



HITANO ENTERPRISE CORP.

7F-7, No. 3, Wu Chuan 1st Road, New Taipei
Industrial Park, New Taipei City, TAIWAN, R.O.C.
Tel: +886 2 2299 1331 Fax: +886 2 2298 2466

Data Sheet

Customer : _____

Product : Insulated Gate Bipolar Transistor (IGBT) _____

Type : H60G3U60SC _____

Issued Date: 08-Jan.-2024 _____

Edition : Ver. 2 _____

Record of change

Date	Ver.	Description	Page
06-Sep.-2023	1		
08-Jan.-2024	2	Revise Cies_Coes_Cres Unit: pF	2

VENDOR :

HITANO ENTERPRISE CORP.

7F-7,NO.3,WUCHUAN1ST ROAD,
NEW TAIPEI INDUSTRIAL PARK,
NEW TAIPEI CITY, TAIWAN, R.O.C.
TEL:+886222991331(REP.)
FAX:+886222982466



MAKER :

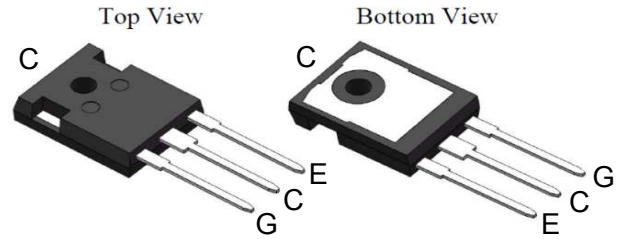
Changzhou Starsea Electronics Co., Ltd.

No. 1,Tianmuhu Road,Xinbei District,Changzhou,Jiangsu
Hot Online : 86-519-85111098
Mobile : 13915082769 (Mr Zuo)
Fax : +86-519-85112846



FEATURES

- Low switching losses
- $V_{CE(sat)}$ with positive temperature coefficient
- Fast switching and short tail current
- Free wheeling diodes with fast and soft reverse recovery
- Pb-free Lead Plating
- Halogen-free and RoHS-compliant



TO-247-3L

MECHANICAL DATA

Case: TO-247-3L molded plastic body
Terminals : Leads solderable per MIL-STD-750, Method 2026
Polarity : As marked
Mounting Position : Any



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings (@ $T_C = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter/Test Conditions		Values	Unit
V_{CES}	Collector Emitter Voltage	$T_J = 25^\circ\text{C}$	600	V
V_{GES}	Gate Emitter Voltage		± 20	
I_C	DC Collector Current	$T_C = 25^\circ\text{C}$	120	A
		$T_C = 100^\circ\text{C}$	60	
I_{Cpuls}	Pulsed collector current, tp limited by T_{Jmax}		180	
P_{tot}	Power Dissipation Per IGBT	$T_C = 25^\circ\text{C}$	483	W
		$T_C = 100^\circ\text{C}$	241	
V_{RRM}	Repetitive Reverse Voltage	$T_J = 25^\circ\text{C}$	600	V
I_F	Average Forward Current	$T_C = 25^\circ\text{C}$	120	A
		$T_C = 100^\circ\text{C}$	60	
T_{Jmax}	Max. Junction Temperature		175	$^\circ\text{C}$
T_{Jop}	Operating Temperature		-40~175	
T_{stg}	Storage Temperature		-55~150	

Thermal Resistance

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
R_{th} Characteristics						
IGBT thermal resistance, junction - case(IGBT)	$R_{th(j-c)}$		-	-	0.31	$^\circ\text{C}/\text{W}$
Diode thermal resistance, junction - case(per diode)	$R_{th(j-c)}$		-	-	0.54	$^\circ\text{C}/\text{W}$
Thermal resistance junction - ambient	$R_{th(j-a)}$		-	-	40.1	$^\circ\text{C}/\text{W}$

IGBT

Electrical Characteristic (at TC = 25 °C, unless otherwise specified)

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
$V_{GE(th)}$	Gate Emitter Threshold Voltage	$V_{CE}=V_{GE}, I_C=1mA$	4.0	5.4	7.0	V
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$I_C=60A, V_{GE}=15V, T_J=25^\circ C$		1.84	2.40	
I_{CES}	Collector Leakage Current	$V_{CE}=650V, V_{GE}=0V, T_J=25^\circ C$			2.0	mA
I_{GES}	Gate Leakage Current	$V_{CE}=0V, V_{GE}=\pm 20V, T_J=25^\circ C$	-250		250	nA
Q_g	Total Gate Charge	$V_{CE}=400V, I_C=60A, V_{GE}=15V$		117		nC
Q_{ge}	Gate emitter charge			35		
Q_{gc}	Gate collector charge			47		
$t_{d(on)}$	Turn on Delay Time	$V_{CE}=400V, I_C=60A$ $R_G=10\Omega,$ $V_{GE}=15V,$ Inductive Load	$T_J=25^\circ C$	66		ns
t_r	Rise Time		$T_J=125^\circ C$	61		
			$T_J=25^\circ C$	124		
$t_{d(off)}$	Turn off Delay Time		$T_J=25^\circ C$	112		
			$T_J=125^\circ C$	152		
t_f	Fall Time		$T_J=25^\circ C$	167		
			$T_J=125^\circ C$	51		
E_{on}	Turn on Energy		$T_J=25^\circ C$	50		
		$T_J=125^\circ C$	4.79			
E_{off}	Turn off Energy	$T_J=25^\circ C$	4.73			
		$T_J=125^\circ C$	1.39			
E_{ts}	Total Energy	$T_J=25^\circ C$	1.50			
		$T_J=125^\circ C$	6.18			
C_{ies}	Input Capacitance	$V_{CE}=30V, V_{GE}=0V, f=1MHz$		3398		pF
C_{oes}	output Capacitance			224		
C_{res}	Reverse Transfer Capacitance			44		

Anti-Parallel Diode

Electrical Characteristic (at TC = 25 °C, unless otherwise specified)

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F=60A, V_{GE}=0V, T_J=25^\circ C$		1.6	2.0	V
t_{rr}	Reverse Recovery Time	$I_F=60A$		54		ns
I_{RRM}	Max. Reverse Recovery Current	$di_F/dt=100A/\mu s$		2.1		A
Q_{RR}	Reverse Recovery Charge	$T_C=25^\circ C$		110		nC

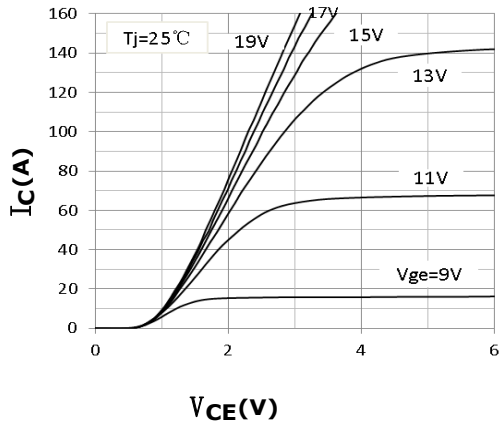


Figure 1. Output Characteristics

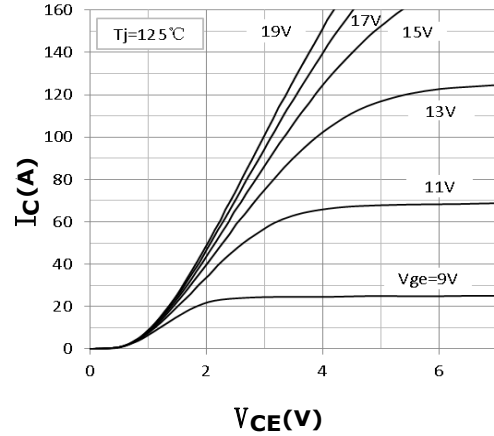


Figure 2. Output Characteristics

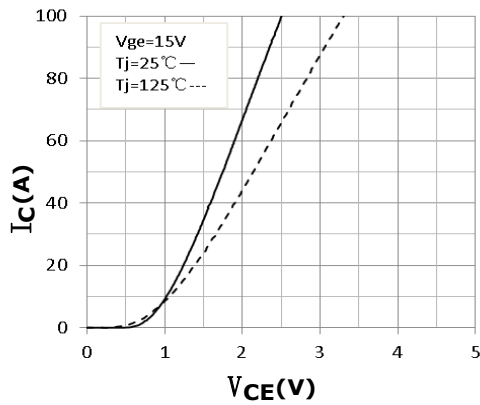


Figure 3. Saturation Voltage Characteristics

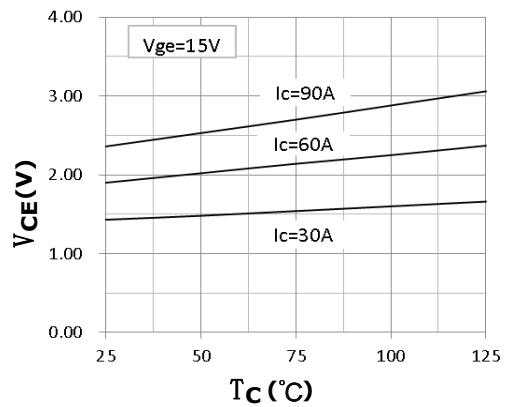


Figure 4. Saturation Voltage - TC Characteristics

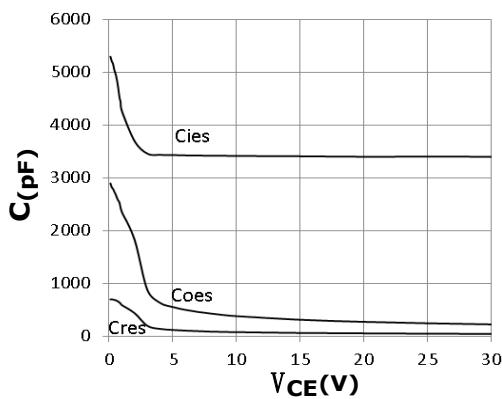


Figure 5. Capacitance Characteristics

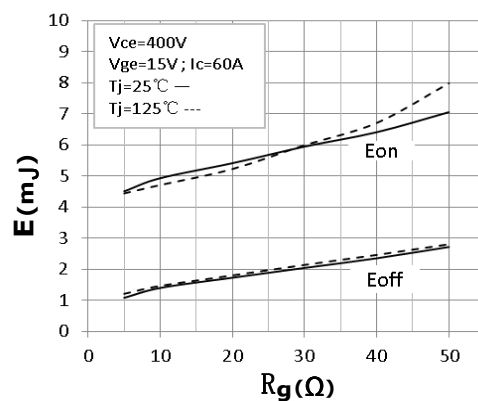


Figure 6. Switching Loss-RG Characteristics

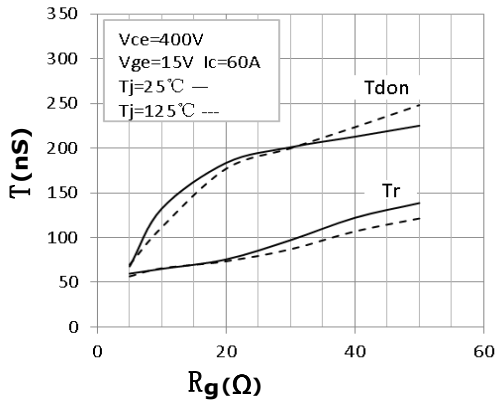


Figure 7. Opening Time-RG Characteristics

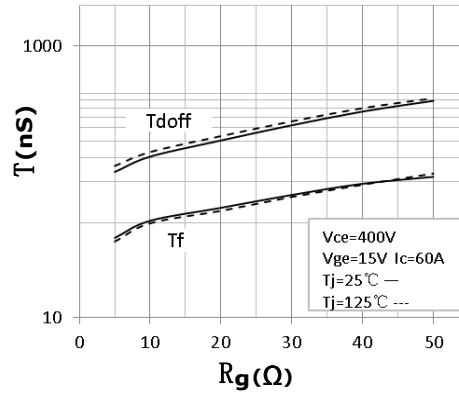


Figure 8. Closing Time-RG Characteristics

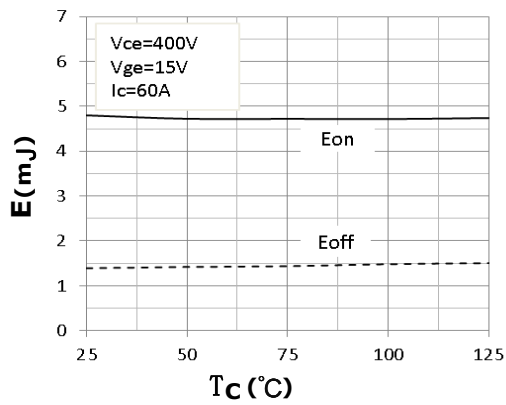


Figure 9. Switching loss-Tc Characteristics

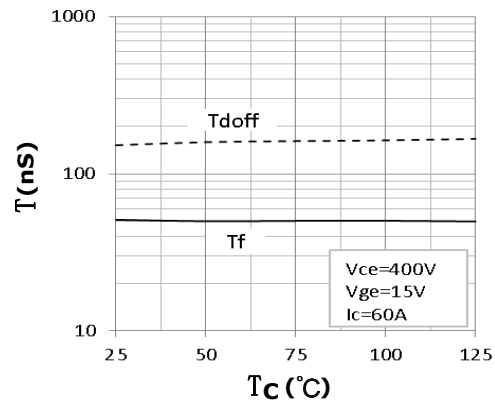


Figure 10. Closing Time-Tc Characteristics

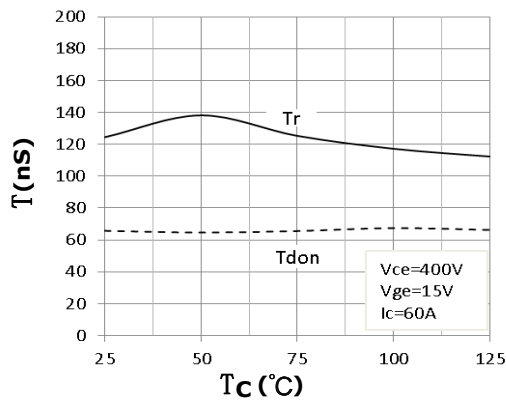


Figure 11. Opening Time-Tc Characteristics

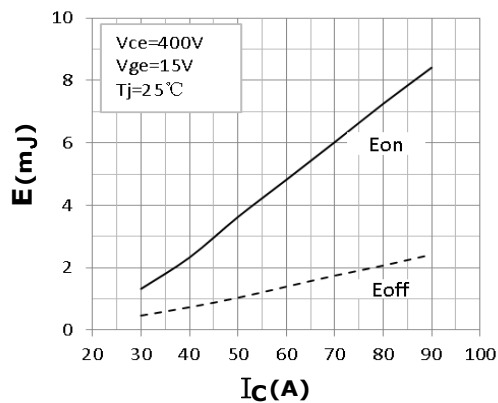


Figure 12. Switching Loss-IC Characteristics

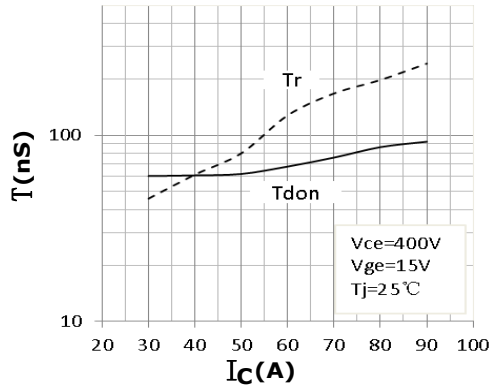


Figure 13. Opening Time-Ic Characteristics

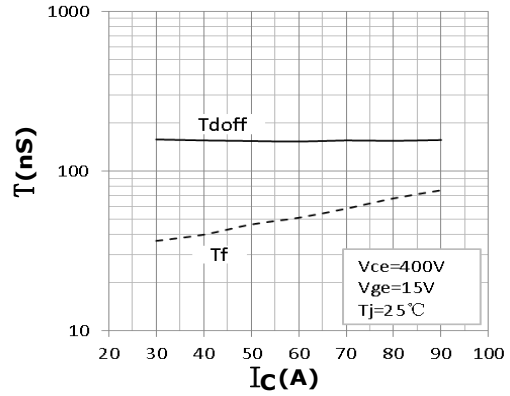


Figure 14. Closing Time-Ic Characteristics

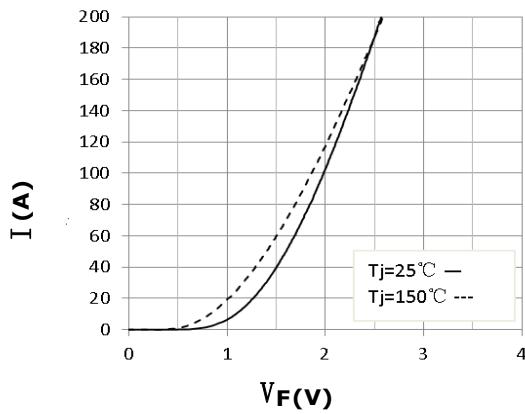


Figure 15. Diode Forward Characteristics

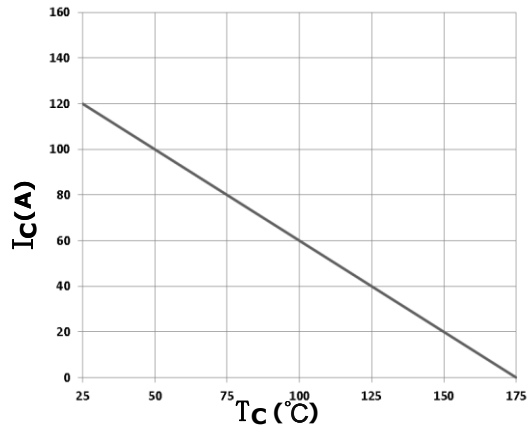


Figure 16. Collector Current-Tc Characteristics ($T_j \leq 175^\circ\text{C}$)

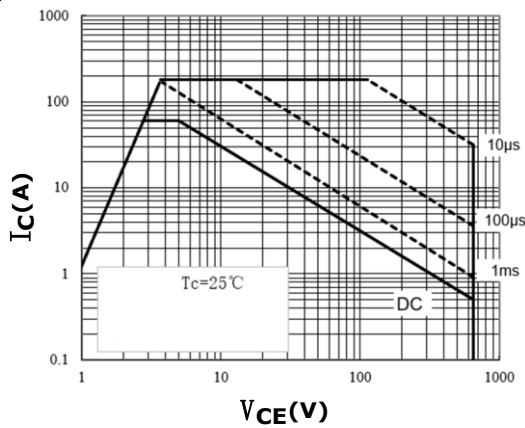


Figure 17. Forward Bias Safe Operating Area

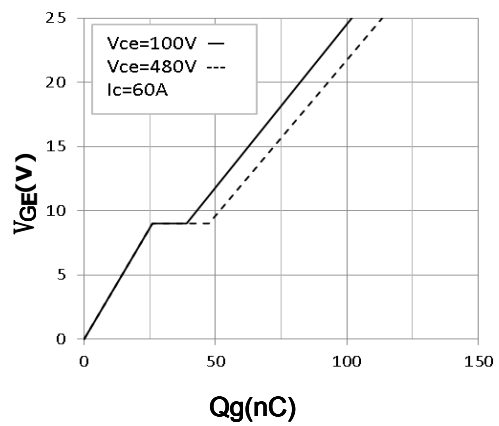


Figure 18. Gage Charge Characteristics

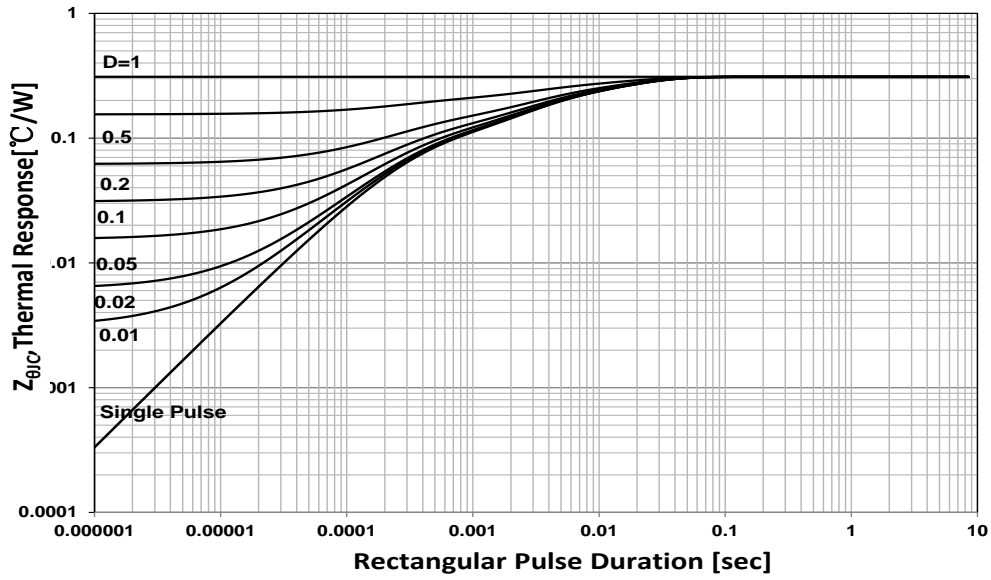
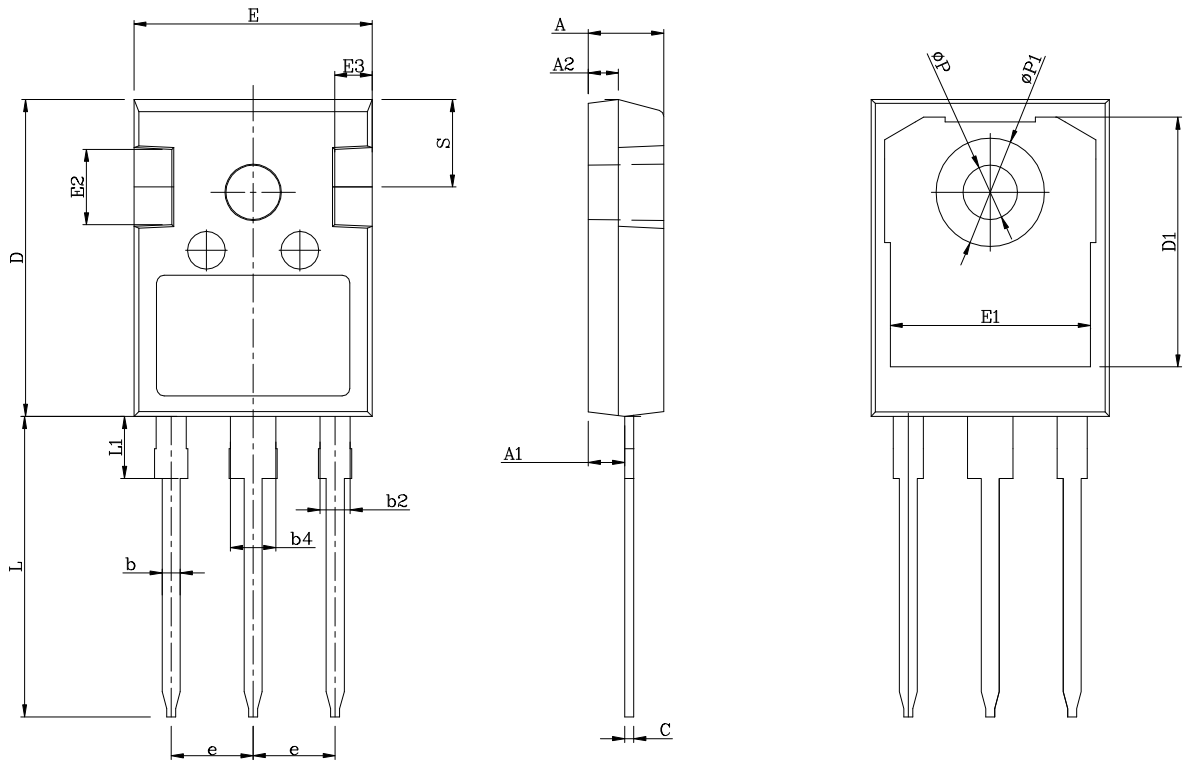


Figure 19. Transient Thermal Impedance

TO-247-3L



COMMON DIMENSIONS

SYMBOL	mm			SYMBOL	mm		
	Min	Nom	Max		Min	Nom	Max
A	4.80	5.00	5.20	E1	13.00	13.26	13.56
A1	2.23	2.41	2.59	E2	4.80	5.00	5.20
A2	1.85	2.00	2.15	E3	2.30	2.50	2.70
b	1.11	1.21	1.36	e	5.44BSC		
b2	1.91	2.01	2.21	L	19.82	19.92	20.22
b4	2.91	3.01	3.21	L1	3.94	4.12	4.30
c	0.51	0.61	0.75	ØP	3.40	3.60	3.80
D	20.80	21.00	21.30	ØP1	7.08	7.19	7.30
D1	16.25	16.55	16.85	S	6.15BSC		
E	15.50	15.80	16.10				