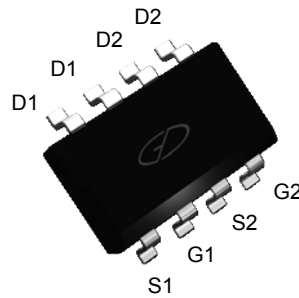
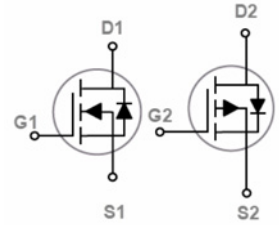


### Main Product Characteristics

Channel	N-Channel	P-Channel
$B_{VDSS}$	30V	-30V
$R_{DS(ON)}$	20m $\Omega$	50m $\Omega$
$I_D$	8A	-5.5A



SOP-8



Schematic Diagram

### Features and Benefits

- Advanced MOSFET process technology
- Ideal for high efficiency switched mode power supplies
- Low on-resistance with low gate charge
- Fast switching and reverse body recovery



### Description

The SSFQ3712 utilizes the latest techniques to achieve high cell density and low on-resistance. These features make this device extremely efficient and reliable for use in high efficiency switch mode power supply and a wide variety of other applications.

### Absolute Maximum Ratings ( $T_C=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Rating		Unit
Drain-Source Voltage	$V_{DS}$	30	-30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	$\pm 20$	V
Drain Current – Continuous ( $T_C=25^\circ\text{C}$ )	$I_D$	8	-5.5	A
Drain Current – Continuous ( $T_C=100^\circ\text{C}$ )		5	-3.5	A
Drain Current – Pulsed <sup>1</sup>	$I_{DM}$	32	-22	A
Single Pulse Avalanche Energy <sup>2,6</sup>	$E_{AS}$	14	5	mJ
Single Pulse Avalanche Current <sup>2</sup>	$I_{AS}$	17	10	A
Power Dissipation ( $T_C=25^\circ\text{C}$ )	$P_D$	2.5		W
Power Dissipation – Derate above $25^\circ\text{C}$		0.02		W/ $^\circ\text{C}$
Storage Temperature Range	$T_{STG}$	-55 to +150		$^\circ\text{C}$
Operating Junction Temperature Range	$T_J$	-55 to +150		$^\circ\text{C}$

### Thermal Characteristics

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	---	62.5	$^\circ\text{C/W}$
Thermal Resistance Junction to Case	$R_{\theta JC}$	---	50	$^\circ\text{C/W}$

### N-Channel Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	30	---	---	V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	μA
		V <sub>DS</sub> =24V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C	---	---	10	μA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	---	---	±100	nA
<b>On Characteristics</b>						nA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =8A	---	15	20	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =5A	---	21	30	mΩ
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250μA	1.2	1.5	2.5	V
V <sub>GS(th)</sub> Temperature Coefficient	ΔV <sub>GS(th)</sub>		---	-4	---	mV/°C
Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =3A	---	3	---	S
<b>Dynamic Characteristics</b>						
Total Gate Charge <sup>3,4</sup>	Q <sub>g</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =4.5V, I <sub>D</sub> =8A	---	4.1	6	nC
Gate-Source Charge <sup>3,4</sup>	Q <sub>gs</sub>		---	1	1.4	
Gate-Drain Charge <sup>3,4</sup>	Q <sub>gd</sub>		---	2.1	4	
Turn-On Delay Time <sup>3,4</sup>	T <sub>d(on)</sub>	V <sub>DD</sub> =15V, V <sub>GS</sub> =10V, R <sub>G</sub> =6Ω I <sub>D</sub> =1A	---	2.8	5	nS
Rise Time <sup>3,4</sup>	T <sub>r</sub>		---	7.2	14	
Turn-Off Delay Time <sup>3,4</sup>	T <sub>d(off)</sub>		---	15.8	30	
Fall Time <sup>3,4</sup>	T <sub>f</sub>		---	4.6	9	
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, F=1MHz	---	345	500	pF
Output Capacitance	C <sub>oss</sub>		---	55	80	
Reverse Transfer Capacitance	C <sub>rss</sub>		---	32	55	
Gate Resistance	R <sub>g</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz	---	3.2	6.4	Ω
<b>Drain-Source Diode Characteristics</b>						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I <sub>S</sub>	V <sub>G</sub> =V <sub>b</sub> =0V, Force Current	---	---	8	A
Pulsed Source Current	I <sub>SM</sub>		---	---	16	A
Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =1A, T <sub>J</sub> =25°C	---	---	1	V

Note:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. V<sub>DD</sub>=25V, V<sub>GS</sub>=10V, L=0.1mH, I<sub>AS</sub>=17A, R<sub>G</sub>=25Ω, Starting T<sub>J</sub>=25°C.
3. The data tested by pulsed, pulse width ≤ 300μS, duty cycle ≤ 2%.
4. Essentially independent of operating temperature.

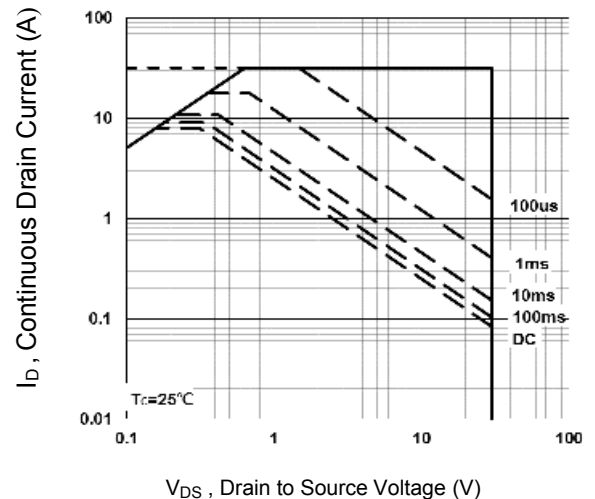
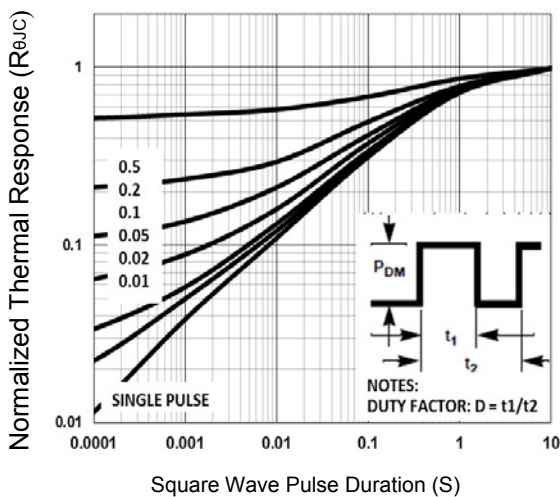
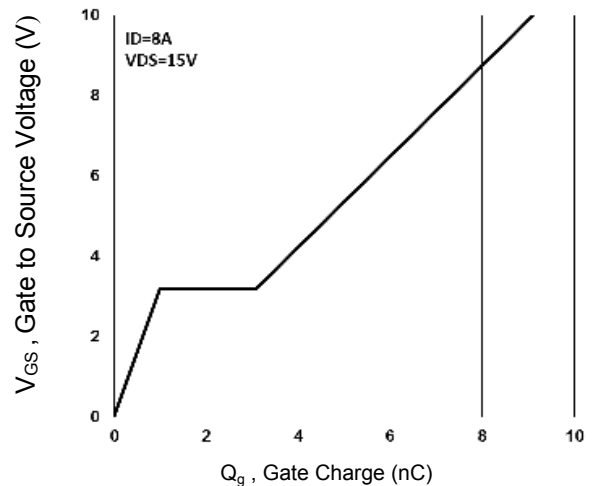
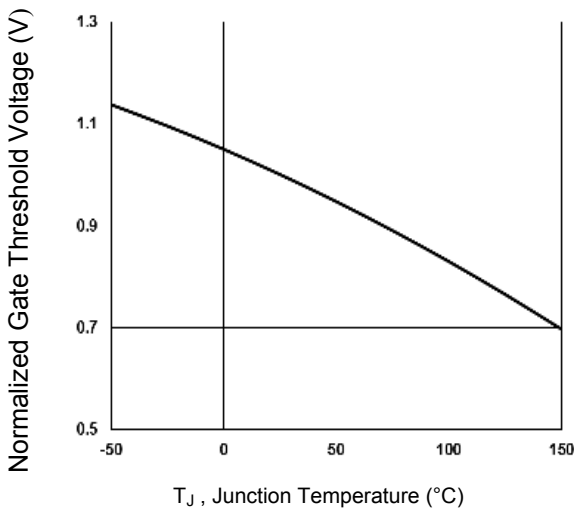
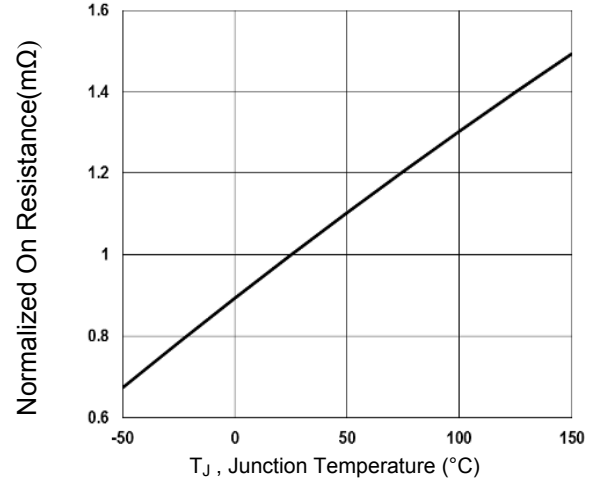
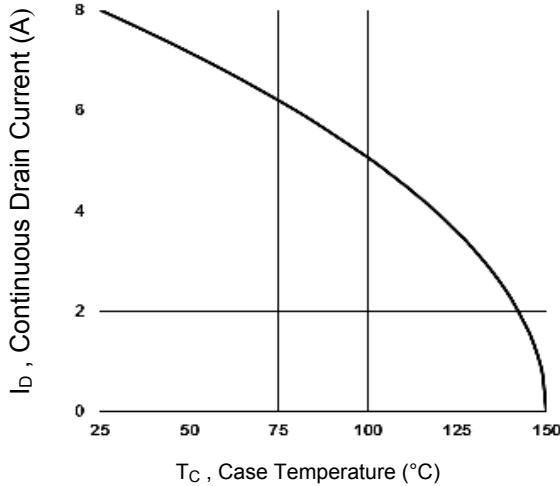
### P-Channel Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>b</sub> =-250uA	-30	---	---	V
BV <sub>DSS</sub> Temperature Coefficient	ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	Reference to 25°C, I <sub>b</sub> =-1mA	---	-0.03	---	V/°C
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	-1	uA
		V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C	---	---	-10	uA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	---	---	±100	nA
<b>On Characteristics</b>						
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-5A	---	40	50	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-3A	---	65	90	mΩ
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =-250uA	-1.2	-1.6	-2.5	V
V <sub>GS(th)</sub> Temperature Coefficient	ΔV <sub>GS(th)</sub>		---	4	---	mV/°C
Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub> =-10V, I <sub>D</sub> =-3A	---	3.5	---	S
<b>Dynamic Characteristics</b>						
Total Gate Charge <sup>6,7</sup>	Q <sub>g</sub>	V <sub>DS</sub> =-15V, V <sub>GS</sub> =-4.5V, I <sub>b</sub> =-3A	---	5.1	7	nC
Gate-Source Charge <sup>6,7</sup>	Q <sub>gs</sub>		---	2	3	
Gate-Drain Charge <sup>6,7</sup>	Q <sub>gd</sub>		---	2.2	4	
Turn-On Delay Time <sup>6,7</sup>	T <sub>d(on)</sub>	V <sub>DD</sub> =-15V, V <sub>GS</sub> =-10V, R <sub>G</sub> =6Ω, I <sub>D</sub> =-1A	---	3.4	6	nS
Rise Time <sup>6,7</sup>	T <sub>r</sub>		---	10.8	21	
Turn-Off Delay Time <sup>6,7</sup>	T <sub>d(off)</sub>		---	26.9	51	
Fall Time <sup>6,7</sup>	T <sub>f</sub>		---	6.9	13	
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, F=1MHz	---	560	810	pF
Output Capacitance	C <sub>oss</sub>		---	55	80	
Reverse Transfer Capacitance	C <sub>rss</sub>		---	40	60	
<b>Drain-Source Diode Characteristics</b>						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I <sub>S</sub>	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	-5.5	A
Pulsed Source Current	I <sub>SM</sub>		---	---	-11	A
Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =-1A, T <sub>J</sub> =25°C	---	---	-1	V

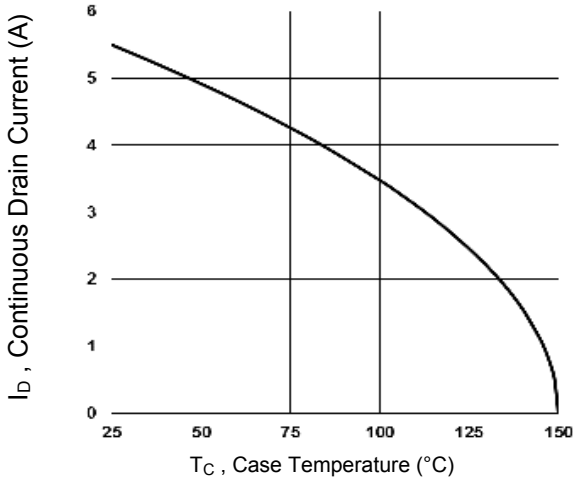
Note:

- V<sub>DD</sub>=-25V, V<sub>GS</sub>=-10V, L=0.1mH, I<sub>AS</sub>=-10A, R<sub>G</sub>=25Ω, Starting T<sub>J</sub>=25°C.
- The data tested by pulsed, pulse width ≤ 300uS duty cycle ≤ 2%.
- Essentially independent of operating temperature.

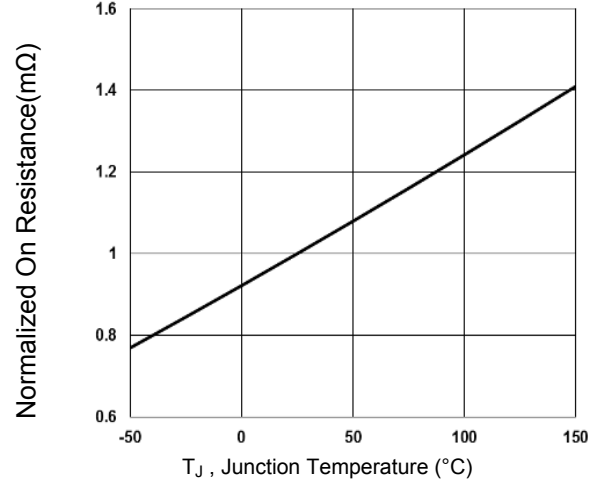
### N-Channel Typical Electrical and Thermal Characteristic Curves



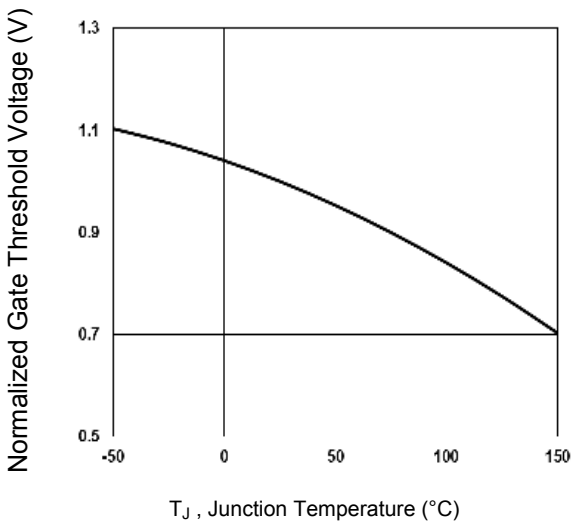
### P-Channel Typical Electrical and Thermal Characteristic Curves



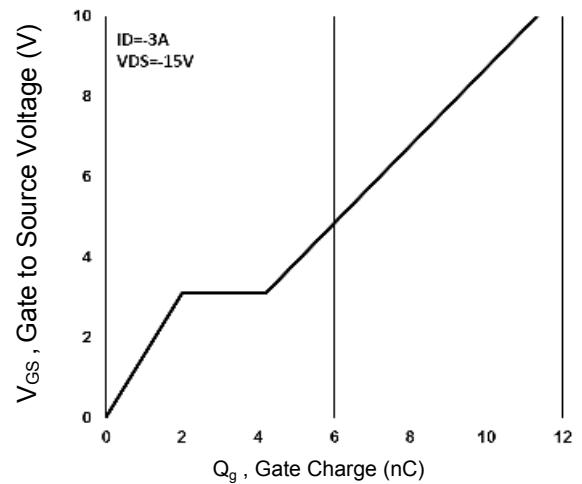
**Fig.1 Continuous Drain Current vs. Tc**



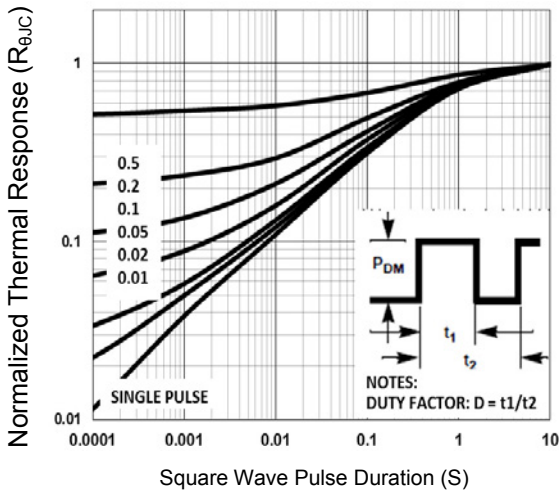
**Fig.2 Normalized  $R_{DS(ON)}$  vs.  $T_J$**



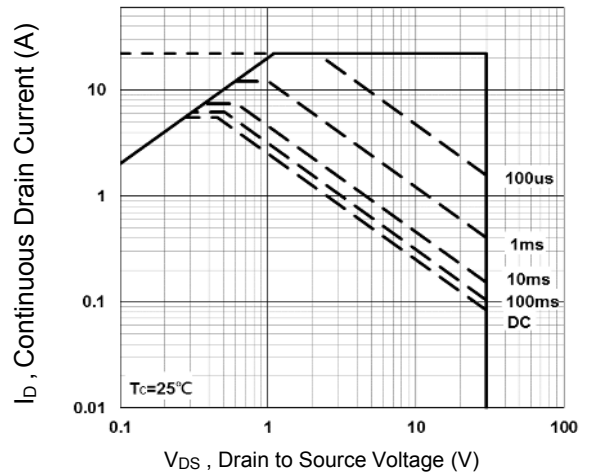
**Fig.3 Normalized  $V_{th}$  vs.  $T_J$**



**Fig.4 Gate Charge Characteristics**



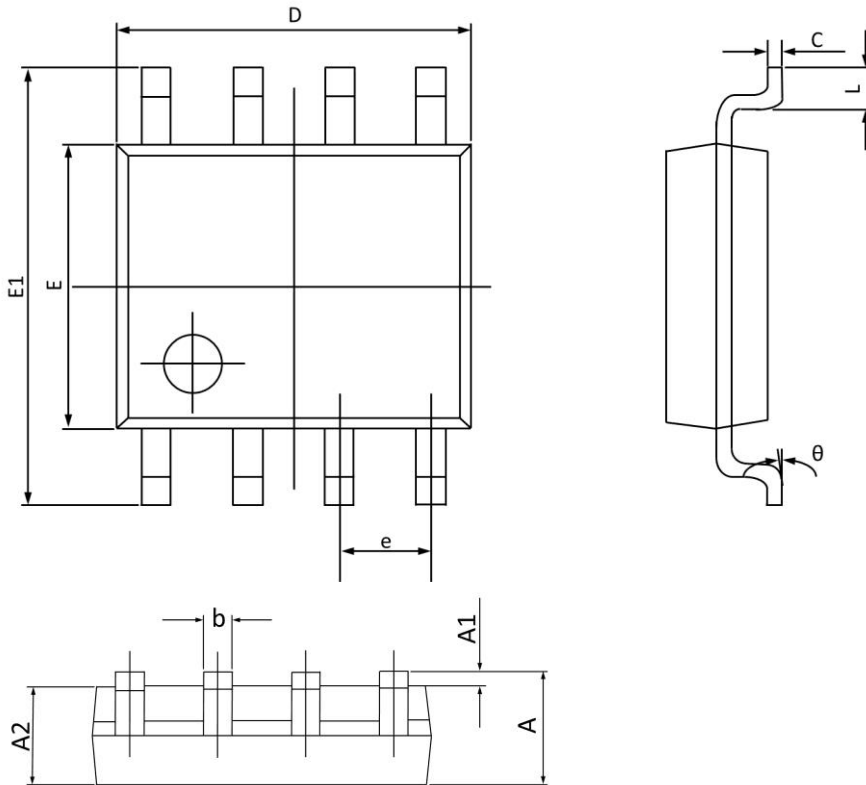
**Fig.5 Normalized Transient Impedance**



**Fig.6 Maximum Safe Operation Area**

### Package Outline Dimensions

### SOP-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	1.750	1.350	0.069	0.053
A1	0.250	0.100	0.010	0.004
A2	1.500	1.300	0.059	0.051
b	0.490	0.350	0.019	0.014
C	0.260	0.190	0.010	0.007
D	5.100	4.700	0.201	0.185
E	4.100	3.700	0.161	0.146
E1	6.200	5.800	0.244	0.228
e	1.27BSC		0.05BSC	
L	0.900	0.400	0.035	0.016
theta	8°	0°	8°	0°