Alfa-MOS
Technology

AFN2312A
20V N-Channel
Enhancement Mode MOSFET

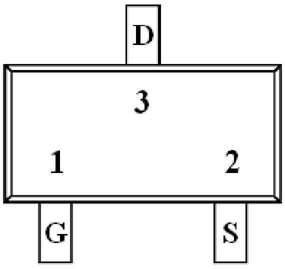
General Description

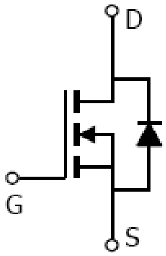
AFN2312A, N-Channel enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent $R_{DS(ON)}$, low gate charge.
These devices are particularly suited for low voltage power management, such as smart phone and notebook computer and other battery powered circuits, and low in-line power loss are needed in commercial industrial surface mount applications.

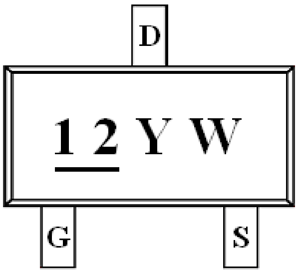
Features

- I_D=4.0A,$R_{DS(ON)}$=25mΩ@V_{GS}=4.5V
- I_D=3.0A,$R_{DS(ON)}$=34mΩ@V_{GS}=2.5V
- I_D=2.0A,$R_{DS(ON)}$=50mΩ@V_{GS}=1.8V
- Super high density cell design for extremely low $R_{DS\ (ON)}$
- Exceptional on-resistance and maximum DC current capability
- SOT-23 package design

Pin Description (SOT-23)







Application

- Portable Equipment
- Battery Powered System
- Net Working System

Pin Define

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

Ordering Information

Part Ordering No.	Part Marking	Package	Unit	Quantity
AFN2312AS23RG	12YW	SOT-23	Tape & Reel	3000 EA

※ 12 parts code
※ Y year code (0 ~ 9)
※ W week code (A ~ Z = 1 ~ 26 / a ~ z = 27 ~ 52)
※ AFN2312AS23RG : 7” Tape & Reel ; Pb- Free ; Halogen –Free

Absolute Maximum Ratings

(T_A=25°C Unless otherwise noted)

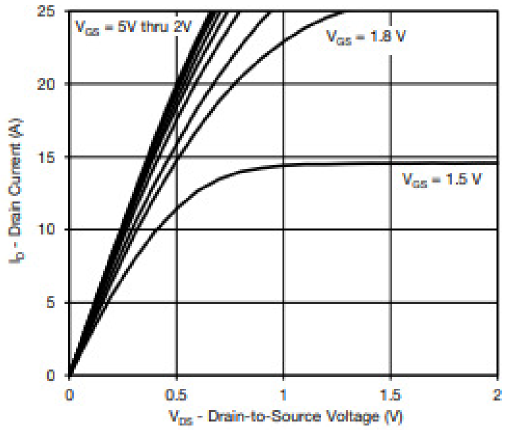
Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	20	V
Gate –Source Voltage		V_{GSS}	±12	V
Continuous Drain Current(T_J=150°C)	Tc =25°C	I_D	6.0	A
	Tc =70°C		5.0	
Pulsed Drain Current		I_{DM}	17	A
Continuous Source Current(Diode Conduction)	Tc =25°C	I_S	1.4	A
Power Dissipation	Tc=25°C	P_D	1.7	W
	Tc=70°C		1.1	
Operating Junction Temperature		T_J	150	°C
Storage Temperature Range		T_{STG}	-55/150	°C
Thermal Resistance-Junction to Ambient		$R_{\theta JA}$	120	°C/W

Electrical Characteristics

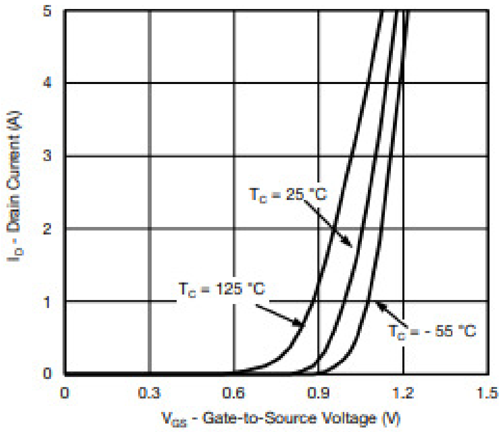
(T_A=25°C Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V,I_D=250uA	20			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250uA	0.4		0.8	
Gate Leakage Current	I_{GSS}	V_{DS}=0V,V_{GS}=±12V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=16V,V_{GS}=0V			1	uA
		V_{DS}=16V,V_{GS}=0V T_J=85°C			10	
On-State Drain Current	$I_{D(on)}$	V_{DS}≧5V,V_{GS}=10V	12			A
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=4.5V,I_D=4.0A		19	25	mΩ
		V_{GS}=2.5V,I_D=3.0A		26	34	
		V_{GS}=1.8V,I_D=2.0A		38	50	
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=2.8A		10		S
Diode Forward Voltage	V_{SD}	I_S=1.6A,V_{GS}=0V		0.85	1.2	V
Dynamic						
Total Gate Charge	Q_g	V_{DS}=10V,V_{GS}=4.5V I_D≡4.5A		7.7	12	nC
Gate-Source Charge	Q_{gs}			1.0		
Gate-Drain Charge	Q_{gd}			1.0		
Input Capacitance	C_{iss}	V_{DS}=10V,V_{GS}=0V f=1MHz		735		pF
Output Capacitance	C_{oss}			110		
Reverse Transfer Capacitance	C_{rss}			40		
Turn-On Time	$t_{d(on)}$	V_{DD}=10V,R_L=2.8Ω I_D≡3.6A,V_{GEN}=4.5V R_G=1Ω		10	20	ns
	t_r			20	40	
Turn-Off Time	$t_{d(off)}$			15	30	
	t_f			10	20	

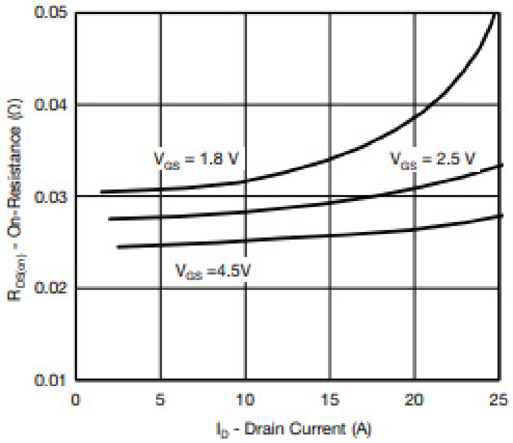
Typical Characteristics



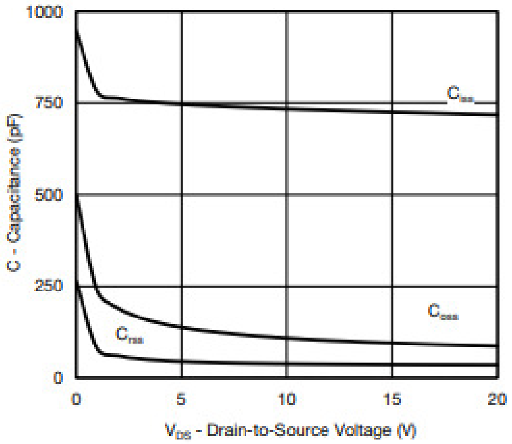
Output Characteristics



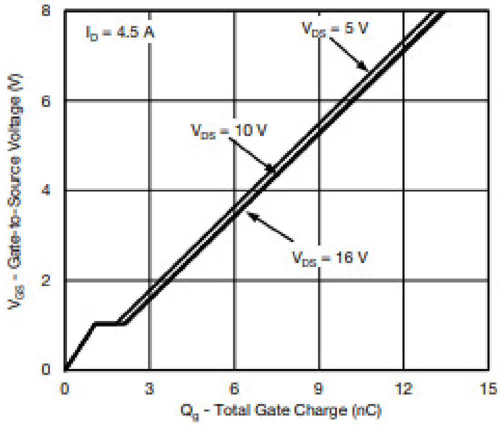
Transfer Characteristics



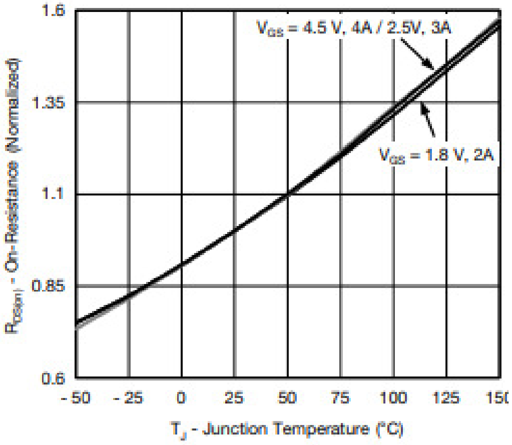
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

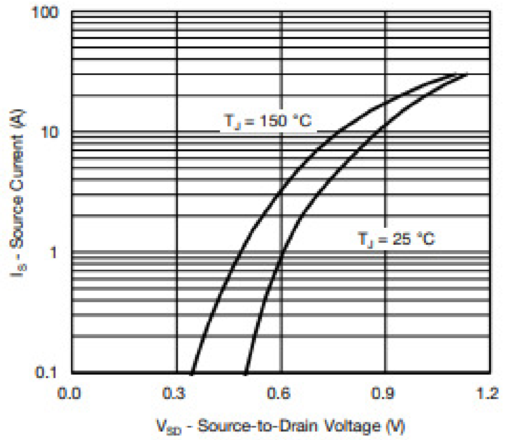


Gate Charge

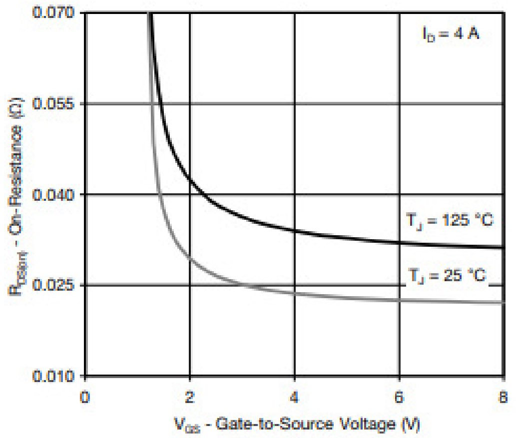


On-Resistance vs. Junction Temperature

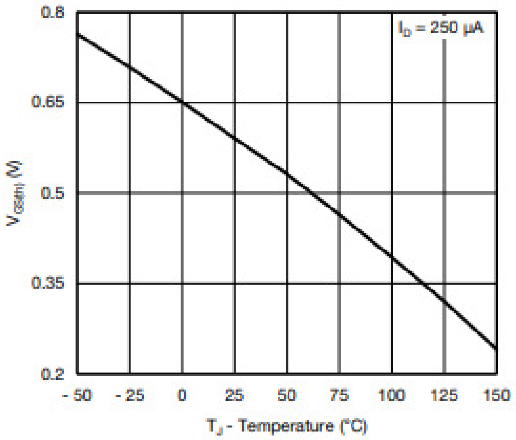
Typical Characteristics



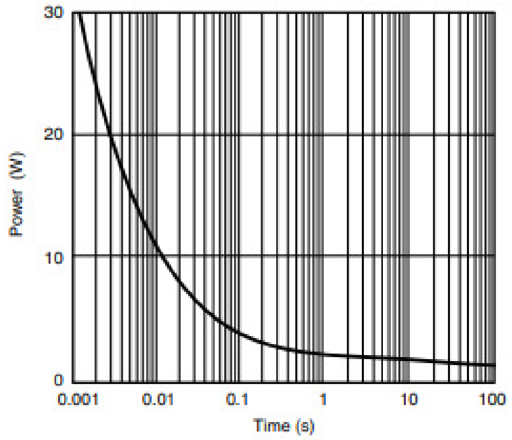
Source-Drain Diode Forward Voltage



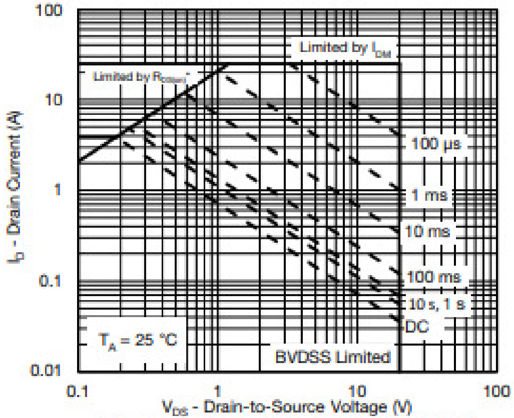
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

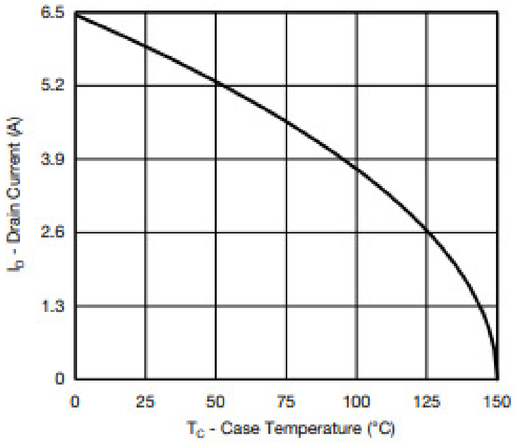


Single Pulse Power (Junction-to-Ambient)



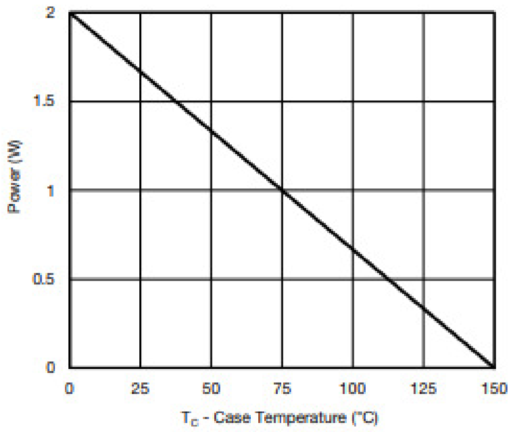
* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient

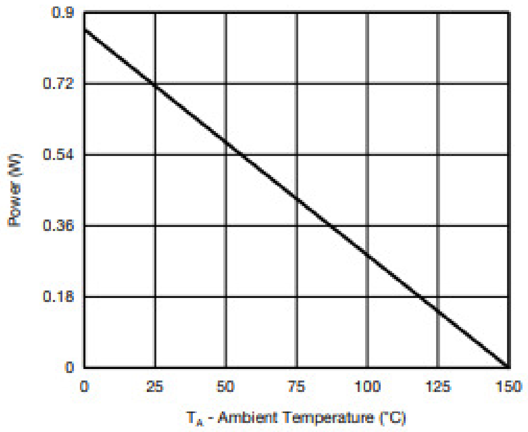


Current Derating*

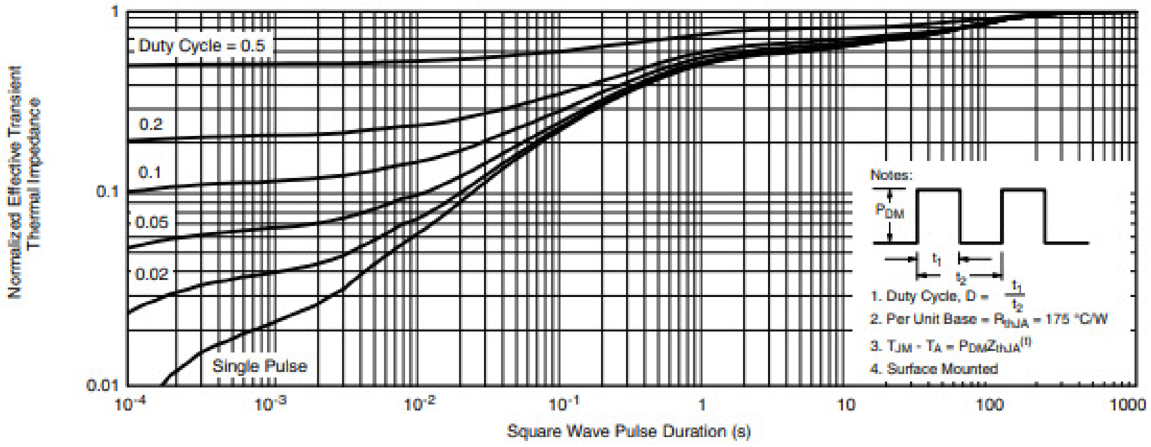
Typical Characteristics



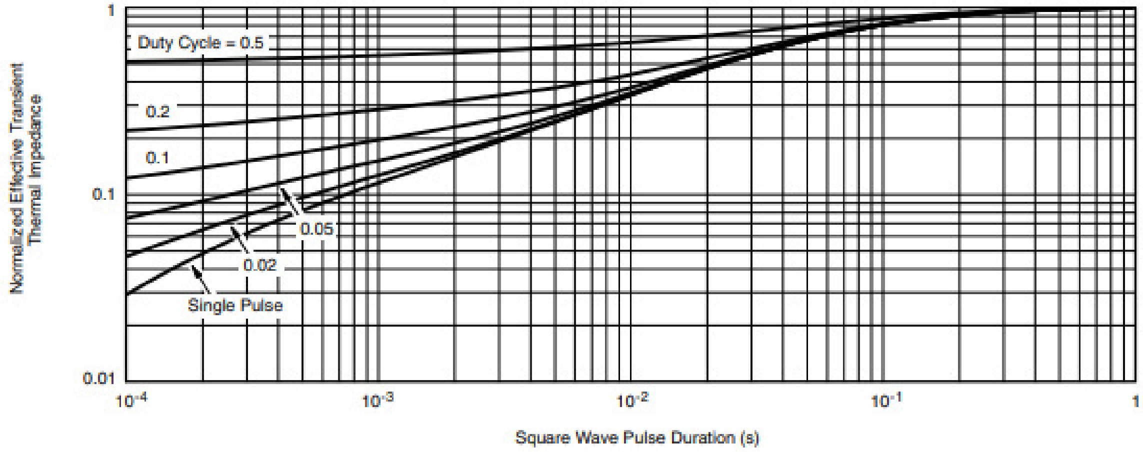
Power Junction-to-Foot



Power Junction-to-Ambient



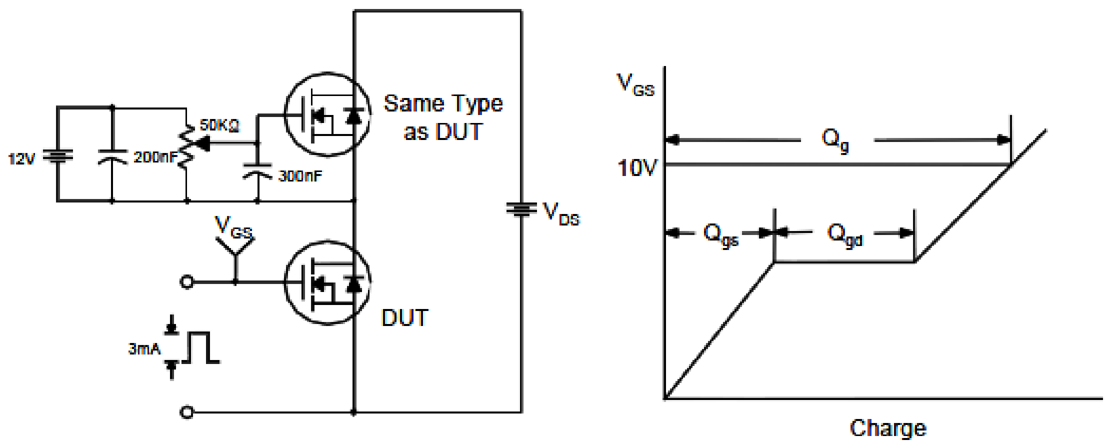
Normalized Thermal Transient Impedance, Junction-to-Ambient



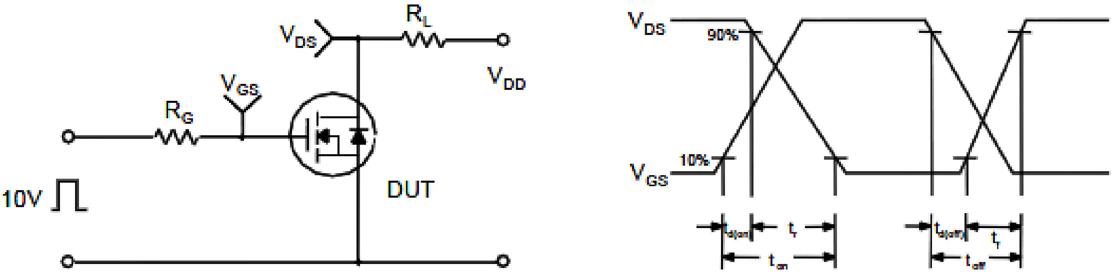
Normalized Thermal Transient Impedance, Junction-to-Foot

Typical Characteristics

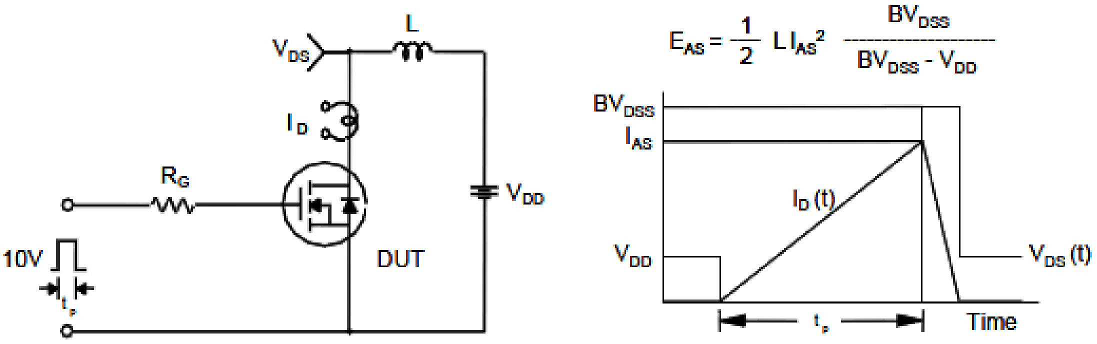
Gate Charge Test Circuit & Waveform



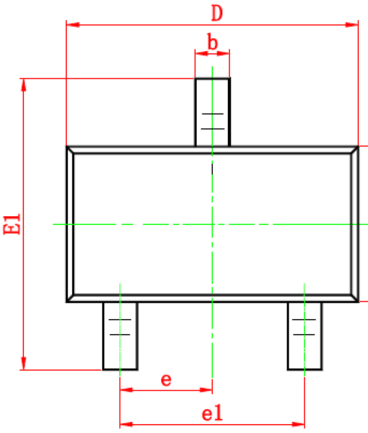
Resistive Switching Test Circuit & Waveforms

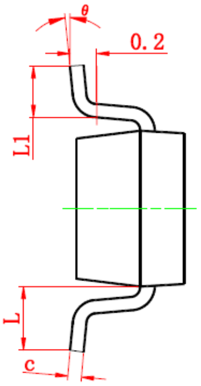


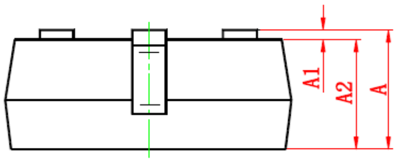
Unclamped Inductive Switching Test Circuit & Waveforms



Package Information (SOT-23)







Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.200	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.100	0.035	0.039
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	6°

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