

Description

The GT55N06D5 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

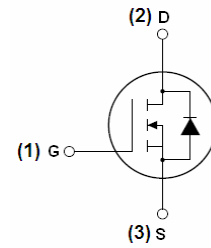
General Features

VDSS	RDS(ON) @10V (typ)	RDS(ON) @4.5V (typ)	ID
60V	7 mΩ	10 mΩ	53A

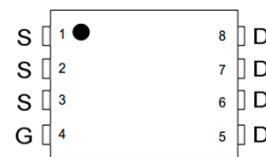
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation
- Special process technology for high ESD capability
- RoHS Compliant

Application

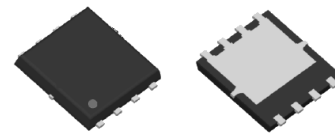
Synchronous Rectification in DC/DC and AC/DC Converters
Industrial and Motor Drive applications



Schematic diagram



Marking and pin assignment



DFN 5x6-8L

Ordering Information

Part Number	Marking	Case	Packaging
GT55N06D5	GT55N06	DFN5X6-8L	5000pcs/Reel

Absolute Maximum Ratings $T_A = 25^\circ\text{C}$ unless otherwise noted

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ^G	I_D	53	A
$T_A = 25^\circ\text{C}$		34	
$T_A = 100^\circ\text{C}$			
Pulsed Drain Current ^C	I_{DM}	110	A
Avalanche energy $L=0.5\text{mH}$ ^C	E_{AS}	40	mJ
Power Dissipation ^A	P_{DSM}	70	W
$T_A = 25^\circ\text{C}$		28	
$T_A = 70^\circ\text{C}$			
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Maximum	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	14	$^\circ\text{C/W}$
$t \leq 10\text{s}$		17	
Maximum Junction-to-Ambient ^{A D}	$R_{\theta JC}$	40	$^\circ\text{C/W}$
Steady-State		55	
Maximum Junction-to-Case	$R_{\theta JC}$	1.3	$^\circ\text{C/W}$
Steady-State		1.8	

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	60	65		V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=60\text{V}$, $V_{GS}=0\text{V}$ $T_J=55^{\circ}\text{C}$			1 5	μA
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}$, $V_{GS}=\pm 20\text{V}$			± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	1.0	1.7	2.5	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}$, $I_D=14\text{A}$		7	9	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}$, $I_D=10\text{A}$		10	13.0	$\text{m}\Omega$
ϕ_{FS}	Diode Forward Voltage	$V_{DS}=5\text{V}$, $I_D=20\text{A}$	30			S
V_{SD}	Diode Forward Voltage	$I_S=14\text{A}$, $V_{GS}=0\text{V}$		0.85	0.99	V
I_S	Maximum Body-Diode Continuous Current ^G				53	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=30\text{V}$, $f=1\text{MHz}$		1988		pF
C_{oss}	Output Capacitance			470		pF
C_{rss}	Reverse Transfer Capacitance			14		pF
R_g	Gate resistance	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1\text{MHz}$		1.6		Ω
SWITCHING PARAMETERS						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}$, $V_{DS}=30\text{V}$, $I_D=20\text{A}$		31		nC
$Q_g(4.5\text{V})$	Total Gate Charge			16		nC
Q_{gs}	Gate Source Charge			6		nC
Q_{gd}	Gate Drain Charge			5		nC
$t_{D(on)}$	Turn-on Delay Time	$V_{GS}=10\text{V}$, $V_{DS}=15\text{V}$, $R_L=2.5\Omega$, $R_{GEN}=3\Omega$		10.5		ns
t_r	Turn-on Rise Time			4.5		ns
$t_{D(off)}$	Turn-off Delay Time			29.5		ns
t_f	Turn-off Fall Time			8		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=20\text{A}$, $di/dt=500\text{A}/\mu\text{s}$		17		ns
Q_{rr}	Body Diode Reverse Recovery charge	$I_F=20\text{A}$, $di/dt=500\text{A}/\mu\text{s}$		58		nC

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^{\circ}\text{C}$. The Power dissipation P_{DSM} is based on $R_{\theta JA} \leq 10\text{s}$ and the maximum allowed junction temperature of 150°C . The value in any given application depends on the user's specific board design.

B. The power dissipation P_D is based on $T_J(\text{MAX})=150^{\circ}\text{C}$, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

C. Single pulse width limited by junction temperature $T_J(\text{MAX})=150^{\circ}\text{C}$.

D. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to case $R_{\theta JC}$ and case to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using $<300\mu\text{s}$ pulses, duty cycle 0.5% max.

F. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_J(\text{MAX})=150^{\circ}\text{C}$. The SOA curve provides a single pulse rating.

G. The maximum current rating is package limited.

Typical Performance Characteristics

Fig 1: Output Characteristics

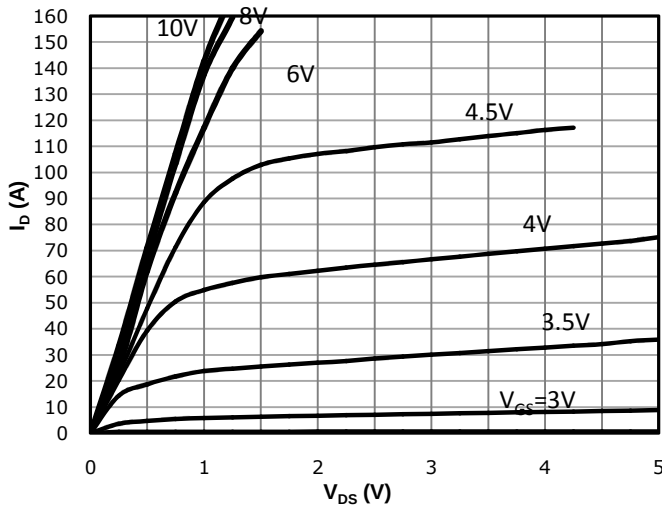


Fig 2: Transfer Characteristics

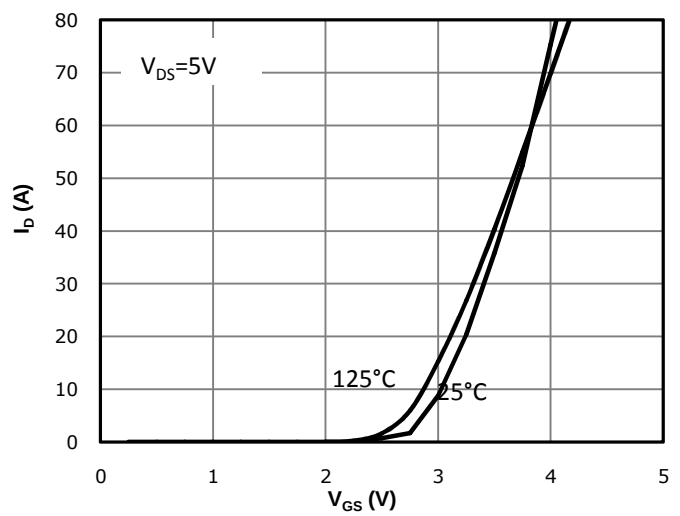


Fig 3: $R_{DS(on)}$ vs Drain Current and Gate Voltage

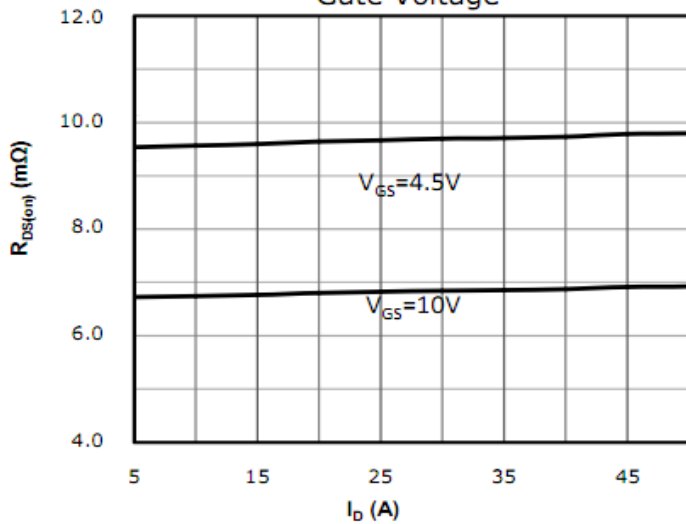


Fig 4: $R_{DS(on)}$ vs Gate Voltage

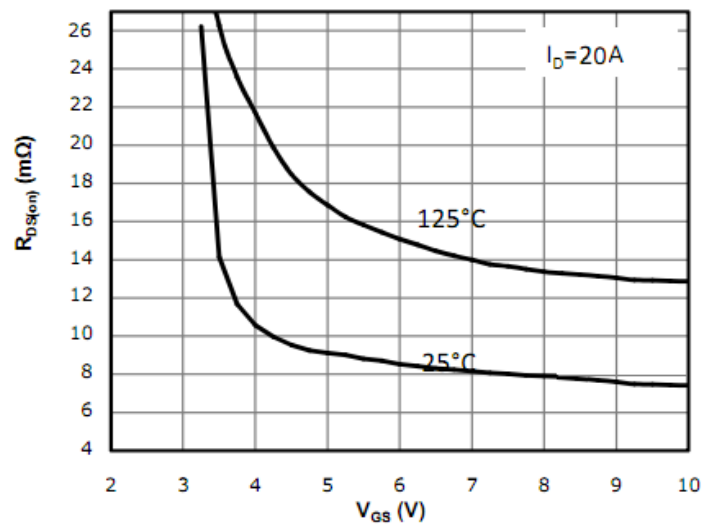


Fig 5: $R_{DS(on)}$ vs. Temperature

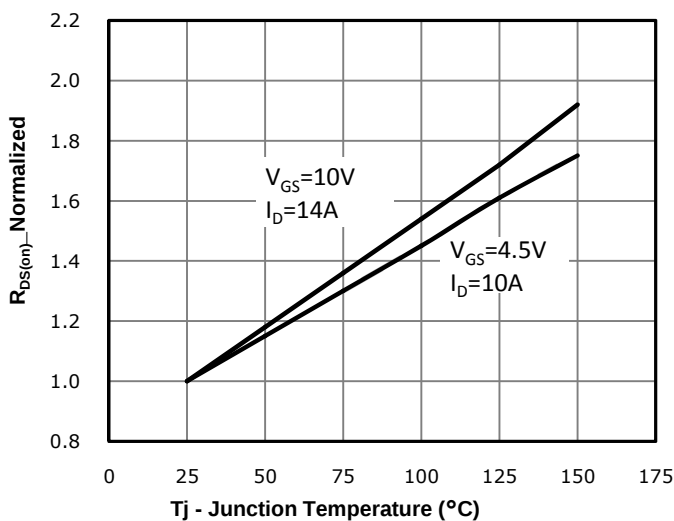


Fig 6: Capacitance Characteristics

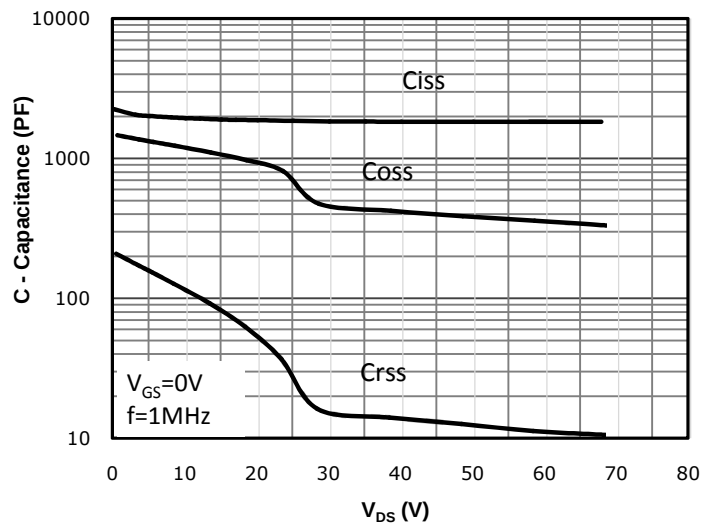


Fig 7: Gate Charge Characteristics

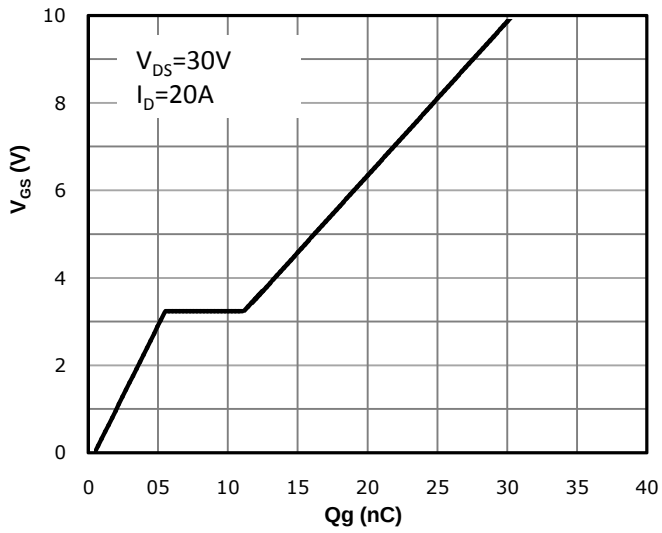


Fig 8: Body-diode Forward Characteristics

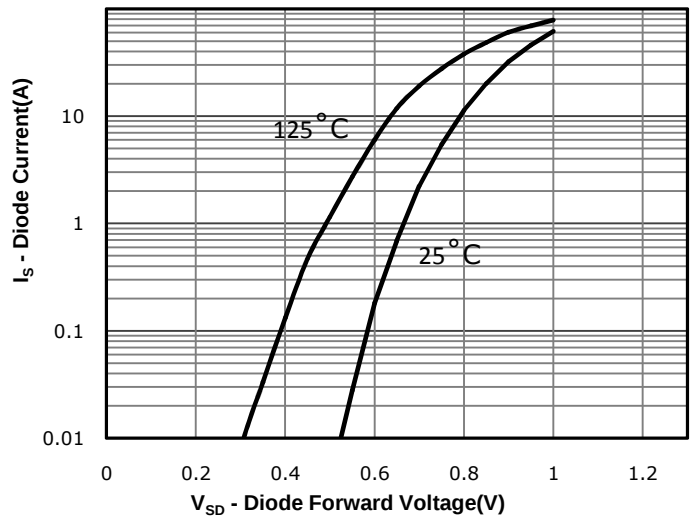


Fig 9: Power Dissipation

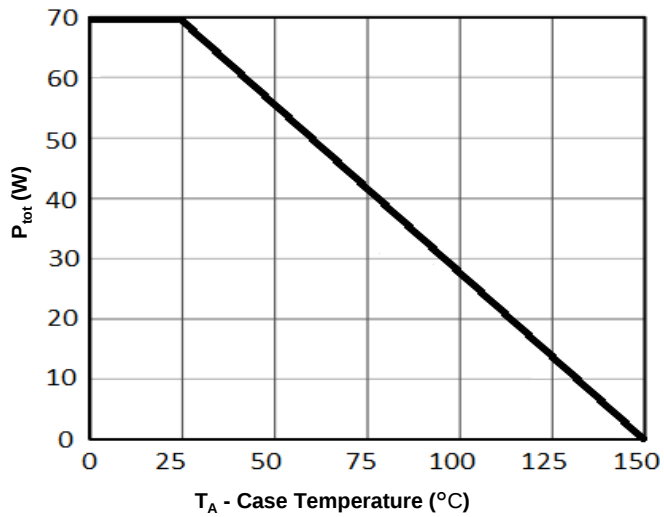


Fig 10: Drain Current Derating

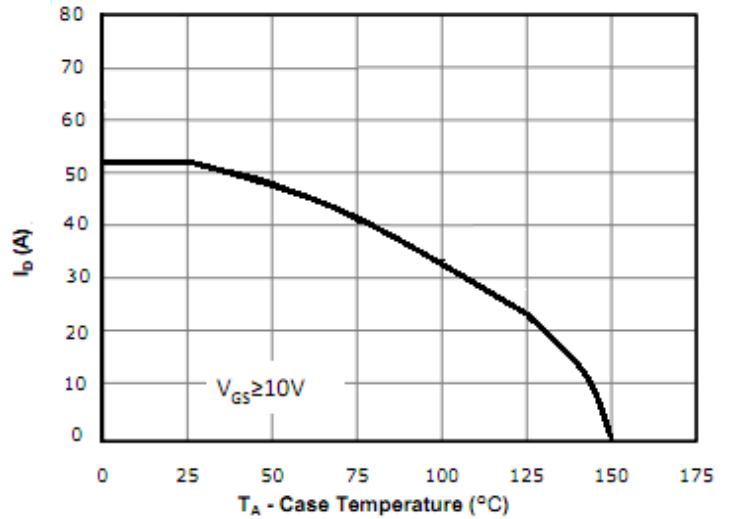


Figure A: Gate Charge Test Circuit & Waveforms

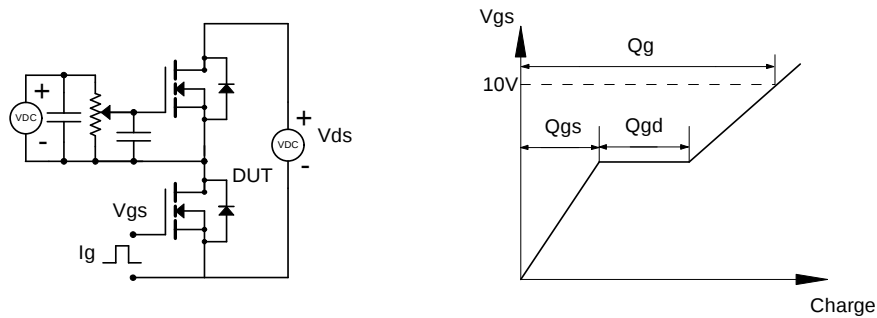


Figure B: Resistive Switching Test Circuit & Waveforms

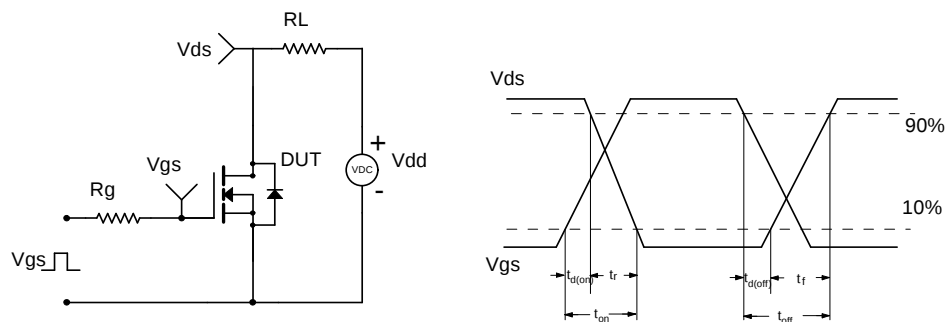


Figure C: Unclamped Inductive Switching (UIS) Test

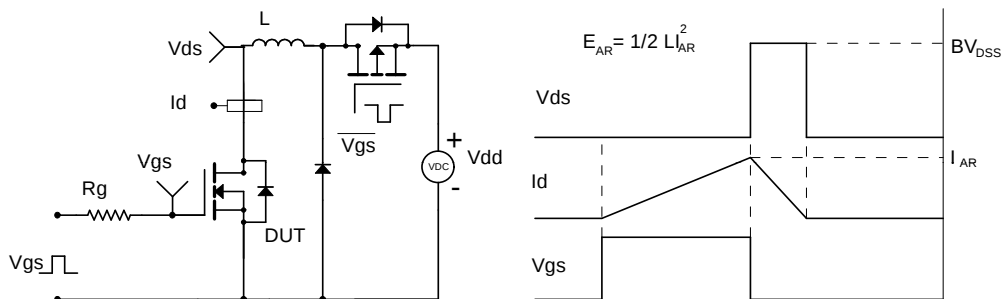
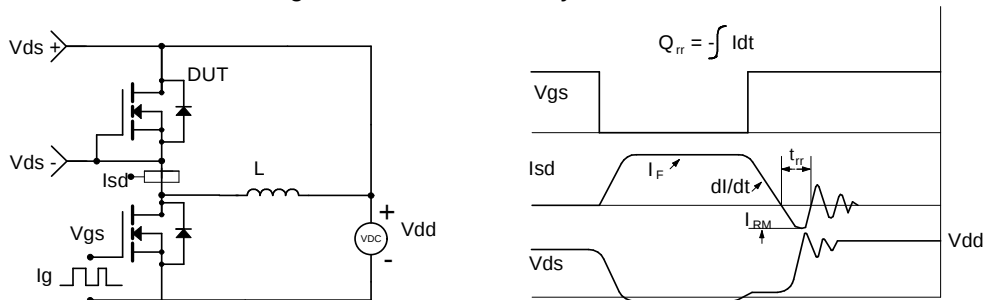
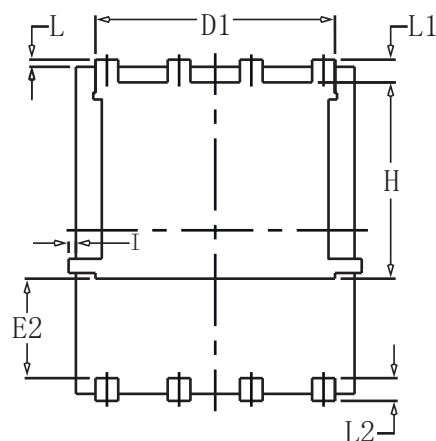
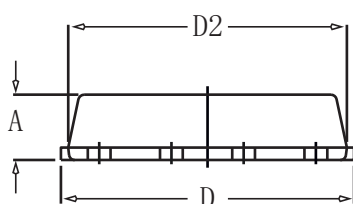
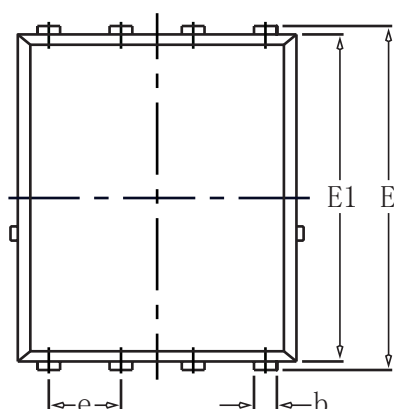


Figure D: Diode Recovery Test Circuit & Waveforms



DFN5X6-8L Package information



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	0.970	0.0324	0.0382
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	5.59	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