

Description

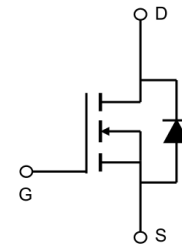
The RST0103A-1 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

General Features

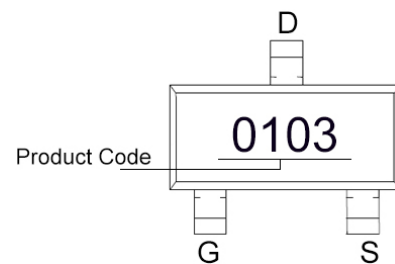
- $V_{DS} = 100V$, $I_D = 3A$
- $R_{DS(ON)} < 160m\Omega$ @ $V_{GS}=10V$ (typical=136 m Ω)
- $R_{DS(ON)} < 170m\Omega$ @ $V_{GS}=4.5V$ (typical=140 m Ω)
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

Application

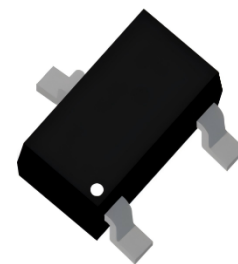
- Battery management
- Motor controller and driver
- PWM applications
- Load switch



Schematic diagram



Marking and pin assignment



SOT-23-3L

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	3	A
Pulsed Drain Current (Note 1)	I_{DM}	20	A
Maximum Power Dissipation	P_D	1.25	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	°C

Thermal Characteristic

Thermal Resistance, Junction-to-Ambient ^(Note 2)	$R_{\theta JA}$	100	°C/W
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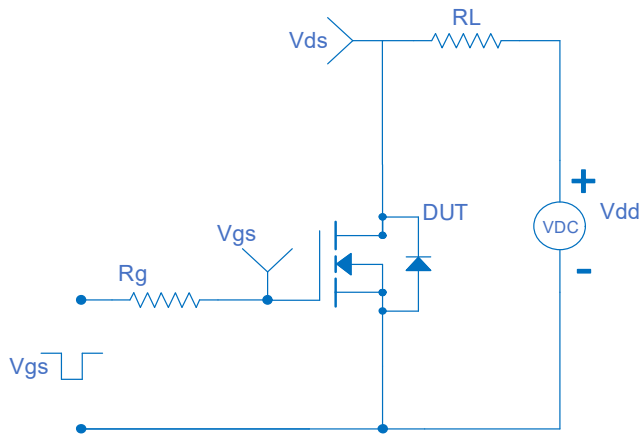
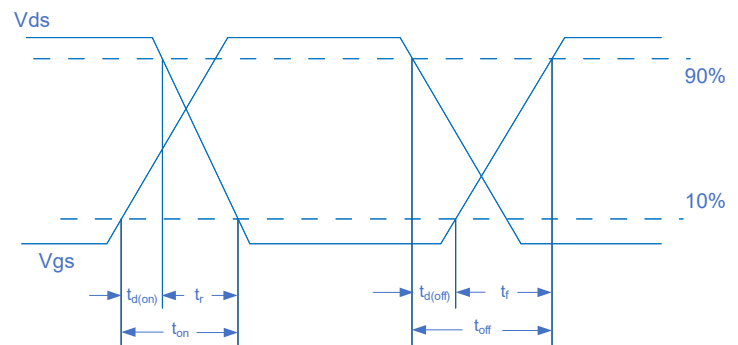
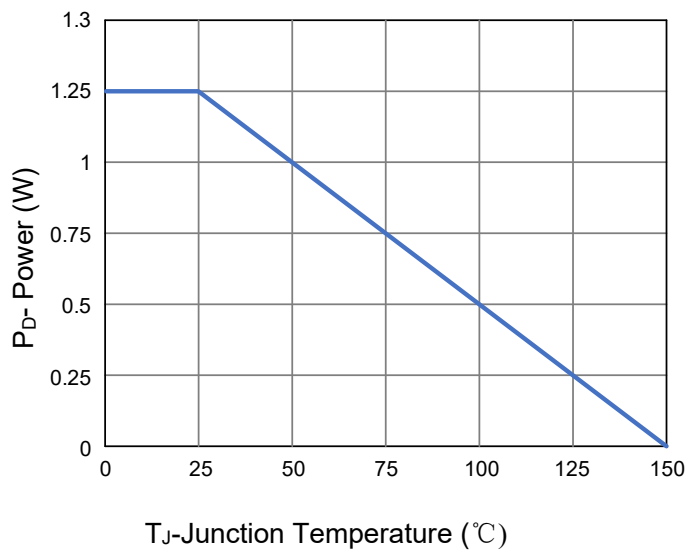
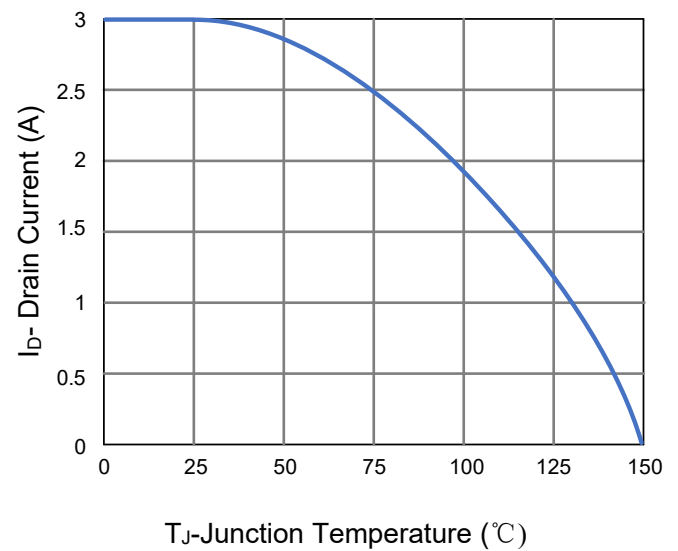
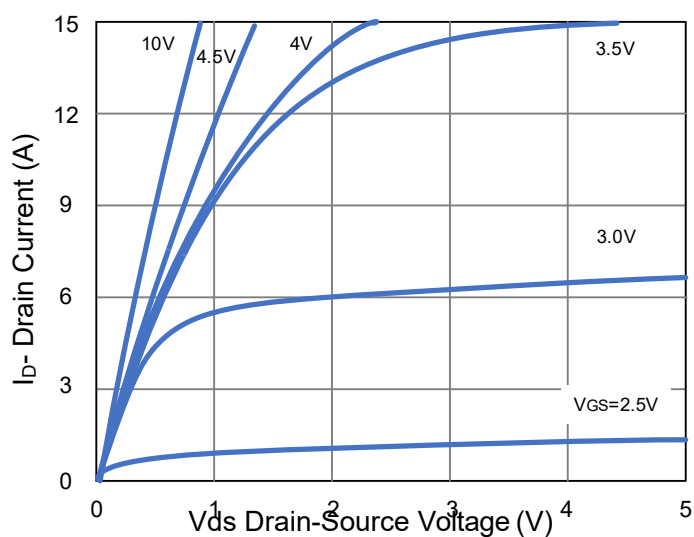
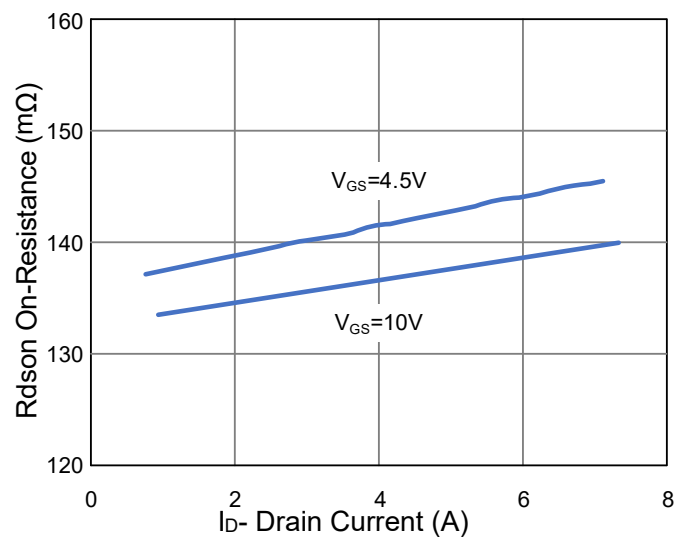
Electrical Characteristics (TA=25°C unless otherwise noted)

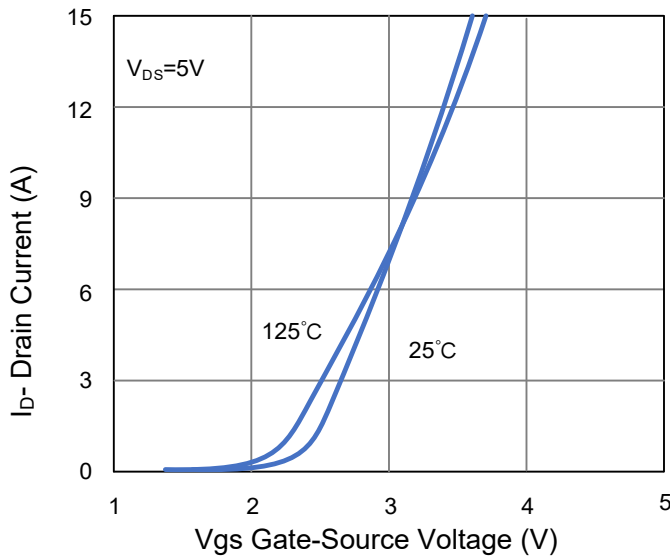
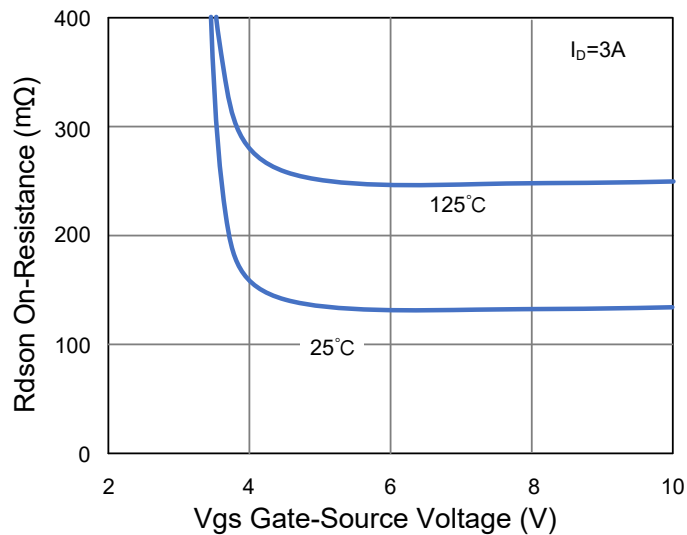
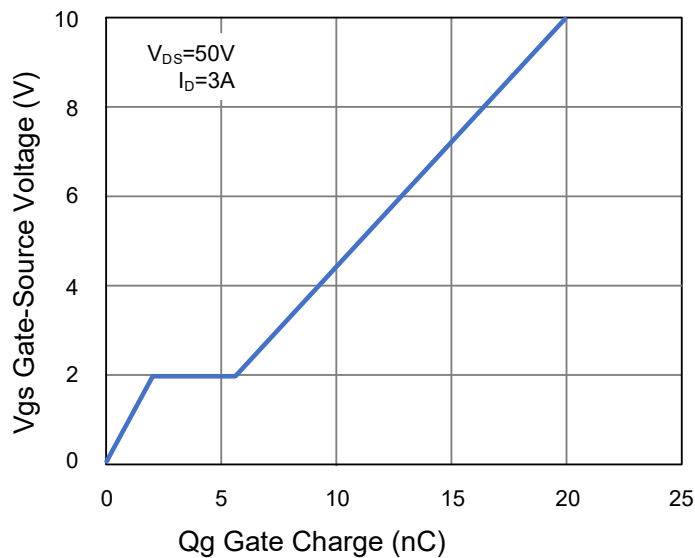
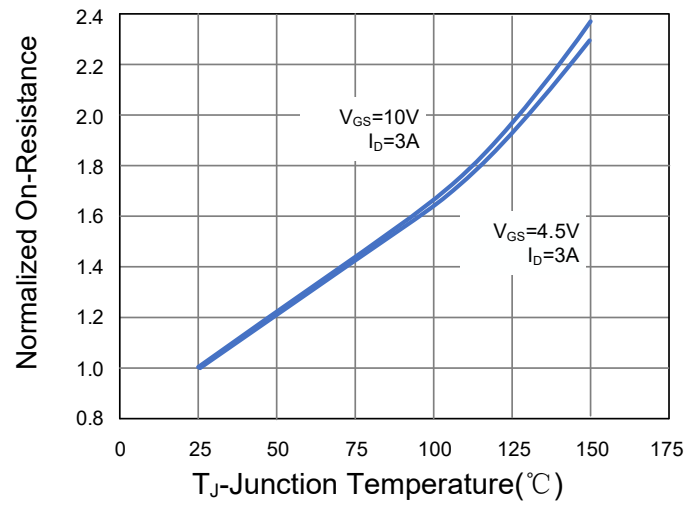
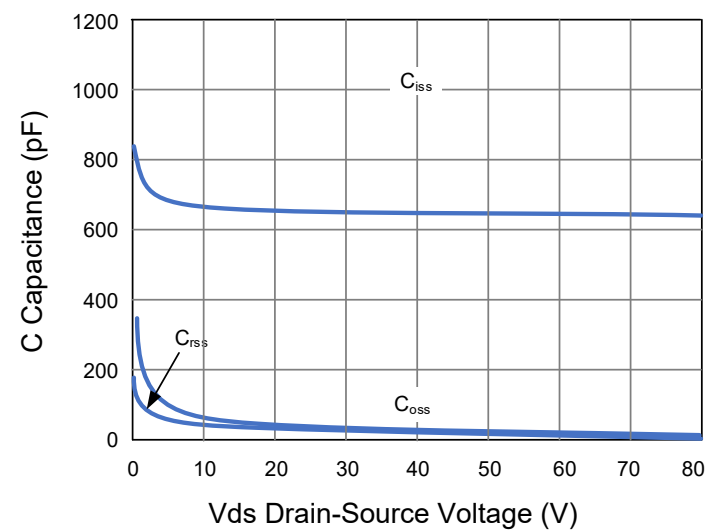
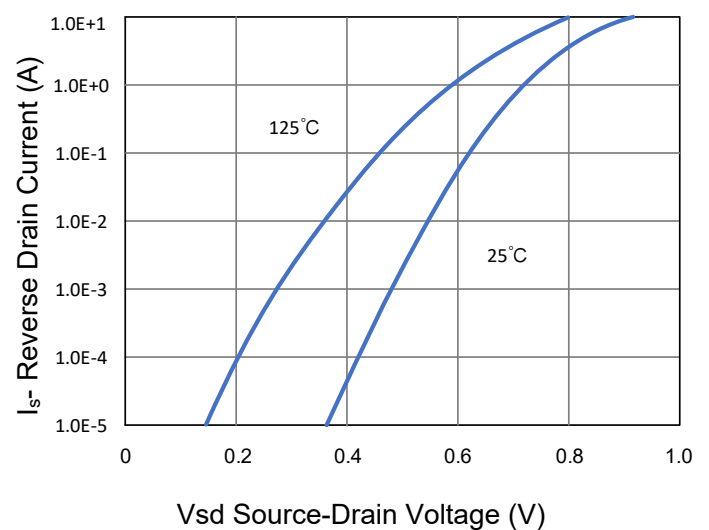
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	100	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=100V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.5	2.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=3A$	-	136	160	m Ω
	$R_{DS(ON)}$	$V_{GS}=4.5V, I_D=3A$		140	170	
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=3A$	-	5	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C_{iss}	$V_{DS}=50V, V_{GS}=0V,$ $F=1.0MHz$	-	650	-	pF
Output Capacitance	C_{oss}		-	24	-	pF
Reverse Transfer Capacitance	C_{rss}		-	20	-	pF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=50V, R_L=19\Omega,$ $V_{GS}=10V, R_G=3\Omega$	-	6	-	nS
Turn-on Rise Time	t_r		-	4	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	20	-	nS
Turn-Off Fall Time	t_f		-	4	-	nS
Total Gate Charge	Q_g	$V_{DS}=50V, I_D=3A, V_{GS}=10V$	-	20	-	nC
Gate-Source Charge	Q_{gs}		-	2.1	-	nC
Gate-Drain Charge	Q_{gd}		-	3.3	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	$V_{GS}=0V, I_S=3A$	-	-	1.2	V
Diode Forward Current (Note 2)	I_S		-	-	3	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to product.

Typical Electrical and Thermal Characteristics


Figure 1 Switching Test Circuit

Figure 2 Switching Waveform

Figure 3 Power De-rating

Figure 4 Drain Current

Figure 5 Output Characteristics

Figure 6 Rdson vs Drain Current


Figure 7 Transfer Characteristics

Figure 9 Rdson vs Vgs

Figure 11 Gate Charge

Figure 8 Rdson vs Junction Temperature

Figure 10 Capacitance vs Vds

Figure 12 Source- Drain Diode Forward

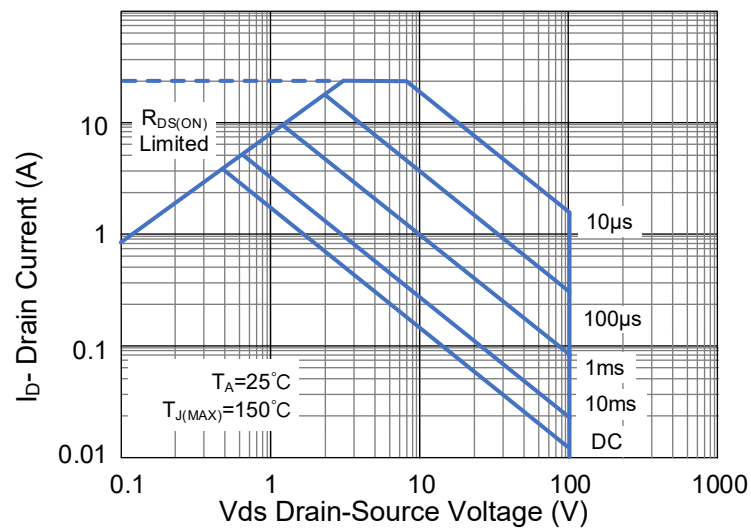


Figure 13 Safe Operation Area

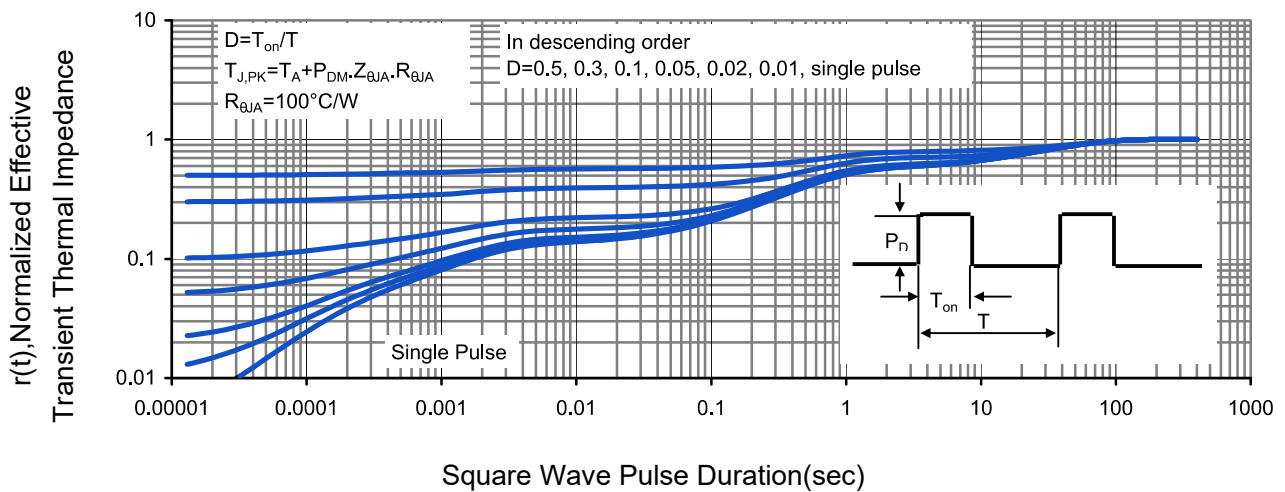
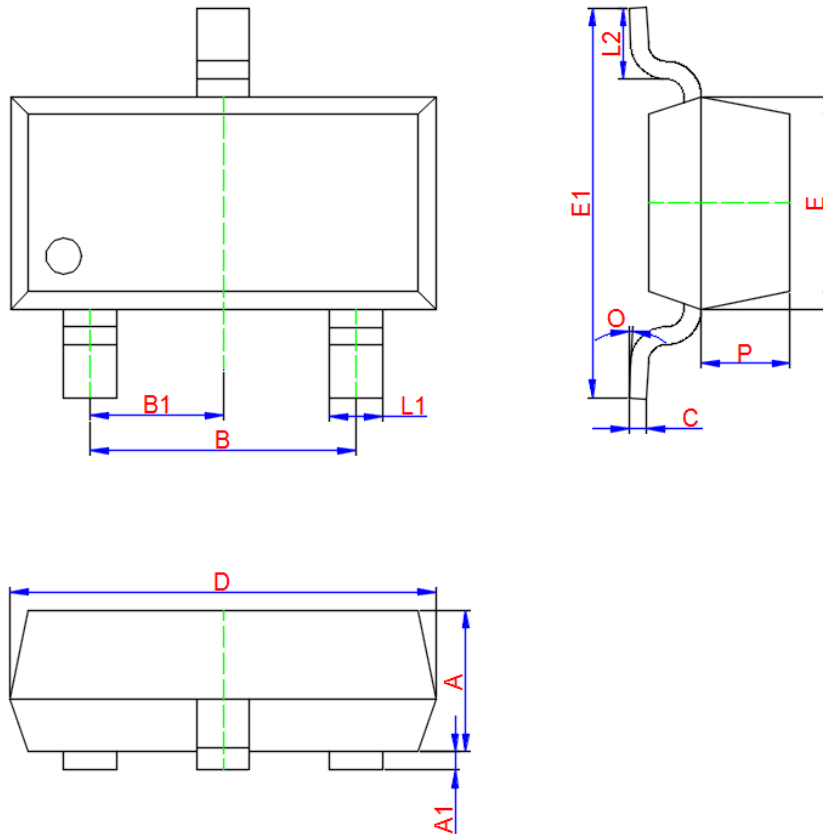


Figure 14 Normalized Maximum Transient Thermal Impedance

SOT-23-3L Package Information



Symbol	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	1.050	1.100	1.150
A1	0.000	0.050	0.100
L1	0.300	0.400	0.500
C	0.100	0.150	0.200
D	2.820	2.920	3.020
E	1.500	1.600	1.70
E1	2.650	2.800	2.950
B	1.800	1.900	2.000
B1	0.950 TYP.		
L2	0.300	0.450	0.60
P	0.550	0.575	0.600
O	0°	4°	8°