★ 100% EAS Guaranteed
★ Green Device Available
★ Super Low Gate Charge
★ Excellent CdV/dt effect decline
★ Advanced high cell density Trench technology

Product Summary

RoHS

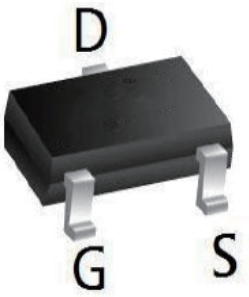
BVDSS	RDSON	ID
-20V	13mΩ	-9.0A

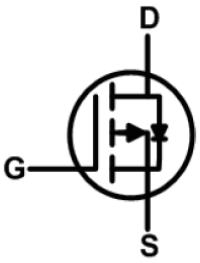
Description

The 20P09L is the high cell density trenched P-ch MOSFETs, which provide excellent RDSON and efficiency for most of the small power swtiching and load swtich applications.

The 20P09L meet the RoHS and Green Product requirement 100% EAS guaranteed with full function reliability approved.

SOT23-3L Pin Configuration





Absolute Maximum Ratings

Symbol	Parameter		Value	Unit
V_{DS}	Drain-to-Source Voltage		-20	V
V_{GS}	Gate-to-Source Voltage		±12	V
I_D	Continuous Drain Current	T_C = 25°C	-9	A
		T_C = 100°C	-4	
I_{DM}	Pulsed Drain Current (1)		-66	A
E_{AS}	Single Pulsed Avalanche Energy (2)		28.8	mJ
P_D	Power Dissipation	T_C = 25°C	30	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient(3)		41.6	°C/W
T_J, T_{STG}	Junction & Storage Temperature Range		-55 to 150	°C

Electrical Characteristics (T_J =25 °C unless otherwise specified)

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D= -250μA	-20	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current(TJ= 25°C)	V_{DS}= -20V, V_{GS}=0V,	-	-	-1	μA
I_{DSS}	Zero Gate Voltage Drain Current(TJ= 100°C)	V_{DS}= -20V, V_{GS}=0V,	-	-	-100	μA
I_{GSS}	Gate to Body Leakage Current	V_{DS}=0V, V_{GS}= ±12V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D= -250μA	-0.4	-0.65	-1	V
$R_{DS(on)}$	Static Drain-Source onResistance note2	V_{GS}= -4.5V, I_D= -8A	-	13	18	mΩ
		V_{GS}= -2.5V, I_D= -6A	-	17	23	
g_{fs}	Forward Transconductance4	V_{DS}=-4.5V, I_D= -8A	-	36	-	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}= -10V, V_{GS}=0V, f=1.0MHz	-	1630	-	pF
C_{oss}	Output Capacitance		-	211	-	pF
C_{rss}	Reverse Transfer Capacitance		-	187	-	pF
R_g	Gate Resistance	f=1.0MHz	-	10	-	Ω
Q_g	Total Gate Charge	V_{DS}= -10V, I_D= -8A, V_{GS}= -4.5V	-	12	-	nC
Q_{gs}	Gate-Source Charge		-	1.8	-	nC
Q_{gd}	Gate-Drain("Miller") Charge		-	3.2	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{GS} = -4.5V, V_{DD} = -10V, R_G = 3Ω, ID= -8A	-	17	-	ns
t_r	Turn-on Rise Time		-	25.5	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	32	-	ns
t_f	Turn-off Fall Time		-	15	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	-40	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS}=0V, I_S= -8A	-	-	-1.2	V

Note :
1.Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C.
2.The EAS data shows Max. rating . The test condition is VDD= -25V, V_{GS}= -10V, L= 0.1mH, IAS= -24A
3.The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
5.This value is guaranteed by design hence it is not included in the production test..

Typical Performance Characteristics

Figure1: Output Characteristics

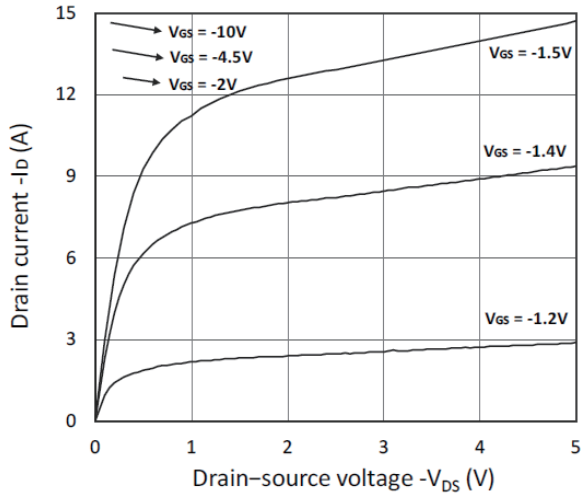


Figure 2: Transfer Characteristics

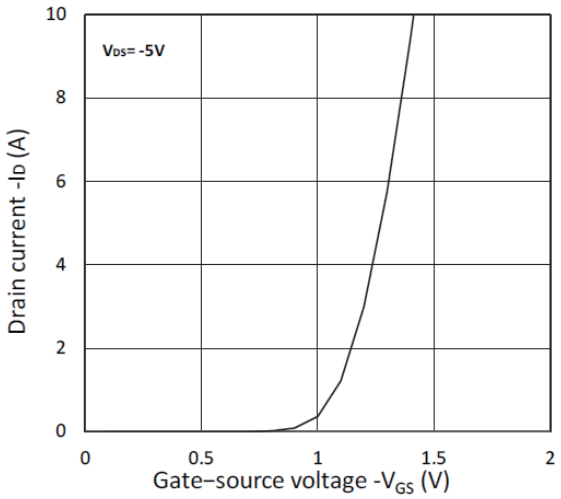


Figure 3:Forward Characteristics of Reve

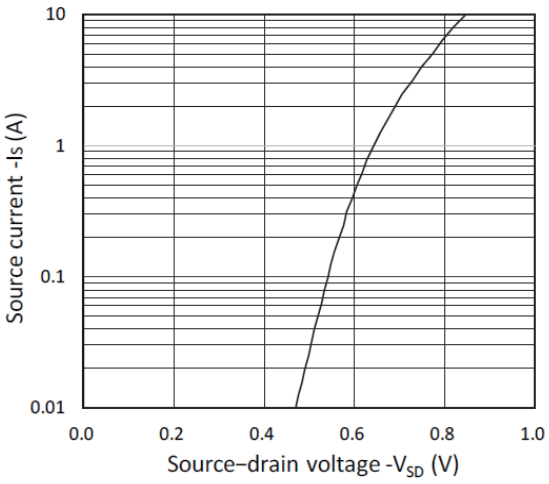


Figure 4: RDS(ON) vs. VGS

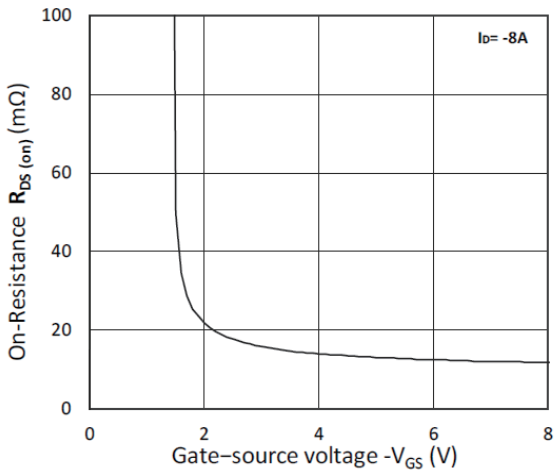


Figure 5: RDS(ON) vs. ID

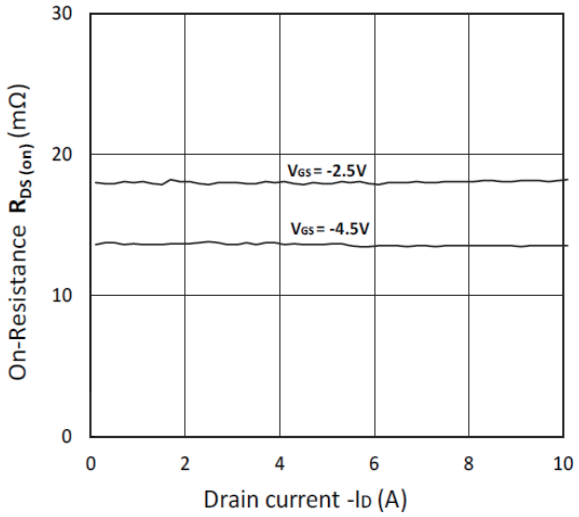
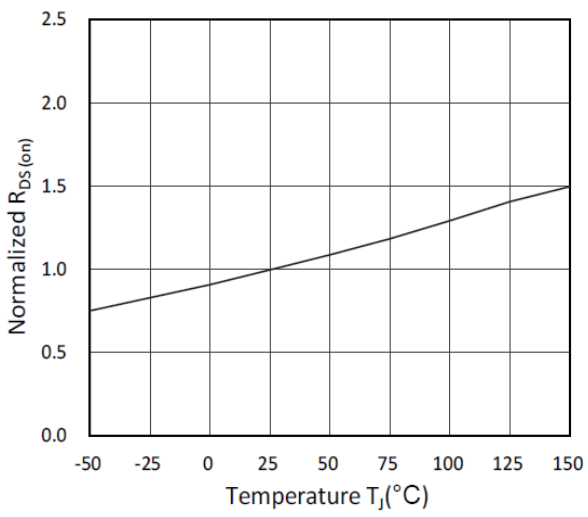


Figure 6: Normalized RDS(on) vs. Temper



Typical Performance Characteristics

Figure 7: Capacitance Temperature

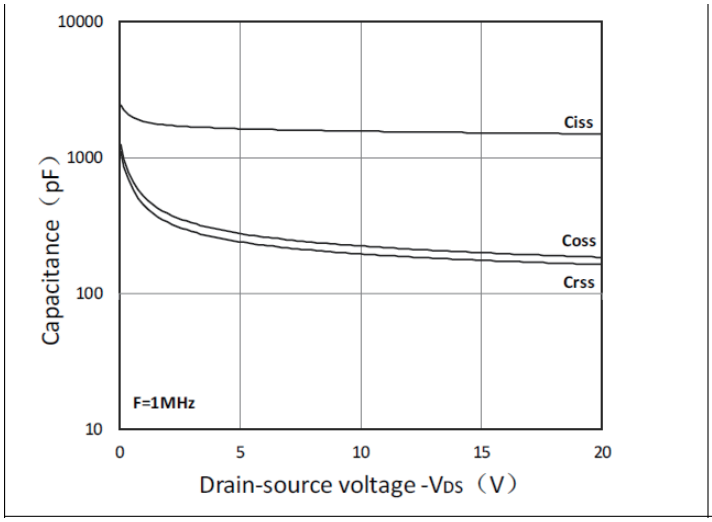


Figure 8: Gate Charge Characteristics

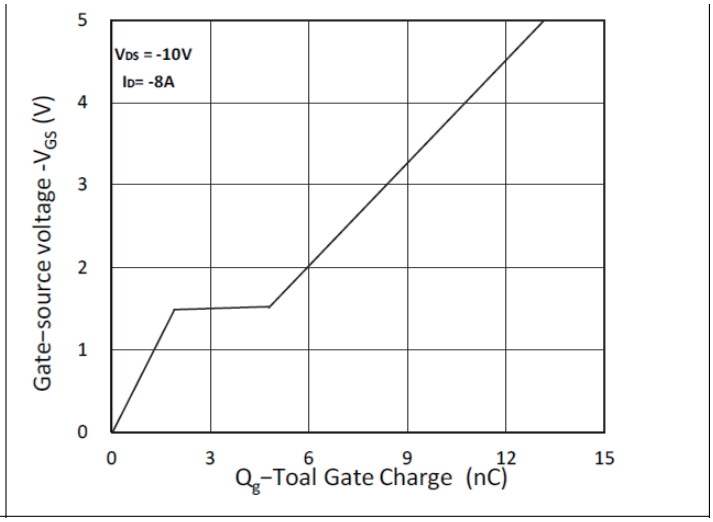


Figure 9: Power Dissipationt Thermal Imp

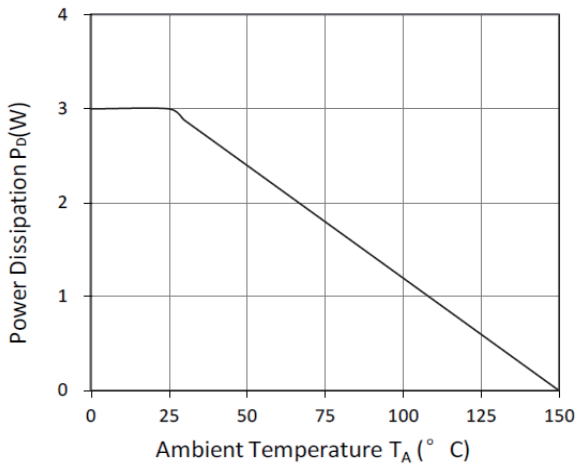


Figure 10: Power Dissipation

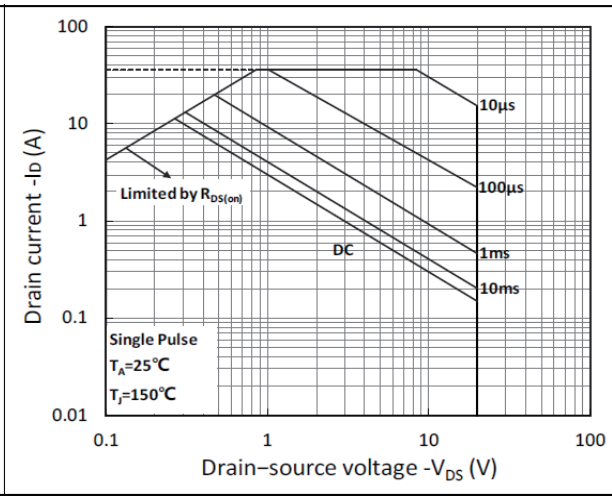
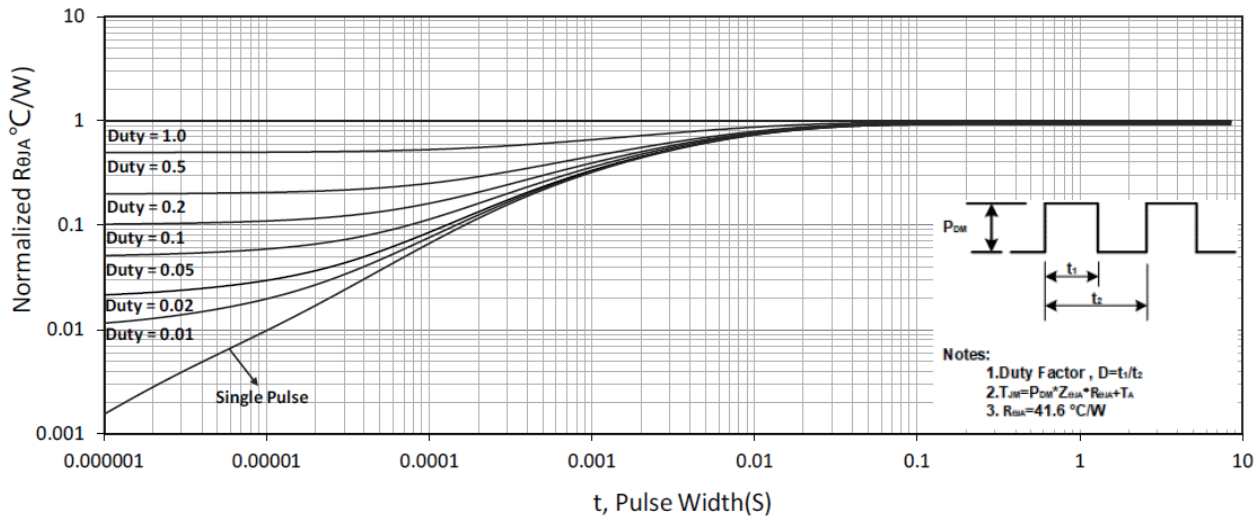
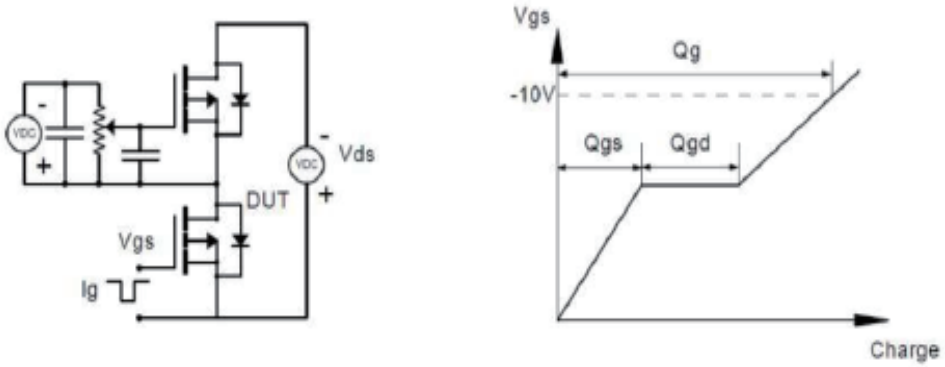


Figure.11: Safe Operating Area

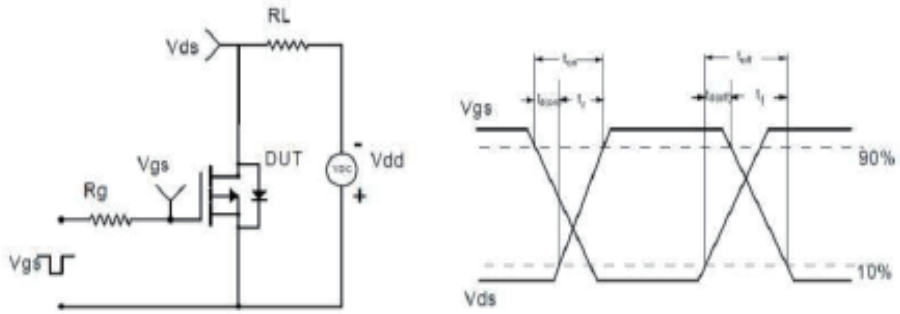


Test Circuit

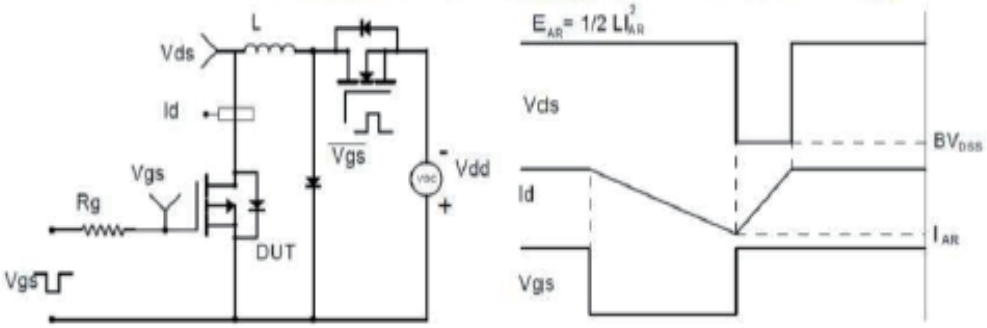
Gate Charge Test Circuit & Waveform



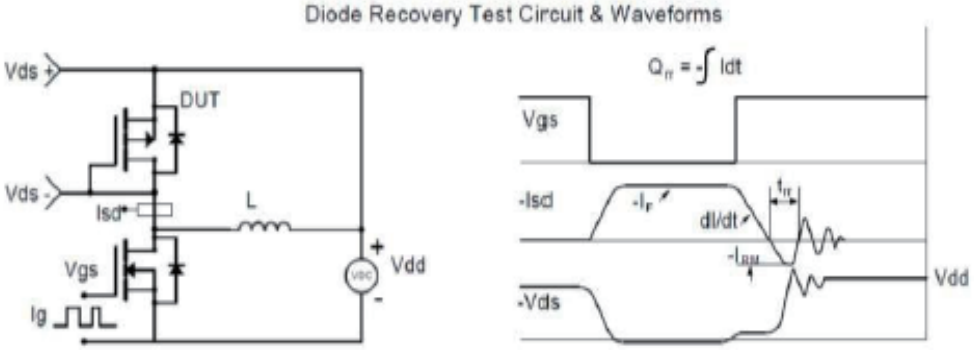
Resistive Switching Test Circuit & Waveforms



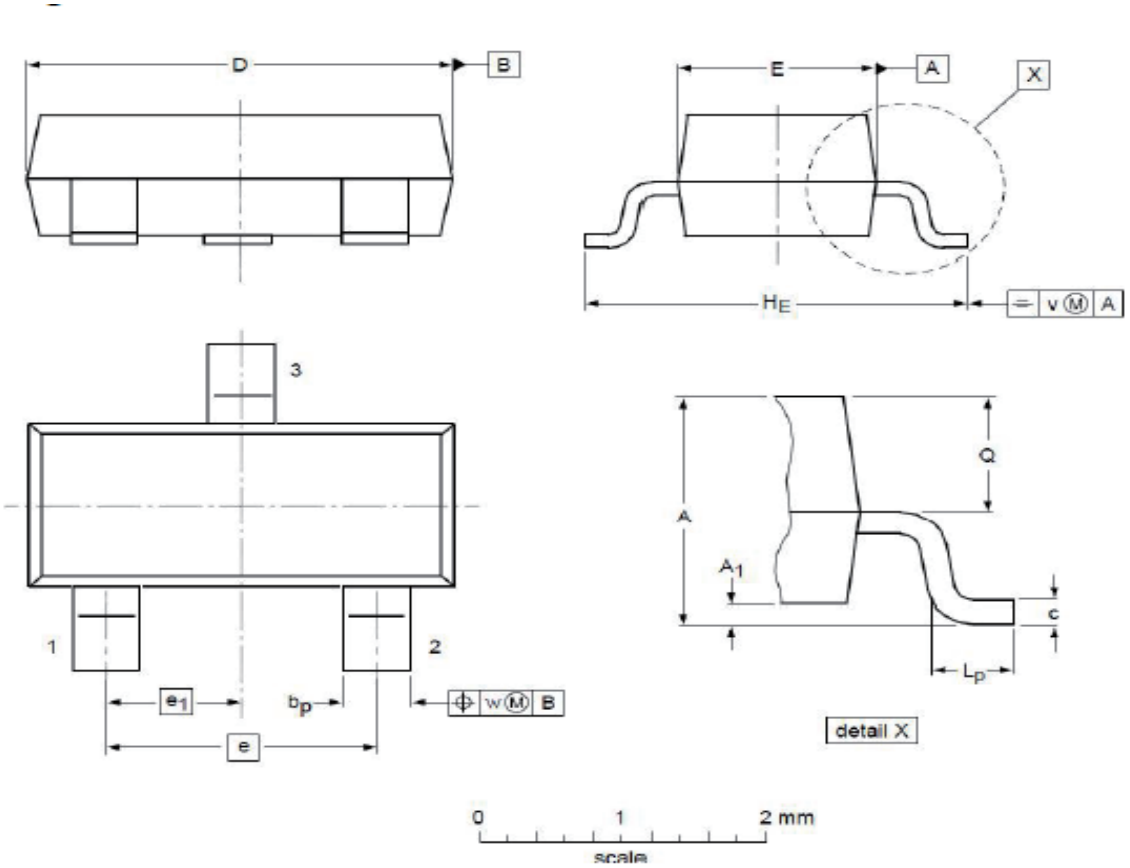
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



SOT-23-3L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.05	1.25	0.041	0.049
A1	0.00	0.10	0.000	0.004
A2	1.05	1.15	0.041	0.045
b	0.30	0.50	0.012	0.02
c	0.10	0.20	0.004	0.008
D	2.82	3.02	0.111	0.119
E	1.50	1.70	0.059	0.067
E1	2.65	2.95	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
L	0.30	0.60	0.012	0.024
θ	0°	8°	0°	8°