P-Channel Enhancement Mode Power MOSFET

Description

The PE20P11S 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

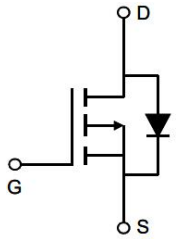
- V_{DS} = -20V, I_D = -11A

  $R_{DS(ON)}$ < 13mΩ @ V_{GS}=-10V
  $R_{DS(ON)}$ < 15mΩ @ V_{GS}=-4.5V
  $R_{DS(ON)}$ < 18mΩ @ V_{GS}=-2.5V

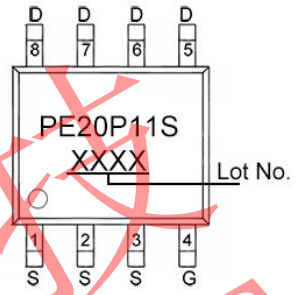
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

Application

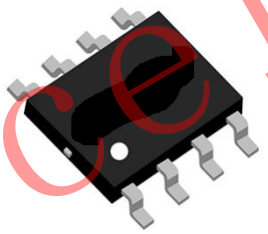
- PWM applications
- Load switch
- Power management



Schematic diagram



Marking and pin assignment



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Absolute Maximum Ratings (TA=25℃ unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	±12	V
Drain Current-Continuous	I_D	-11	A
Drain Current-Continuous (TA=100℃)	I_D	-7.2	A
Pulsed Drain Current (Note 1)	I_{DM}	-33	A
Maximum Power Dissipation	P_D	3.1	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	40	℃/W

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Electrical Characteristics (TA=25℃ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V,I_D=-250μA	-20	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-20V,V_{GS}=0V	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±12V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=-250μA	-0.4	-0.7	-1	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-10V,I_D=-8A	-	9	13	mΩ
		V_{GS}=-4.5V,I_D=-7A	-	10	15	mΩ
		V_{GS}=-2.5V,I_D=-5A	-	13	18	mΩ
sForward Transconductance	g_{FS}	V_{DS}=-5V,I_D=-10A	-	38	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C_{iss}	V_{DS}=-10V,V_{GS}=0V, F=1.0MHz	-	3650	-	pF
Output Capacitance	C_{oss}		-	520	-	pF
Reverse Transfer Capacitance (Note 4)	C_{rss}		-	370	-	pF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-10V,R_L=1Ω, V_{GS}=-10V,R_G=3Ω	-	15	-	nS
Turn-on Rise Time	t_r		-	43	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	158	-	nS
Turn-Off Fall Time	t_f		-	90	-	nS
Total Gate Charge	Q_g	V_{DS}=-10V,I_D=-10A, V_{GS}=-4.5V	-	34	-	nC
Gate-Source Charge	Q_{gs}		-	7	-	nC
Gate-Drain Charge	Q_{gd}		-	9	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=-1A	-	-	-1.2	V
Diode Forward Current (Note 2)	I_S		-	-	-4.5	A

Notes:

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

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Typical Electrical and Thermal Characteristics

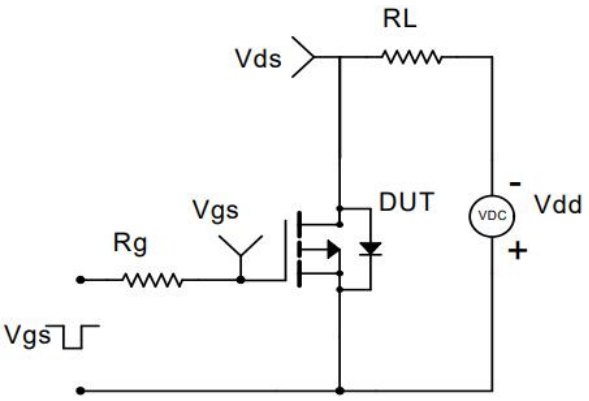

Figure 1 Switching Test Circuit

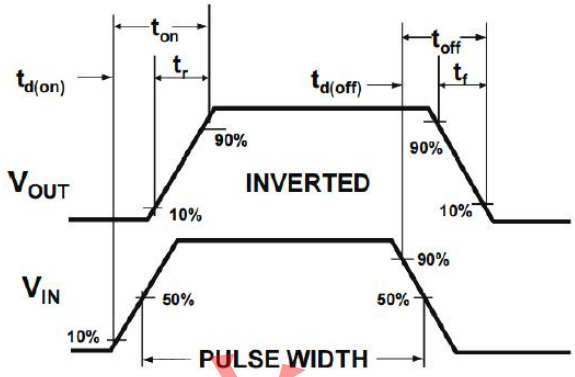

Figure 2 Switching Waveform

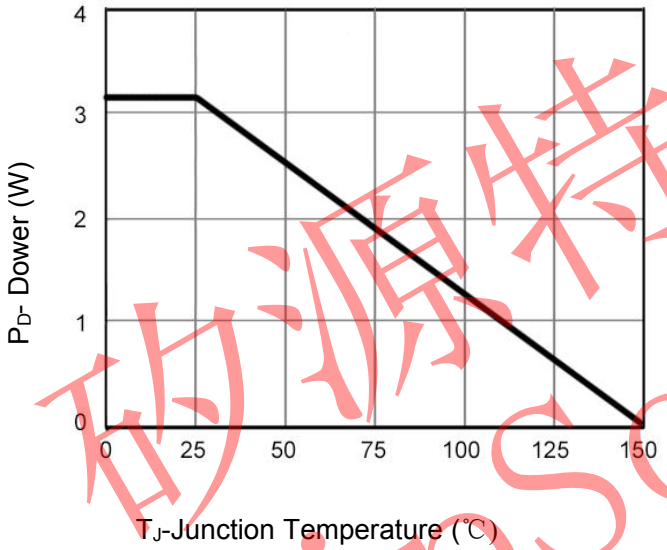

Figure 3 Power De-rating

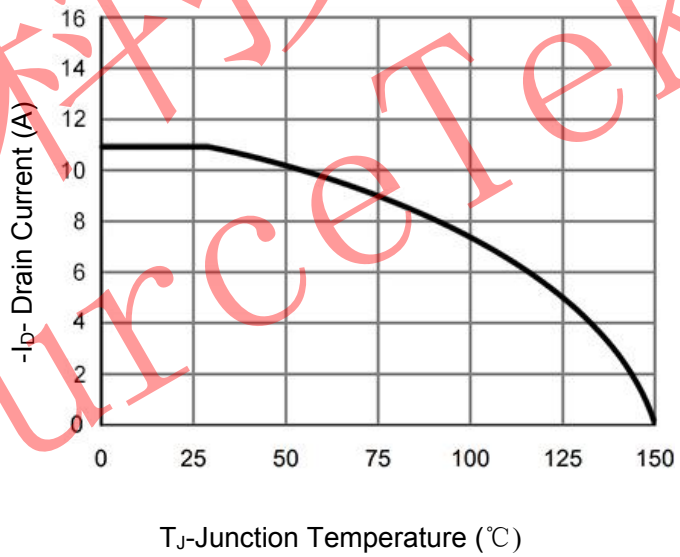

Figure 4 Drain Current

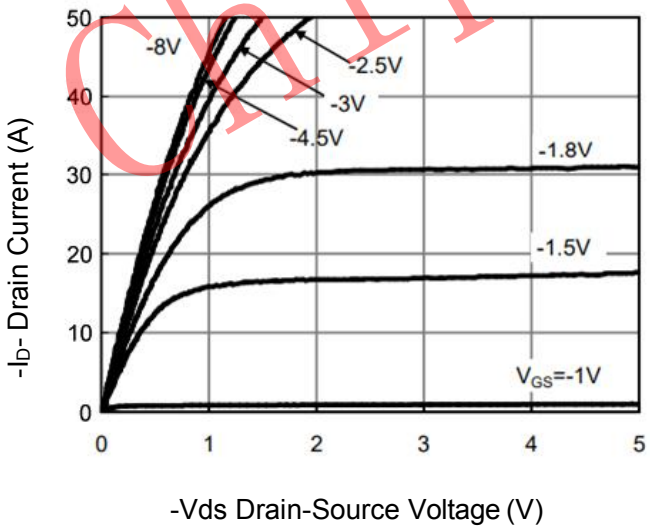

Figure 5 Output Characteristics

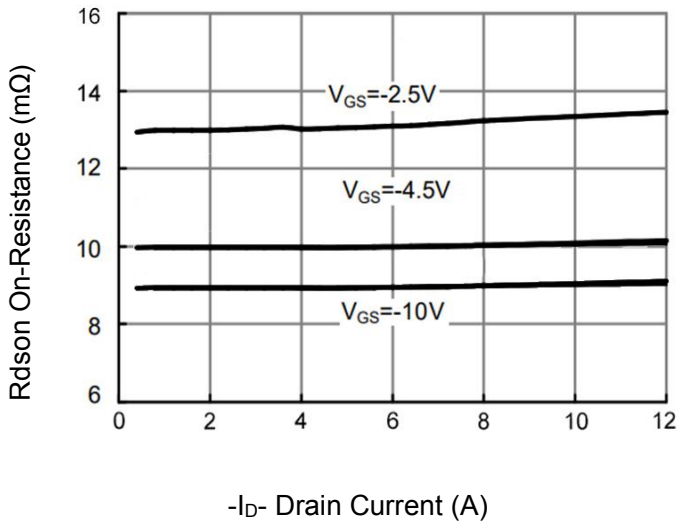

Figure 6 Rdson vs Drain Current

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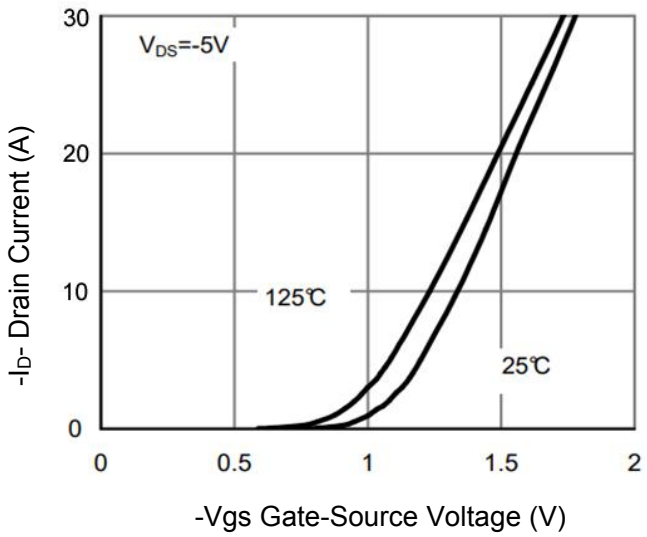

Figure 7 Transfer Characteristics

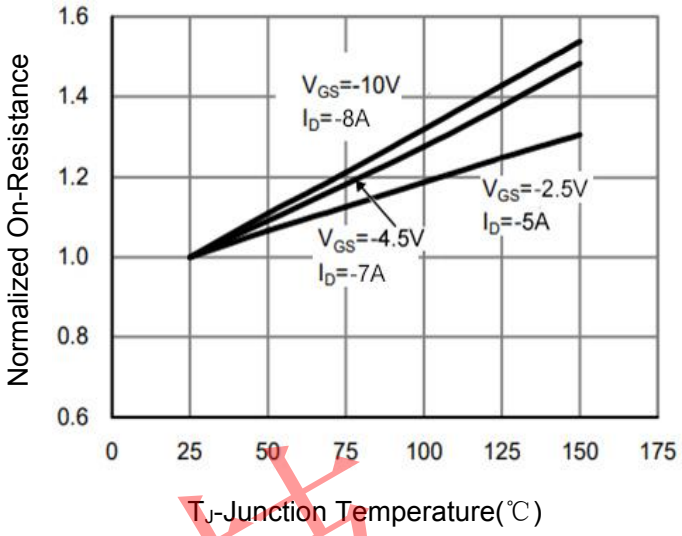

Figure 8 Rdson vs Junction Temperature

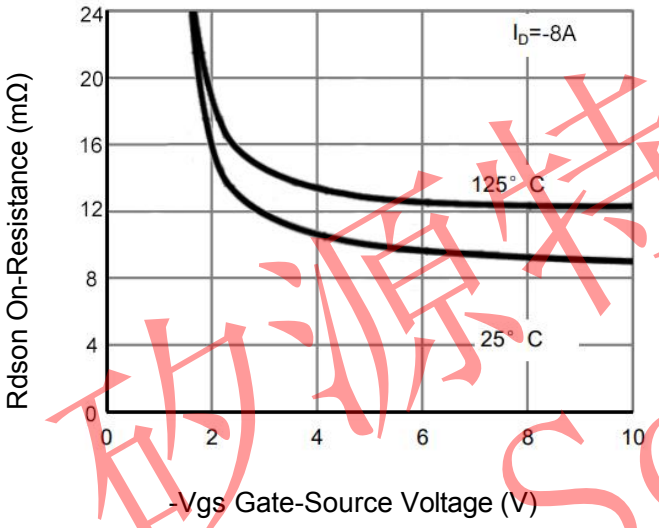

Figure 9 Rdson vs Vgs

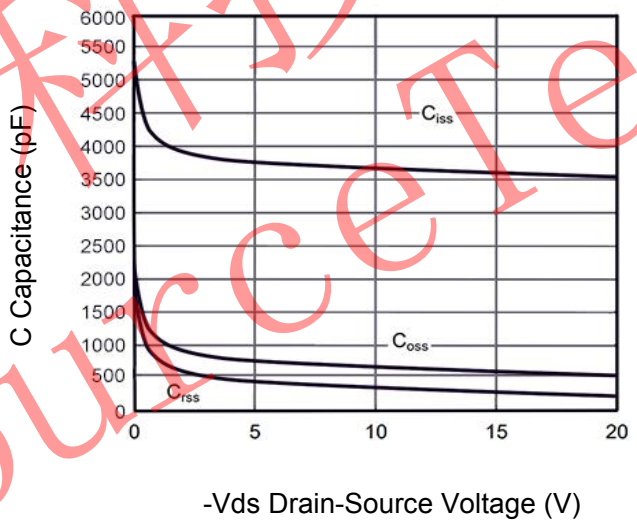

Figure 10 Capacitance vs Vds

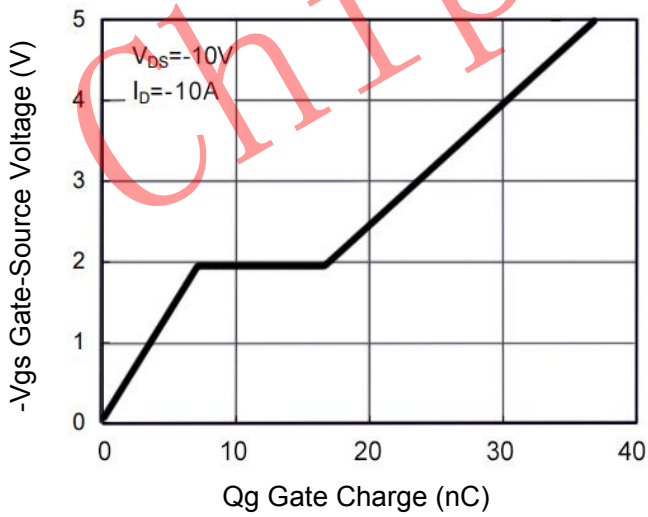

Figure 11 Gate Charge

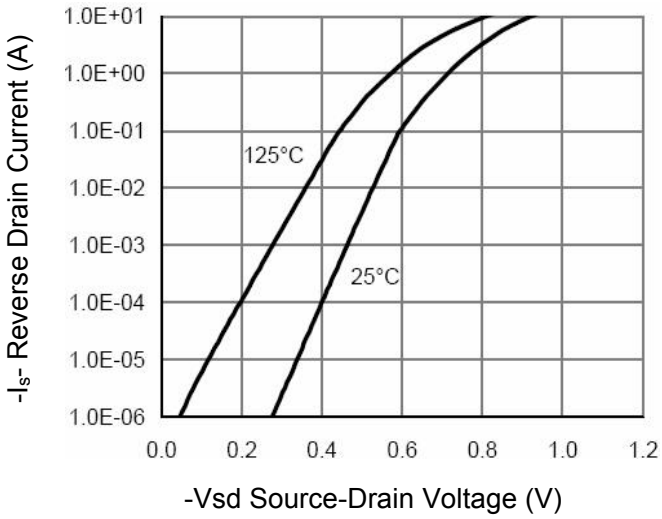

Figure 12 Source- Drain Diode Forward

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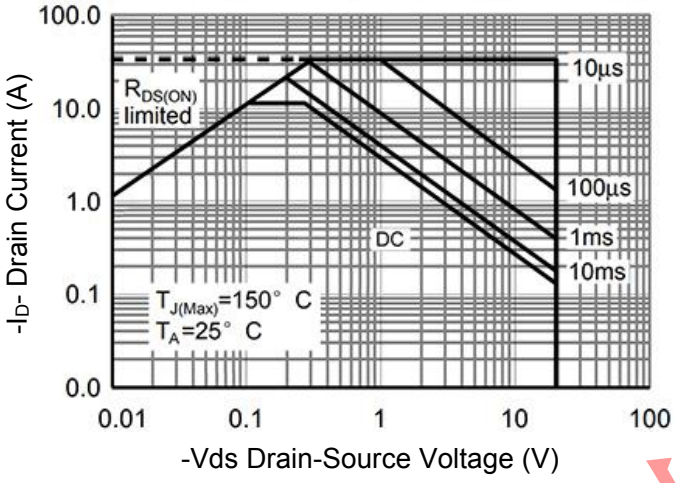

Figure 13 Safe Operation Area

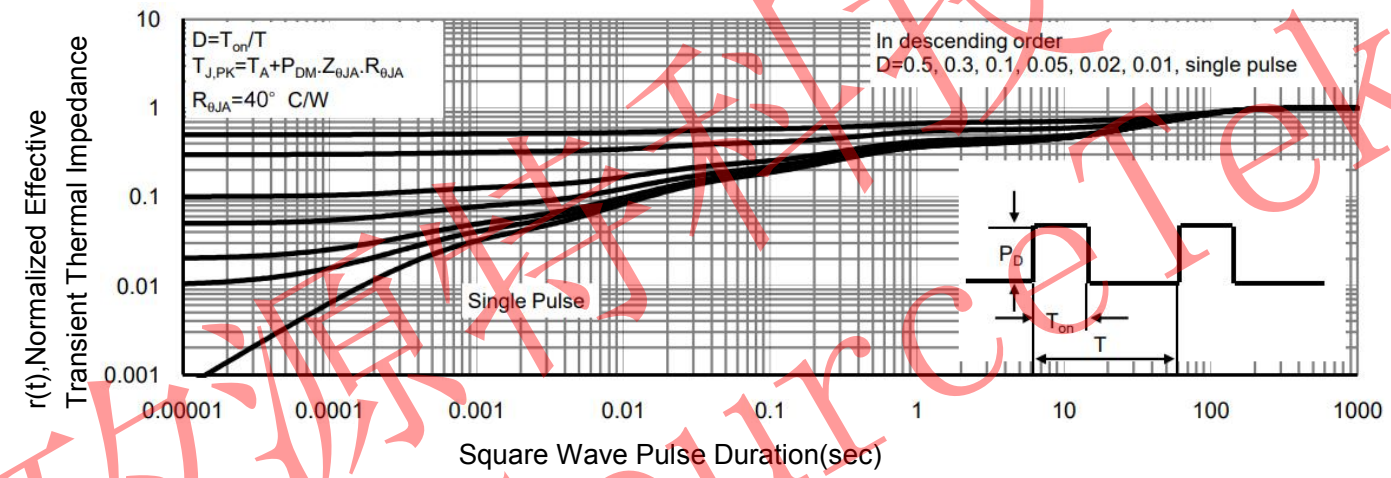

Figure 14 Normalized Maximum Transient Thermal Impedance

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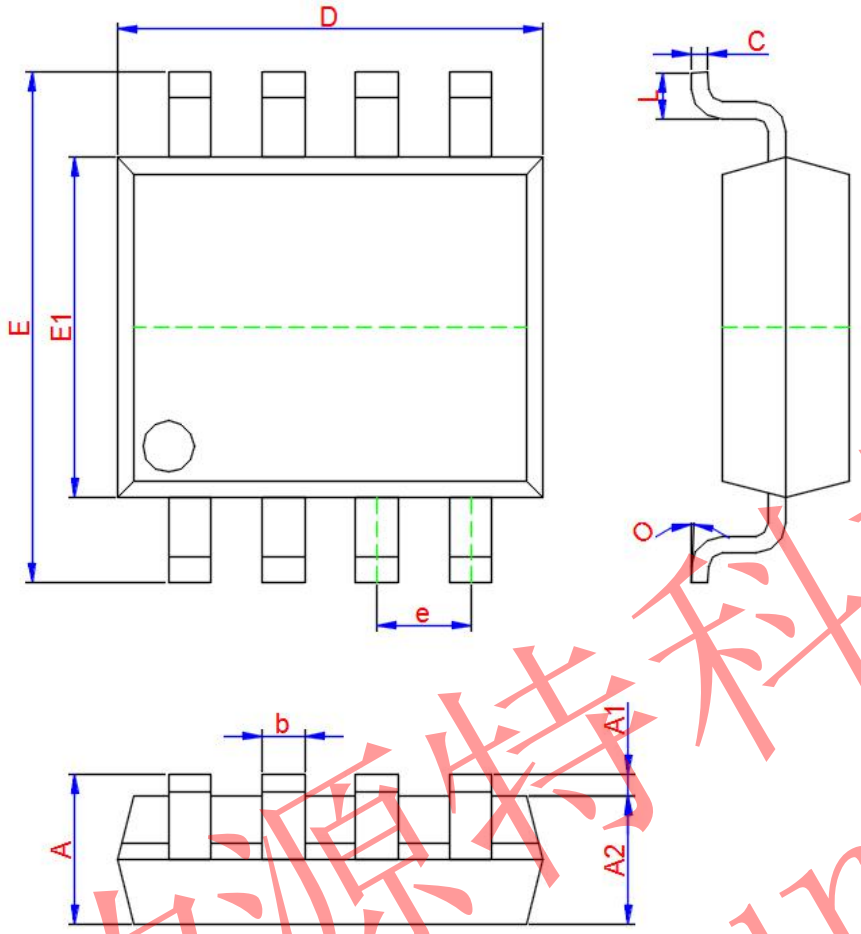
SOP-8 Package Information



Symbol	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	1.350	1.550	1.750
A1	0.100	0.175	0.250
A2	1.350	1.450	1.550
b	0.330	0.420	0.510
c	0.170	0.210	0.250
D	4.700	4.900	5.100
e	1.270 TYP.		
E	5.800	6.000	6.200
E1	3.750	3.900	4.050
L	0.400	0.835	1.270
O	0°	4°	8°

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