



# SPP3413

## P-Channel Enhancement Mode MOSFET

### DESCRIPTION

The SPP3413 is the P-Channel logic 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.

These devices are particularly suited for low voltage application such as cellular phone and notebook computer power management and other battery powered circuits where high-side switching , and low in-line power loss are needed in a very small outline surface mount package.

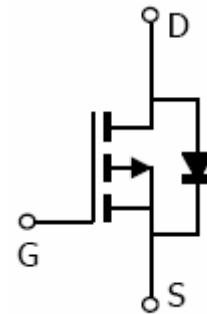
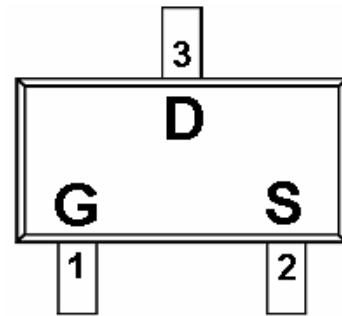
### FEATURES

- ◆ -20V/-3.4A, $R_{DS(ON)}=95m\Omega@V_{GS}=-4.5V$
- ◆ -20V/-2.4A, $R_{DS(ON)}=120m\Omega@V_{GS}=-2.5V$
- ◆ -20V/-1.7A, $R_{DS(ON)}=145m\Omega@V_{GS}=-1.8V$
- ◆ -20V/-1.0A, $R_{DS(ON)}=210m\Omega@V_{GS}=-1.25V$
- ◆ Super high density cell design for extremely low  $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ SOT-23-3L package design

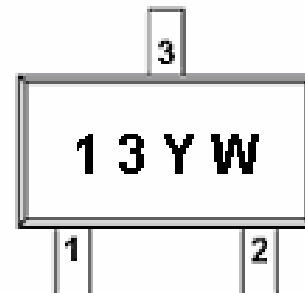
### APPLICATIONS

- Power Management in Note book
- Portable Equipment
- Battery Powered System
- DC/DC Converter
- Load Switch
- DSC
- LCD Display inverter

### PIN CONFIGURATION(SOT-23-3L)



### PART MARKING



Y : Year Code  
W : Week Code



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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
SPP3413S23RG	SOT-23-3L	13YW

※ Week Code : A ~ Z ( 1 ~ 26 ) ; a ~ z ( 27 ~ 52 )

※ SPP3413S23RG : 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	-3.5	A
		TA=70°C	-2.8	
Pulsed Drain Current	I <sub>DM</sub>	-15	A	
Continuous Source Current(Diode Conduction)	I <sub>S</sub>	-1.4	A	
Power Dissipation	P <sub>D</sub>	TA=25°C	1.25	W
		TA=70°C	0.8	
Operating Junction Temperature	T <sub>J</sub>	-55/150	°C	
Storage Temperature Range	T <sub>STG</sub>	-55/150	°C	
Thermal Resistance-Junction to Ambient	R <sub>θJA</sub>	105	°C/W	



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### ELECTRICAL CHARACTERISTICS

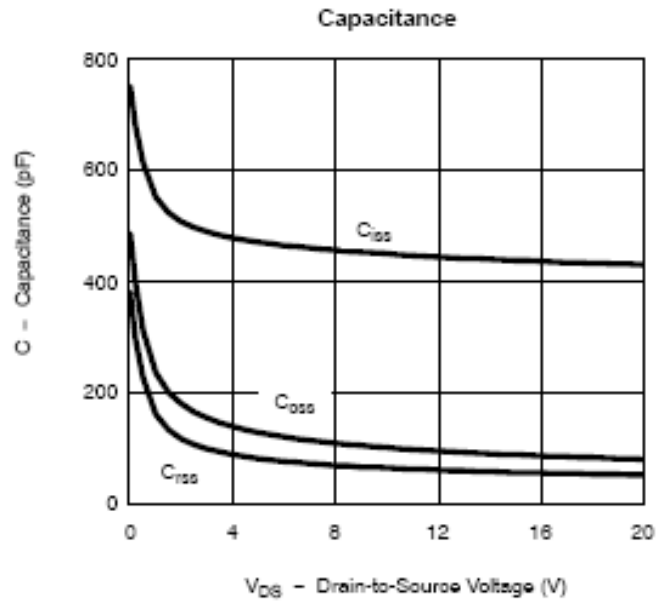
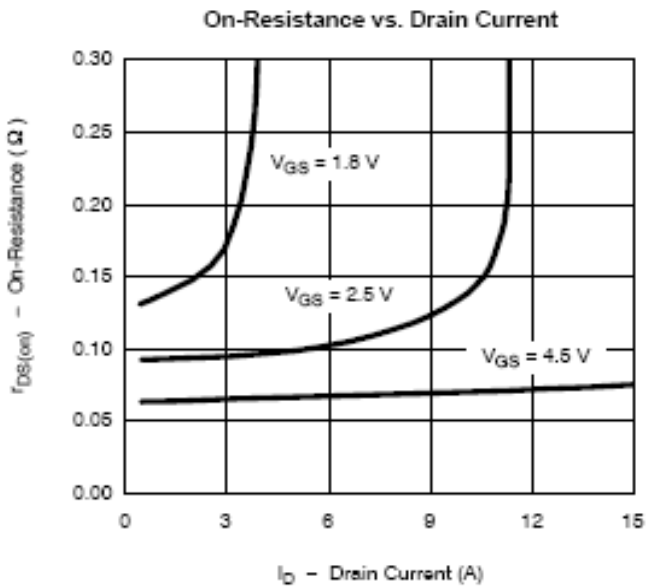
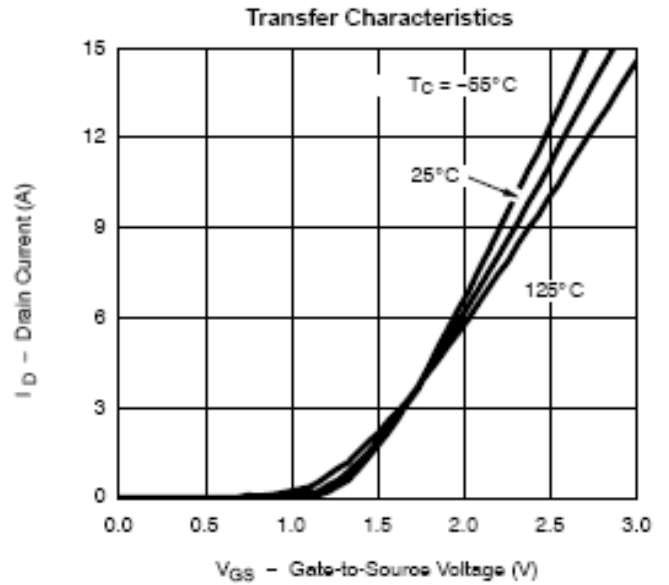
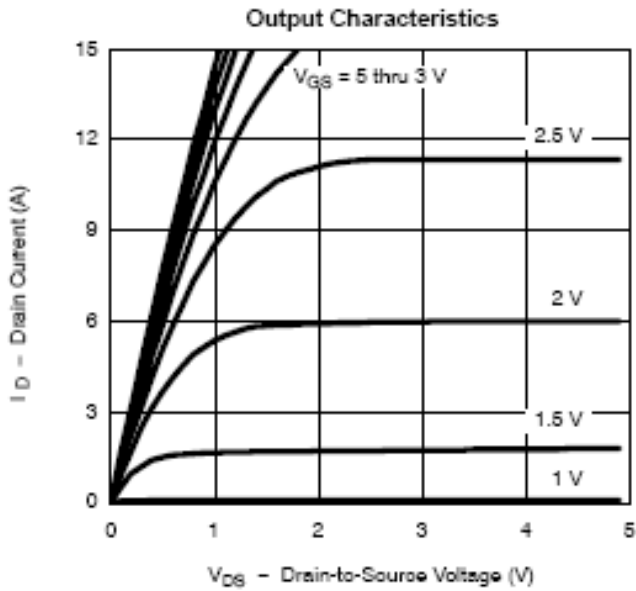
(T<sub>A</sub>=25°C Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA	-20			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250uA	-0.35		-0.8	
Gate Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±12V			±100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V			-1	uA
		V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V T <sub>J</sub> =55°C			-5	
On-State Drain Current	I <sub>D(on)</sub>	V <sub>DS</sub> ≤ -5V, V <sub>GS</sub> =-4.5V	-6			A
Drain-Source On-Resistance	R <sub>DSS(on)</sub>	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-3.4A		0.076	0.095	Ω
		V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-2.4A		0.097	0.120	
		V <sub>GS</sub> =-1.8V, I <sub>D</sub> =-1.7A		0.123	0.145	
		V <sub>GS</sub> =-1.25V, I <sub>D</sub> =-1.0A		0.185	0.210	
Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub> =-5V, I <sub>D</sub> =-2.8A		6		S
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =-1.5A, V <sub>GS</sub> =0V		-0.8	-1.2	V
<b>Dynamic</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =-6V, V <sub>GS</sub> =-4.5V I <sub>D</sub> =-2.8A		4.8	8	nC
Gate-Source Charge	Q <sub>gs</sub>			1.0		
Gate-Drain Charge	Q <sub>gd</sub>			1.0		
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-6V, V <sub>GS</sub> =0V f=1MHz		485		pF
Output Capacitance	C <sub>oss</sub>			85		
Reverse Transfer Capacitance	C <sub>rss</sub>			40		
Turn-On Time	t <sub>d(on)</sub>	V <sub>DD</sub> =-6V, R <sub>L</sub> =6Ω I <sub>D</sub> =-1.0A, V <sub>GEN</sub> =-4.5V R <sub>G</sub> =6Ω		10	16	ns
	t <sub>r</sub>			13	23	
Turn-Off Time	t <sub>d(off)</sub>			18	25	
	t <sub>f</sub>			15	20	



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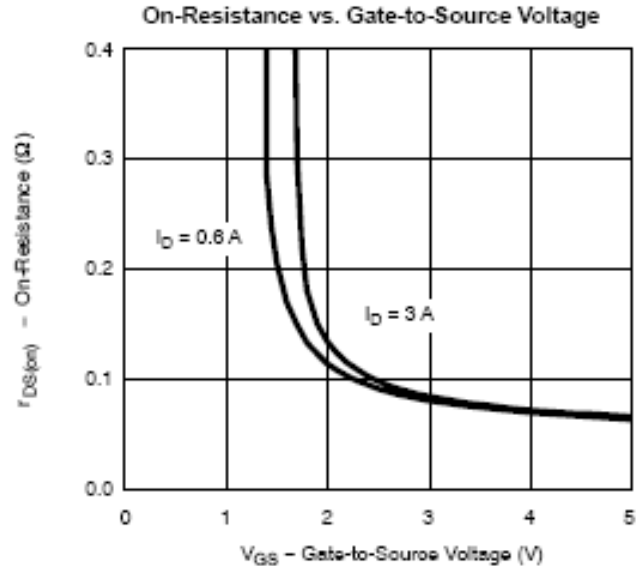
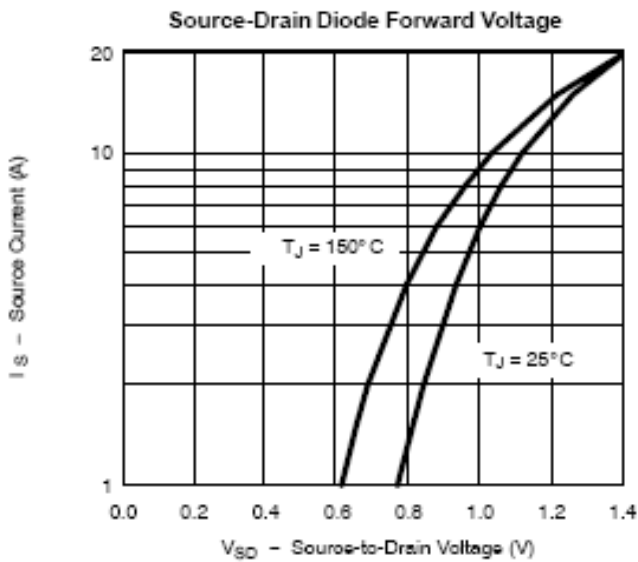
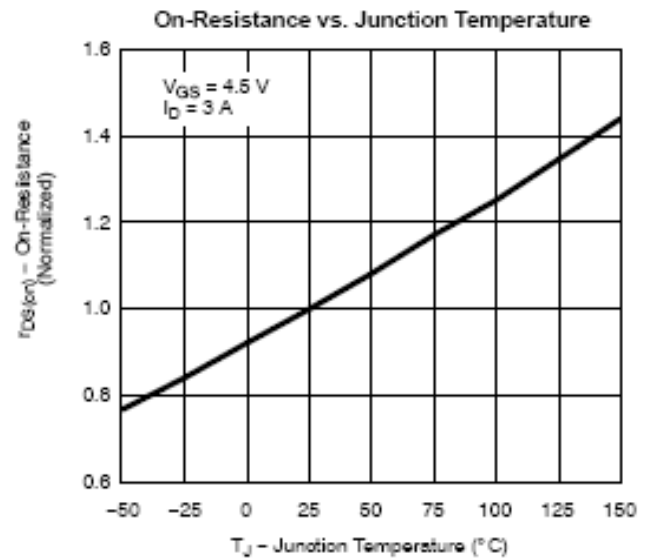
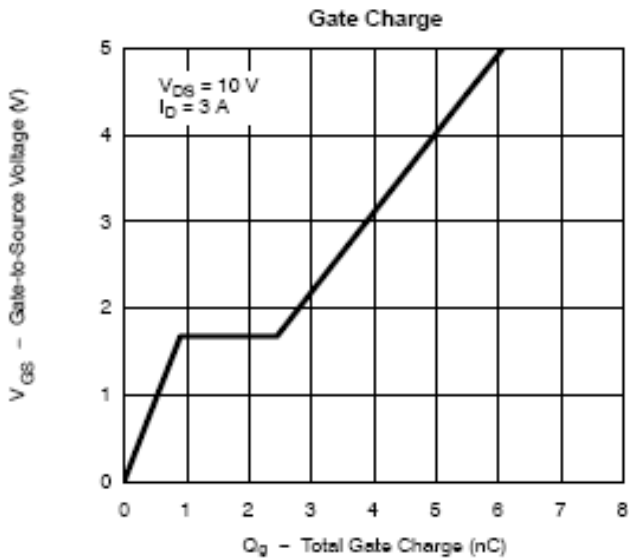
## TYPICAL CHARACTERISTICS





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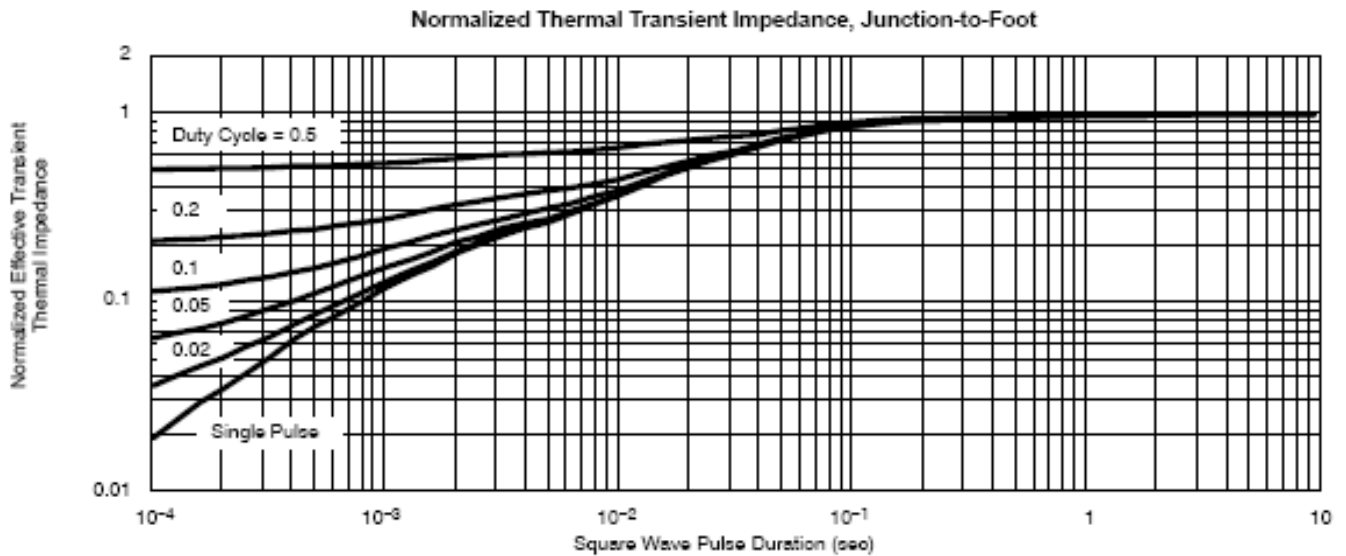
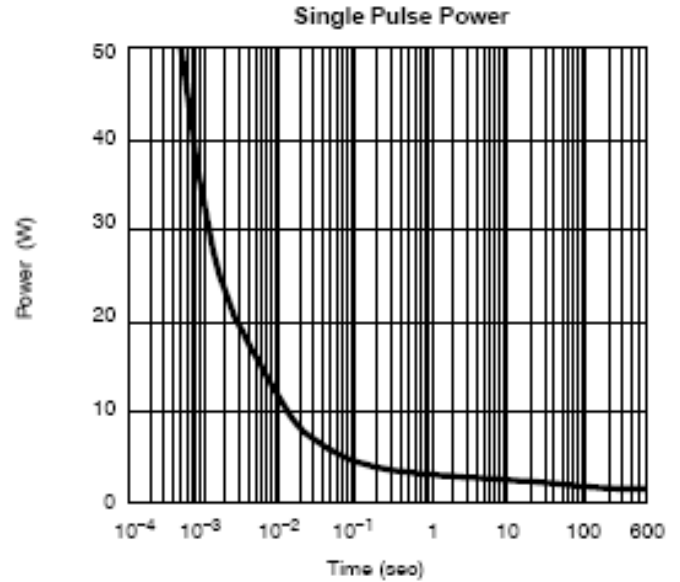
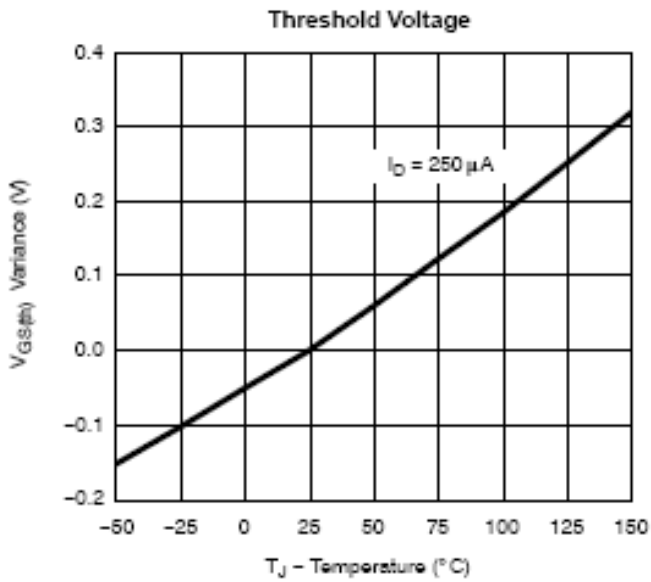
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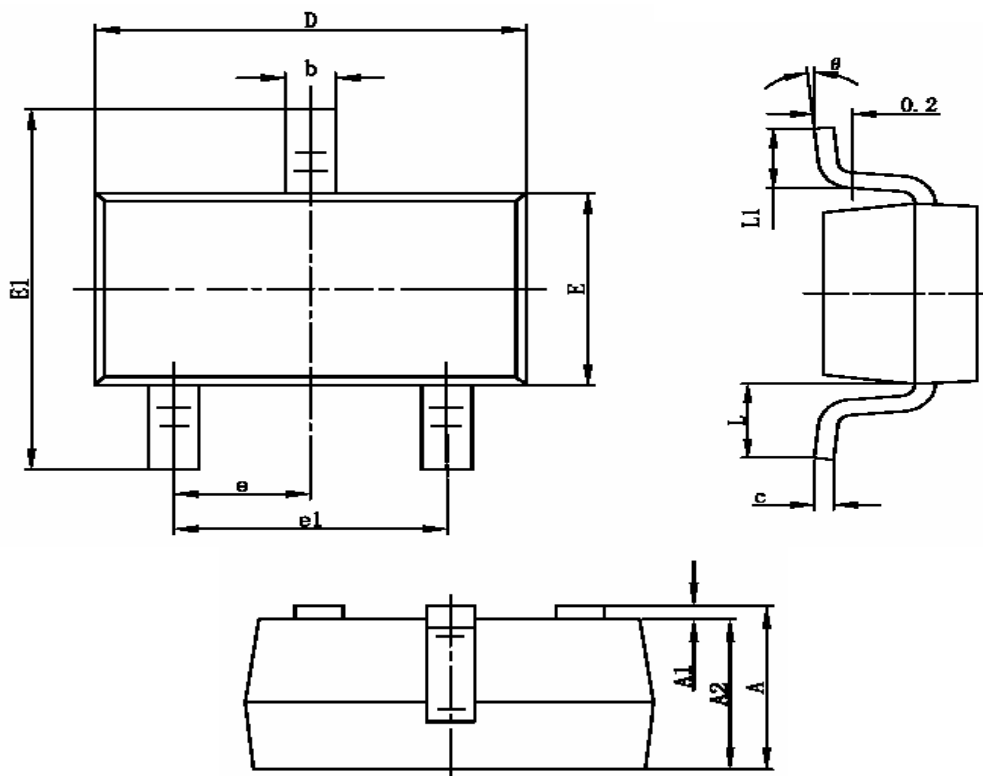




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### SOT-23-3L PACKAGE OUTLINE



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.400	0.012	0.016
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.700REF		0.028REF	
L1	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°



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