



## 3060K (文件编号: S&CIC1695)

## N-Channel Trench Power MOSFET

### General Description

The 3060K uses advanced trench technology to provide excellent RDS(ON), low gate charge and operation with gate voltages as low as 5V. This device is suitable for use as a wide variety of applications.

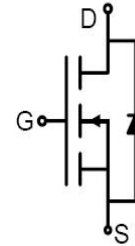
### Features

- VDS = 30V, ID = 60A  
RDS(ON) < 7mΩ @ VGS = 10V  
RDS(ON) < 12mΩ @ VGS = 5V
- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package

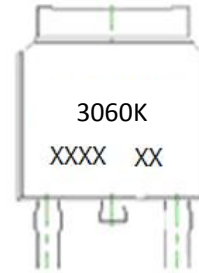
### Application

- PWM applications
- Load switch
- Power management

**100% UIS TESTED!**  
**100% ΔVds TESTED!**



Schematic Diagram



Marking and pin Assignment



TO-252(DPAK) top view

### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
3060K	3060K	TO-252	325mm	16mm	2500

Table 1. Absolute Maximum Ratings (TA=25°C)

Symbol	Parameter	Value	Unit
VDS	Drain-Source Voltage (VGS=0V)	30	V
VGS	Gate-Source Voltage (VDS=0V)	±20	V
ID	Drain Current-Continuous(Tc=25°C) (Note 1)	60	A
	Drain Current-Continuous(Tc=100°C)	38	A
IDM (pluse)	Drain Current-Continuous@ Current-Pulsed (Note 2)	250	A
PD	Maximum Power Dissipation(Tc=25°C)	65	W
	Maximum Power Dissipation(Tc=100°C)	33	W
EAS	Avalanche energy (Note 3)	120	mJ
TJ,TSTG	Operating Junction and Storage Temperature Range	-55 To 175	°C



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Table 2. Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
R $\theta$ JC	Thermal Resistance, Junction-to-Case	-	2.3	$^{\circ}$ C/W

Table 3. Electrical Characteristics (TA=25 $^{\circ}$ C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>On/Off States</b>						
BVDSS	Drain-Source Breakdown Voltage	VGS=0V ID=250 $\mu$ A	30			V
IDSS	Zero Gate Voltage Drain Current	VDS=30V, VGS=0V			1	$\mu$ A
IGSS	Gate-Body Leakage Current	VGS= $\pm$ 20V, VDS=0V			$\pm$ 100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS, ID=250 $\mu$ A	1.0	1.5	2.5	V
gFS	Forward Transconductance	VDS=5V, ID=20A		20		S
RDS (ON)	Drain-Source On-State Resistance	VGS=10V, ID=20A (Tc=25 $^{\circ}$ C)		5.5	7.0	m $\Omega$
		VGS=10V, ID=20A (Tc=125 $^{\circ}$ C)		7.3	11	m $\Omega$
		VGS=5V, ID=15A		7.8	12	m $\Omega$
<b>Dynamic Characteristics</b>						
Ciss	Input Capacitance	VDS=15V, VGS=0V,		1450		pF
Coss	Output Capacitance			230		pF
Crss	Reverse Transfer Capacitance			185		pF
Rg	Gate resistance	VGS=0V, VDS=0V, f=1.0MHz		1.7		$\Omega$
<b>Switching Times</b>						
td(on)	Turn-on Delay Time	VGS=10V, VDS=15V, RL=0.75 $\Omega$ , RGEN=		9		nS
tr	Turn-on Rise Time			26		nS
td(off)	Turn-Off Delay Time			35		nS
tf	Turn-Off Fall Time			8		nS
Qg	Total Gate Charge		VGS=10V, VDS=25V, ID=14A		35	
Qgs	Gate-Source Charge			6		nC
Qgd	Gate-Drain Charge			12		nC
<b>Source-Drain Diode Characteristics</b>						
ISD	Source-Drain Current(Body Diode)				60	A
VSD	Forward on Voltage	VGS=0V, IS=20A			1.2	V

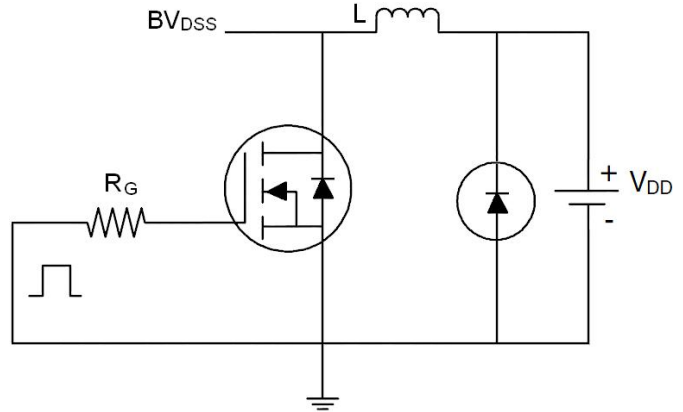
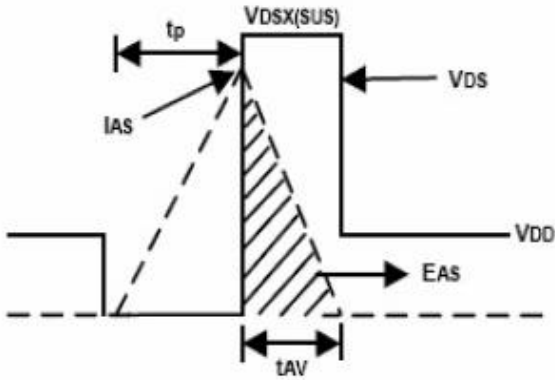
Notes 1.The maximum current rating is package limited.

Notes 2.Repetitive Rating: Pulse width limited by maximum junction temperature Notes 3.EAS condition: TJ=25 $^{\circ}$ C, VDD=15V, VG=10V, RG=25 $\Omega$

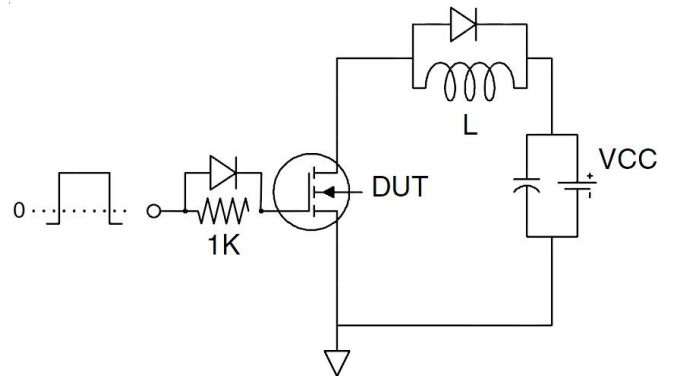
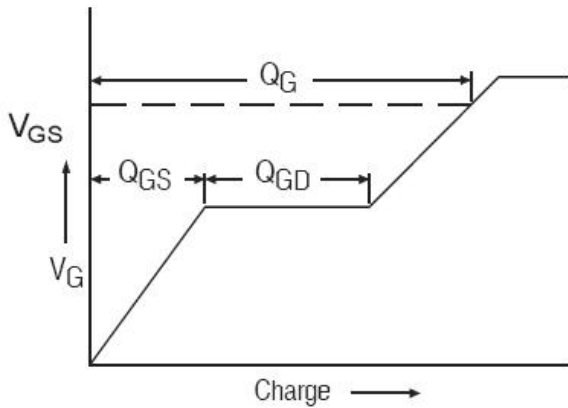


### Test Circuit

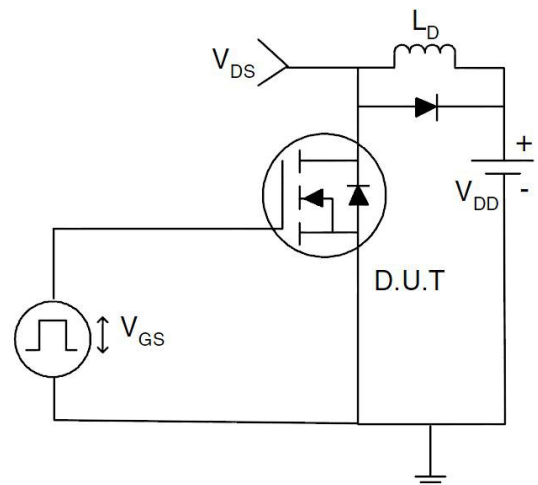
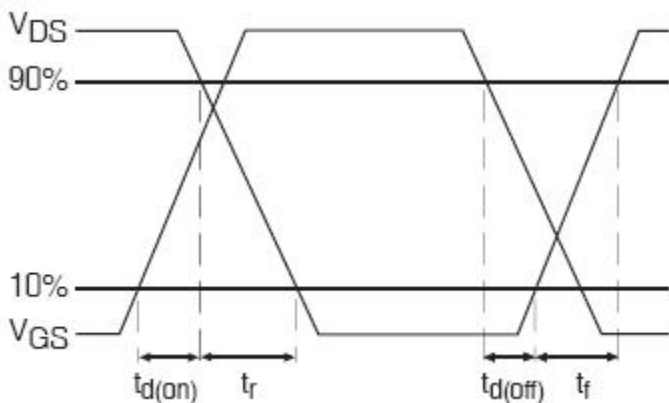
#### 1) $E_{AS}$ Test Circuits



#### 2) Gate Charge Test Circuit:



#### 3) Switch Time Test Circuit:





TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)

Figure 1. Output Characteristics

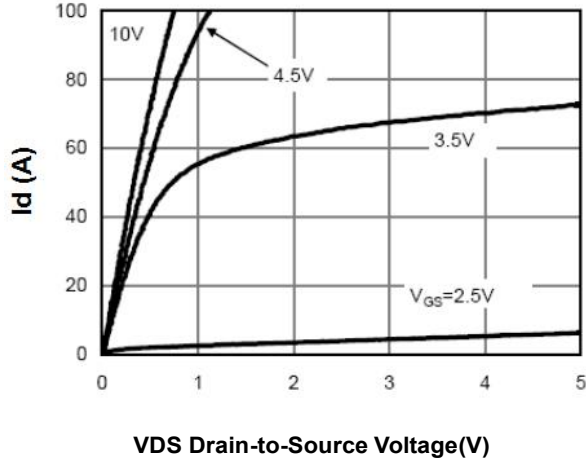


Figure 2. Transfer Characteristics

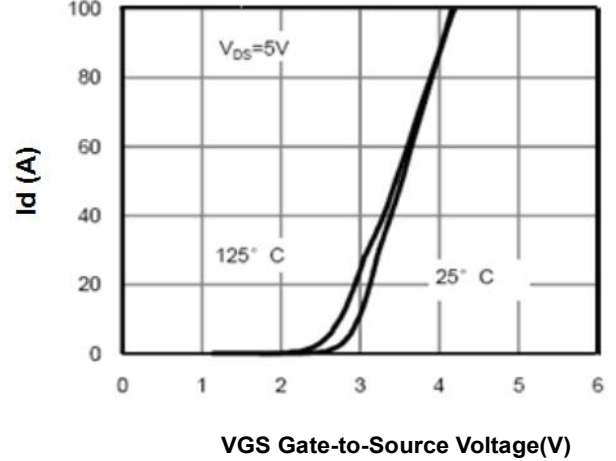


Figure 3. Max  $BV_{DSS}$  vs Junction Temperature

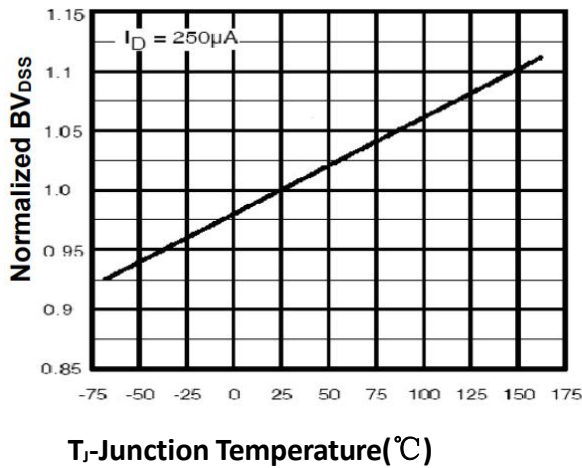


Figure 4. Drain Current

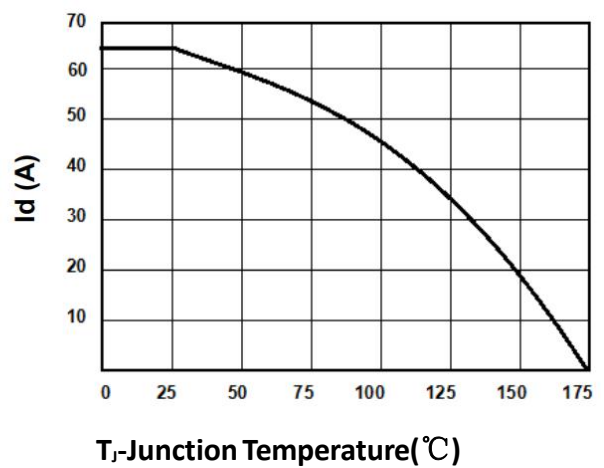


Figure 5.  $V_{GS(th)}$  vs Junction Temperature

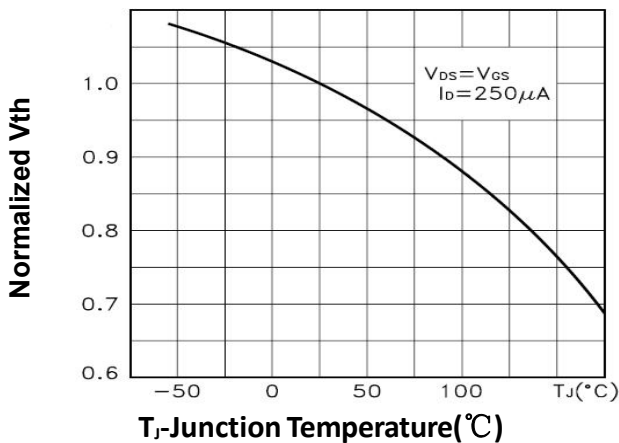
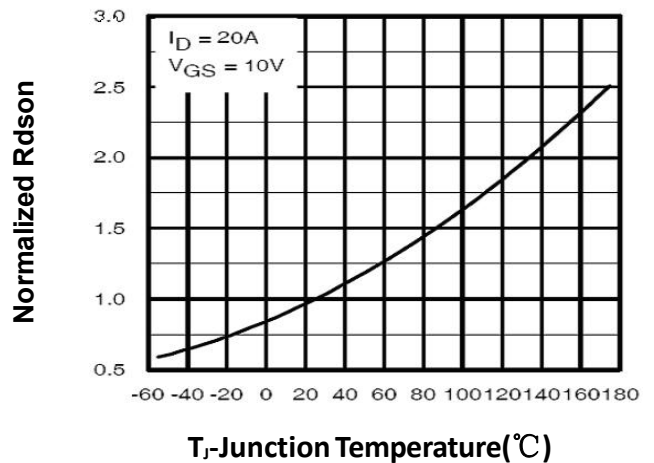


Figure 6.  $R_{DS(ON)}$  vs Junction Temperature





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Figure 7. Gate Charge Waveforms

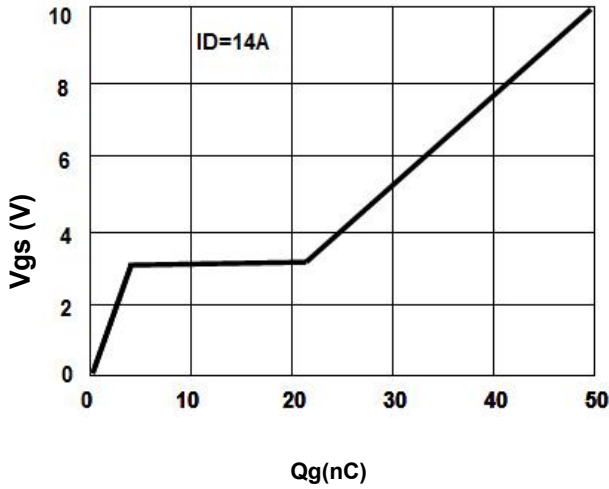


Figure 9. Body-Diode Characteristics

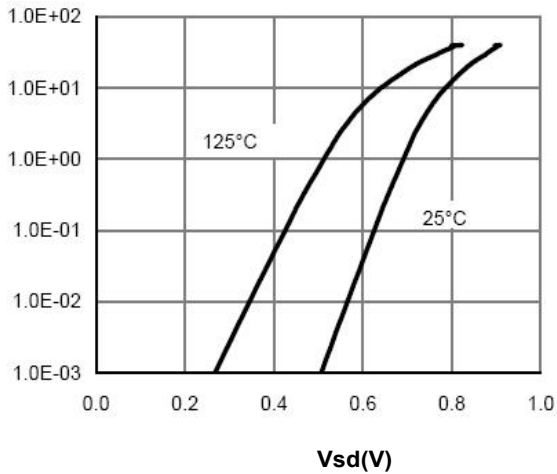
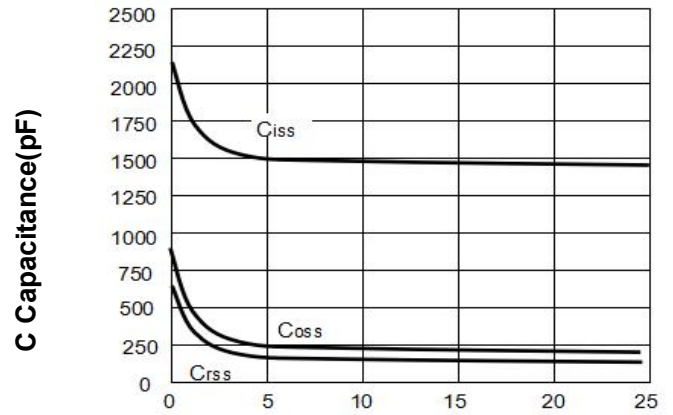


Figure 8. Capacitance



VDS Drain-to-Source Voltage(V)

Figure 10. Maximum Safe Operating Area

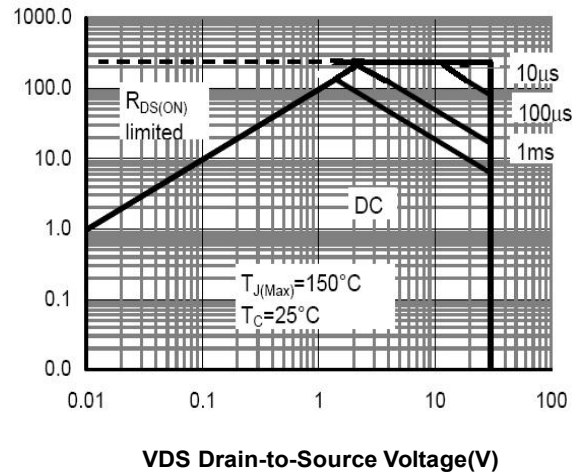
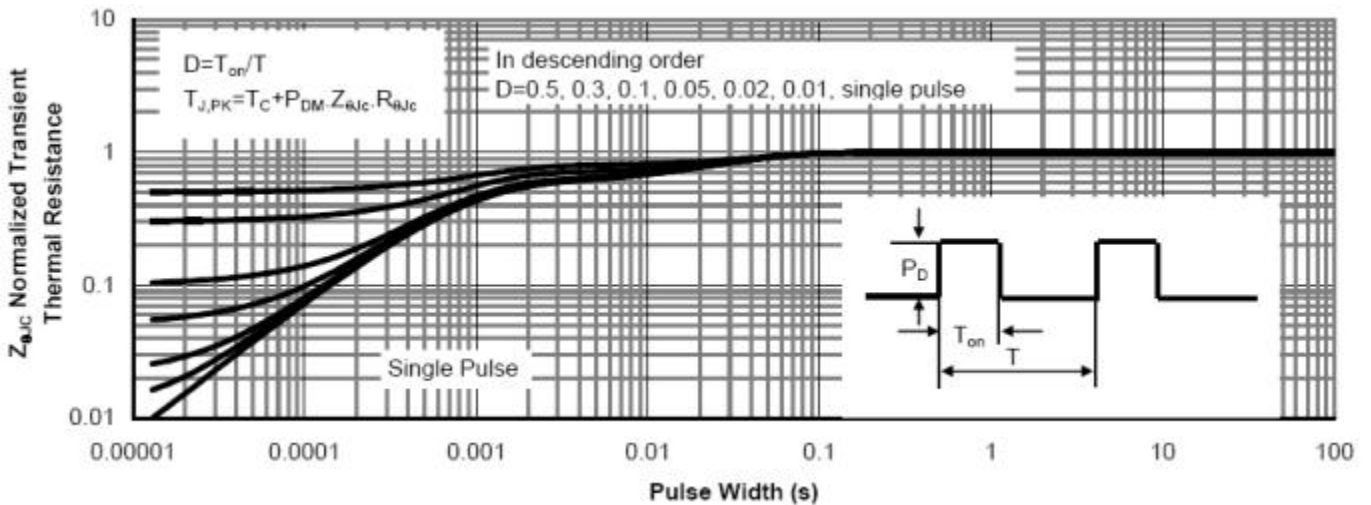
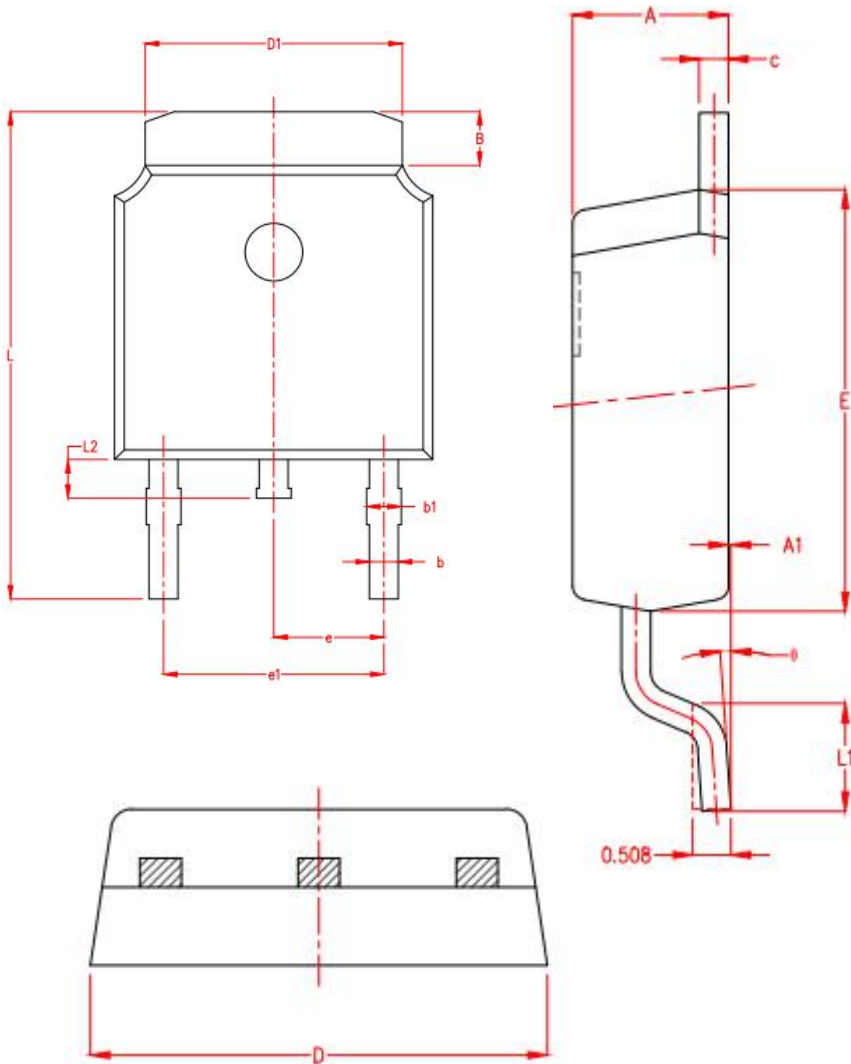


Figure 11. Normalized Maximum Transient Thermal Impedance





TO-252 Package Information



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	2.15	2.25	2.35
A1	0.00	0.06	0.12
B	0.96	1.11	1.26
b	0.59	0.69	0.79
b1	0.69	0.81	0.93
c	0.34	0.42	0.50
D	6.45	6.60	6.75
D1	5.23	5.33	5.43
E	5.95	6.10	6.25
e	2.286TYP.		
e1	4.47	4.57	4.67
L	9.90	10.10	10.30
L1	1.40	1.55	1.70
L2	0.60	0.80	1.00
θ	0°	4°	8°