

## N-Channel Enhancement Mode Power MOSFET

## Description

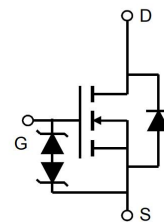
The G250N03IE uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge. It can be used in a wide variety of applications.

## General Features

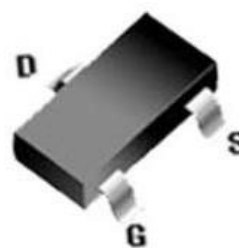
- $V_{DS}$  30V
- $I_D$  (at  $V_{GS} = 10V$ ) 5.3A
- $R_{DS(ON)}$  (at  $V_{GS} = 10V$ ) < 25m $\Omega$
- $R_{DS(ON)}$  (at  $V_{GS} = 4.5V$ ) < 30m $\Omega$
- $R_{DS(ON)}$  (at  $V_{GS} = 2.5V$ ) < 50m $\Omega$
- 100% Avalanche Tested
- RoHS Compliant
- ESD (HBM): 3.5KV

## Application

- Power switch
- DC/DC converters



Schematic diagram



SOT-23

## Ordering Information

Device	Package	Marking	Packaging
G250N03IE	SOT-23	G250N03	3000pcs/Reel

Absolute Maximum Ratings  $T_C = 25^\circ\text{C}$ , unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Continuous Drain Current	$I_D$	5.3	A
Pulsed Drain Current (note1)	$I_{DM}$	22	A
Gate-Source Voltage	$V_{GS}$	$\pm 10$	V
Power Dissipation	$P_D$	1.4	W
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 To 150	$^\circ\text{C}$

## Thermal Resistance

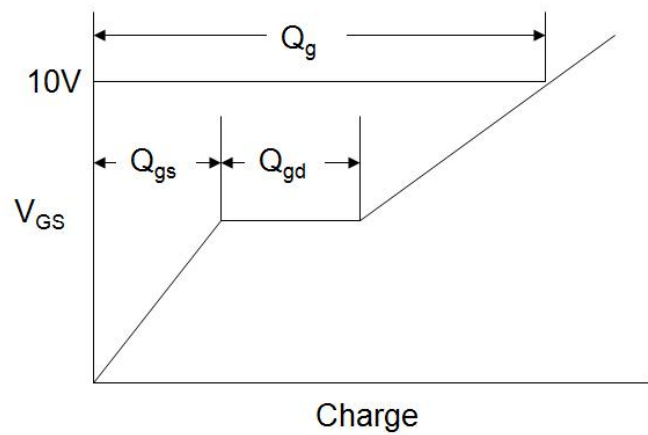
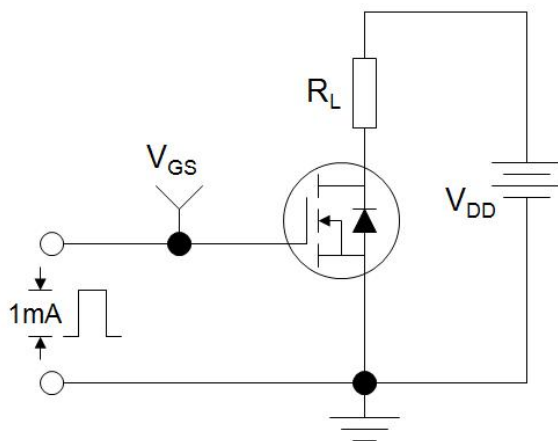
Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	$R_{thJA}$	89	$^\circ\text{C/W}$

Specifications T <sub>J</sub> = 25°C, unless otherwise noted						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	30	--	--	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V	--	--	1	μA
Gate-Source Leakage	I <sub>GSS</sub>	V <sub>GS</sub> = ±10V	--	--	±10	uA
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	0.5	1	1.3	V
Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 4A	--	21	25	mΩ
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> =4A	--	24	30	
		V <sub>GS</sub> = 2.5V, I <sub>D</sub> =2A	--	37	50	
Forward Transconductance	g <sub>FS</sub>	V <sub>GS</sub> = 5V, I <sub>D</sub> = 4A	--	10	--	S
Dynamic Parameters						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 15V, f = 1.0MHz	--	573	--	pF
Output Capacitance	C <sub>oss</sub>		--	66	--	
Reverse Transfer Capacitance	C <sub>rss</sub>		--	56	--	
Total Gate Charge	Q <sub>g</sub>	V <sub>DD</sub> = 15V, I <sub>D</sub> = 4A, V <sub>GS</sub> = 4.5V	--	9.1	--	nC
Gate-Source Charge	Q <sub>gs</sub>		--	2.1	--	
Gate-Drain Charge	Q <sub>gd</sub>		--	2.8	--	
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 15V, I <sub>D</sub> = 4A, R <sub>G</sub> = 3Ω	--	3	--	ns
Turn-on Rise Time	t <sub>r</sub>		--	2.8	--	
Turn-off Delay Time	t <sub>d(off)</sub>		--	25	--	
Turn-off Fall Time	t <sub>f</sub>		--	4	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I <sub>S</sub>	T <sub>C</sub> = 25°C	--	--	5.3	A
Body Diode Voltage	V <sub>SD</sub>	T <sub>J</sub> = 25°C, I <sub>SD</sub> = 4A, V <sub>GS</sub> = 0V	--	--	1.2	V
Reverse Recovery Charge	Q <sub>rr</sub>	I <sub>F</sub> = 4A, V <sub>GS</sub> = 0V di/dt=100A/us	--	2	--	nC
Reverse Recovery Time	T <sub>rr</sub>		--	6	--	ns

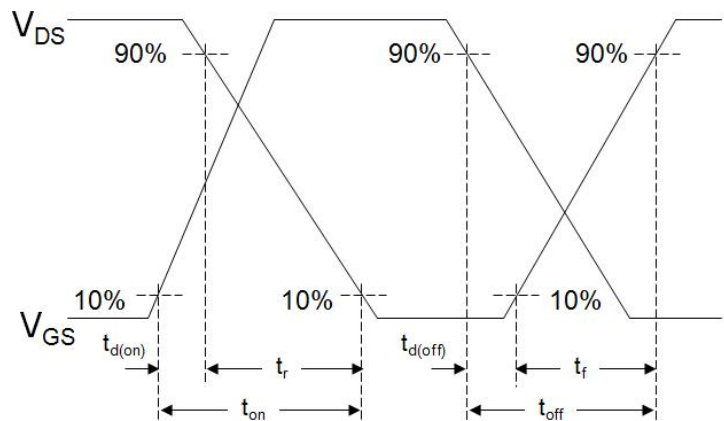
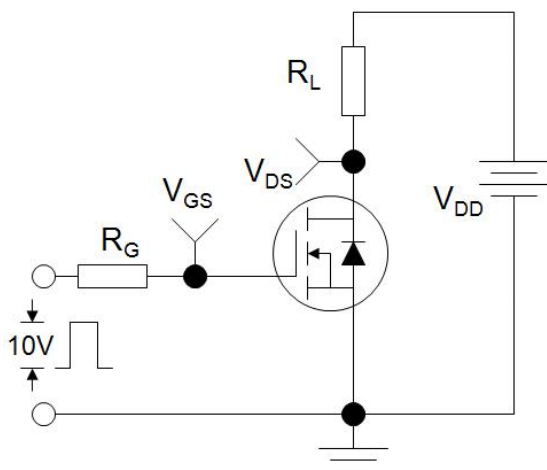
## Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. Identical low side and high side switch with identical  $R_G$

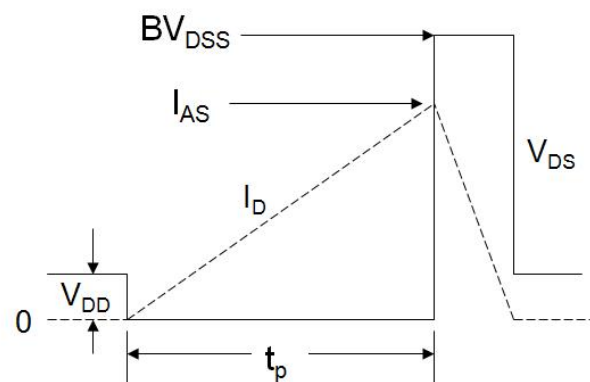
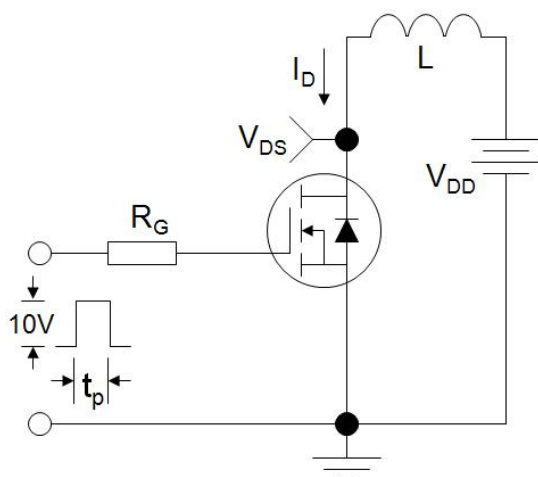
### Gate Charge Test Circuit



### Switch Time Test Circuit



### EAS Test Circuit



Typical Characteristics  $T_J = 25^\circ\text{C}$ , unless otherwise noted

Figure 1. Output Characteristics

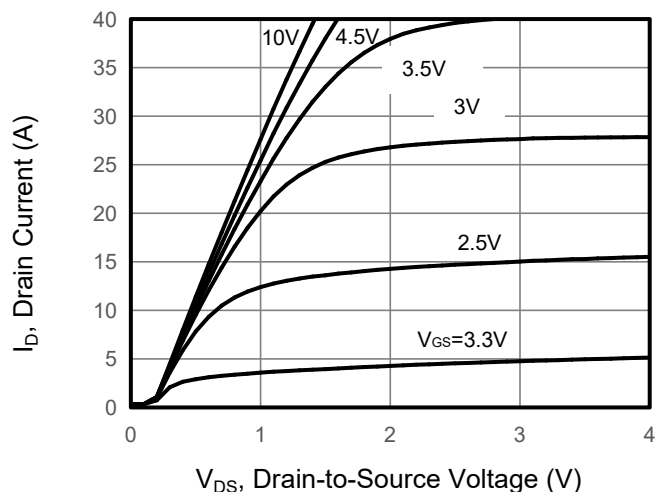


Figure 2. Transfer Characteristics

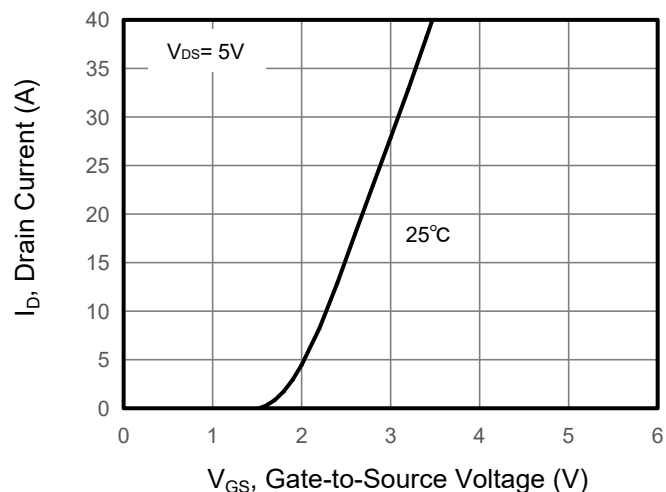


Figure 3. Drain Source On Resistance

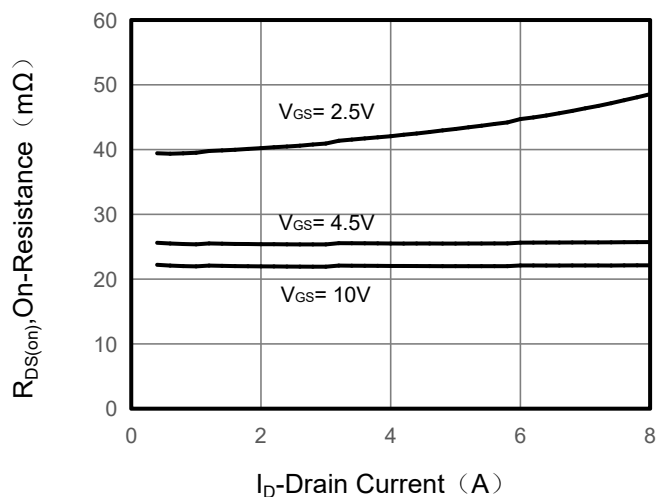


Figure 4. Gate Charge

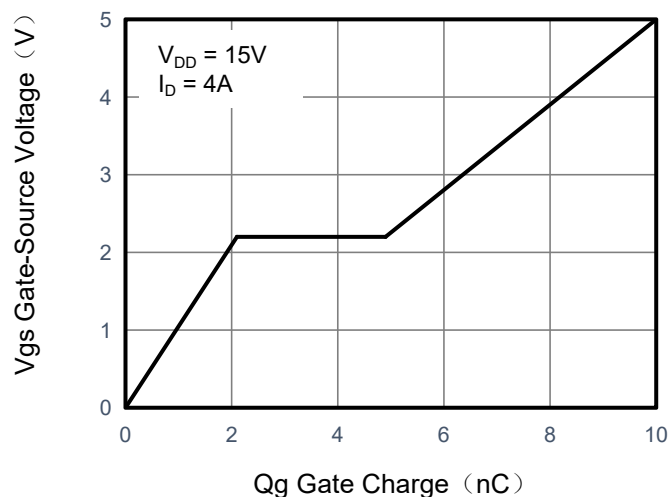


Figure 5. Capacitance

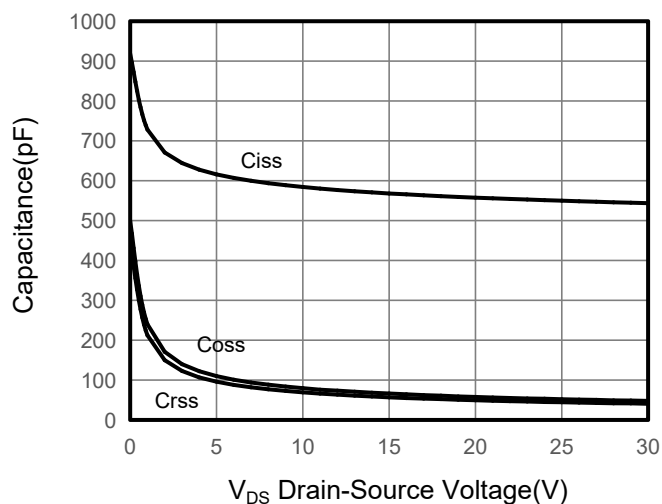
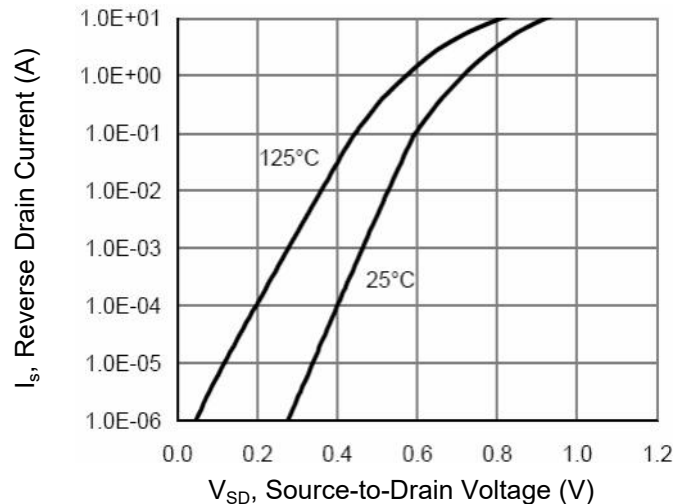
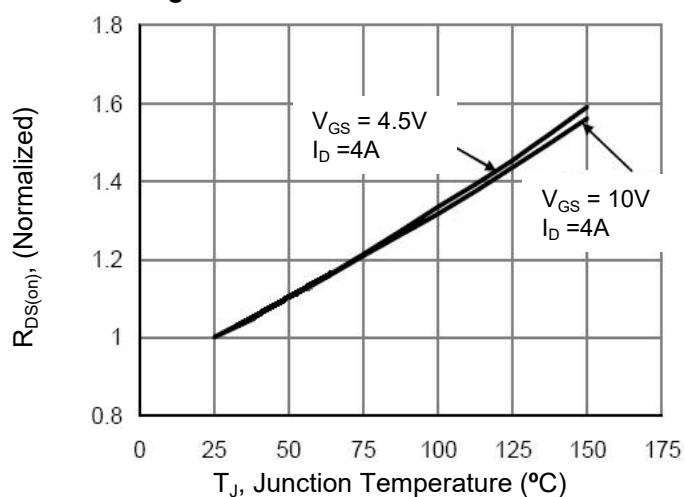


Figure 6. Source-Drain Diode Forward

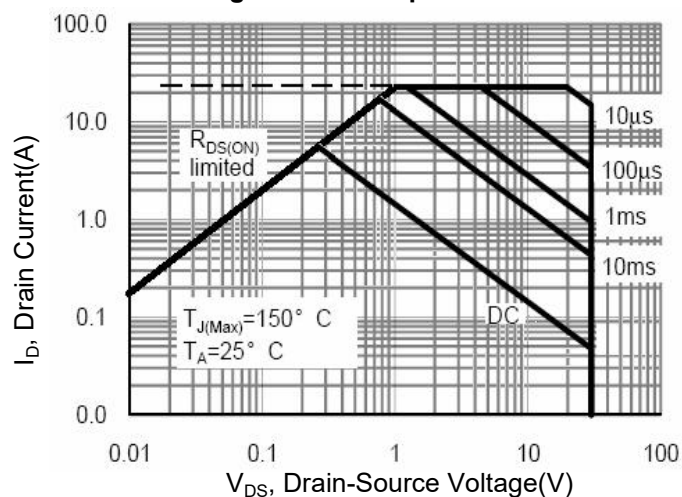


**Typical Characteristics**  $T_J = 25^\circ\text{C}$ , unless otherwise noted

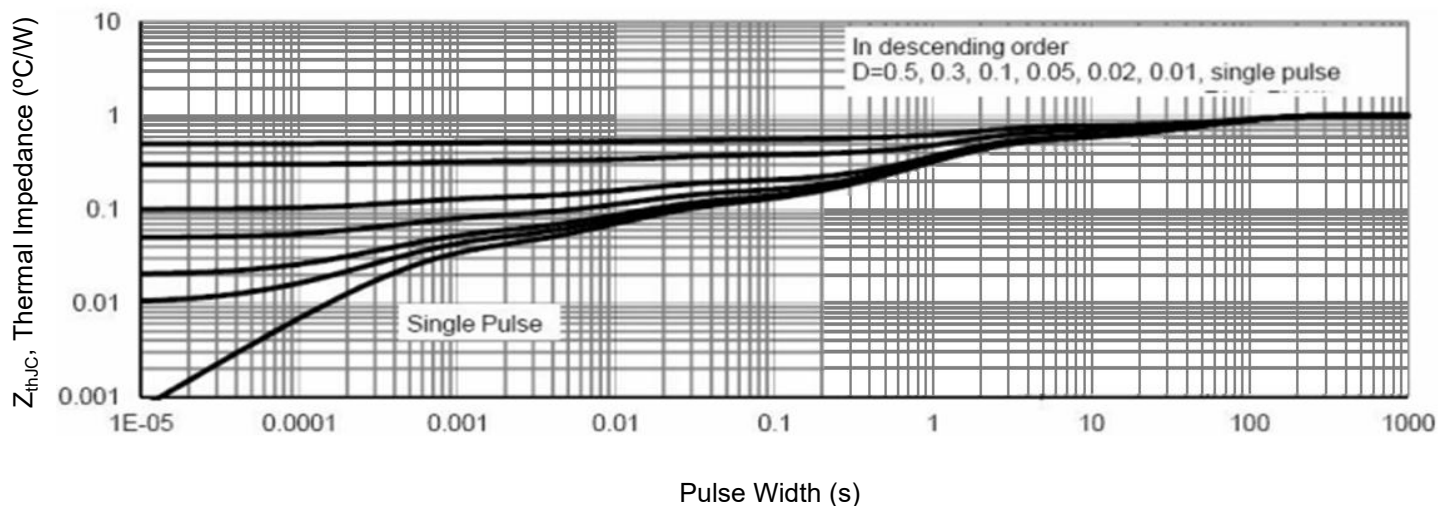
**Figure 7. Drain-Source On-Resistance**



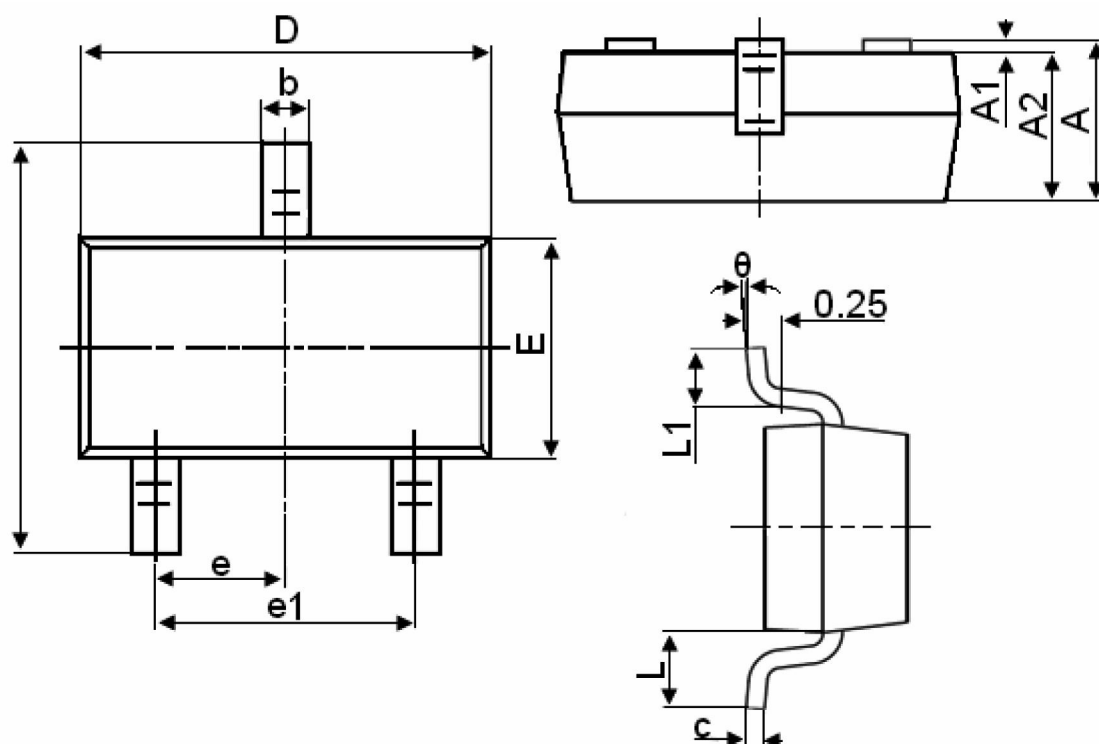
**Figure 8. Safe Operation Area**



**Figure 9. Normalized Maximum Transient Thermal Impedance**



## SOT-23 Package Information



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
$\theta$	0°	8°