Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
100V	90mΩ@10V	3A
	100mΩ@4.5V	
-100V	170mΩ@-10V	-2.5A
	190mΩ@-4.5V	

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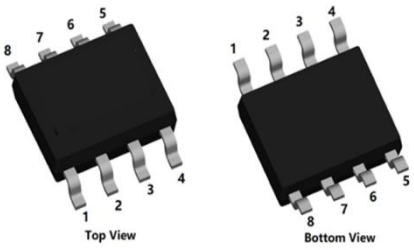
Feature

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

Applications

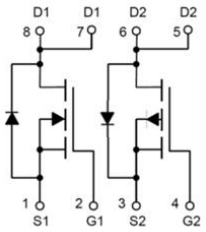
- Battery Protection
- Load Switch
- Power Management

Package

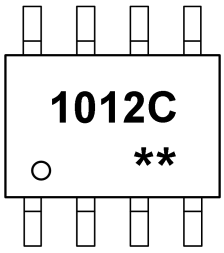


SOP-8L

Circuit diagram



Marking



1012C :Device Code
** :Week Code

Order Information

Device	Package	Unit/Tape
SP1012CP8	SOP-8L	4000

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

Parameter	Symbol	Value		Units
		N-Channel	P-Channel	
Drain-Source Voltage	V_{DS}	100	-100	V
Gate-Source Voltage	V_{GS}	±20	±20	V
Continuous Drain Current (Ta=25°C)	I_D	3	-2.5	A
Continuous Drain Current (Ta=100°C)	I_D	2	-1.7	A
Pulsed Drain Current	I_{DM}	12	-10	A
Single Pulse Avalanche Energy[1]	E_{AS}	4	12	mJ
Power Dissipation (Ta=25°C)	P_D	2		W
Power Dissipation (Ta=100°C)	P_D	0.8		W
Thermal Resistance Junction-to-Ambient	$R_{\theta JA}$	62.5		℃/W
Storage Temperature Range	T_{STG}	-55 to 150		℃
Operating Junction Temperature Range	T_J	-55 to 150		℃

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	VGS=0V , ID=250uA	100	-	-	V
Drain-Source Leakage Current	I_{DSS}	VDS=80V , VGS=0V , TJ=25℃	-	-	1	uA
Gate-Source Leakage Current	I_{GSS}	VGS=±20V , VDS=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	VGS=VDS , ID =250uA	1.2	1.8	2.4	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	VGS=10V , ID=2A	-	90	115	mΩ
		VGS=4.5V , ID=1A	-	100	135	
Gate Resistance	R_G	VDS=50V , VGS=0V , f=1MHz	-	1.7	-	Ω
Dynamic characteristics						
Input Capacitance	C_{iss}	VDS=50V , VGS=0V , f=1MHz	-	695	-	pF
Output Capacitance	C_{oss}		-	25	-	
Reverse Transfer Capacitance	C_{rss}		-	17	-	
Total Gate Charge	Q_g	VDS=50V , VGS=10V , ID=2A	-	14.3	-	nC
Gate-Source Charge	Q_{gs}		-	3.9	-	
Gate-Drain Charge	Q_{gd}		-	2.0	-	
Gate Plateau Voltage	$V_{pleteau}$		-	3.1	-	V
Switching Characteristics						
Turn-On Delay Time	$T_{d(on)}$	VDD=50V, VGS=10V , RG=3Ω, ID=3A	-	7	-	nS
Rise Time	T_r		-	1.5	-	
Turn-Off Delay Time	$T_{d(off)}$		-	15.3	-	
Fall Time	T_f		-	2	-	
Diode Characteristics						
Diode Forward Voltage	V_{SD}	VGS=0V , IS=1A , TJ=25℃	-	-	1.2	V
Maximum Body-Diode Continuous Current	I_S		-	-	3	A
Reverse Recovery Time	T_{rr}	I_S=3A, di/dt=100A/us, TJ=25℃	-	35	-	nS
Reverse Recovery Charge	Q_{rr}		-	26	-	nC

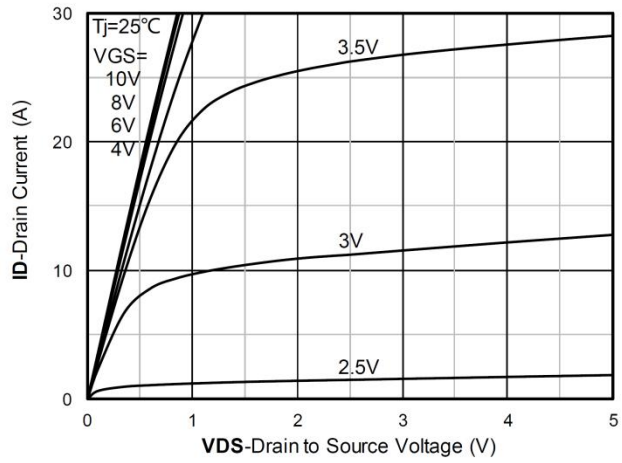
Note :
1.The EAS test condition is VDD=50V,VGS=10V,L=0.5mH,RG=25Ω

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

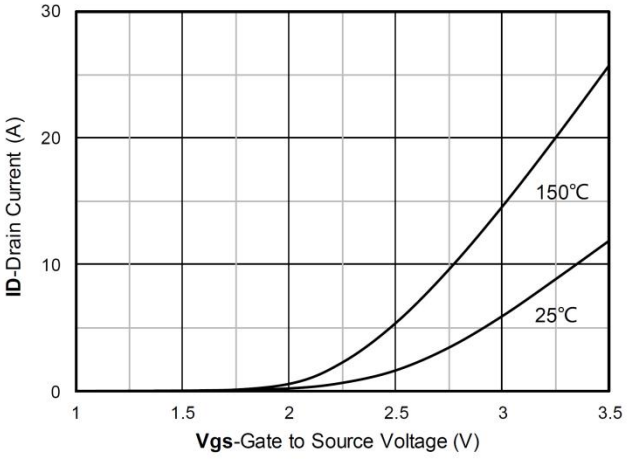
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	VGS=0V , ID=-250uA	-100	-	-	V
Drain-Source Leakage Current	I_{DSS}	VDS=-80V , VGS=0V , TJ=25℃	-	-	-1	uA
Gate-Source Leakage Current	I_{GSS}	VGS=±20V , VDS=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	VGS=VDS , ID =-250uA	-1.2	-1.8	-2.4	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	VGS=-10V , ID=-2A	-	170	215	mΩ
		VGS=-4.5V , ID=-1A	-	190	250	
Gate Resistance	R_G	VDS=-50V , VGS=0V , f=1MHz	-	3.2	-	Ω
Dynamic characteristics						
Input Capacitance	C_{iss}	VDS=-50V , VGS=0V , f=1MHz	-	721	-	pF
Output Capacitance	C_{oss}		-	30	-	
Reverse Transfer Capacitance	C_{rss}		-	18	-	
Total Gate Charge	Q_g	VDS=-50V , VGS=-10V , ID=-2A	-	20	-	nC
Gate-Source Charge	Q_{gs}		-	3.9	-	
Gate-Drain Charge	Q_{gd}		-	4.1	-	
Gate Plateau Voltage	$V_{pleteau}$		-	-3.4	-	V
Switching Characteristics						
Turn-On Delay Time	$T_{d(on)}$	VDD=-50V VGS=-10V , RG=3Ω, ID=-2A	-	9	-	nS
Rise Time	T_r		-	6.5	-	
Turn-Off Delay Time	$T_{d(off)}$		-	28	-	
Fall Time	T_f		-	7.5	-	
Diode Characteristics						
Diode Forward Voltage	V_{SD}	VGS=0V , IS=-1A , TJ=25℃	-	-	-1.2	V
Maximum Body-Diode Continuous Current	I_S		-	-	-2.5	A
Reverse Recovery Time	T_{rr}	I_S=-2.5A, di/dt=-100A/us, Tj=25℃	-	35	-	nS
Reverse Recovery Charge	Q_{rr}		-	45		nC

Note :
1.The EAS test condition is VDD=-50V,VGS=-10V,L=0.5mH,RG=25Ω

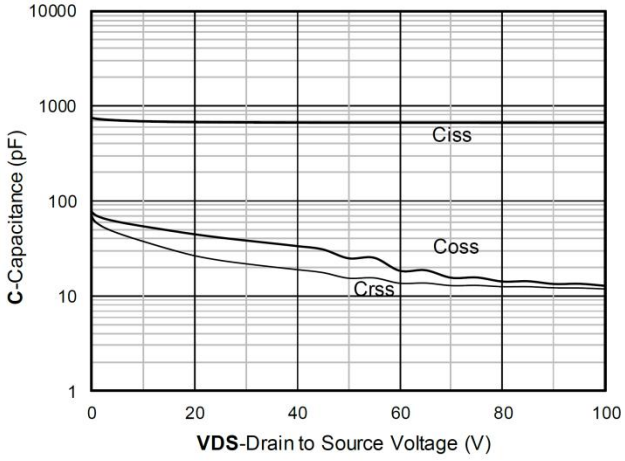
N-Channel Typical Characteristics



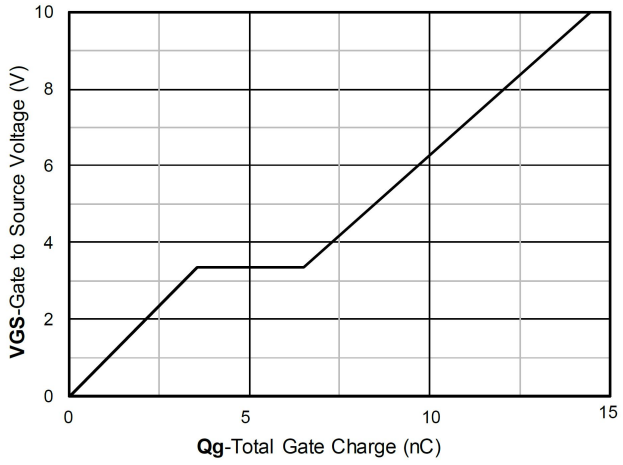
Output Characteristics



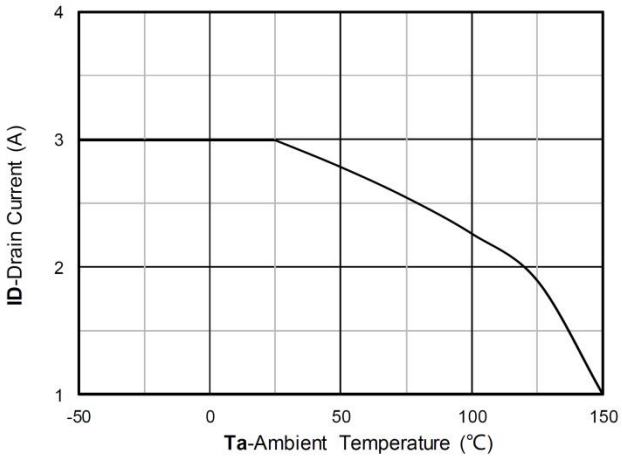
Transfer Characteristics



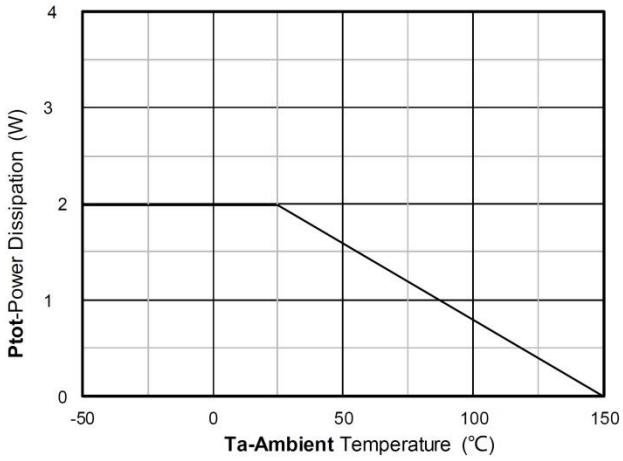
Capacitance Characteristics



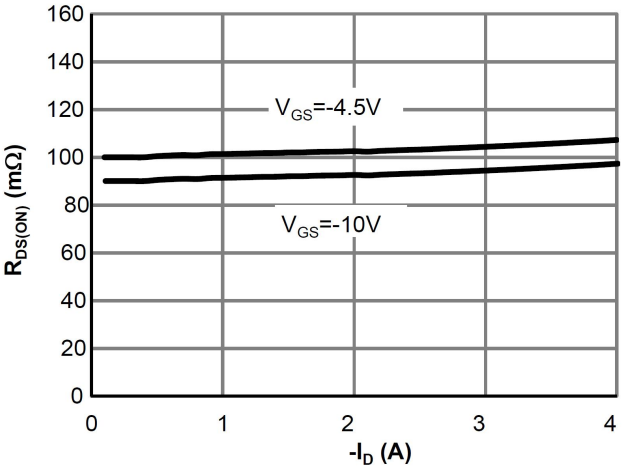
Gate Charge



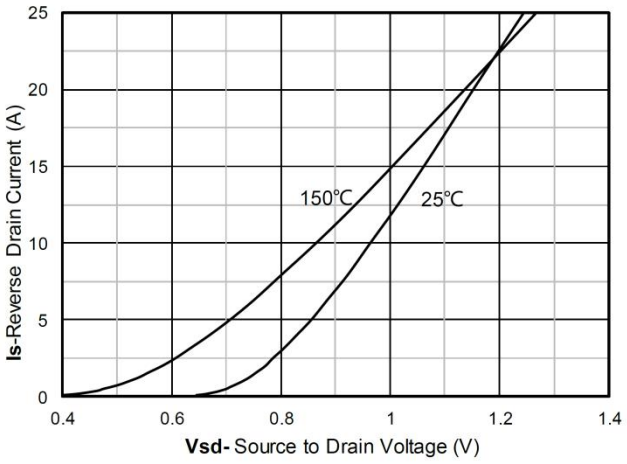
Current dissipation



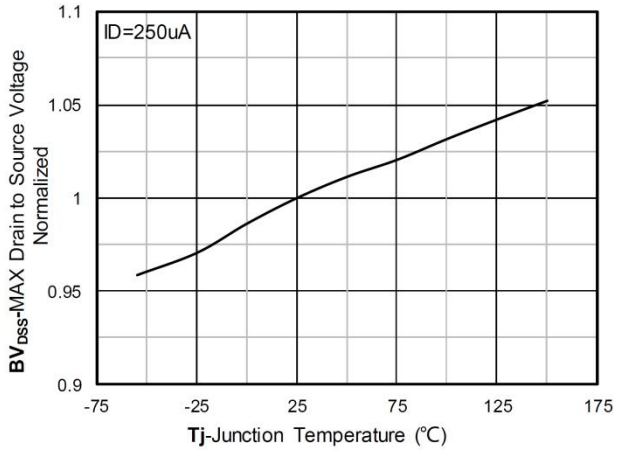
Power dissipation



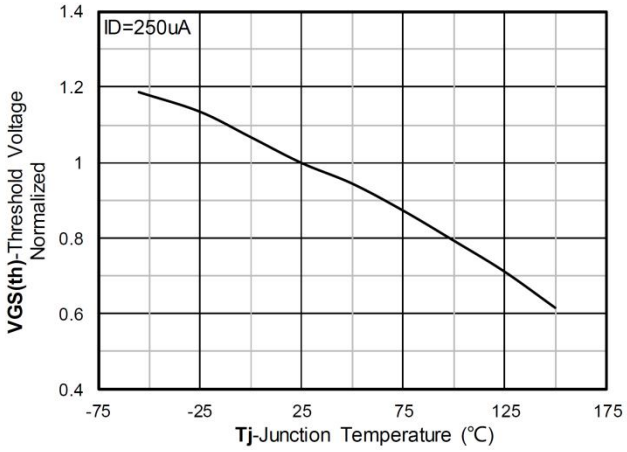
$R_{DS(on)}$ VS Drain Current



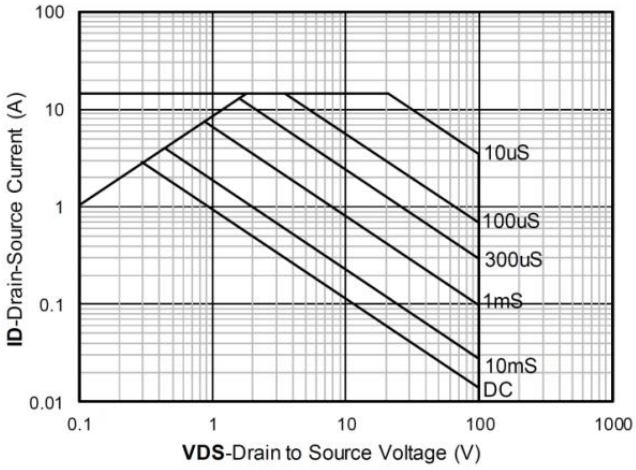
Forward characteristics of reverse diode



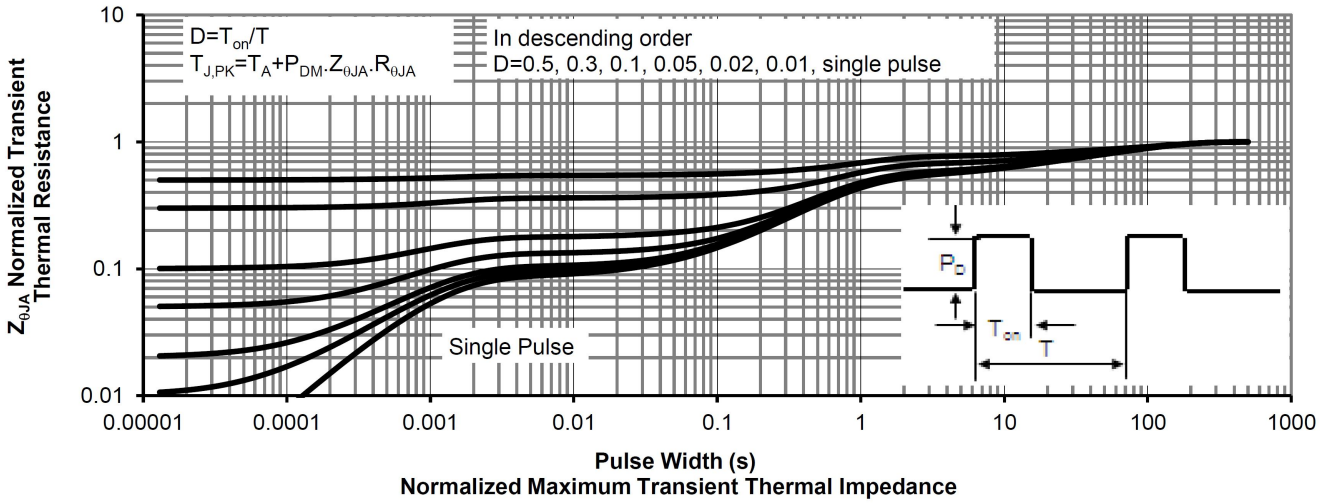
Normalized breakdown voltage



Normalized Threshold voltage

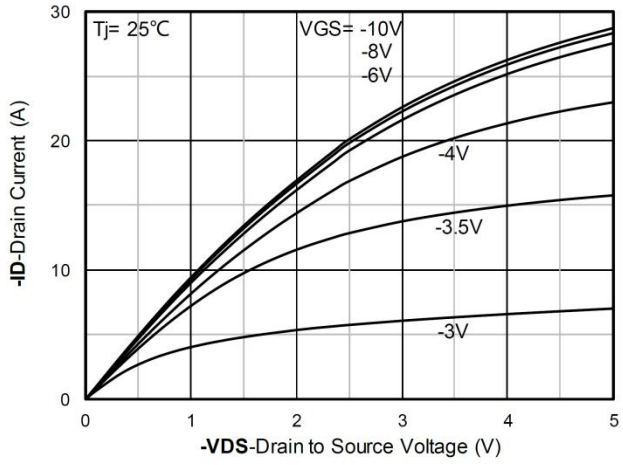


Safe Operation Area

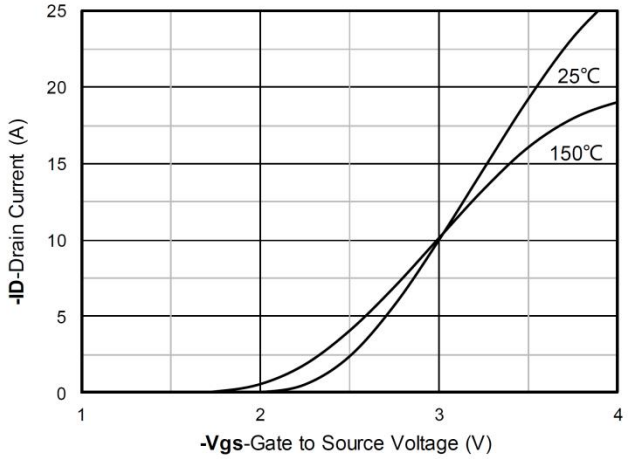


Normalized Maximum Transient Thermal Impedance

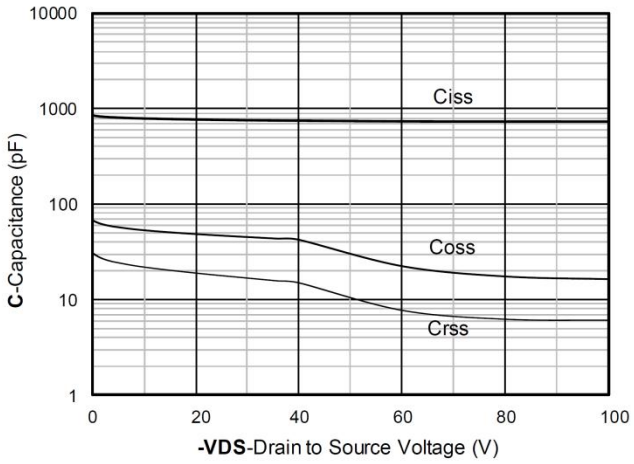
P-Channel Typical Characteristics



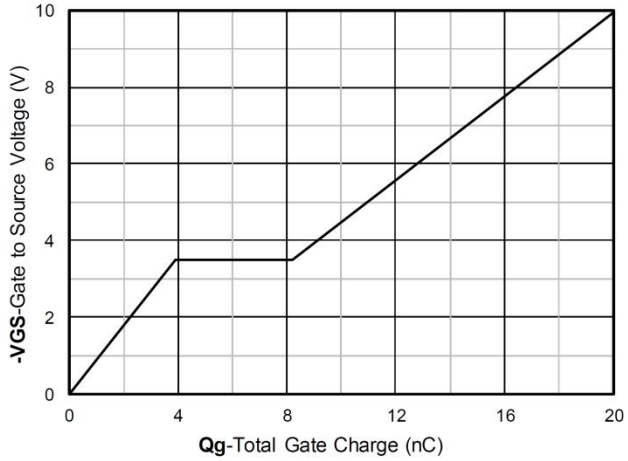
Output Characteristics



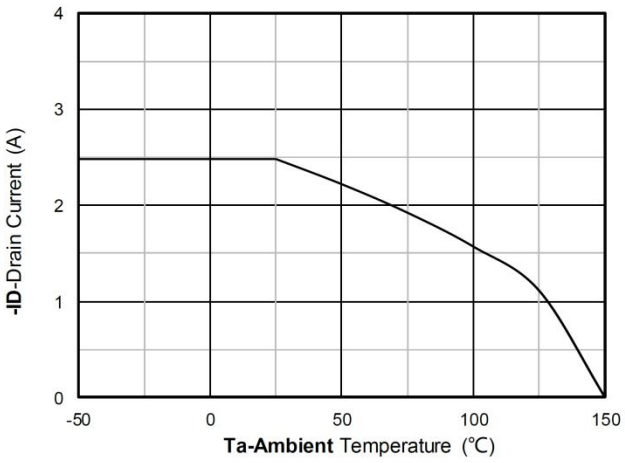
Transfer Characteristics



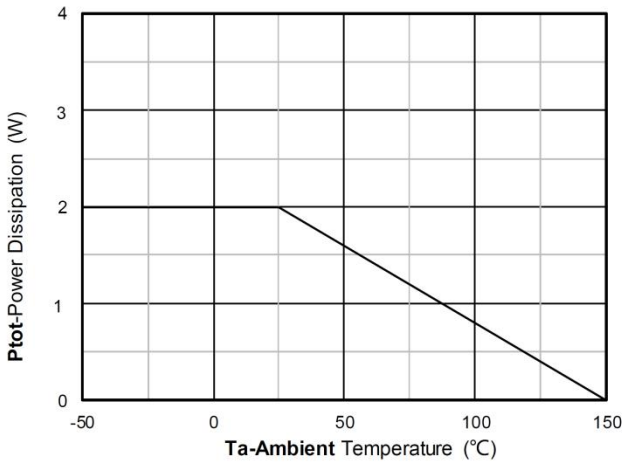
Capacitance Characteristics



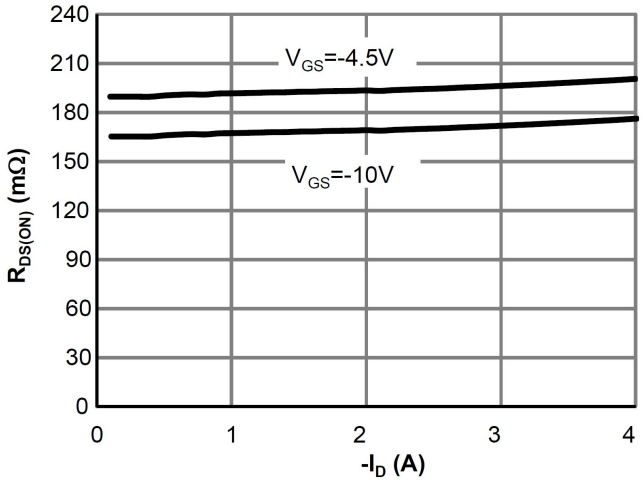
Gate Charge



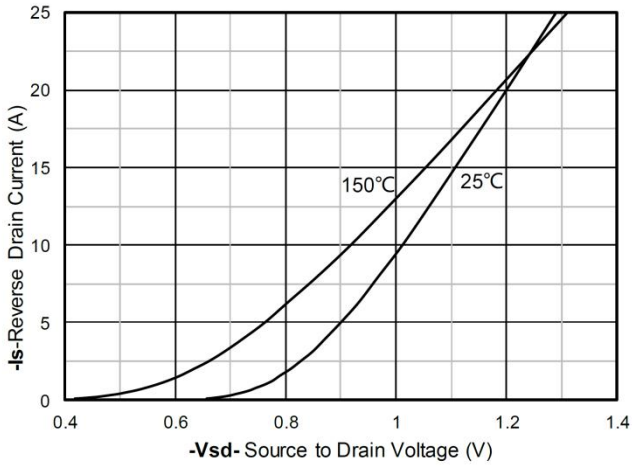
Current dissipation



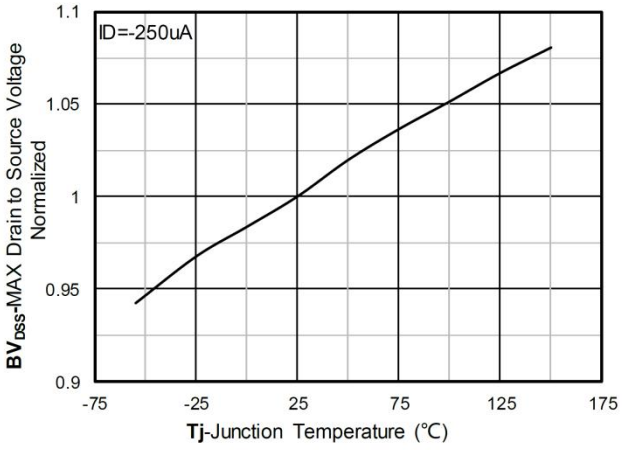
Power dissipation



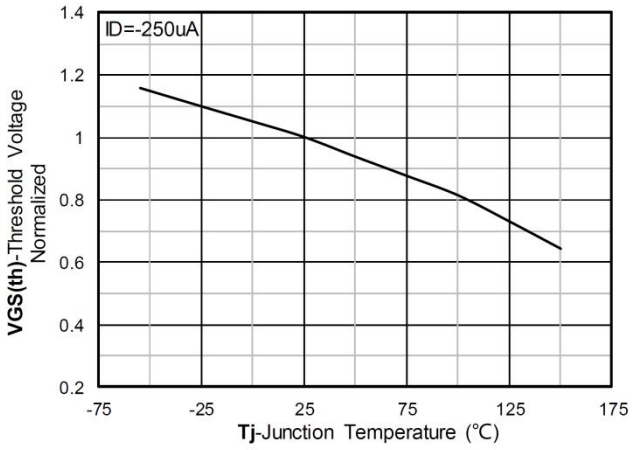
$R_{DS(on)}$ VS Drain Current



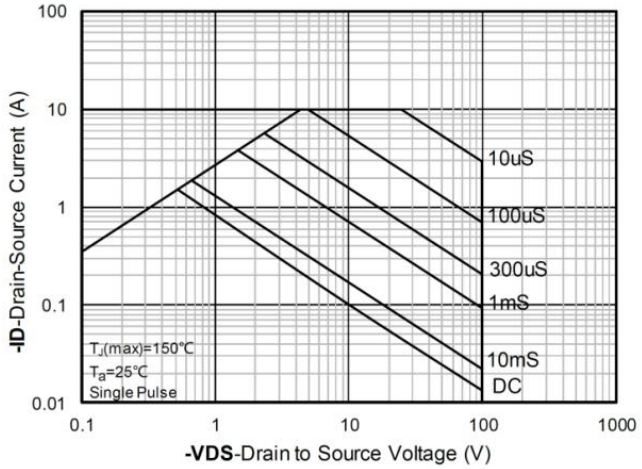
Forward characteristics of reverse diode



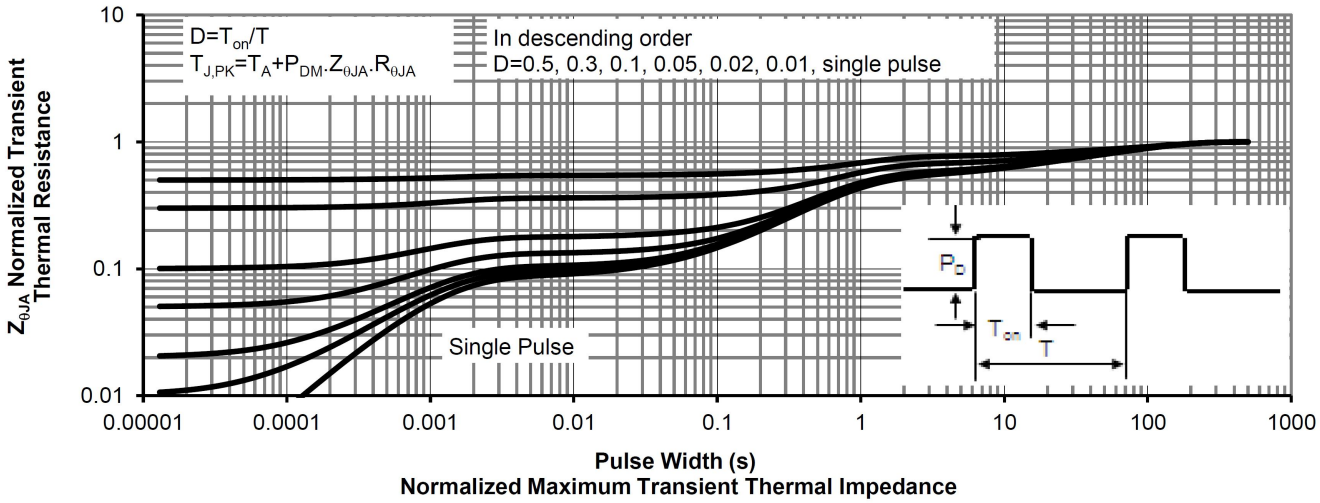
Normalized breakdown voltage



Normalized Threshold voltage



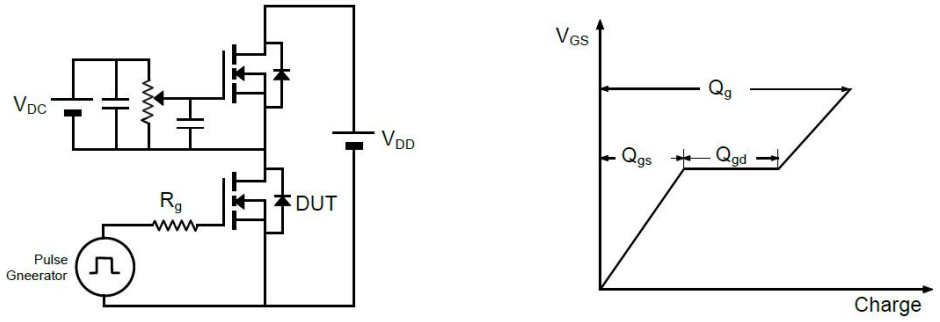
Safe Operation Area



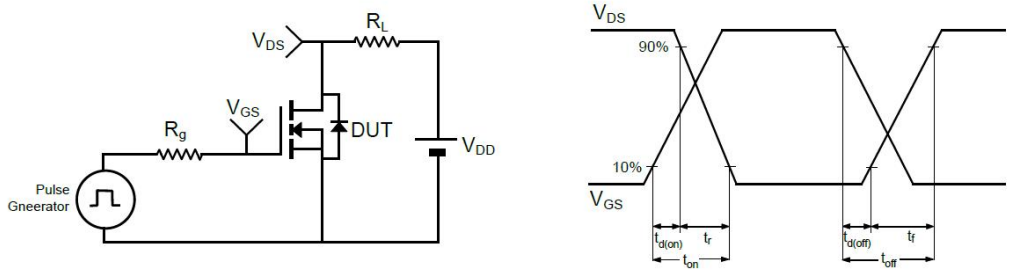
Normalized Maximum Transient Thermal Impedance

Test Circuit

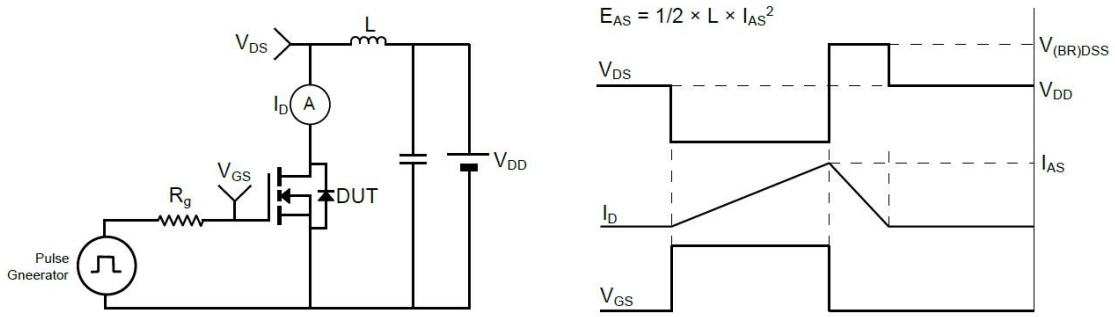
Gate Charge



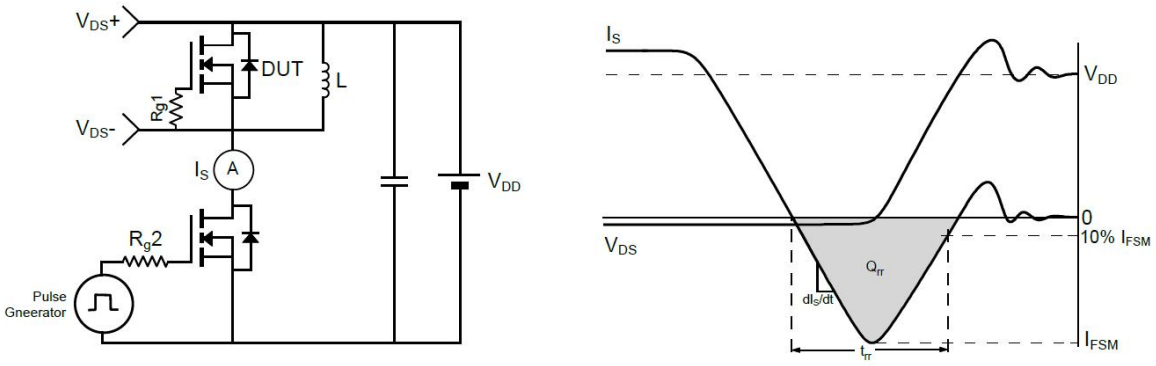
Resistive Load Switching Time



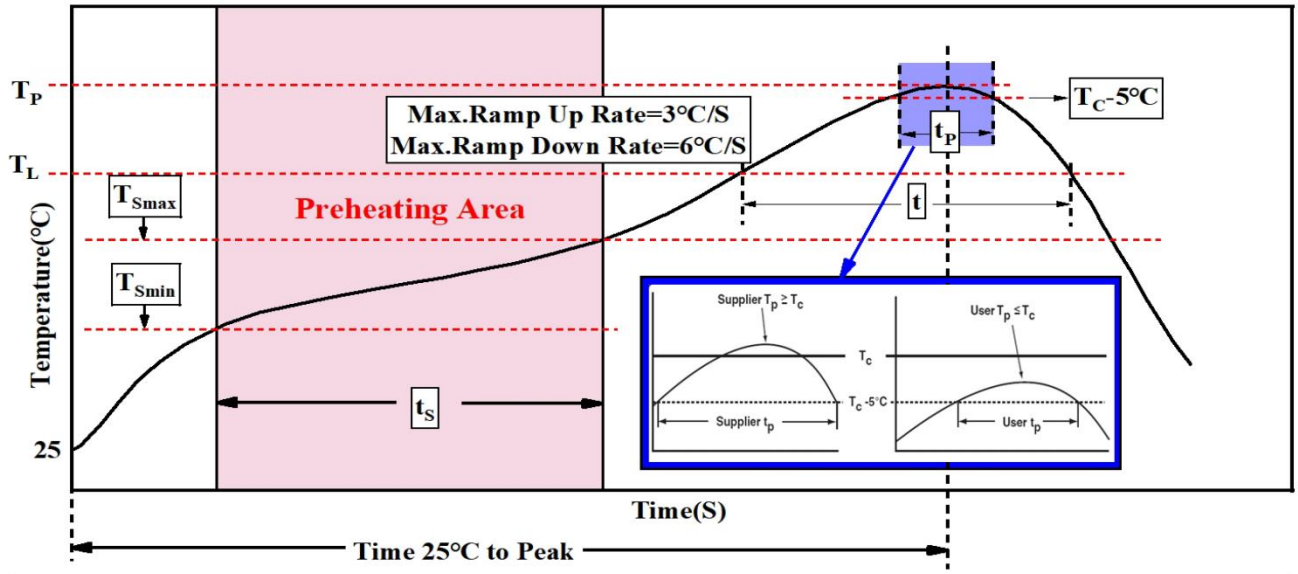
Un-clamped Inductive Load Switching



Drain-Source Body Diode Reverse Recovery



Temperature Profile for IR Reflow Soldering



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat & Soak Temperature min (Tsmin) Temperature max (Tsmax) Time (Tsmin to Tsmax) (ts)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-120 seconds
Average ramp-up rate (Tsmax to Tp)	3 °C/second max.	3°C/second max.
Liquidous temperature (TL) Time at liquidous (tL)	183 °C 60-150 seconds	217°C 60-150 seconds
Peak package body Temperature e (Tp)*	See Classification Temp in table 1	See Classification Temp in table 2
Time (tp)** within 5°C of the specified classification temperature (Tc)	20** seconds	30** seconds
Average ramp-down rate (Tp to Tsmax)	6 °C/second max.	6 °C/second max.
Time 25°C to peak temperature	6 minutes max.	8 minutes max.
* Tolerance for peak profile Temperature (Tp) is defined as a supplier minimum and a user maximum. ** Tolerance for time at peak profile temperature (tp) is defined as a supplier minimum and a user maximum		

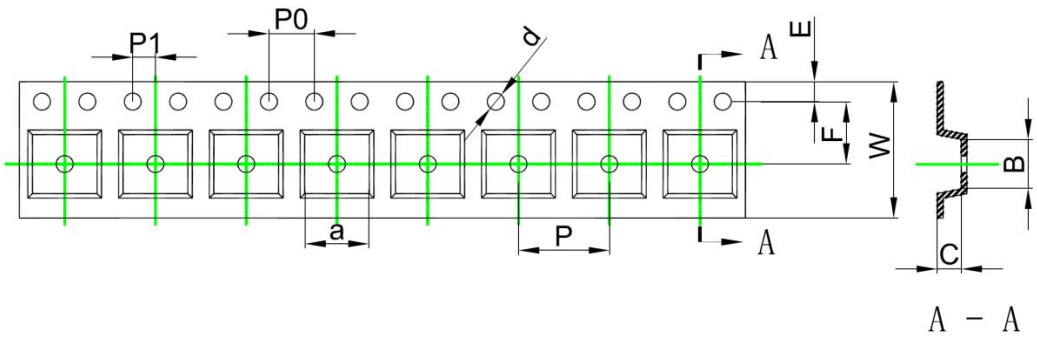
Table 1. SnPb Eutectic Process – Classification Temperatures (Tc)

Package Thickness	Volume mm^3 <350	Volume mm^3 ≥350
<2.5 mm	235 °C	220 °C
≥2.5 mm	220 °C	220 °C

Table 2. Pb-free Process – Classification Temperatures (Tc)

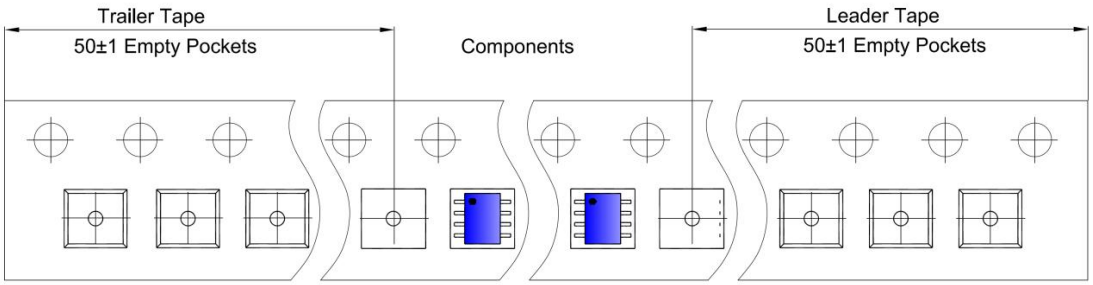
Package Thickness	Volume mm^3 <350	Volume mm^3 350-2000	Volume mm^3 >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 mm – 2.5 mm	260 °C	250 °C	245 °C
≥2.5 mm	250 °C	245 °C	245 °C

SOP8 Embossed Carrier Tape

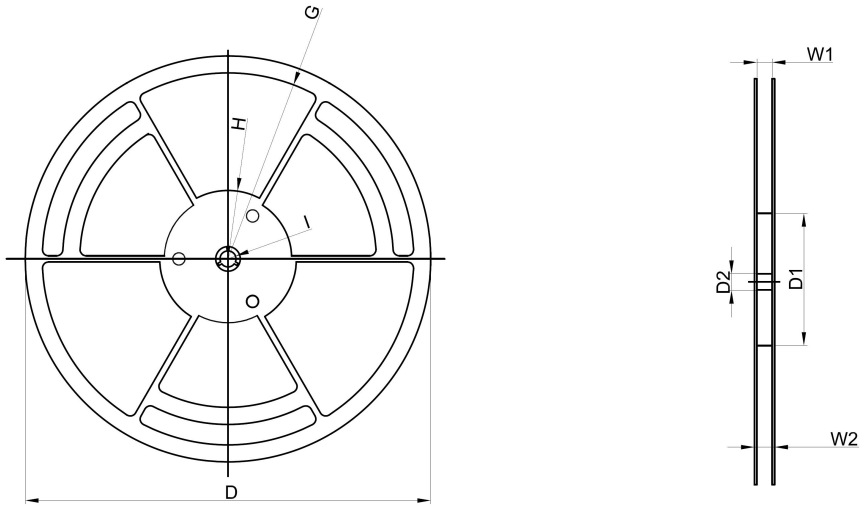


Dimensions are in millimeter										
Pkg type	a	B	c	d	E	F	P0	P	P1	W
SOP-8	6.40	5.40	2.10	Φ1.50	1.75	5.50	4.00	8.00	2.00	12.00

SOP8 Tape Leader and Trailer



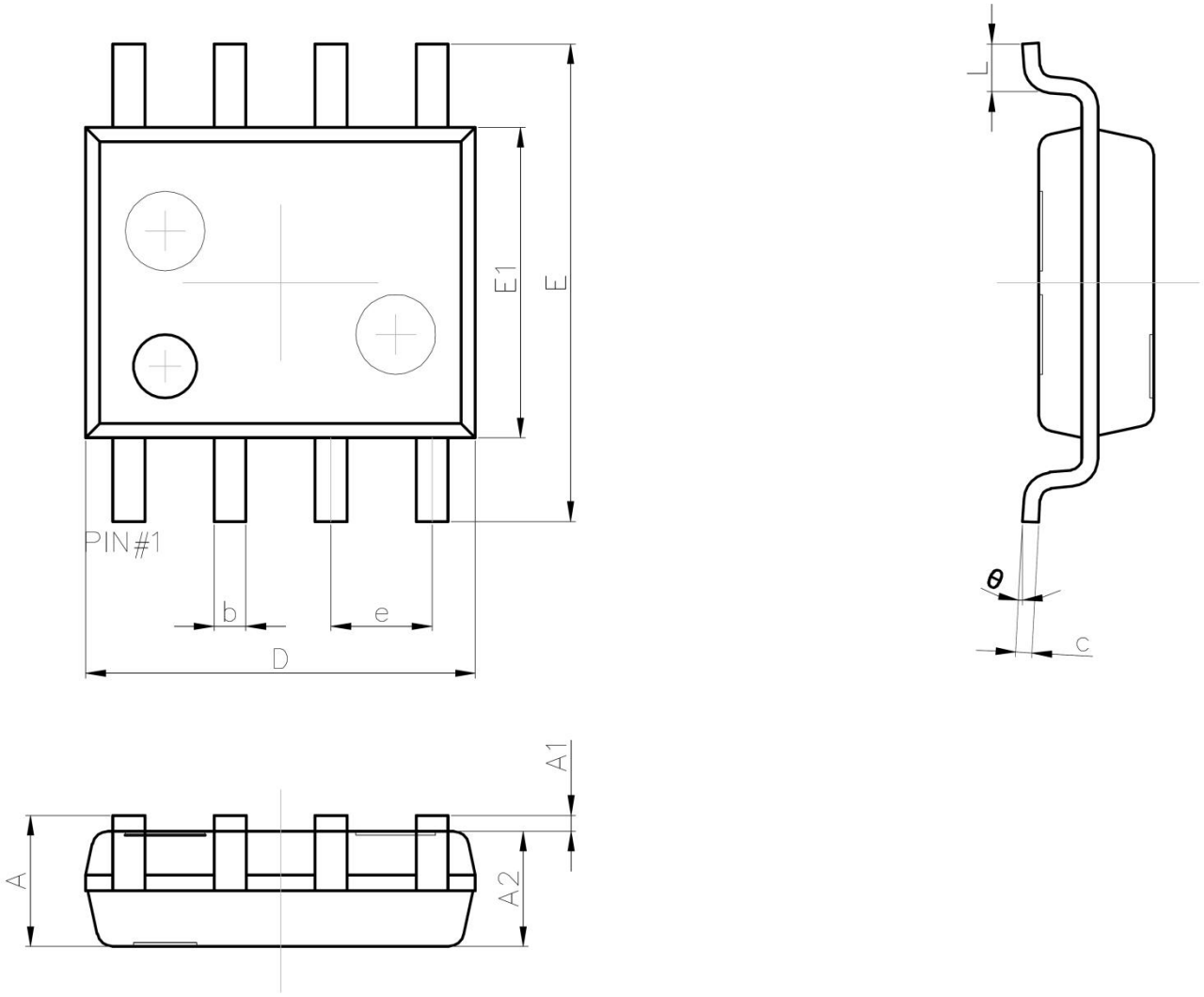
SOP8 Reel



Dimensions are in millimeter								
Reel Option	D	D1	D2	G	H	I	W1	W2
13"Dia	Ø330.00	100.00	13.00	R151.00	R56.00	R6.50	12.40	17.60

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
4,000 pcs	13 inch	8,000 pcs	360×360×65	40,000 pcs	565×380×390	

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°