

Description

The 2002A uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

General Features

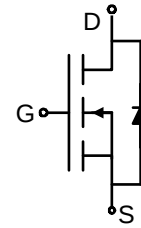
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V_{DSS}	$R_{DS(ON)}$ @ 4.5V(Typ)	$R_{DS(ON)}$ @ 10V (Typ)	I_D
190V	400m Ω	395m Ω	2A

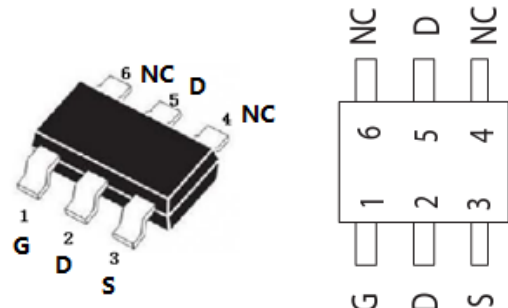
- High density cell design for ultra low $R_{DS(on)}$
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation

Application

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply



Schematic diagram



SOT23-6L

Ordering Information

Part Number	Marking	Case	Packaging
2002A	2002A	SOT-23-6L	3000pcs/Reel

Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	190	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	2	A
Drain Current-Pulsed ^(Note 1)	I_{DM}	8	A
Maximum Power Dissipation	P_D	3	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ\text{C}$

Thermal Characteristic

Thermal Resistance, Junction-to-Ambient ^(Note 2)	$R_{\theta JA}$	41.7	$^\circ\text{C/W}$
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Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	190	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=190V, V_{GS}=0V$	-	-	1	μA

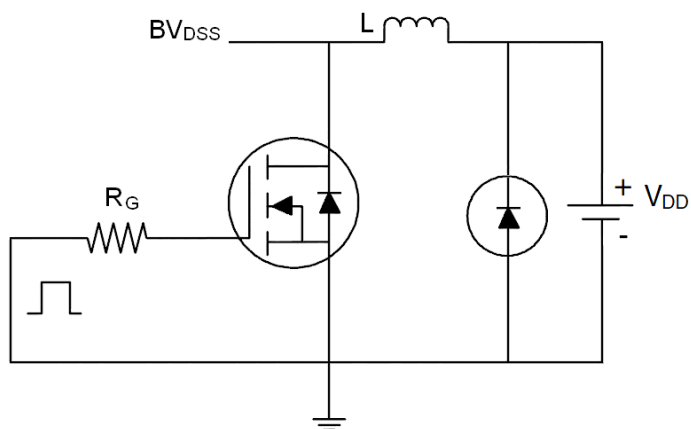
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1	2	3	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =1A	-	395	540	mΩ
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =4.5V, I _D =1A	-	400	560	mΩ
Forward Transconductance	g _{FS}	V _{DS} =15V, I _D =2A	-	8	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, F=1.0MHz	-	580	-	pF
Output Capacitance	C _{OSS}		-	90	-	pF
Reverse Transfer Capacitance	C _{RSS}		-	3	-	pF
Switching Characteristics (Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =100V, R _L =15Ω V _{GS} =10V, R _G =2.5Ω	-	10	-	nS
Turn-on Rise Time	t _r		-	12	-	nS
Turn-Off Delay Time	t _{d(off)}		-	15	-	nS
Turn-Off Fall Time	t _f		-	15	-	nS
Total Gate Charge	Q _g	V _{DS} =100V, I _D =2A, V _{GS} =10V	-	12		nC
Gate-Source Charge	Q _{gs}		-	2.5	-	nC
Gate-Drain Charge	Q _{gd}		-	3.8	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V, I _S =2A	-	-	1.1	V
Diode Forward Current (Note 2)	I _S		-	-	2	A

Notes:

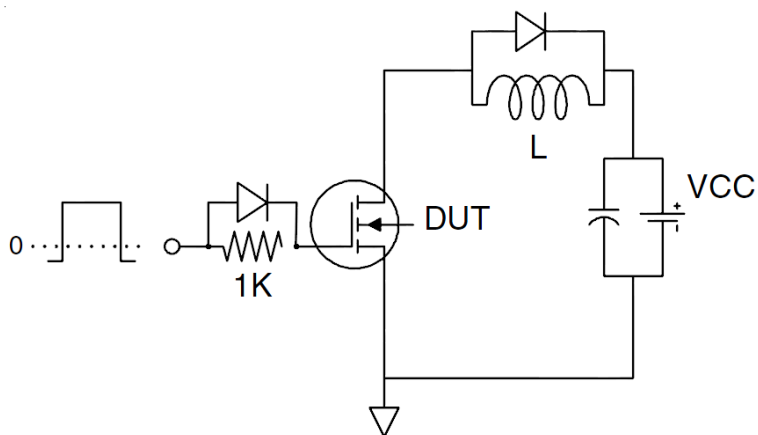
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

Test Circuit

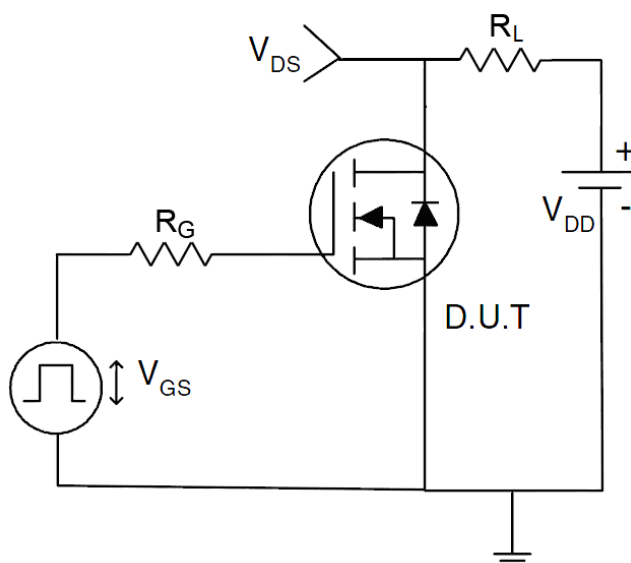
1) E_{AS} test circuit



2) Gate charge test circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

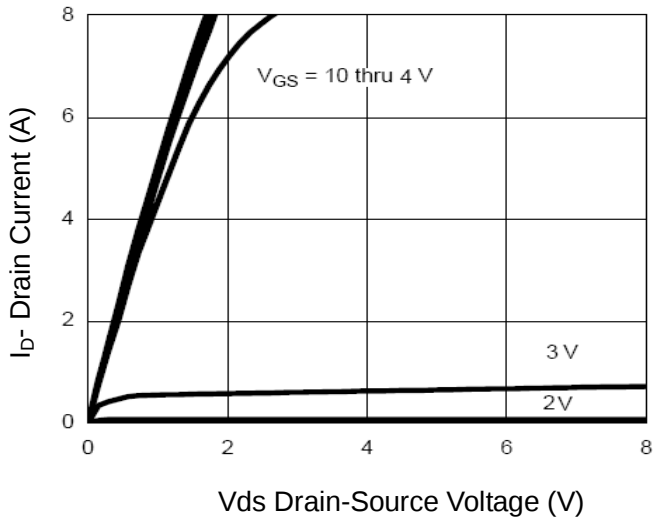


Figure 1 Output Characteristics

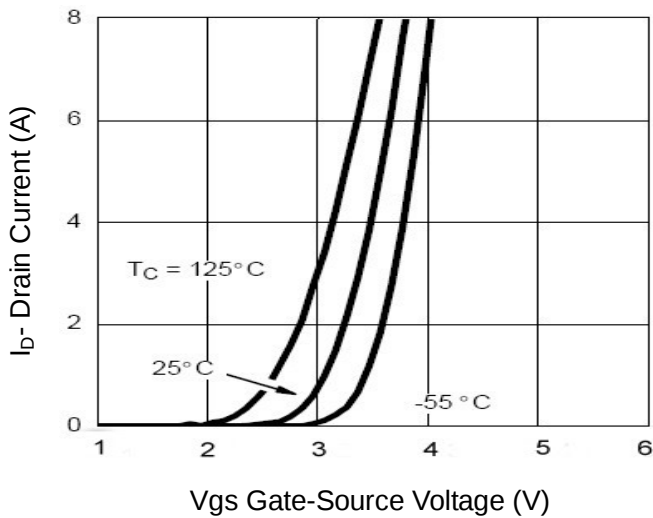


Figure 2 Transfer Characteristics

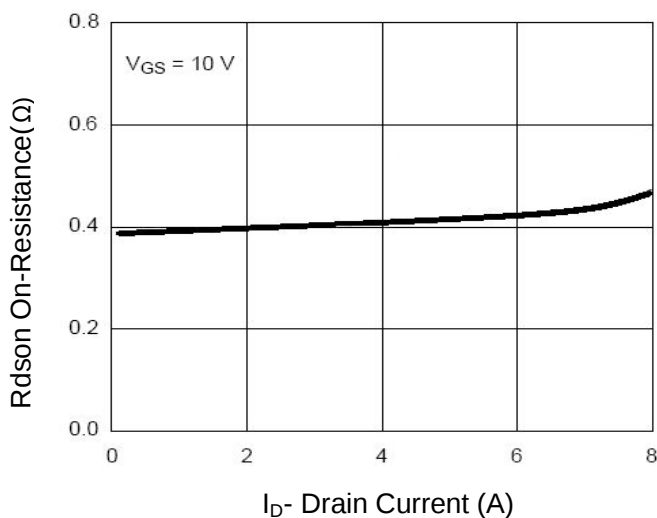


Figure 3 $R_{DS(on)}$ - Drain Current

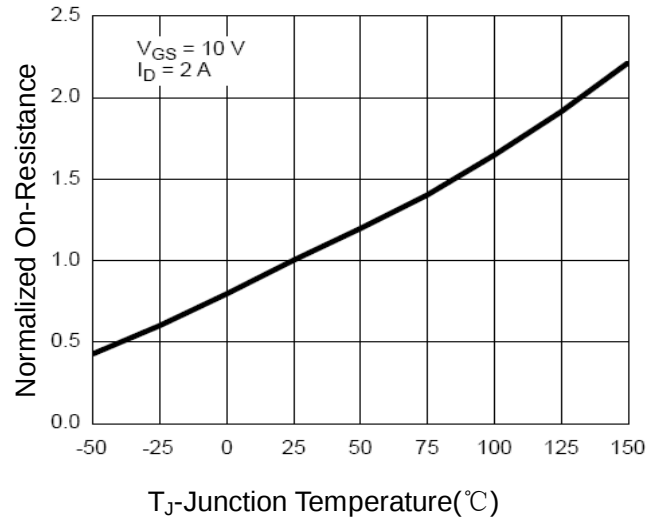


Figure 4 $R_{DS(on)}$ -Junction Temperature

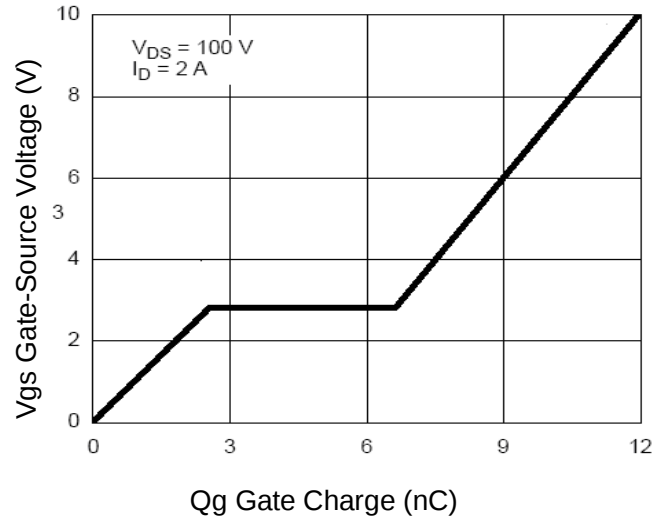


Figure 5 Gate Charge

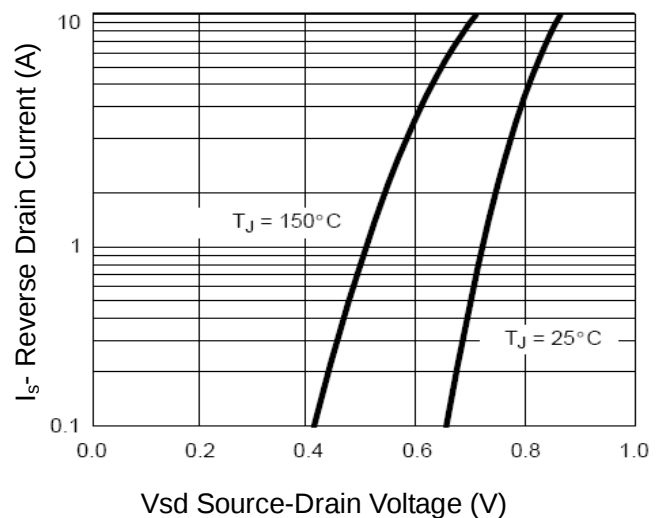


Figure 6 Source- Drain Diode Forward

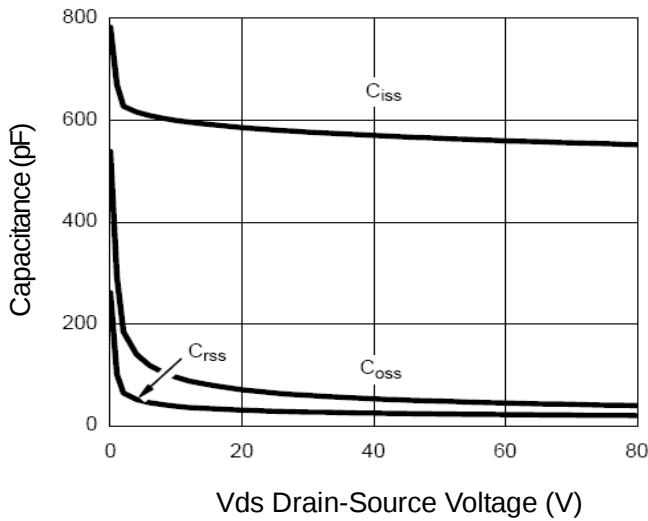


Figure 7 Capacitance vs Vds

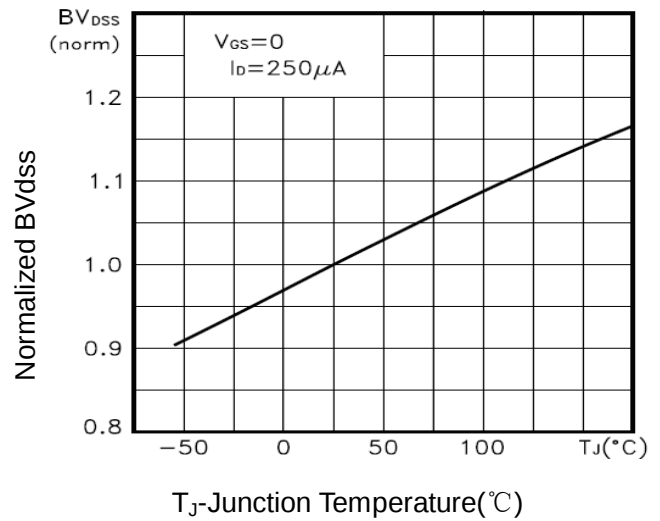


Figure 9 BV_{DSS} vs Junction Temperature

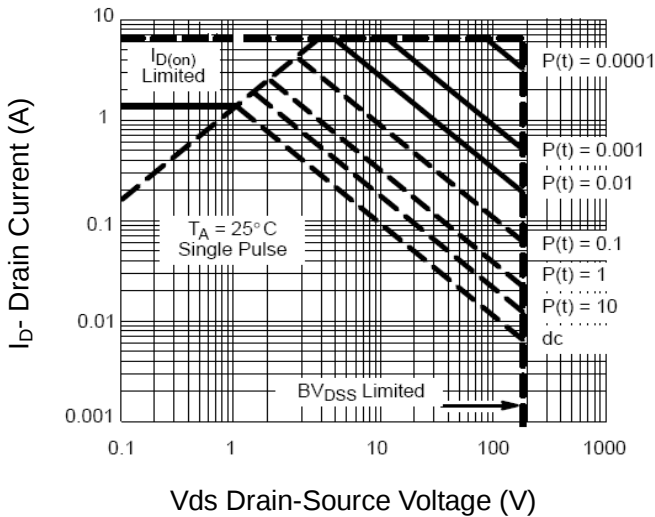


Figure 8 Safe Operation Area

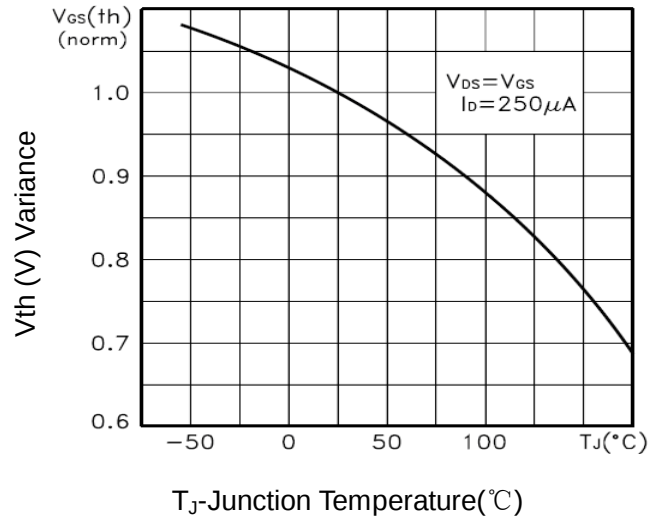


Figure 10 $V_{GS(th)}$ vs Junction Temperature

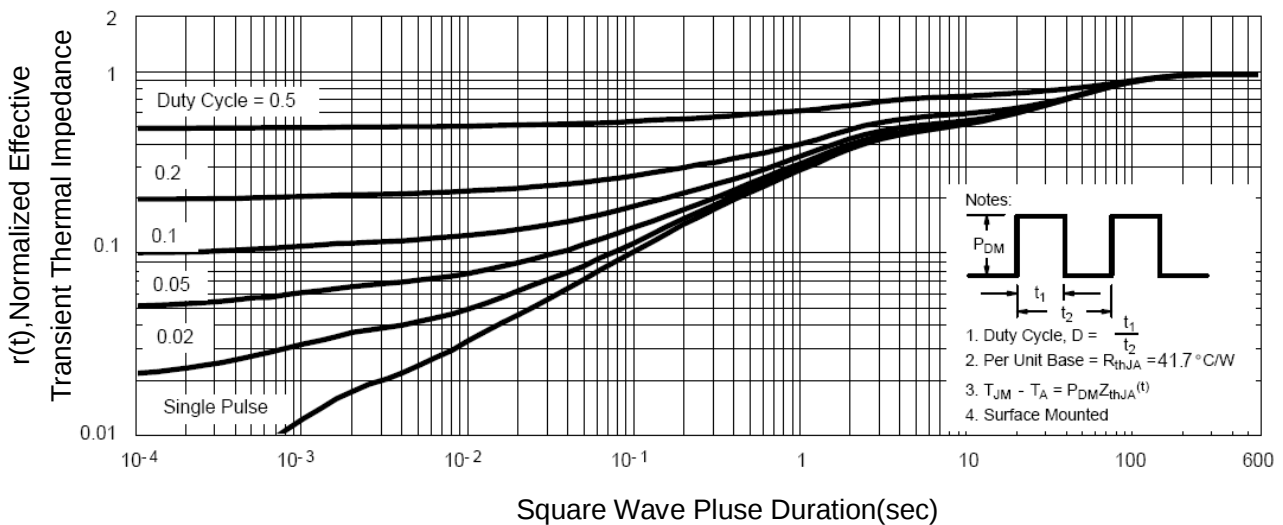
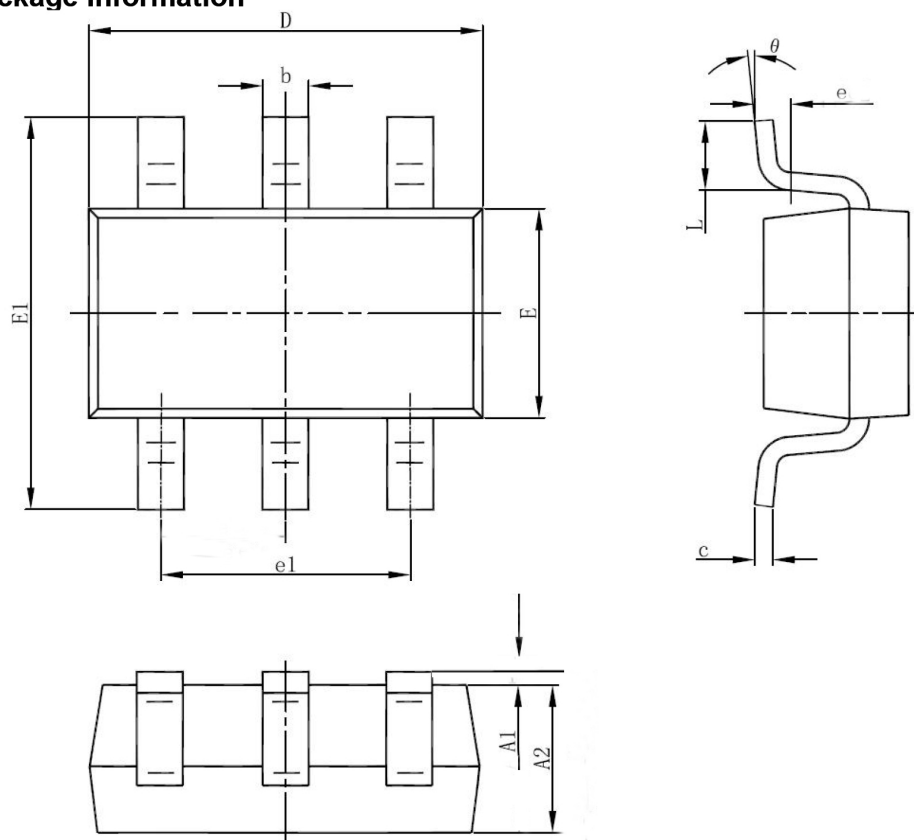


Figure 11 Normalized Maximum Transient Thermal Impedance

SOT23-6L Package Information



DIM	MIN	NOM	MAX
A1	0.00	-	0.10
A2	1.00	1.10	1.20
b	0.30	0.40	0.50
c	0.10	0.15	0.20
D	2.80	2.90	3.00
E	1.50	1.60	1.70
E1	2.60	2.80	3.00
e	0.2GAUGE PLANE		
e1	-	1.90	-
L	0.30	0.45	0.60
θ	0°	-	8°
All Dimensions in mm			