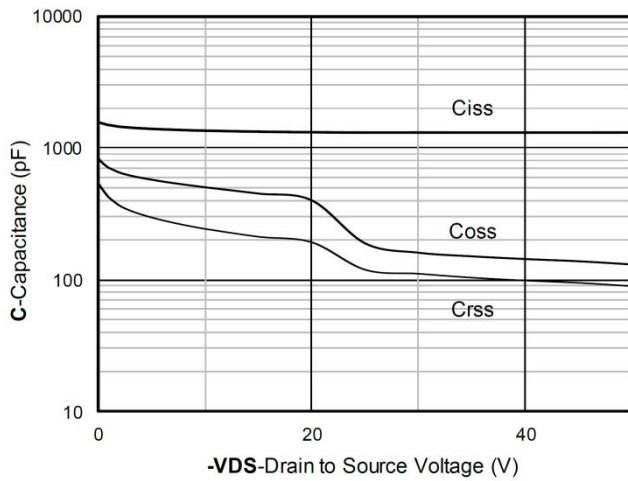
P-Channel Typical Characteristics



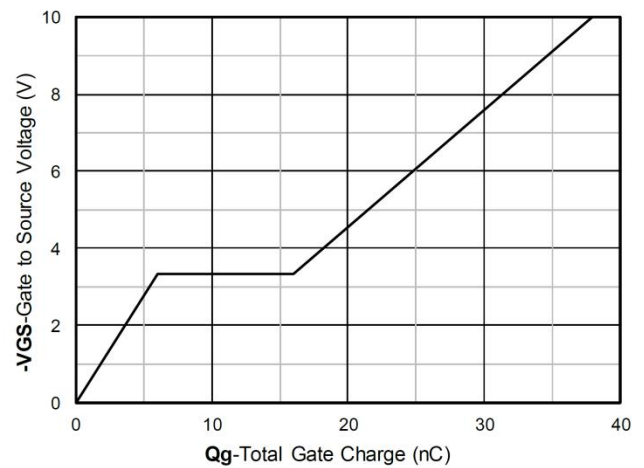
Output Characteristics



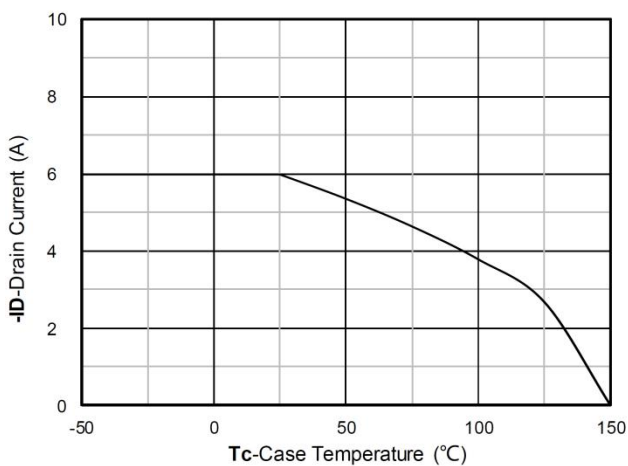
Transfer Characteristics



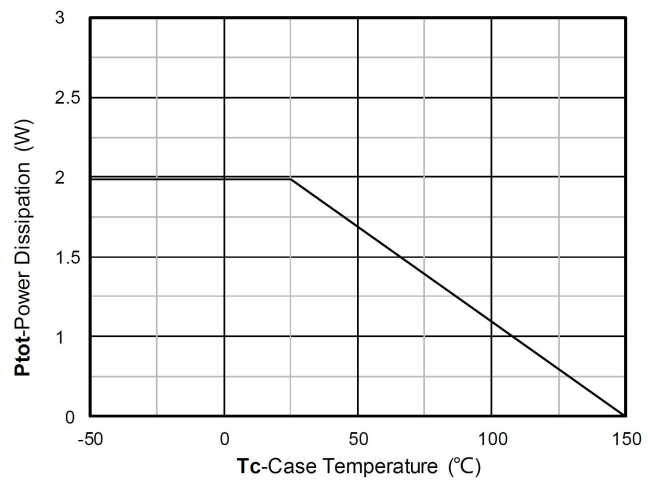
Capacitance Characteristics



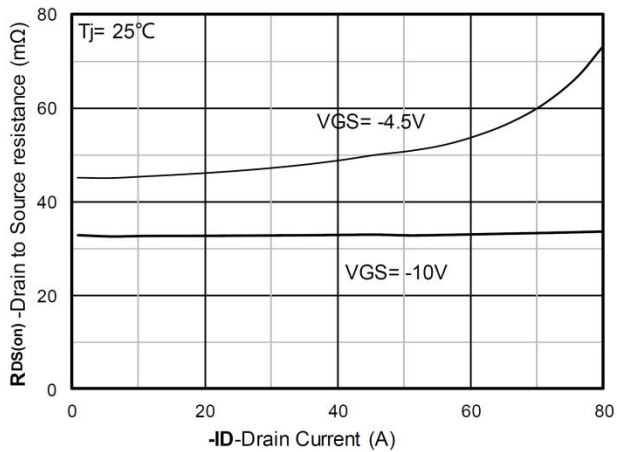
Gate Charge



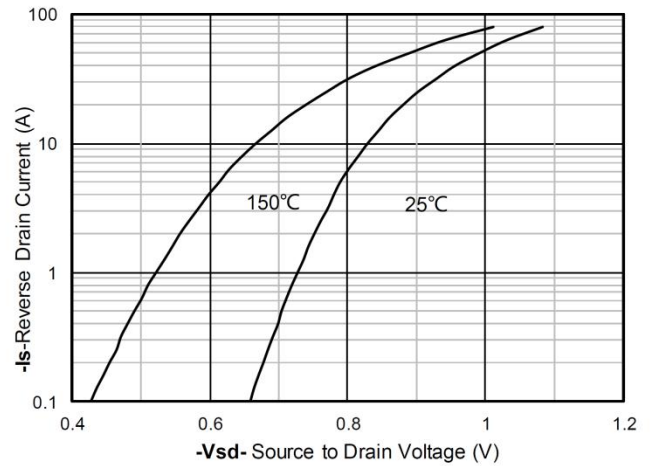
Current dissipation



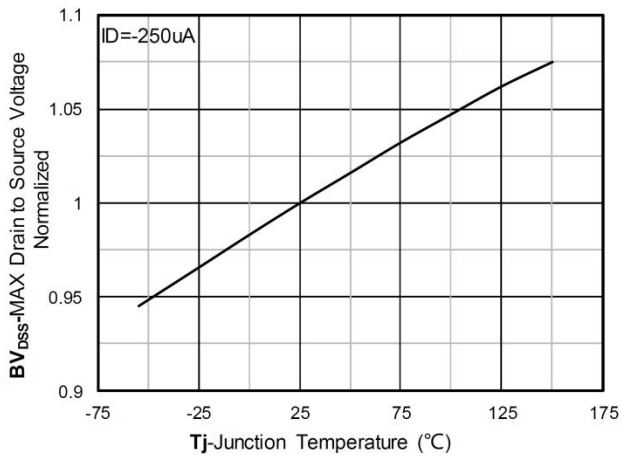
Power dissipation



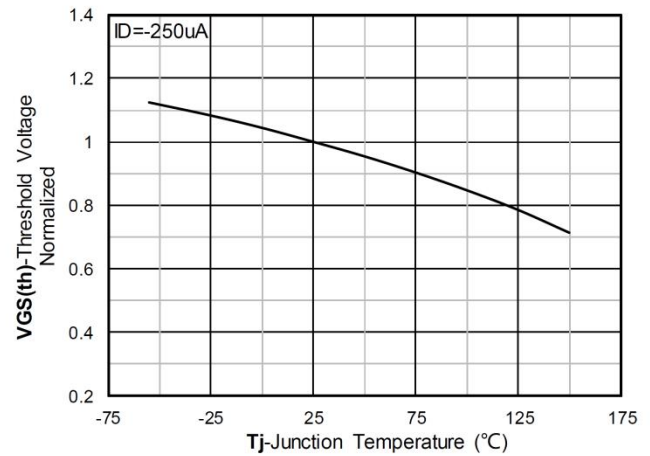
$R_{DS(on)}$ VS Drain Current



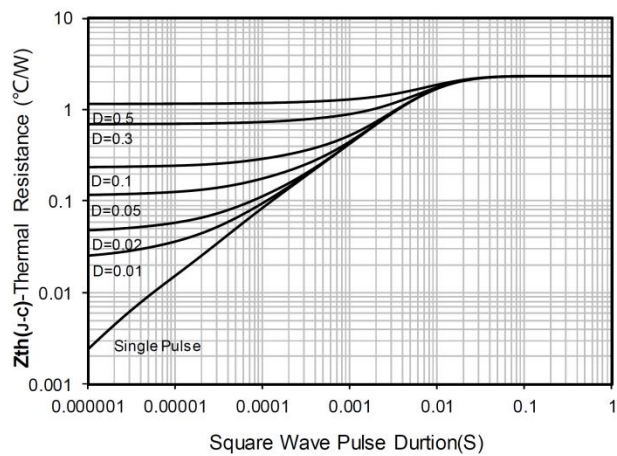
Forward characteristics of reverse diode



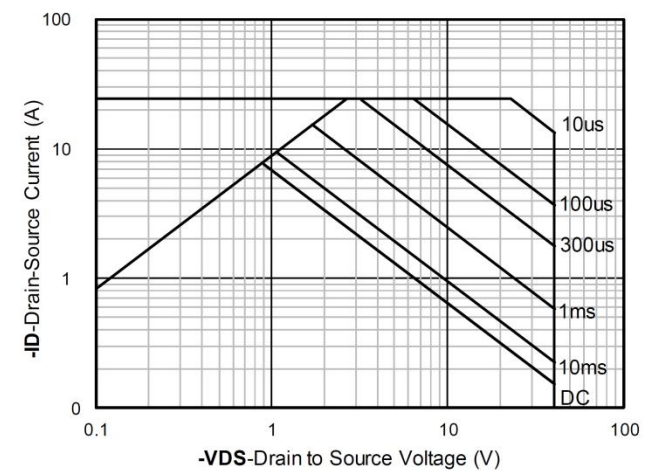
Normalized breakdown voltage



Normalized Threshold voltage

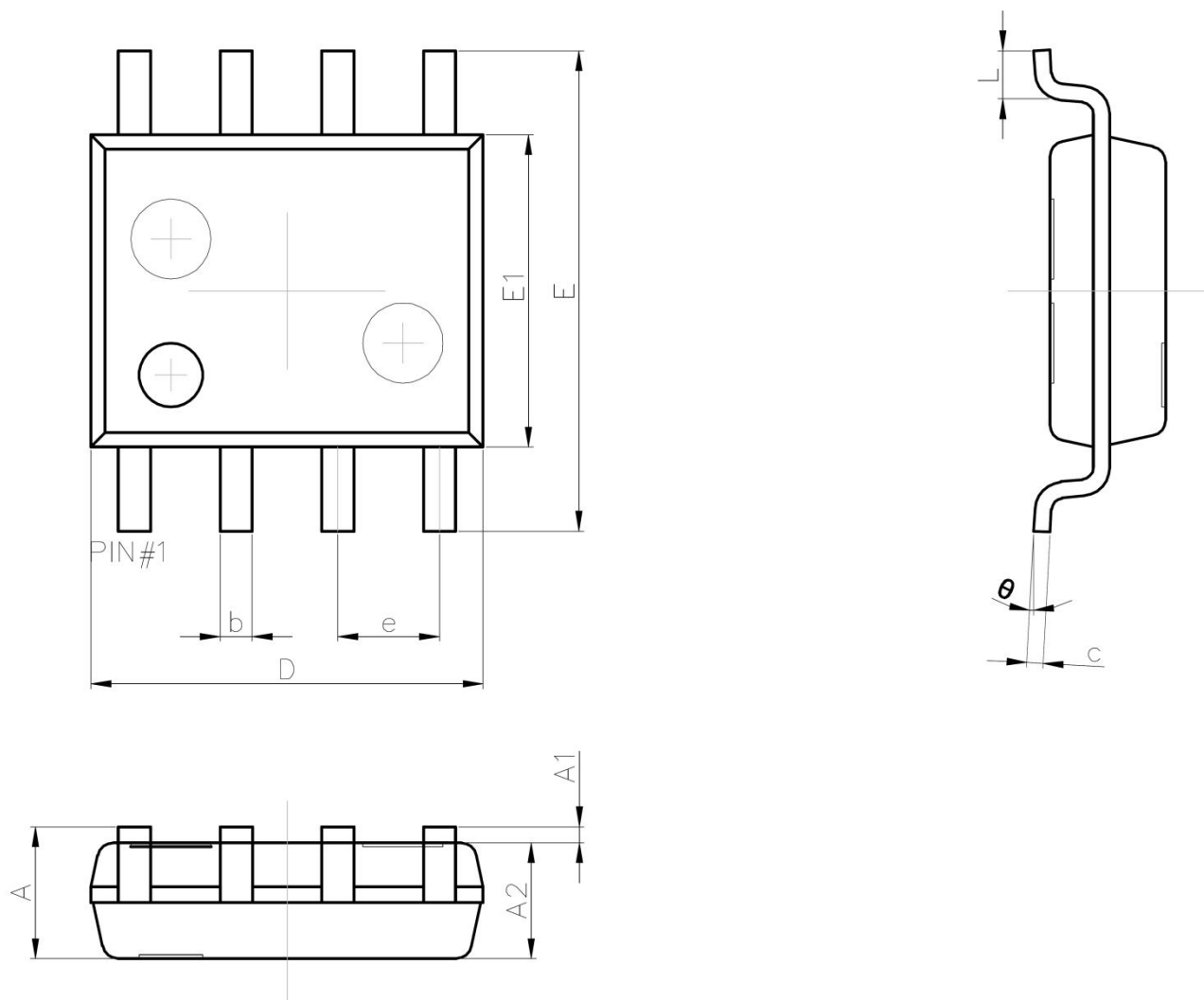


Maximum Transient Thermal Impedance



Safe Operation Area

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
θ	0°	8°