0.3A 100KHz 100V Buck DC to DC Converter XL7045

Features

- Operating Voltage: 10V~80V
- Output Adjustable from 1.25V to 20V
- Maximum Duty Cycle 100%
- Minimum Drop Out 1V
- Fixed 100KHz Switching Frequency
- Max. IOUT=0.3A at VOUT=5V
- Max. IOUT=0.2A at VOUT=12V or 15V
- Internal Optimize HV Power Transistor
- High efficiency up to 84%
- Excellent line and load regulation
- Built in thermal shutdown function
- Built in current limit function
- Built in output short Protection Function
- SOP8-EP (Exposed PAD) package

Applications

- Ebike Controller Power Supply
- Telecom / Networking Equipment

General Description

The XL7045 is a 100KHz fixed frequency PWM buck (step-down) DC/DC converter, capable of driving a 0.3A load with high efficiency, low ripple and excellent line and load regulation. Requiring a minimum number of external components, the regulator is simple to use and include internal frequency compensation and a fixed-frequency oscillator.

The PWM control circuit is able to adjust the duty ratio linearly from 0 to 100%. An enable function, an over current protection function is built inside. When output short protection function happens, the operation frequency will be reduced from 100KHz to 15KHz. An internal compensation block is built in to minimize external component count.

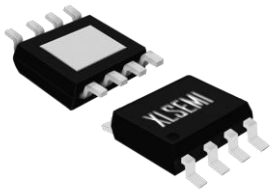


Figure1. Package Type of XL7045

Pin Configurations

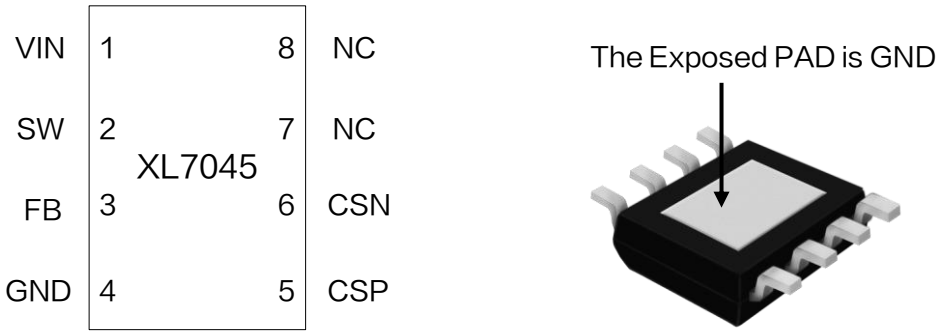


Figure2. Pin Configuration of XL7045

Table 1 Pin Description

Pin Number	Pin Name	Description
1	VIN	Supply Voltage Input Pin. Bypass Vin to GND with a suitably large capacitor to eliminate noise on the input.
2	SW	Power Switch Output Pin (SW). Output is the switch node that supplies power to the output.
3	FB	Feedback Pin (FB). Through an external resistor divider network, Feedback senses the output voltage and regulates it. The feedback threshold voltage is 1.25V.
4	GND	Ground Pin. Care must be taken in layout. This pin should be placed outside of the Schottky Diode to output capacitor ground path to prevent switching current spikes from inducing voltage noise into XL7045. The exposed PAD is GND.
5	CSP	Current Sense Positive Terminal Pin.
6	CSN	Current Sense Negative Terminal Pin.
7~8	NC	No Connected.

Function Block

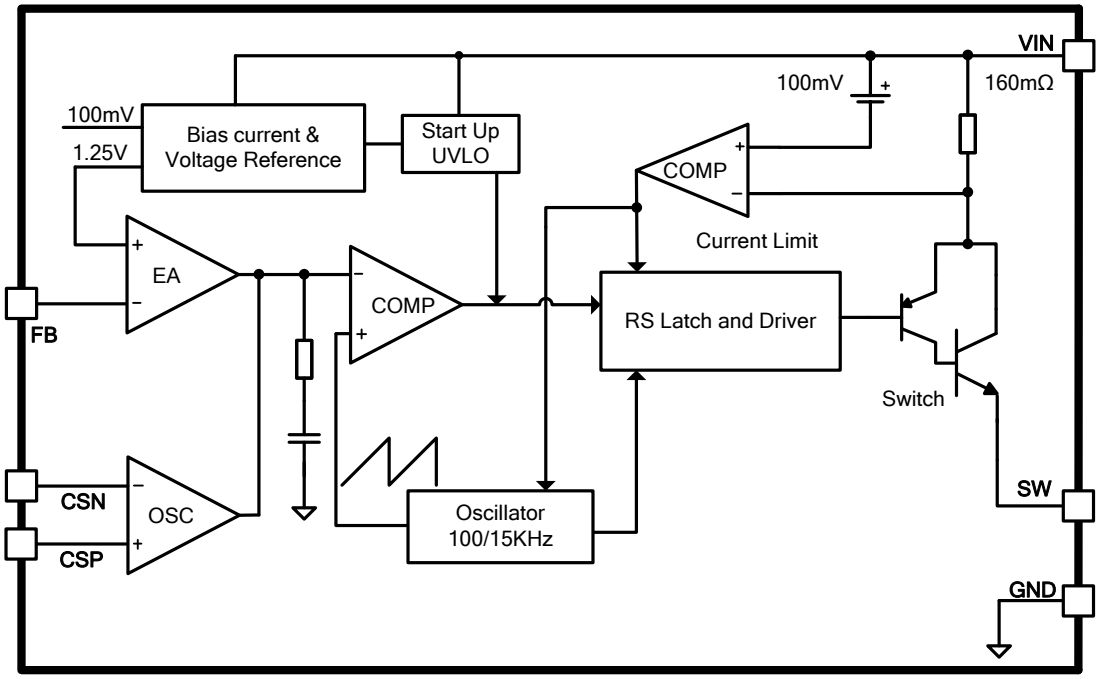


Figure3. Function Block Diagram of XL7045

Typical Application Circuit

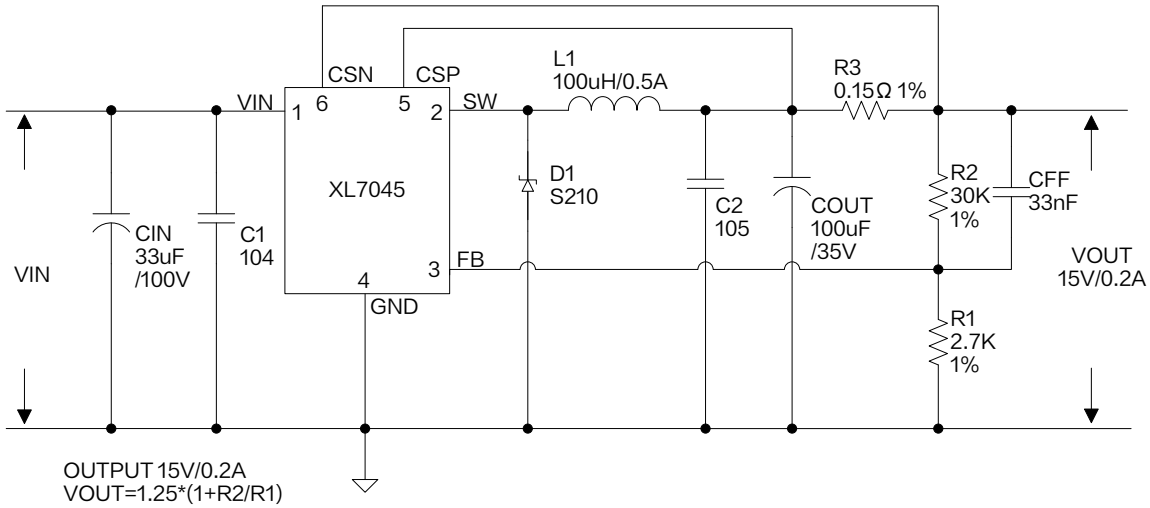


Figure4. XL7045 Typical Application Circuit

Ordering Information

Order Information	Marking ID	Package Type	Eco Plan	Packing Type Supplied As
XL7045E1	XL7045E1	SOP8-EP	RoHS & HF	4000 Units on Tape & Reel

Absolute Maximum Ratings（Note1）

Parameter	Symbol	Value	Unit
Input Voltage	Vin	-0.3 to 100	V
Feedback Pin Voltage	V_{FB}	-0.3 to Vin	V
Output Switch Pin Voltage	V_{SW}	-0.3 to Vin	V
CSP Pin Voltage	V_{CSP}	-0.3 to 20	V
CSN Pin Voltage	V_{CSN}	-0.3 to 20	V
Power Dissipation	P_D	Internally limited	mW
Thermal Resistance (SOP8-EP) (Junction to Ambient, No Heatsink, Free Air)	R_{JA}	60	°C/W
Maximum Junction Temperature	T_J	-40 to 150	°C
Operating Junction Temperature	T_J	-40 to 125	°C
Storage Temperature	T_{STG}	-65 to 150	°C
Lead Temperature (Soldering, 10 sec)	T_{LEAD}	260	°C

Note1: Stresses greater than those listed under Maximum Ratings may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operation is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

XL7045 Electrical Characteristics

T_a = 25℃;unless otherwise specified.

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
System parameters test circuit figure4						
VFB	FB Voltage	Vin =20V to 80V, Vout=15V Iload=0.1A to 0.2A	1.225	1.25	1.275	V
η	Efficiency	Vin=36V ,Vout=15V Iout=0.2A	–	84	–	%
η	Efficiency	Vin=48V ,Vout=15V Iout=0.2A	–	81	–	%
η	Efficiency	Vin=60V ,Vout=15V Iout=0.2A	–	77	–	%

Electrical Characteristics (DC Parameters)

Vin = 48V, GND=0V, Vin & GND parallel connect a 33uf/100V capacitor; Iout=0.2A, T_a = 25℃; the others floating unless otherwise specified.

Parameters	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Input operation voltage	Vin		10		80	V
VIN UVLO	Vin_uvlo			8	9	V
Quiescent Supply Current	I_q	V_{FB}=2V		2.8	5	mA
Oscillator Frequency	Fosc		75	100	125	KHz
Switch Current Limit	I_L	V_{FB}=0V R3=0.15Ω		0.35		A
Output Saturation Voltage	V_{CE}	V_{FB}=0V I_{SW}=0.3A		0.84		V
Max. Duty Cycle	D_{MAX}	V_{FB}=0V		100		%

Typical Performance Characteristics

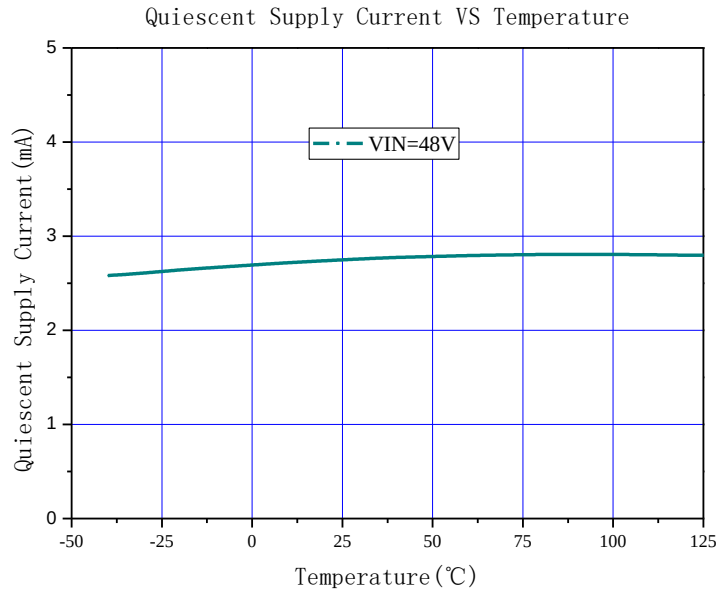


Figure5. Quiescent Current Curve

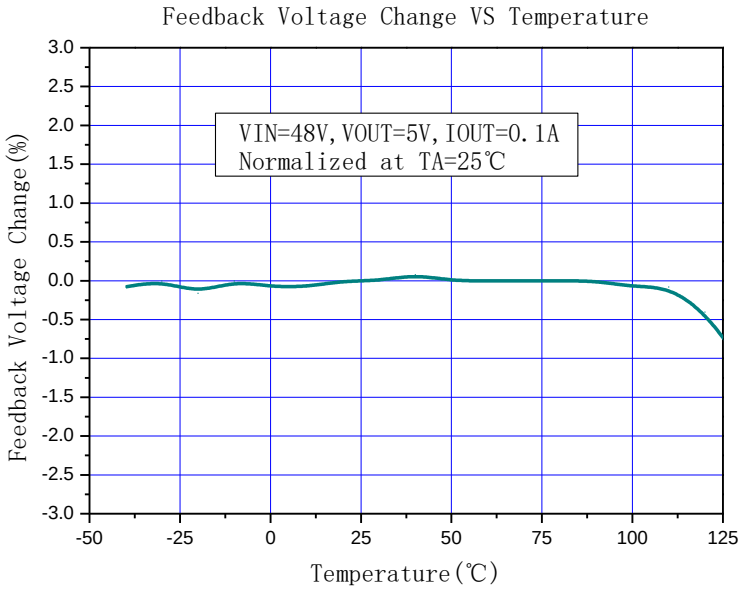


Figure6. Feedback Voltage Curve

Typical System Application(VOUT=15V/0.2A)

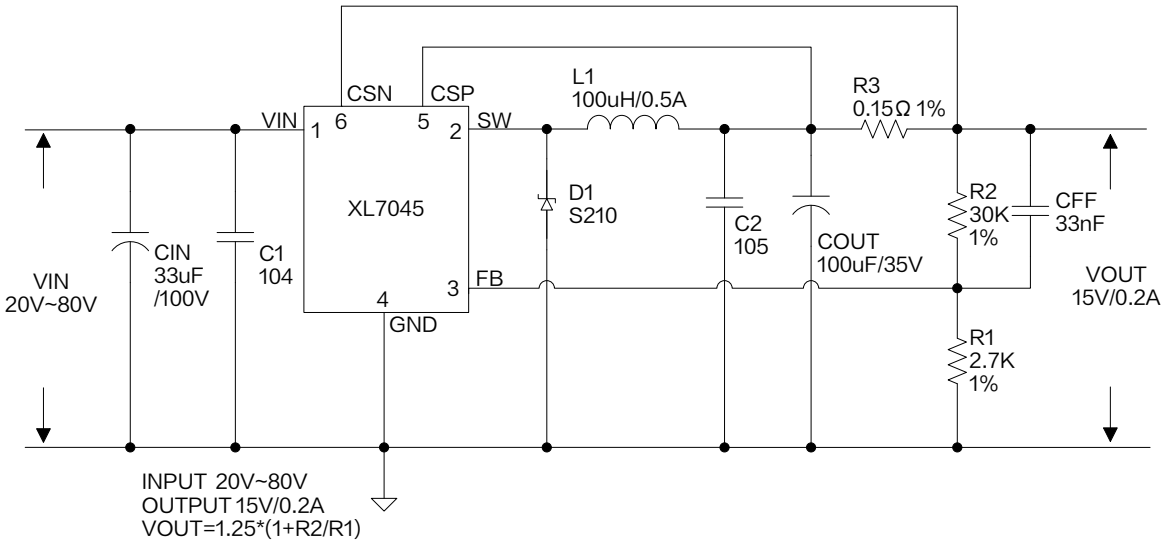


Figure7. XL7045 System Application (VIN=20V~80V, VOUT=15V/0.2A)

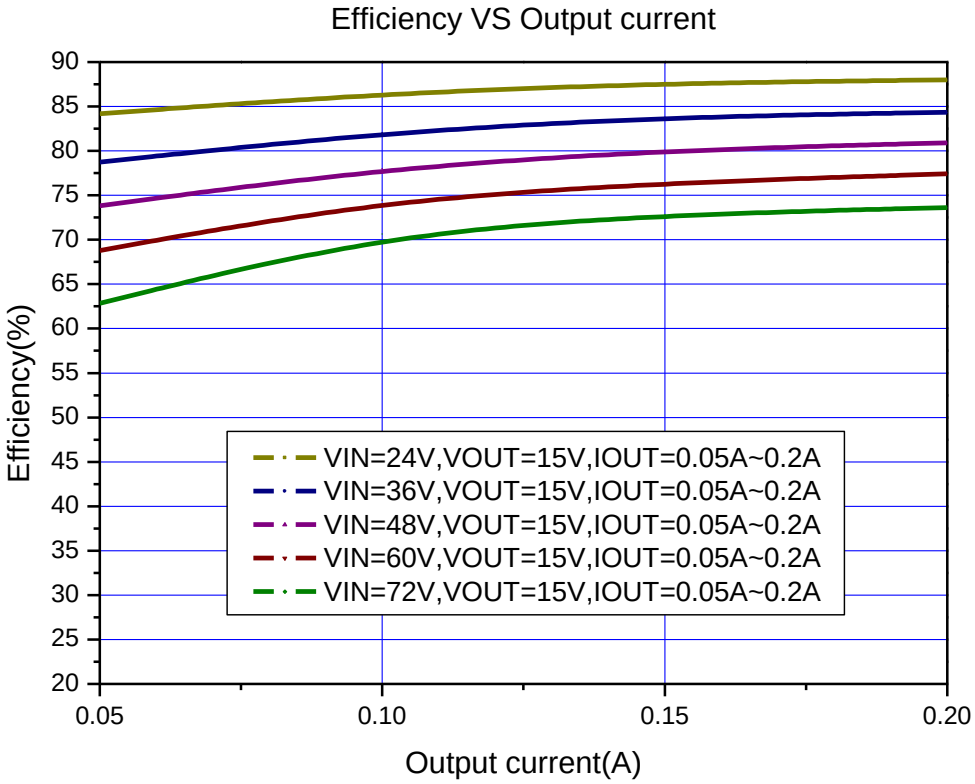


Figure8. XL7045 System Application (Efficiency VS Output Current)

Typical System Application(VOUT=5V/0.3A)

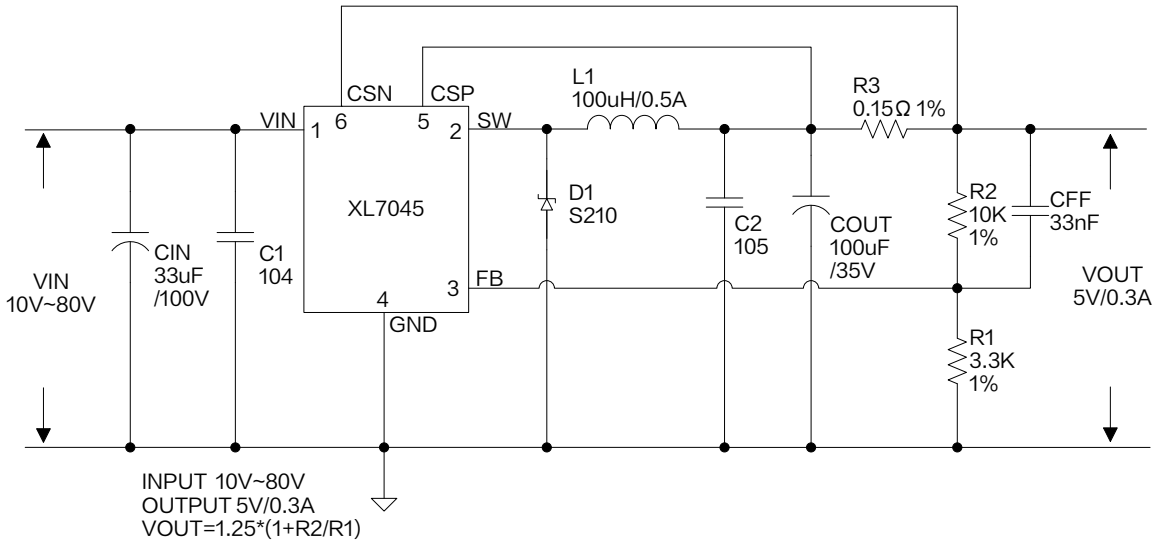


Figure9. XL7045 System Application (VIN=10V~80V, VOUT=5V/0.3A)

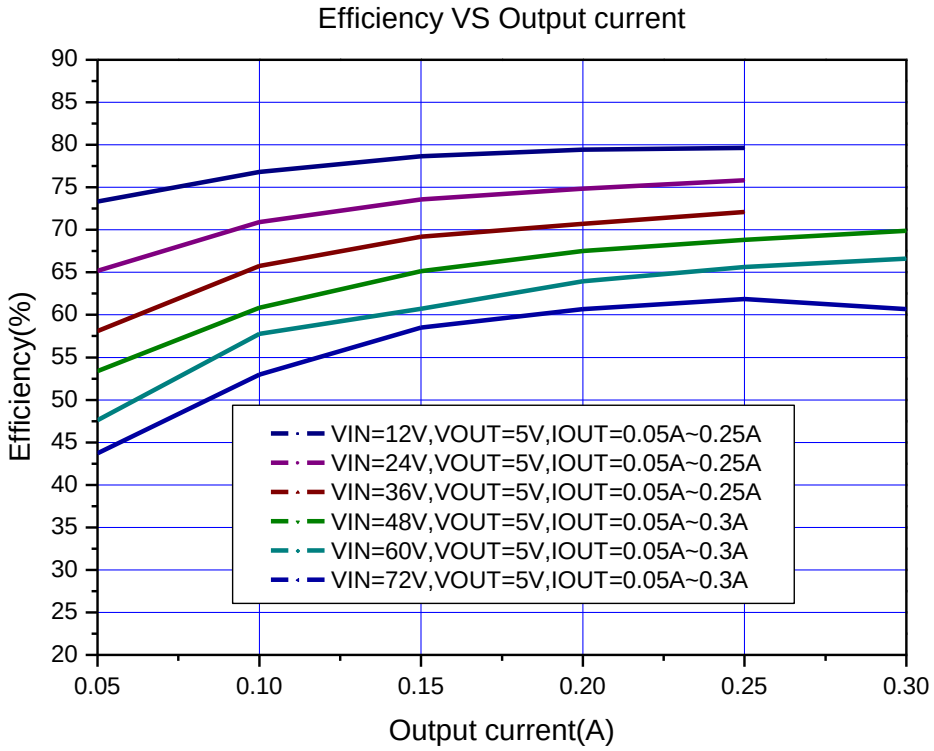
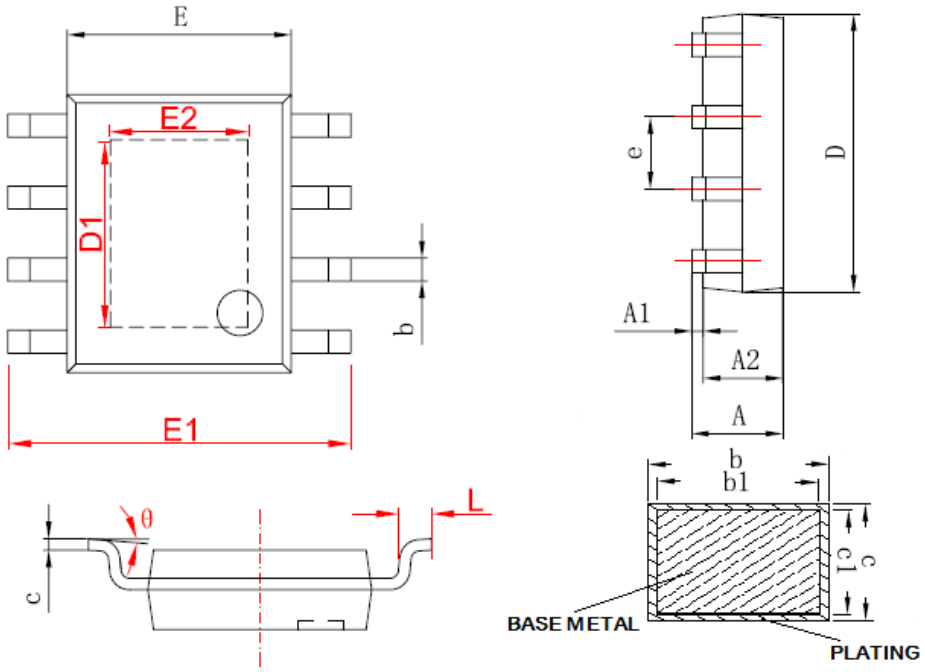


Figure10. XL7045 System Application (Efficiency VS Output Current)

Package Information

SOP8-EP



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.000	0.150	0.000	0.006
A2	1.250	1.650	0.049	0.065
b	0.306	0.510	0.012	0.020
b1	0.296	0.480	0.011	0.019
c	0.170	0.250	0.006	0.010
c1	0.170	0.230	0.006	0.009
D	4.700	5.100	0.185	0.200
D1	2.650	3.467	0.104	0.136
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
E2	1.930	2.534	0.076	0.100
e	1.140	1.400	0.045	0.055
L	0.450	0.800	0.017	0.031
θ	0°	8°	0°	8°

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