

N-Ch 30V Fast Switching MOSFETs

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

Product Summary

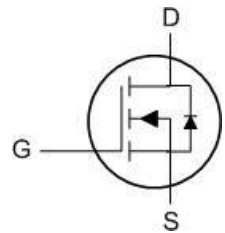
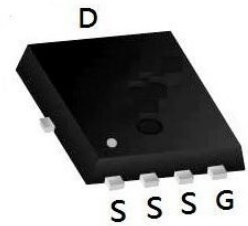


BVDSS	RDS(on)	ID
30V	3.0mΩ	120 A

Description

The XR120N03F is the high cell density trench N-ch MOSFETs, which provide excellent RDS(on) and gate charge for most of the synchronous buck converter applications. The XR120N03F meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

PDFN5060-8L Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating		Units
		10s	Steady State	
V _{DS}	Drain-Source Voltage	30		V
V _{GS}	Gate-Source Voltage	±20		V
I _D @T _C =25°C	Continuous Drain Current, V _{GS} @ 10V ¹	120		A
I _D @T _C =100°C	Continuous Drain Current, V _{GS} @ 10V ¹	75		A
I _{DM}	Pulsed Drain Current ²	384		A
EAS	Single Pulse Avalanche Energy ³	198		mJ
I _{AS}	Avalanche Current	53.8		A
P _D @T _C =25°C	Total Power Dissipation ⁴	62.5		W
P _D @T _A =25°C	Total Power Dissipation ⁴	6	2.42	W
T _{STG}	Storage Temperature Range	-55 to 175		°C
T _J	Operating Junction Temperature Range	-55 to 175		°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R _{θJA}	Thermal Resistance Junction-Ambient ¹	---	62	°C/W
R _{θJA}	Thermal Resistance Junction-Ambient ¹ (t ≤ 10s)	---	25	°C/W
R _{θJC}	Thermal Resistance Junction-Case ¹	---	2.4	°C/W

Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

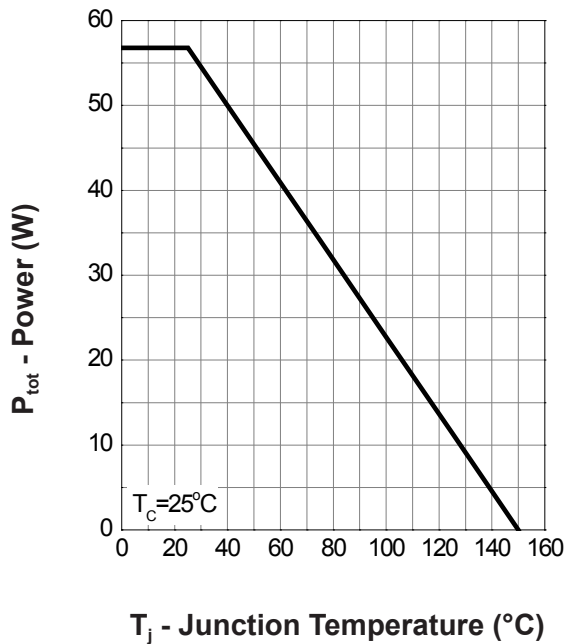
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	30	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =24V, V _{GS} =0V T _J =85°C	-	-	1 30	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	1.4	1.7	2.5	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ^d	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =20A T _J =125°C V _{GS} =4.5V, I _{DS} =15A	- - -	3 4.4 4.0	3.8 - 5.5	mΩ
Gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =10A	-	24.6	-	S
Diode Characteristics						
V _{SD} ^d	Diode Forward Voltage	I _{SD} =20A, V _{GS} =0V	-	0.8	1.1	V
t _{rr}	Reverse Recovery Time	I _{DS} =20A, di _{SD} /dt=100A/μs	-	35.6	-	ns
t _a	Charge Time		-	19.3	-	
t _b	Discharge Time		-	16.3	-	
Q _{rr}	Reverse Recovery Charge		-	26	-	nC
Dynamic Characteristics [°]						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	-	1	2	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, Frequency=1.0MHz	-	2485	2971	pF
C _{oss}	Output Capacitance		-	850	-	
C _{rss}	Reverse Transfer Capacitance		-	85	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =15V, R _L =15Ω, I _{DS} =1A, V _{GEN} =10V, R _G =6Ω	-	12.4	23	ns
t _r	Turn-on Rise Time		-	9.5	18	
t _{d(OFF)}	Turn-off Delay Time		-	27.2	49	
t _f	Turn-off Fall Time		-	35.2	64	
Gate Charge Characteristics [°]						
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =10V, I _{DS} =20A	-	20.6	28.8	nC
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =4.5V, I _{DS} =20A	-	9.8	-	
Q _{gth}	Threshold Gate Charge		-	1.8	-	
Q _{gs}	Gate-Source Charge		-	3.8	-	
Q _{gd}	Gate-Drain Charge		-	3.7	-	

Note d : Pulse test ; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

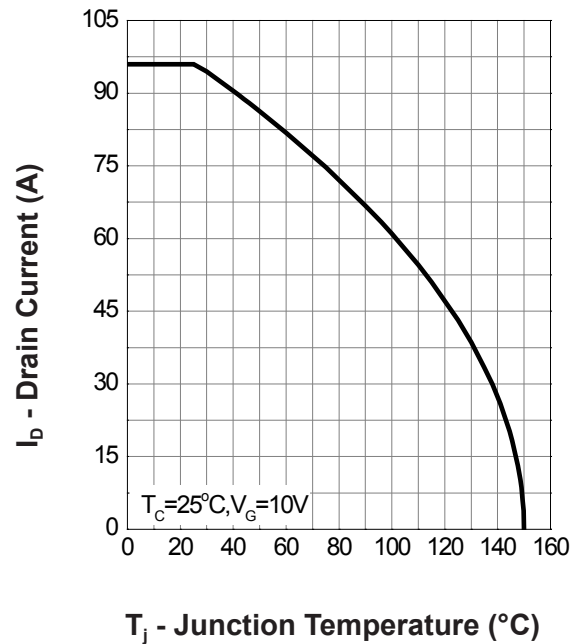
Note e : Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

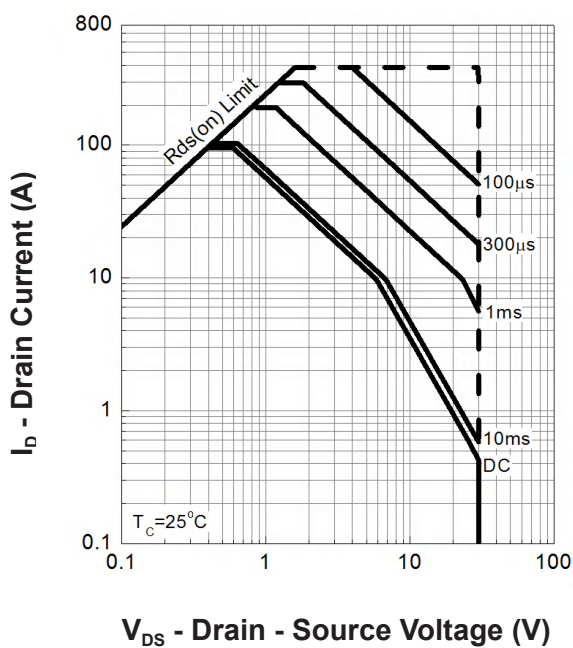
Power Dissipation



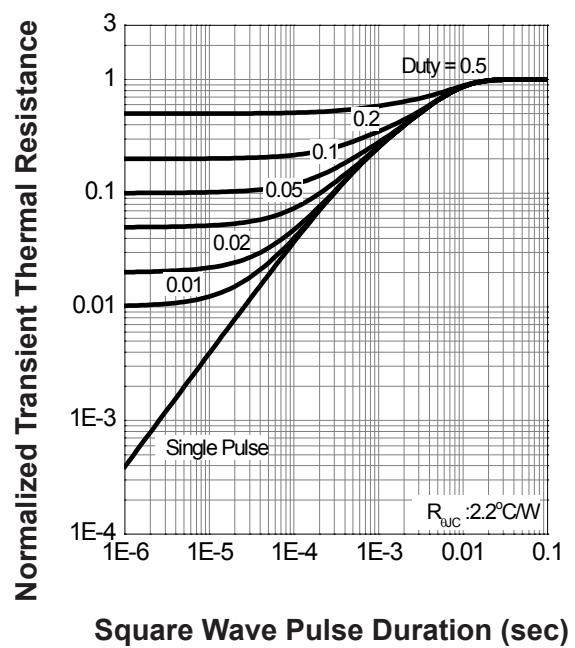
Drain Current



Safe Operation Area

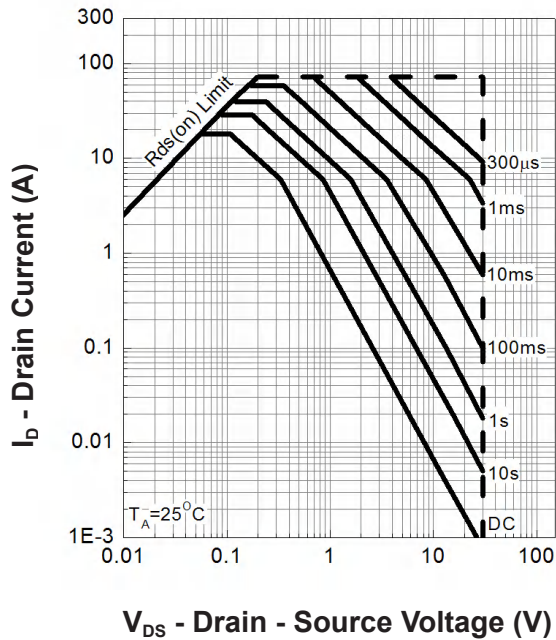


Thermal Transient Impedance

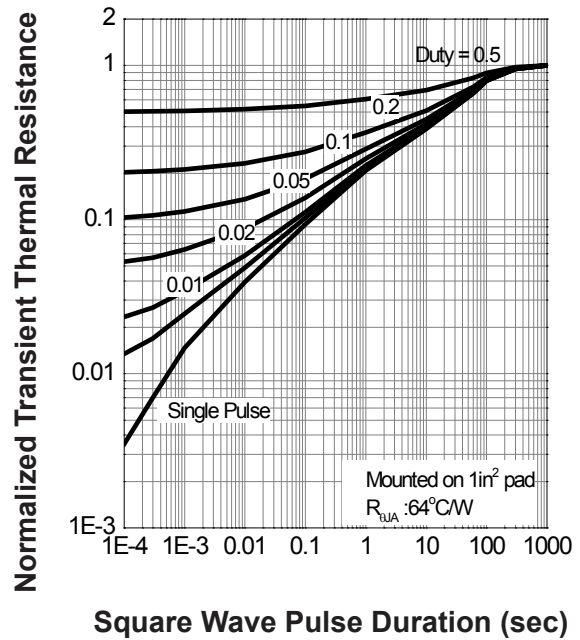


Typical Operating Characteristics(Cont.)

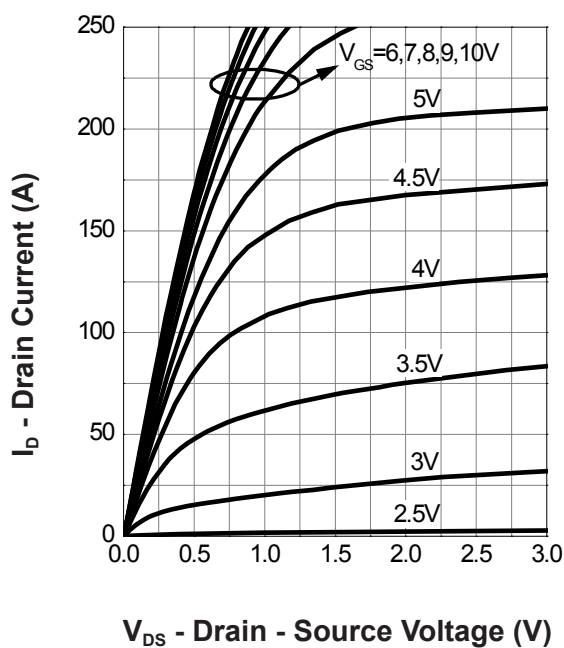
Safe Operation Area



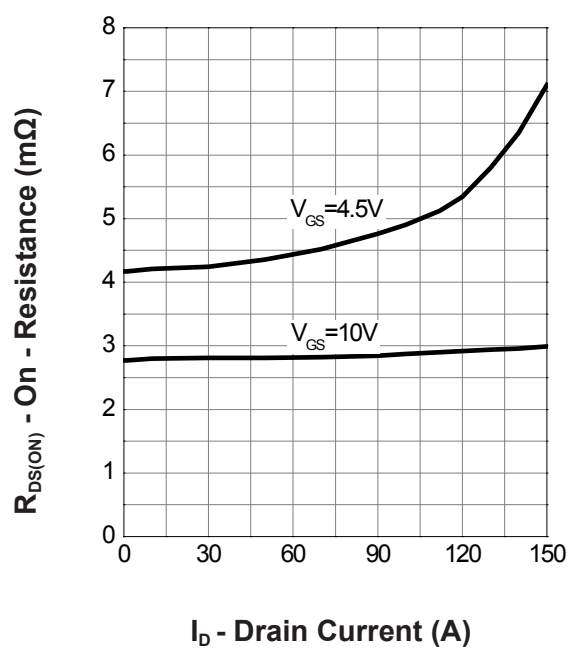
Thermal Transient Impedance



Output Characteristics



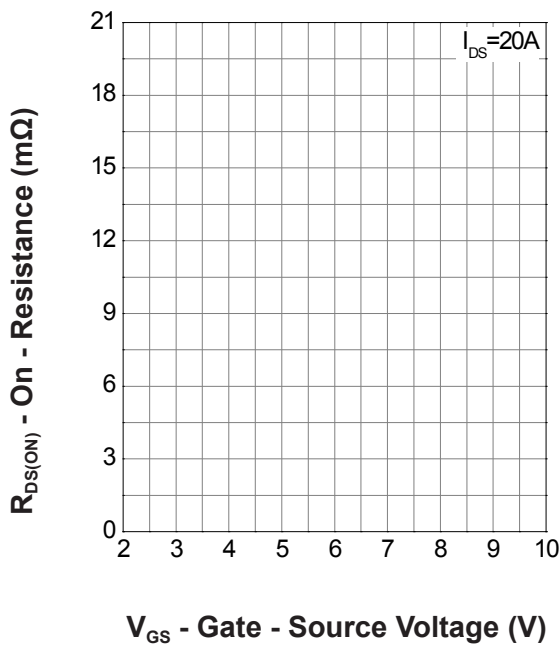
Drain-Source On Resistance



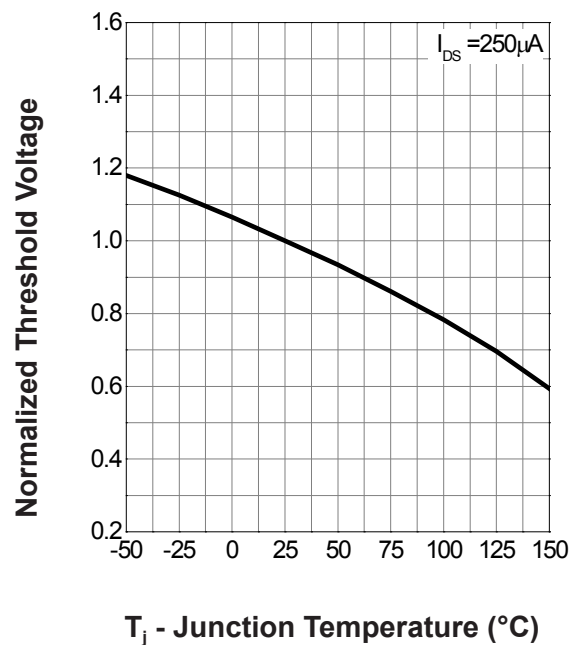


Typical Operating Characteristics(Cont.)

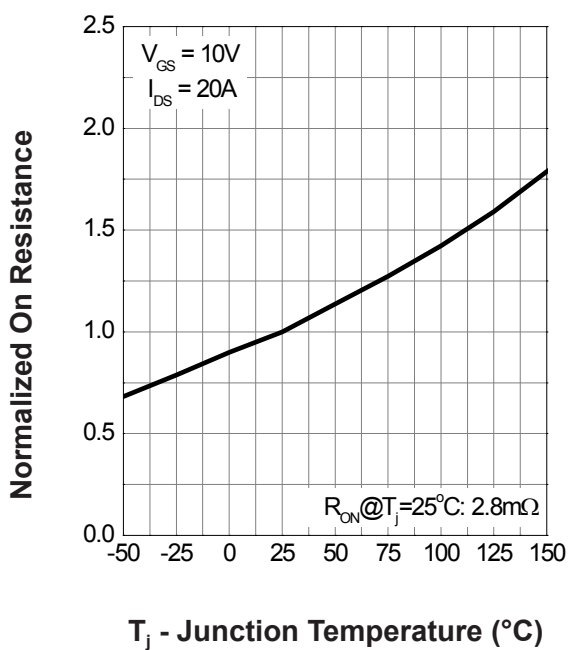
Gate-Source On Resistance



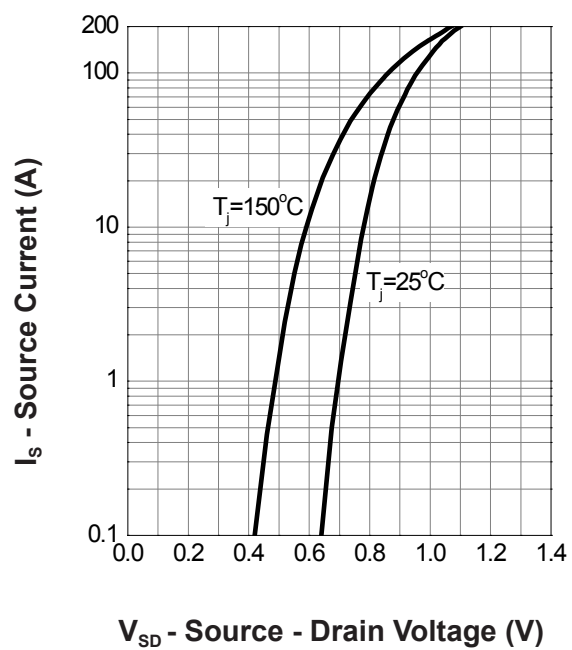
Gate Threshold Voltage



Drain-Source On Resistance



Source-Drain Diode Forward

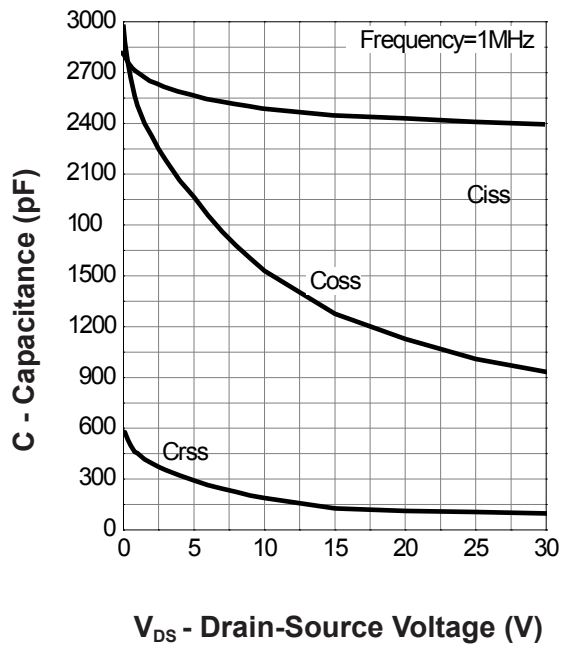




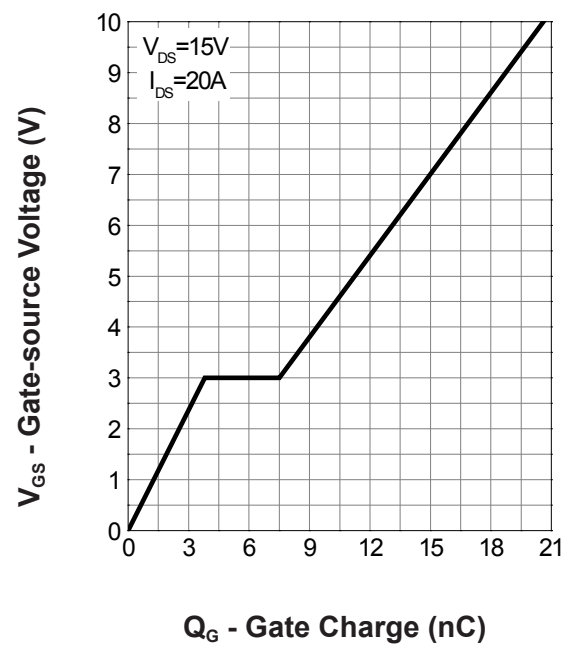
Typical Operating Characteristics(Cont.)

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Capacitance

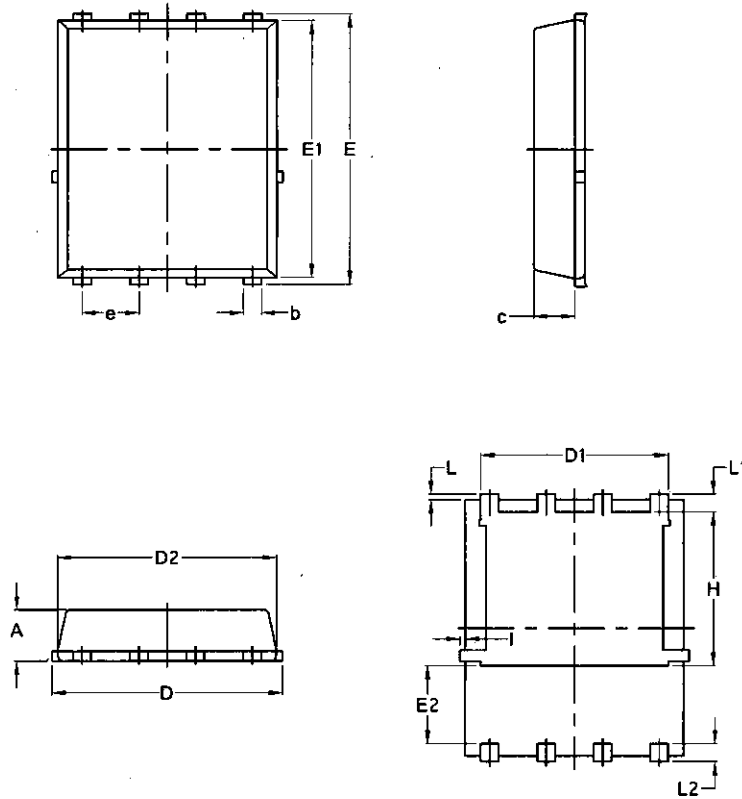


Gate Charge





Package Mechanical Data-PDFN5060-8L-Single



Symbol	Common			
	mm		Inch	
	Mim	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