



# SPP1013

## P-Channel Enhancement Mode MOSFET

### DESCRIPTION

The SPP1013 is the P-Channel enhancement mode power field effect transistors are produced using high cell density , DMOS trench technology. This high density process is especially tailored to minimize on-state resistance and provide superior switching performance. These devices are particularly suited for low voltage applications such as notebook computer power management and other battery powered circuits where high-side switching , low in-line power loss, and resistance to transients are needed.

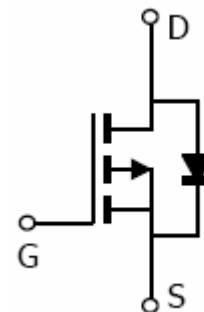
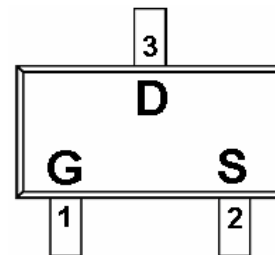
### FEATURES

- ◆ P-Channel
  - 20V/0.45A,  $R_{DS(ON)} = 0.38\Omega @ V_{GS} = -4.5V$
  - 20V/0.35A,  $R_{DS(ON)} = 0.46\Omega @ V_{GS} = -2.5V$
  - 20V/0.25A,  $R_{DS(ON)} = 0.58\Omega @ V_{GS} = -1.8V$
- ◆ Super high density cell design for extremely low  $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ SOT-523 (SC-89) package design

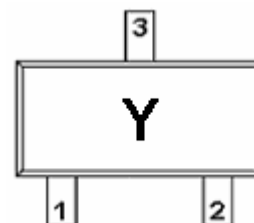
### APPLICATIONS

- Drivers : Relays/Solenoids/Lamps/Hammers
- Power Supply Converter Circuits
- Load/Power Switching Cell Phones, Pagers

### PIN CONFIGURATION( SOT-523 / SC-89 )



### PART MARKING





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### PIN DESCRIPTION

Pin	Symbol	Description
1	G	Gate
2	S	Source
3	D	Drain

### ORDERING INFORMATION

Part Number	Package	Part Marking
SPP1013S52RG	SOT-523	Y

※ SPP1013S52RG : Tape Reel ; Pb – Free

### ABSOLUTE MAXIMUM RATINGS

(TA=25°C Unless otherwise noted)

Parameter	Symbol	Typical	Unit	
Drain-Source Voltage	V <sub>DSS</sub>	-20	V	
Gate –Source Voltage	V <sub>GSS</sub>	±12	V	
Continuous Drain Current(T <sub>J</sub> =150°C)	I <sub>D</sub>	TA=25°C	-0.45	A
		TA=80°C	-0.35	
Pulsed Drain Current	I <sub>DM</sub>	-1.0	A	
Continuous Source Current(Diode Conduction)	I <sub>S</sub>	-0.3	A	
Power Dissipation	P <sub>D</sub>	TA=25°C	0.27	W
		TA=70°C	0.16	
Operating Junction Temperature	T <sub>J</sub>	-55/150	°C	
Storage Temperature Range	T <sub>STG</sub>	-55/150	°C	



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### ELECTRICAL CHARACTERISTICS

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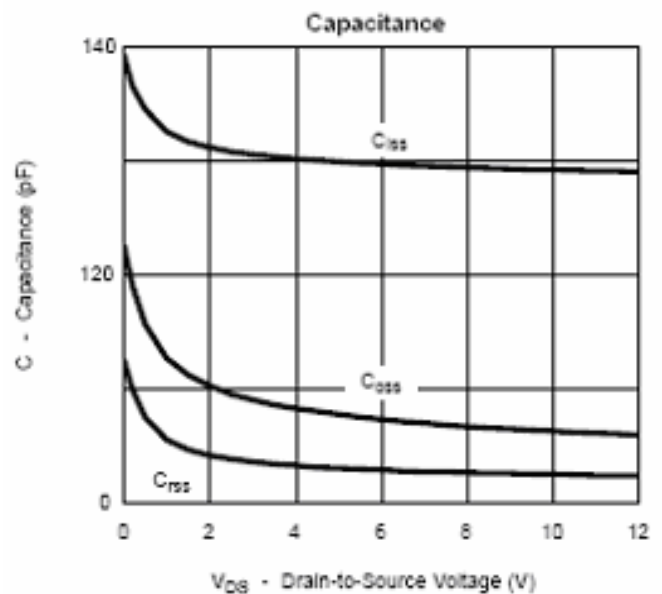
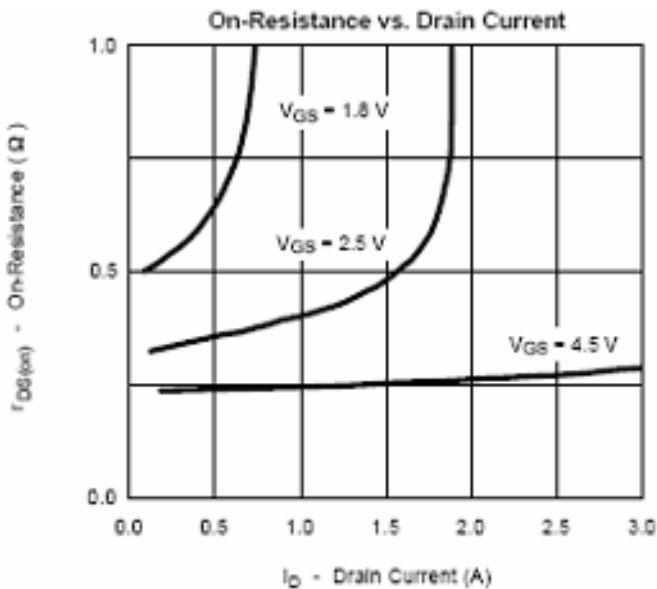
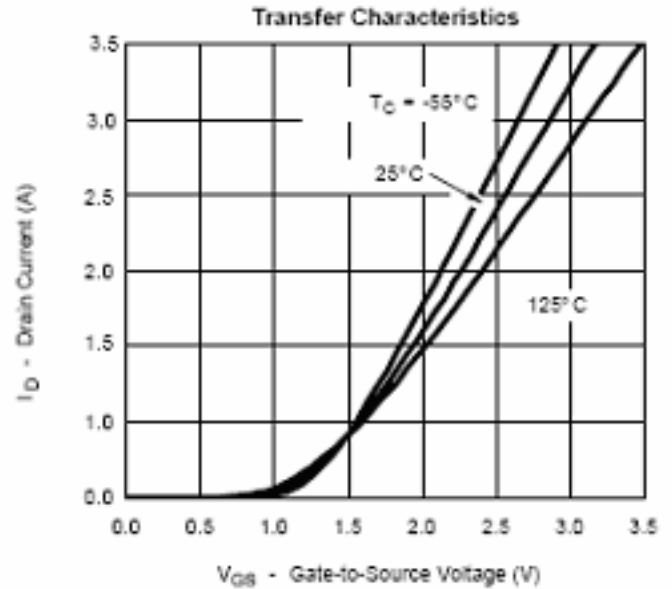
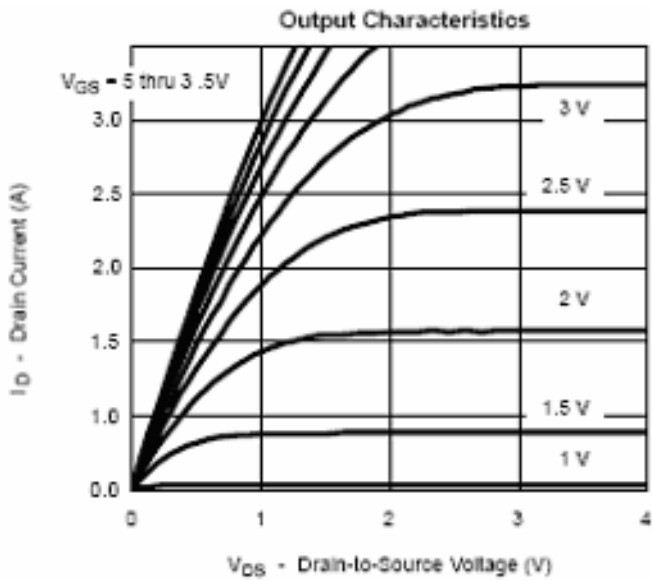
Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-20			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.35		-0.8	
Gate Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 12V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-20V, V_{GS}=0V$			-1	uA
		$V_{DS}=-20V, V_{GS}=0V$ $T_J=55^\circ C$			-5	
On-State Drain Current	$I_{D(on)}$	$V_{DS}\leq -4.5V, V_{GS}=-5V$	-0.7			A
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-0.45A$		0.32	0.38	$\Omega$
		$V_{GS}=-2.5V, I_D=-0.35A$		0.40	0.46	
		$V_{GS}=-1.8V, I_D=-0.25A$		0.50	0.58	
Forward Transconductance	$g_{fs}$	$V_{DS}=-10V, I_D=-0.25A$		0.4		S
Diode Forward Voltage	$V_{SD}$	$I_S=-0.15A, V_{GS}=0V$		-0.8	-1.2	V
<b>Dynamic</b>						
Total Gate Charge	$Q_g$	$V_{DS}=-10V, V_{GS}=-4.5V, I_D=-0.6A$		1.5	2.0	nC
Gate-Source Charge	$Q_{gs}$			0.3		
Gate-Drain Charge	$Q_{gd}$			0.35		
Turn-On Time	$t_{d(on)}$	$V_{DD}=-10V, R_L=10\Omega, I_D=-0.4A$ $V_{GEN}=-4.5V, R_G=6\Omega$		5	10	ns
	$t_r$			15	25	
Turn-Off Time	$t_{d(off)}$			8	15	
	$t_f$			1.4	1.8	



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### TYPICAL CHARACTERISTICS

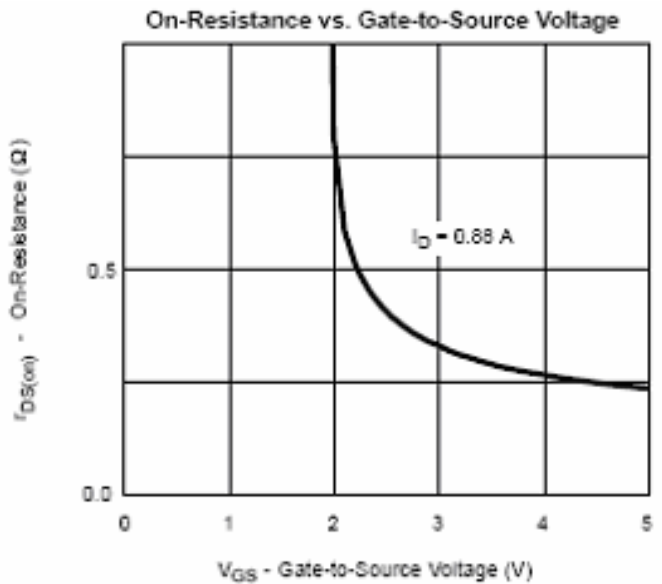
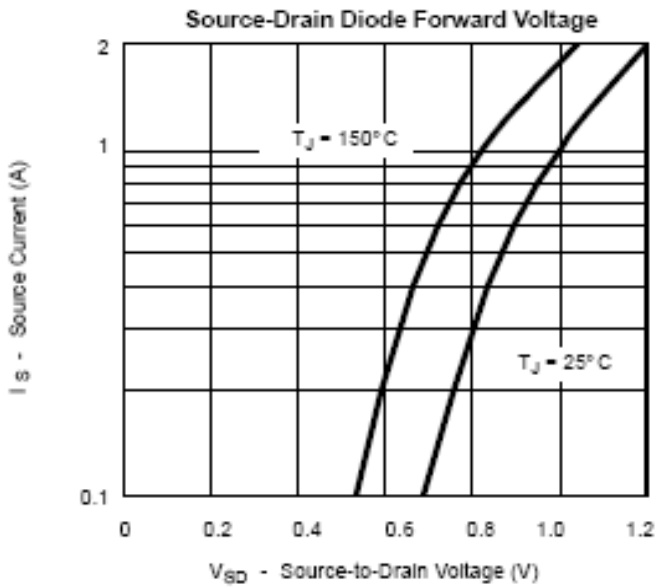
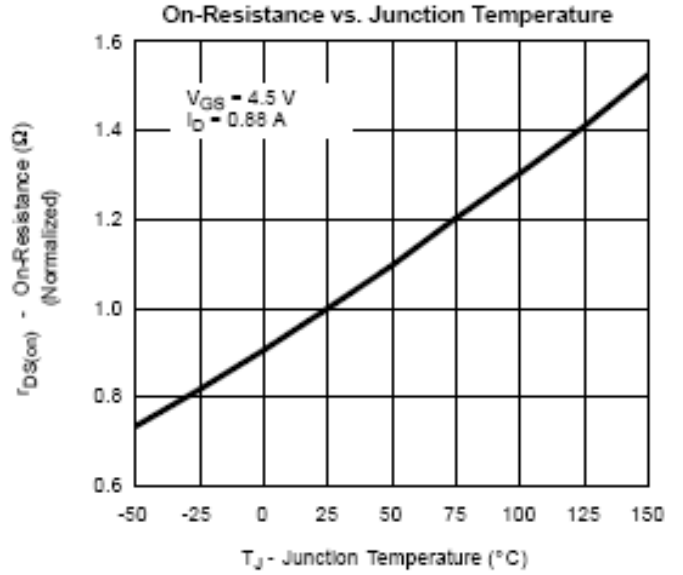
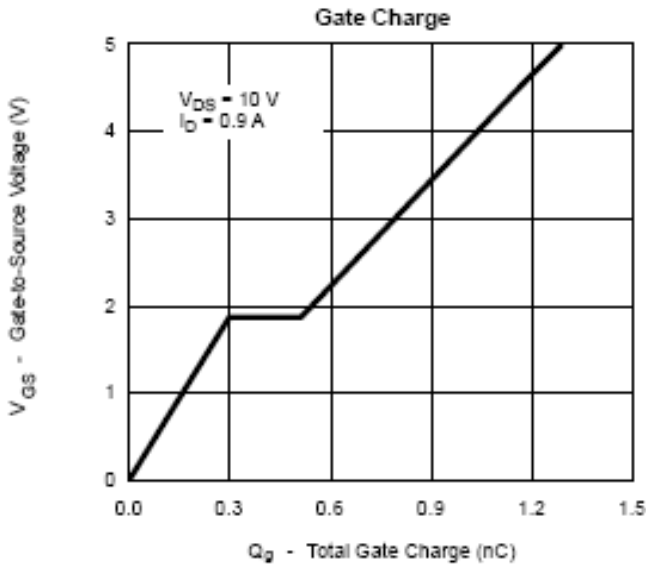




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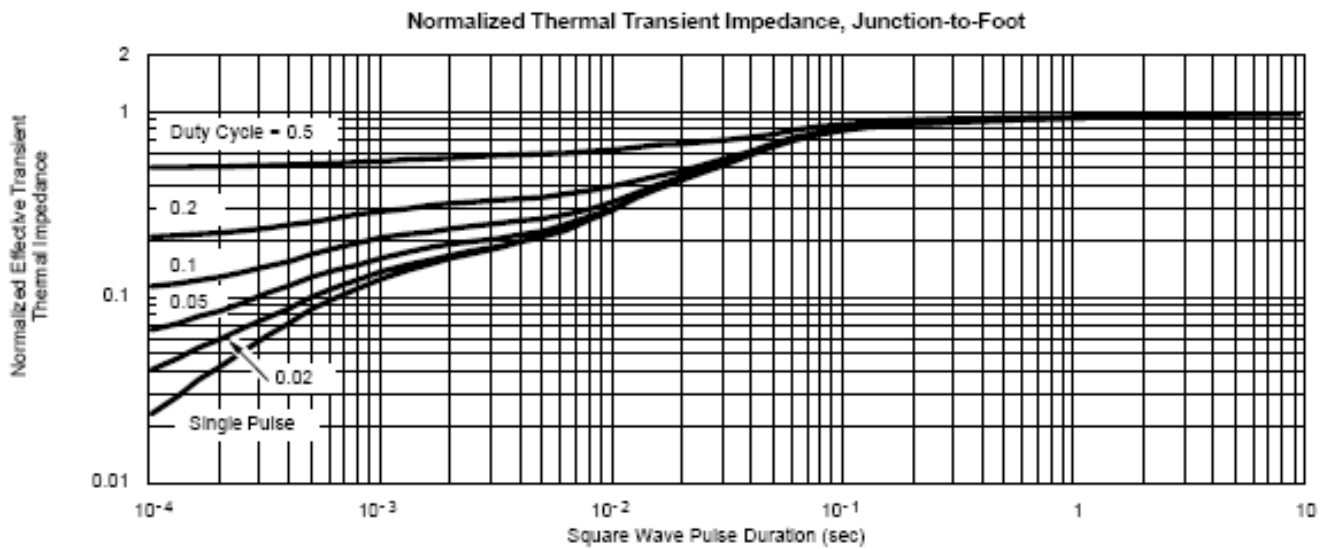
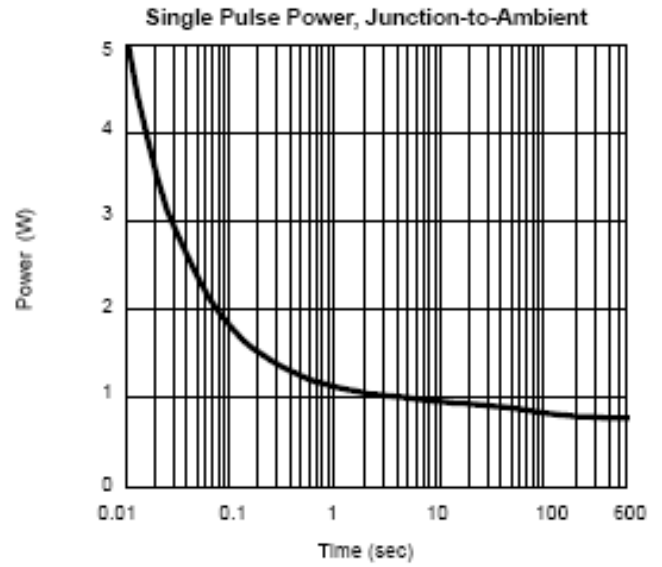
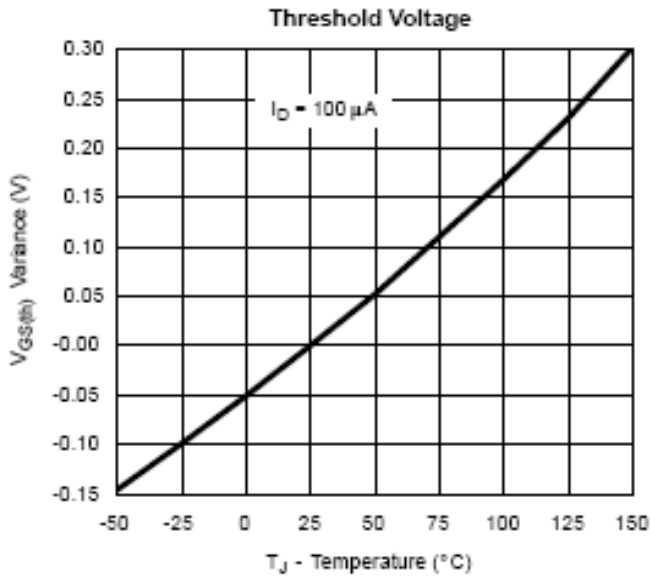




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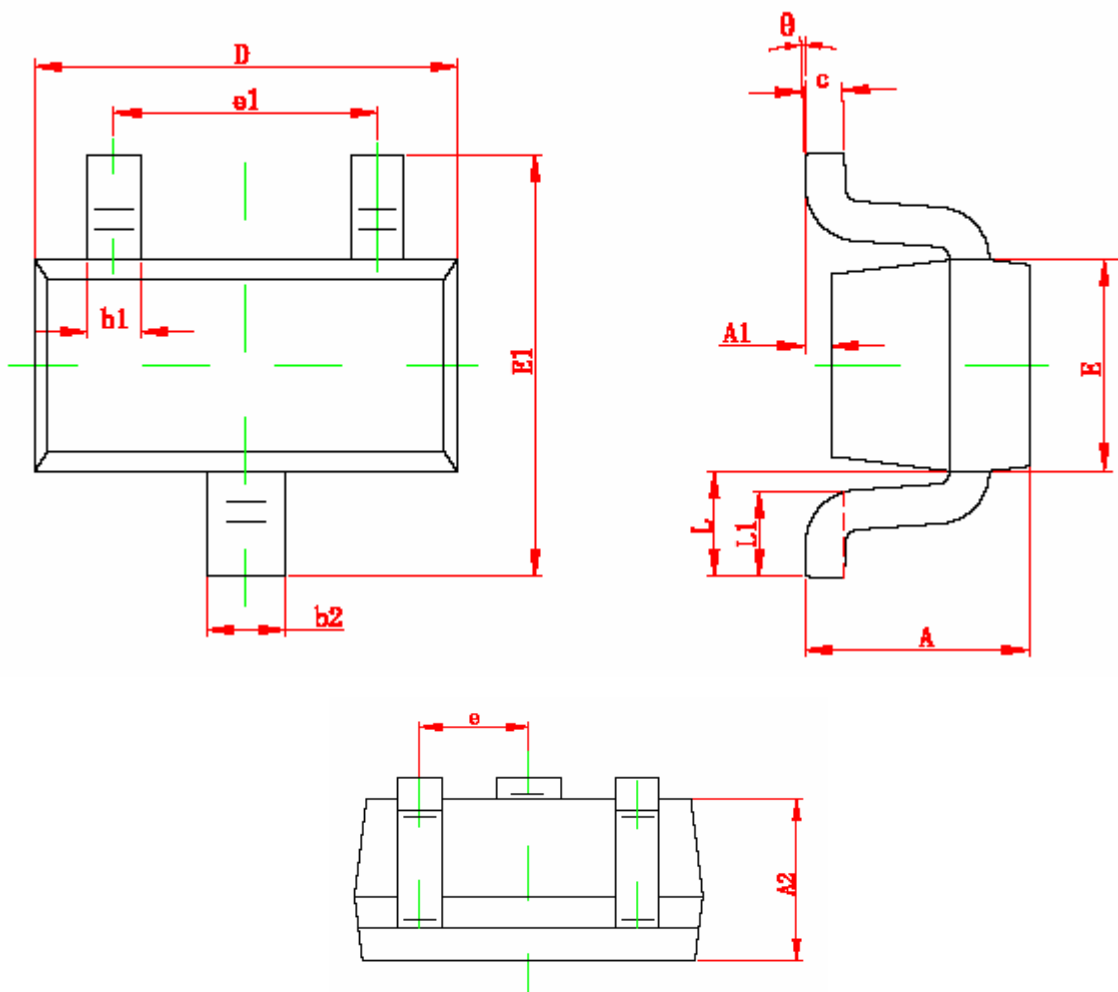




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### SOT-523 PACKAGE OUTLINE



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.700	0.900	0.028	0.035
A1	0.000	0.100	0.000	0.004
A2	0.700	0.800	0.028	0.031
b1	0.150	0.250	0.006	0.010
b2	0.250	0.325	0.010	0.013
c	0.100	0.200	0.004	0.008
D	1.500	1.700	0.059	0.067
E	0.750	0.850	0.030	0.033
E1	1.450	1.750	0.057	0.069
e	0.500 TYP		0.020 TYP	
e1	0.900	1.100	0.035	0.043
L	0.550 REF		0.022 REF	
L1	0.280	0.440	0.011	0.017
$\theta$	0°	4°	0°	4°



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