

**P-Ch 30V Fast Switching MOSFETs**

- ★ 100% EAS Guaranteed
- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

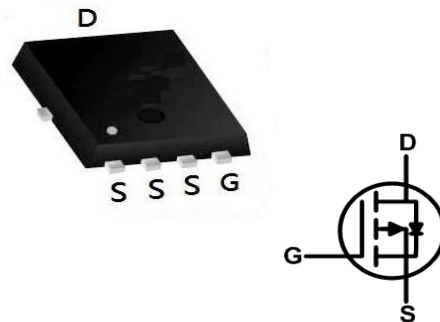
**Description**

The XXW60P03F is the high cell density trenched P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The XXW60P03F meet the RoHS and Gree Product requirement 100% EAS guaranteed with full function reliability approved.

**Product Summary**

BVDSS	RDSON	ID
-30V	7.2mΩ	-60A

**PRPAK5X6 Pin Configuration**

**Absolute Maximum Ratings (T<sub>A</sub> = 25°C, unless otherwise noted)**

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V <sub>DS</sub>	-30	V
Gate-Source Voltage		V <sub>GS</sub>	±20	V
Continuous Drain Current	T <sub>C</sub> =25°C	I <sub>D</sub>	-60	A
	T <sub>C</sub> =100°C		-35	
Pulsed Drain Current <sup>1</sup>		I <sub>DM</sub>	-168	A
Single Pulse Avalanche Energy <sup>2</sup>		EAS	45	mJ
Total Power Dissipation	T <sub>C</sub> =25°C	P <sub>D</sub>	45	W
Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to 150	°C

**Thermal Characteristics**

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Ambient <sup>3</sup>	R <sub>θJA</sub>	65	°C/W
Thermal Resistance from Junction-to-Case	R <sub>θJC</sub>	3.36	°C/W

**P-Ch 30V Fast Switching MOSFETs**  
**Electrical Characteristics (T<sub>J</sub> = 25°C, unless otherwise noted)**

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA	-30	-	-	V
Gate-body Leakage current	I <sub>GSS</sub>	V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T <sub>J</sub> =25°C	V <sub>DS</sub> = -30V, V <sub>GS</sub> = 0V	-	-	-1	μA
	T <sub>J</sub> =100°C		-	-	-100	
Gate-Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA	-1.0	-	-2.5	V
Drain-Source On-Resistance <sup>4</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = -10V, I <sub>D</sub> = -30A	-	7.2	14	mΩ
		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -15A	-	10	22	
Forward Transconductance <sup>4</sup>	g <sub>fs</sub>	V <sub>DS</sub> = -5V, I <sub>D</sub> = -30A	-	57	-	S
<b>Dynamic Characteristics<sup>5</sup></b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V, f = 1MHz	-	2396	-	pF
Output Capacitance	C <sub>oss</sub>		-	325	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	283	-	
Gate Resistance	R <sub>g</sub>	f = 1MHz	-	10.5	-	Ω
<b>Switching Characteristics<sup>5</sup></b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>GS</sub> = -10V, V <sub>DS</sub> = -15V, I <sub>D</sub> = -30A	-	30	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	5	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	7.5	-	
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>GS</sub> = -10V, V <sub>DD</sub> = -15V, R <sub>G</sub> = 3Ω, I <sub>D</sub> = -30A	-	14.1	-	ns
Rise Time	t <sub>r</sub>		-	20	-	
Turn-Off Delay Time	t <sub>d(off)</sub>		-	94	-	
Fall Time	t <sub>f</sub>		-	65	-	
Body Diode Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = -30A, dI/dt = 100A/μs	-	19	-	ns
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>		-	9	-	nC
<b>Drain-Source Body Diode Characteristics</b>						
Diode Forward Voltage <sup>4</sup>	V <sub>SD</sub>	I <sub>S</sub> = -1A, V <sub>GS</sub> = 0V	-	-	-1.2	V
Continuous Source Current	T <sub>C</sub> =25°C	I <sub>S</sub>	-	-	-60	A

Note :

1. Repetitive rating, pulse width limited by junction temperature T<sub>J(MAX)</sub>=150°C.
2. The EAS data shows Max. rating . The test condition is V<sub>DD</sub>= -25V, V<sub>GS</sub>= -10V, L= 0.1mH, I<sub>AS</sub>= -30A.
3. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
5. This value is guaranteed by design hence it is not included in the production test.

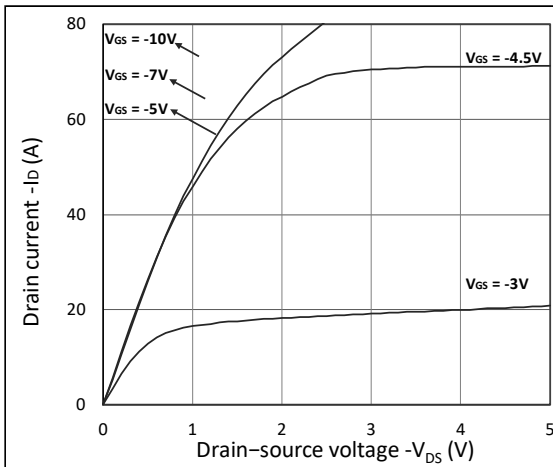
**Typical Characteristics**


Figure 1. Output Characteristics

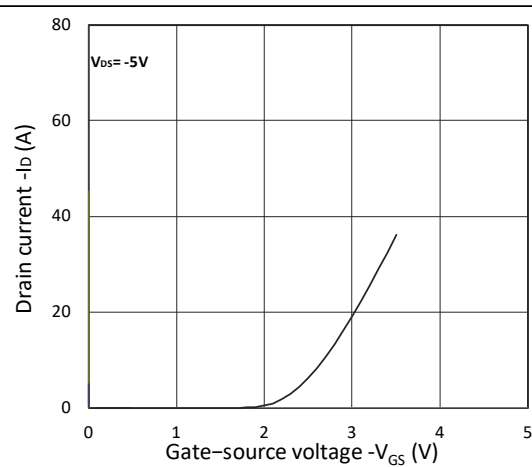


Figure 2. Transfer Characteristics

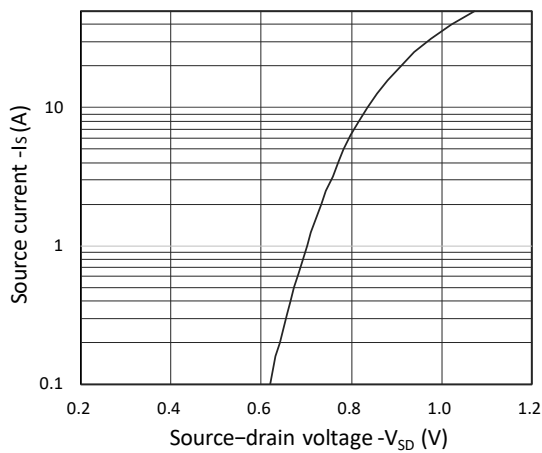
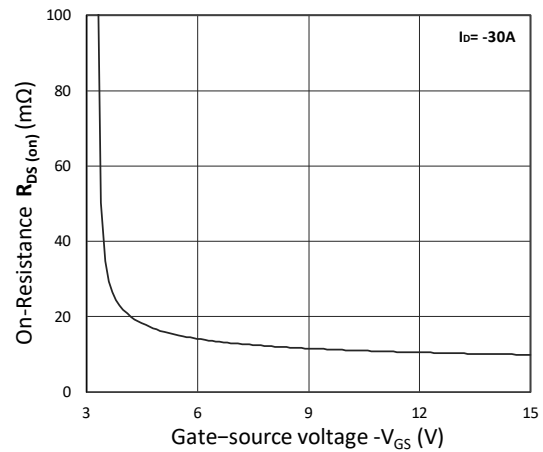
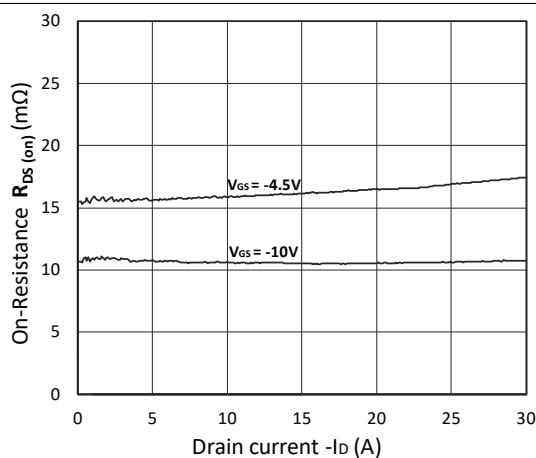
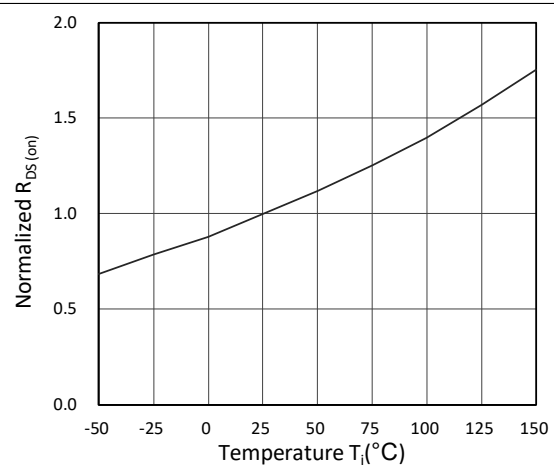


Figure 3. Forward Characteristics of Reverse


 Figure 4.  $R_{DS(on)}$  vs.  $V_{GS}$ 

 Figure 5.  $R_{DS(on)}$  vs.  $I_D$ 

 Figure 6. Normalized  $R_{DS(on)}$  vs. Temperature

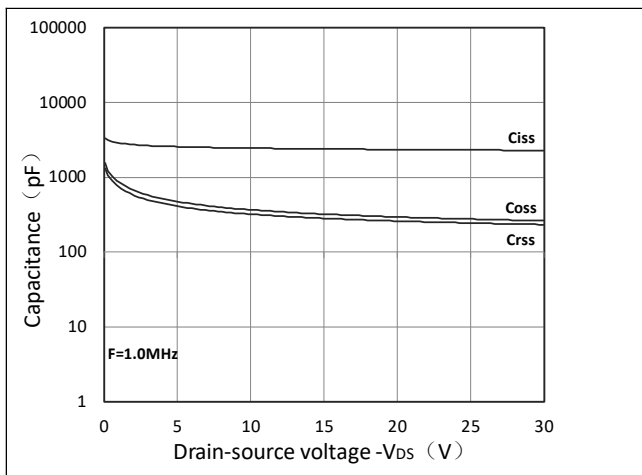
**P-Ch 30V Fast Switching MOSFETs**


Figure 7. Capacitance Characteristics

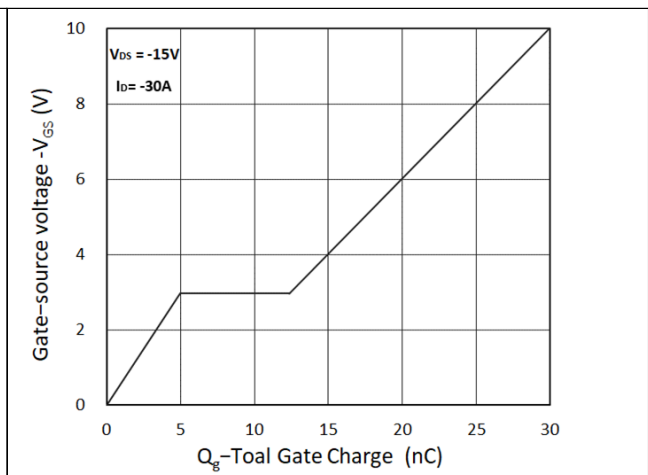


Figure 8. Gate Charge Characteristics

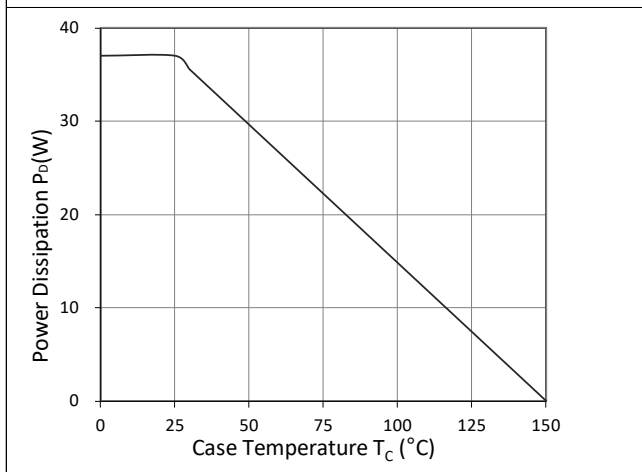


Figure 9. Power Dissipation

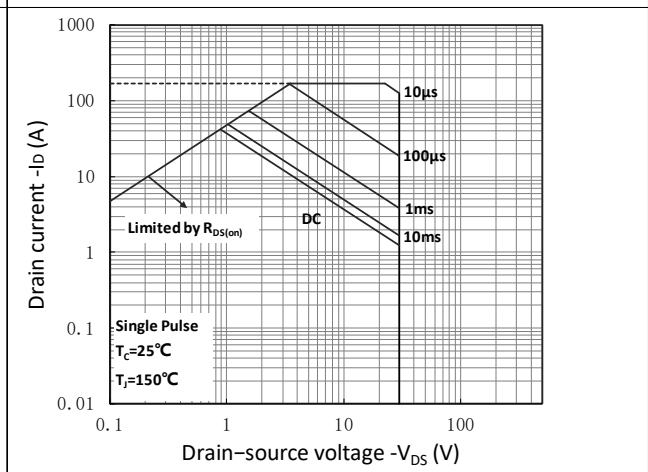


Figure 10. Safe Operating Area

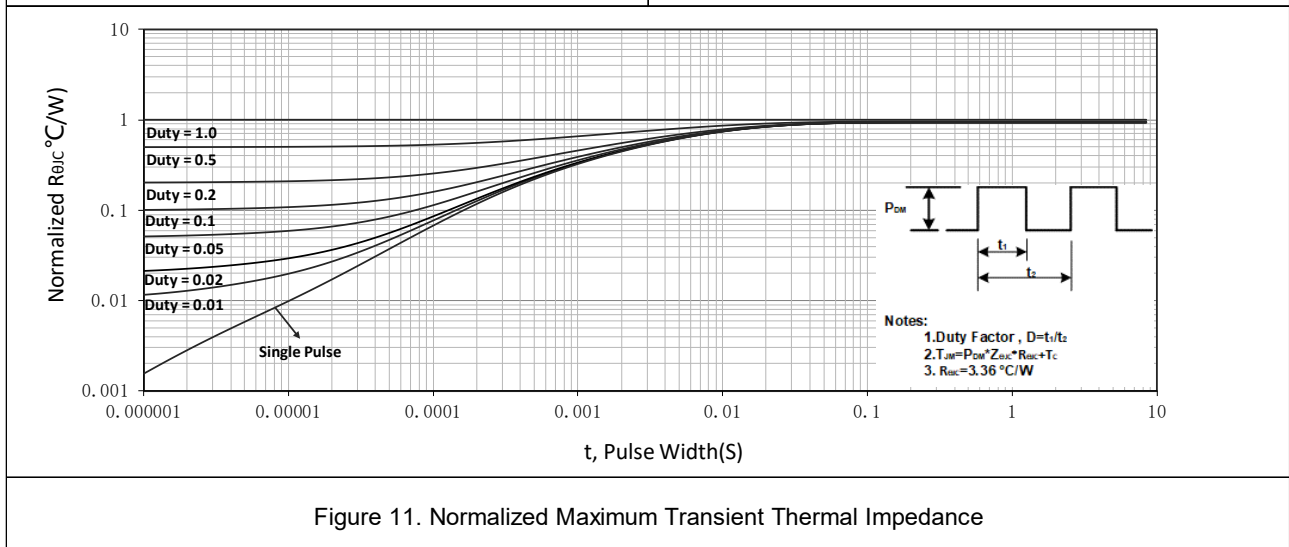
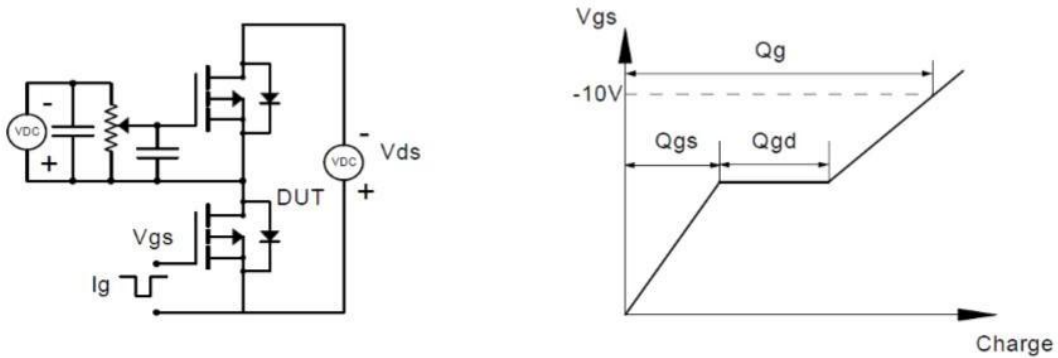


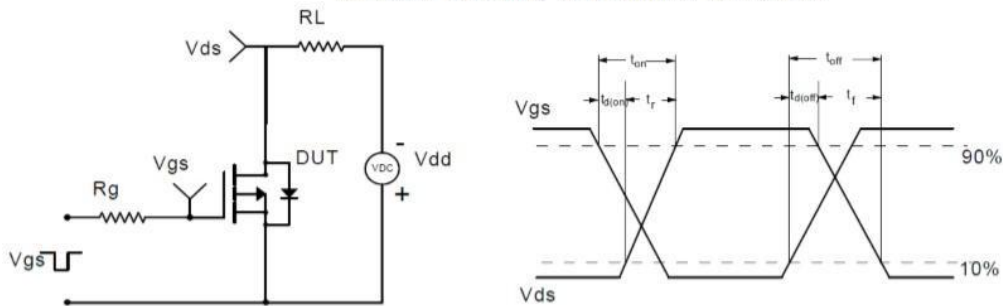
Figure 11. Normalized Maximum Transient Thermal Impedance

**Test Circuit**

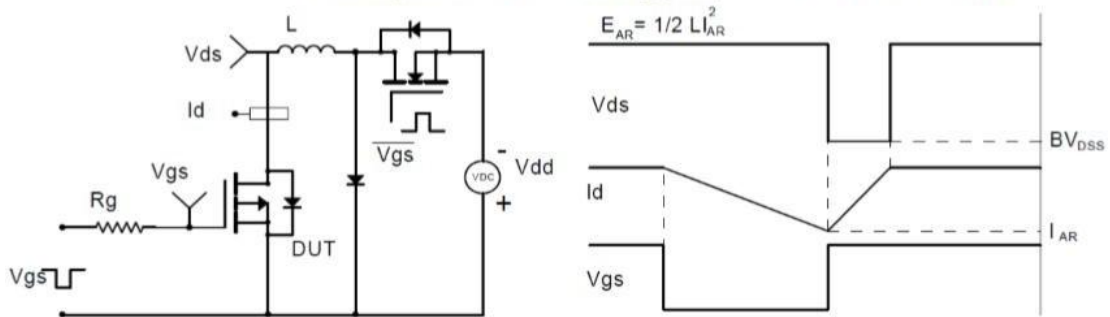
Gate Charge Test Circuit & Waveform



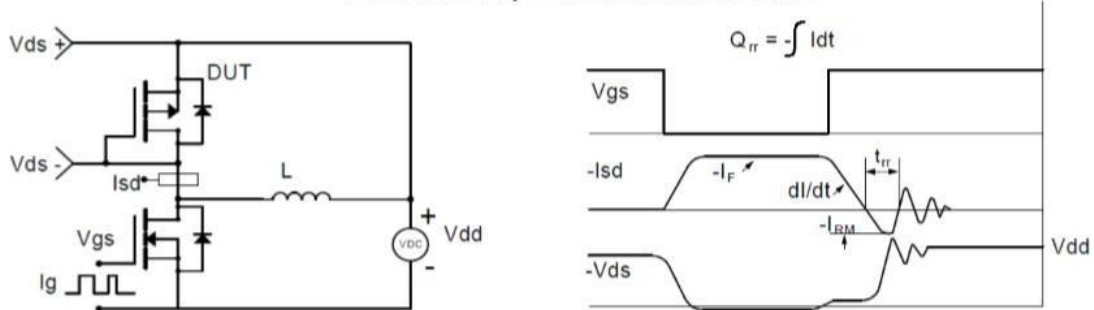
Resistive Switching Test Circuit & Waveforms

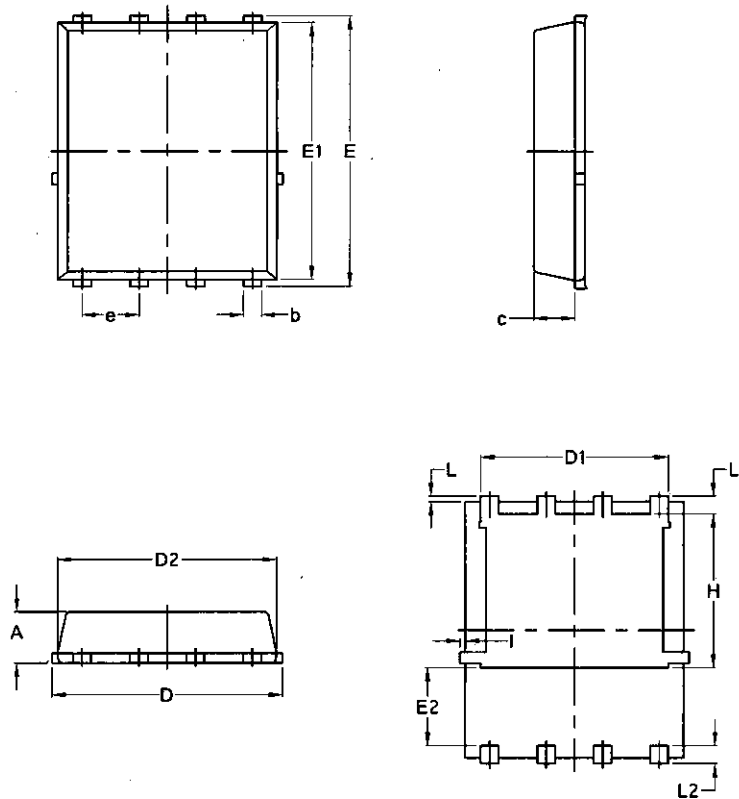


Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



**Package Mechanical Data-DFN5\*6-8L-JQ Single**


Symbol	Common			
	mm		Inch	
	Min	Max	Min	Max
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.0970	0.0324	0.082
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.60	/	0.0630	/
e	1.27 BSC		0.05 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.50	0.0150	0.0197
L2	0.38	0.50	0.0150	0.0197
H	3.30	3.50	0.1299	0.1378
I	/	0.18	/	0.0070