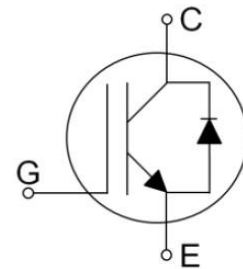


FEATURES

- High breakdown voltage up to 650V for improved reliability
- Trench-Stop Technology offering :
 - High speed switching
 - High ruggedness, temperature stable
 - Short circuit withstand time – 5 μ s
 - Low V_{CEsat}
 - Easy parallel switching capability due to positive temperature coefficient in V_{CEsat}

V_{CE}	650	V
I_C	100	A
$V_{CE(sat)}$ $I_C=100A$	1.75	V



APPLICATION

- Uninterruptible Power Supplies
- Inverter
- Welding Converters
- PFC applications
- Converter with high switching frequency

Product	Package	Packaging
YGQ100N65FP	TO247-PLUS	Tube

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

Parameter	Symbol	Value	Unit
Collector-Emitter Breakdown Voltage	V_{CE}	650	V
DC collector current, limited by T_{jmax} $T_C = 25^{\circ}\text{C}$ $T_C = 100^{\circ}\text{C}$	I_C	200 100	A
Diode Forward current, limited by T_{jmax} $T_C = 25^{\circ}\text{C}$ $T_C = 100^{\circ}\text{C}$	I_F	150 75	A
Continuous Gate-emitter voltage	V_{GE}	± 20	V
Transient Gate-emitter voltage	V_{GE}	± 30	V
Turn off safe operating area $V_{CE} \leq 650\text{V}$, $T_j \leq 175^{\circ}\text{C}$, $t_p = 1\mu\text{s}$	-	300	A
Pulse collector current, $V_{GE} = 15\text{V}$, t_p limited by T_{jmax}	I_{CM}	300	A
Short Circuit Withstand Time, $V_{GE} = 15\text{V}$, $V_{CE} \leq 400\text{V}$	T_{SC}	5	μs
Power dissipation, $T_j = 25^{\circ}\text{C}$	P_{tot}	500	W
Operating junction temperature	T_j	$-40 \dots +175$	$^{\circ}\text{C}$
Storage temperature	T_S	$-55 \dots +175$	$^{\circ}\text{C}$
Soldering temperature, wave soldering 1.6mm (0.063in.) from case for 10s	-	260	$^{\circ}\text{C}$

Thermal Resistance

Parameter	Symbol	Typ. Value	Unit
IGBT thermal resistance, junction - case	$R_{\theta(j-c)}$	0.25	K/W
Diode thermal resistance, junction - case	$R_{\theta(j-c)}$	0.4	K/W
Thermal resistance, junction - ambient	$R_{\theta(j-a)}$	40	K/W

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Static						
Collector-Emitter Breakdown Voltage	BV_{CES}	$V_{GE}=0V, I_C=250\mu A$	650	770	-	V
Gate Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=250\mu A$	4.6	4.8	5.0	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=100A$ $T_j = 25^\circ\text{C}$ $T_j = 175^\circ\text{C}$	- -	1.75 2.1	2.0 -	V
Zero gate voltage collector current	I_{CES}	$V_{CE} = 650V, V_{GE} = 0V$ $T_j = 25^\circ\text{C}$ $T_j = 175^\circ\text{C}$	- -	0.07 -	0.5 10	μA
Gate-emitter leakage current	I_{GES}	$V_{CE} = 0V, V_{GE} = \pm 20V$	-	-	100	nA
Transconductance	g_{fs}	$V_{CE} = 20V, I_C = 100A$	-	35	-	S

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Dynamic $T_j=25^\circ\text{C}$						
Input capacitance	C_{ies}	$V_{CE} = 25V, V_{GE} = 0V,$ $f = 1\text{MHz}$	-	5670	-	pF
Output capacitance	C_{oes}		-	370	-	
Reverse transfer capacitance	C_{res}		-	8	-	
Gate charge	Q_G	$V_{CC} = 520V, I_C = 100A,$ $V_{GE} = 15V$	-	135	-	nC
Short circuit collector current	$I_{C(SC)}$	$V_{GE}=15V, t_{SC} \leq 5\mu s$ $V_{CC}=400V,$ $T_{j, start}=25^\circ\text{C}$	-	640	-	A

Switching Characteristic, Inductive Load

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Dynamic $T_j=25^\circ\text{C}$						
Turn-on Delay Time	$t_{d(\text{on})}$	$V_{CC} = 400\text{V}, I_C = 100.0\text{A},$ $V_{GE} = 0.0/15.0\text{V},$ $R_g = 10\Omega$	-	75	-	ns
Rise Time	t_r		-	130	-	ns
Turn-off Delay Time	$t_{d(\text{off})}$		-	250	-	ns
Fall Time	t_f		-	125	-	ns
Turn-on Energy	E_{on}		-	4.0	-	mJ
Turn-off Energy	E_{off}		-	3.5	-	mJ

Electrical Characteristics of the DIODE ($T_j = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Dynamic $T_j=25^\circ\text{C}$						
Diode Forward Voltage	V_{FM}	$I_F = 100\text{A}$	-	2.1	-	v
Reverse Recovery Time	T_{rr}	$I_F = 100\text{A}, V_R = 400\text{V}$ $di/dt = 850\text{A}/\mu\text{s}$	-	50	-	ns
Reverse Recovery Current	I_{rr}		-	22	-	A
Reverse Recovery Charge	Q_{rr}		-	700	-	nC

YGQ100N65FP

Fig.1 Output characteristics

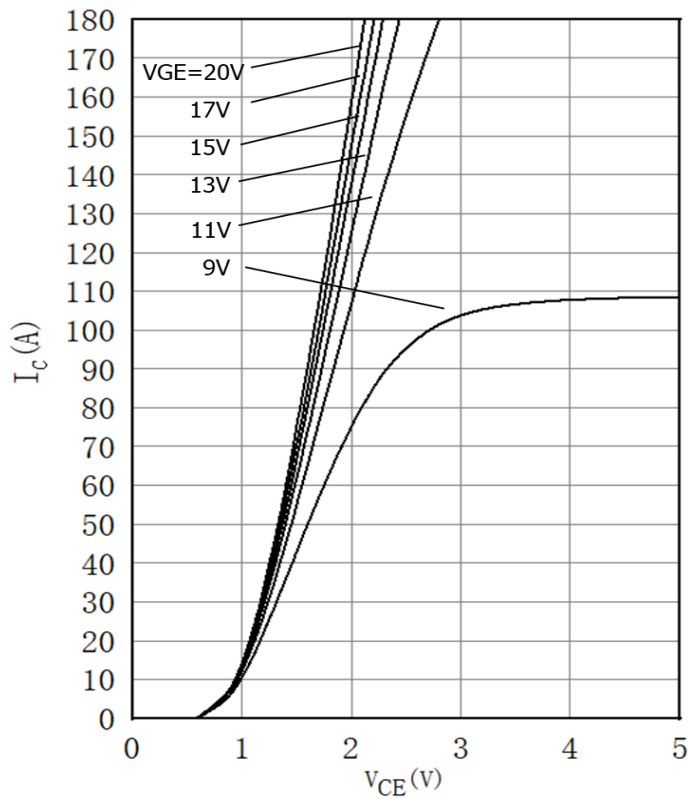


Fig.2 Transfer characteristic

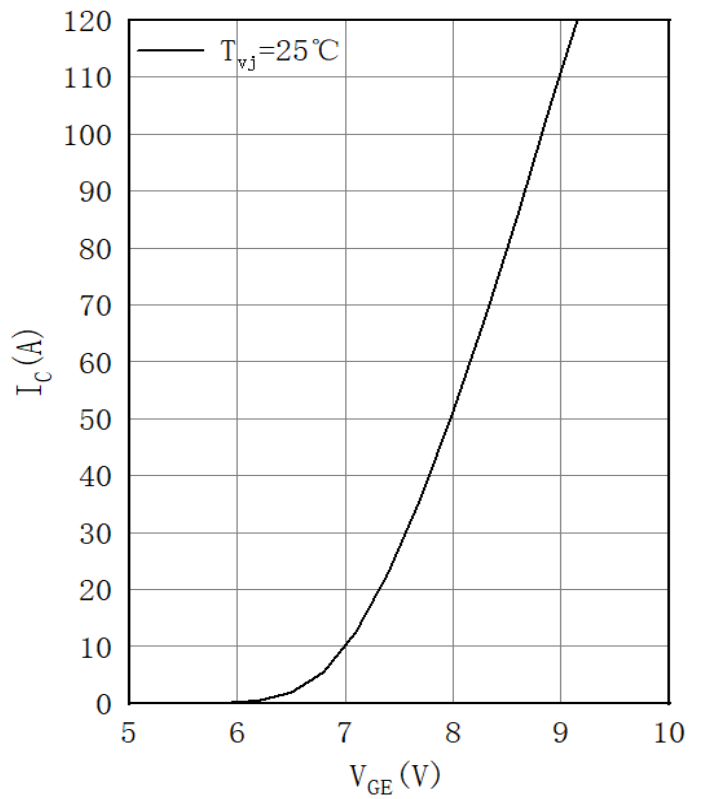


Fig.3 Switching times vs. gate resistor

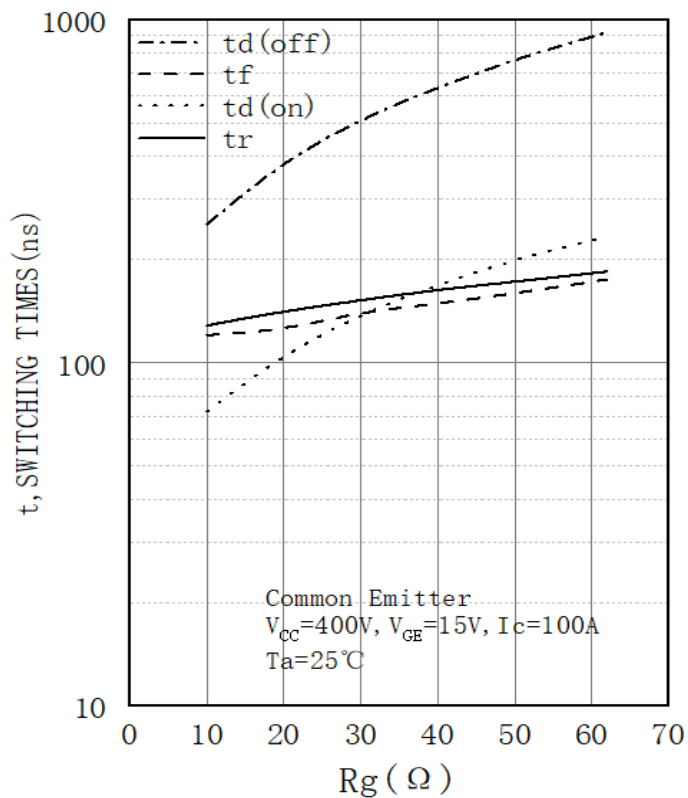


Fig.4 Switching times vs. collector current

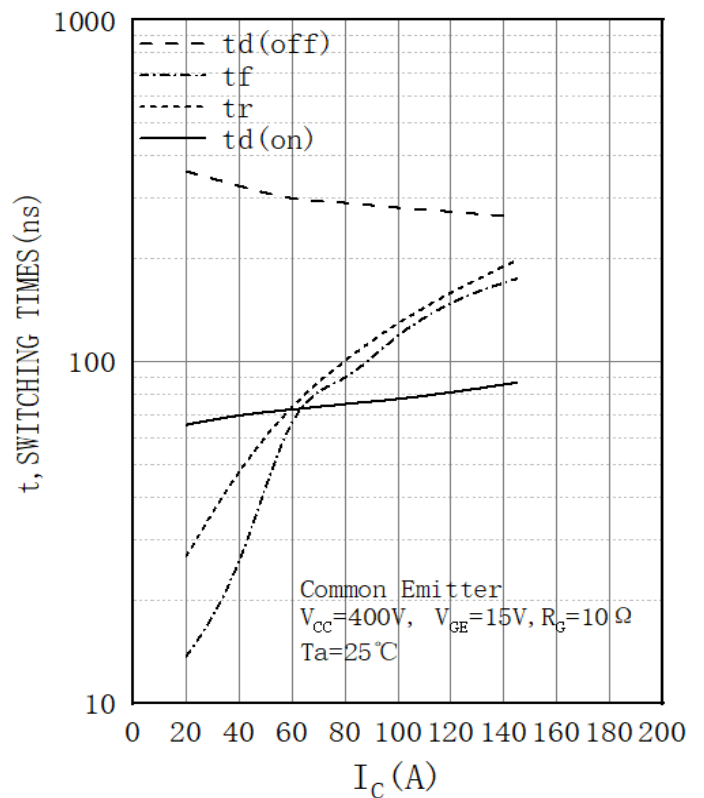


Fig.5 Switching loss vs. gate resistor

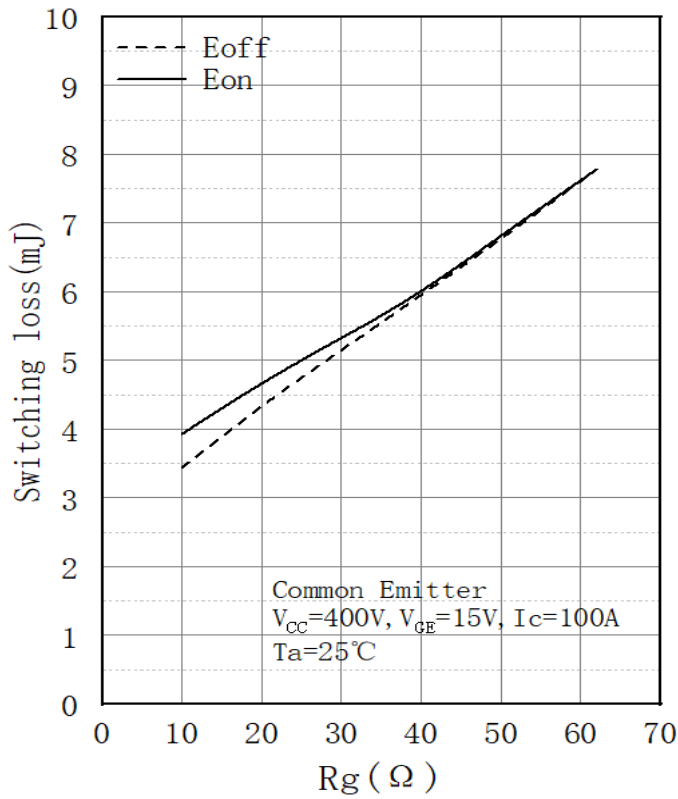
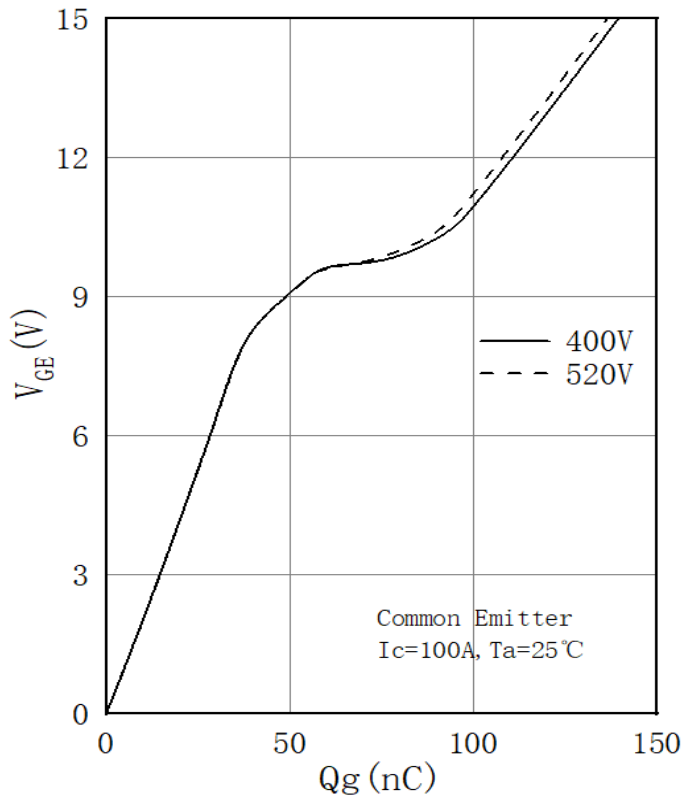


Fig.7 Gate charge characteristics



YGQ100N65FP

Fig.6 Switching loss vs. collector current

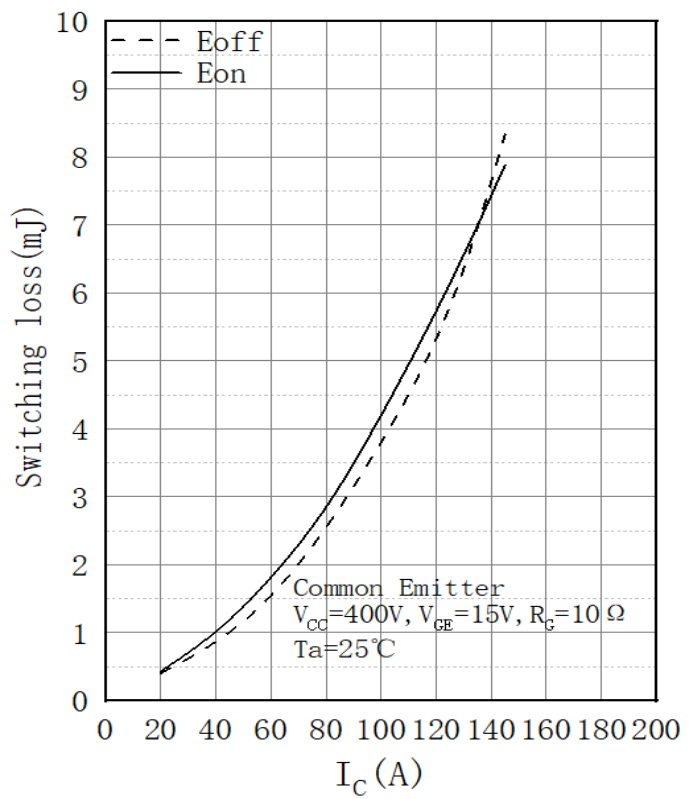
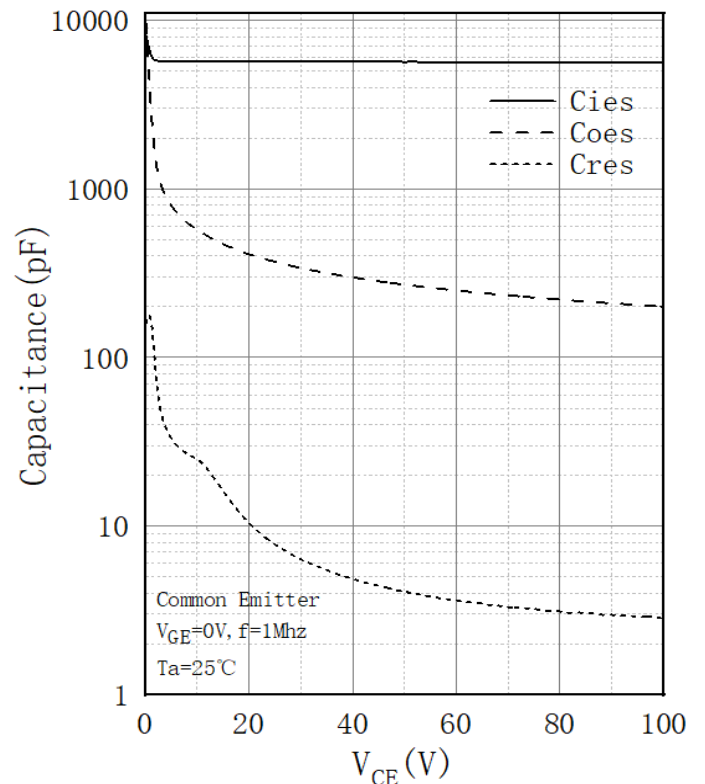
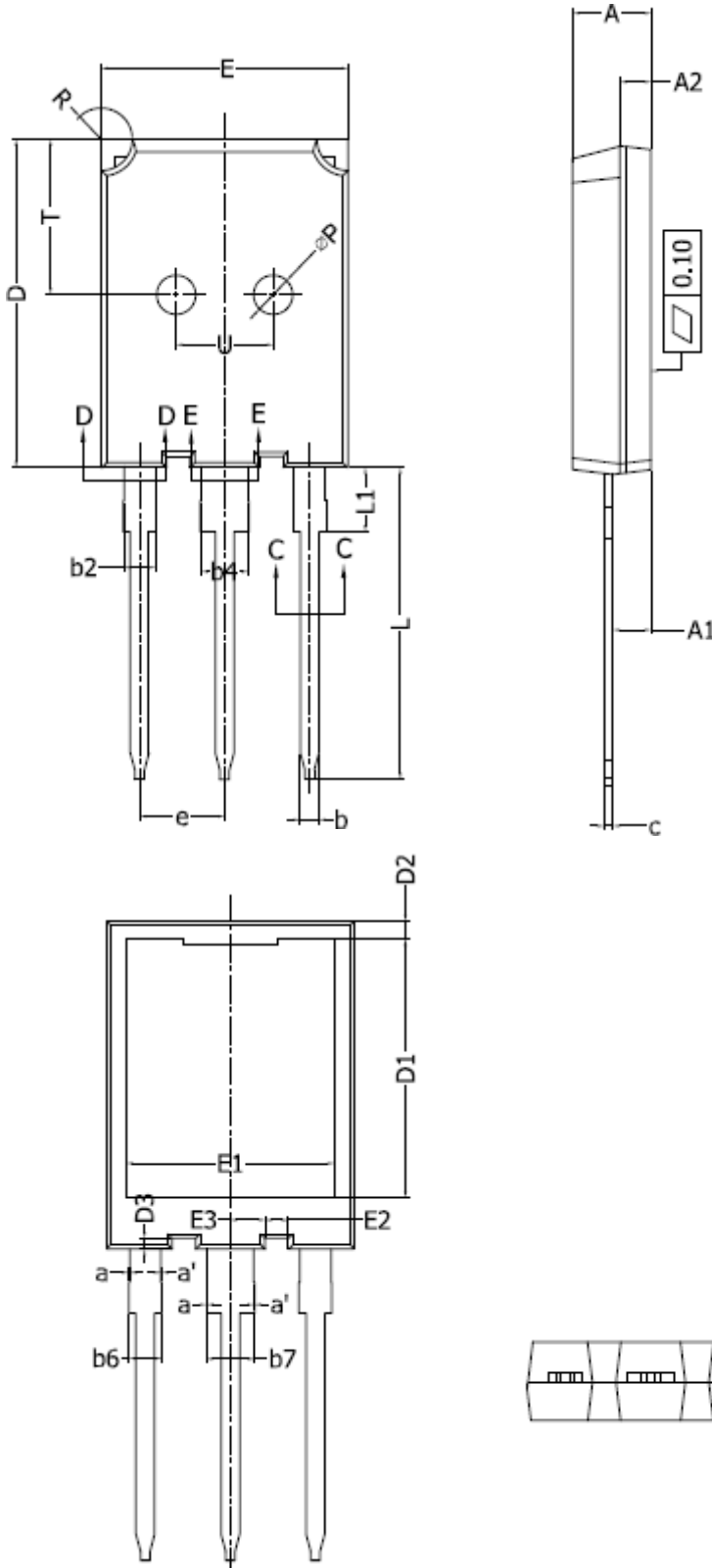


Fig.8 Capacitance characteristics



TO247-PLUS package information



COMMON DIMENSIONS
(UNITS OF MEASURE =MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	4.90	5.00	5.10
A1	2.31	2.41	2.51
A2	1.90	2.00	2.10
a	0	—	0.15
a'	0	—	0.15
b	1.16	—	1.26
b1	1.15	1.2	1.22
b2	1.96	—	2.06
b3	1.95	2.00	2.02
b4	2.96	—	3.06
b5	2.96	3.00	3.02
b6	—	—	2.25
b7	—	—	3.25
c	0.59	—	0.66
c1	0.59	0.60	0.66
D	20.90	21.00	21.10
D1	16.25	16.55	16.85
D2	1.05	1.17	1.35
D3	0.58	—	0.78
E	15.70	15.80	15.90
E1	13.10	13.30	13.50
E2	1.40	1.50	1.60
E3	2.12	2.22	2.32
e	5.436 BSC		
L	19.80	19.95	20.10
L1	—	—	4.30
P	2.40	2.50	2.60
R	1.90	—	2.10
T	9.80	—	10.20
U	6.00	—	6.40

