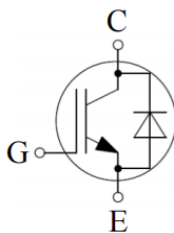


IGBT Discrete

V_{CE}	650	V
I_C	100	A
$V_{CE(SAT)} I_C=100A$	1.25	V

Circuit



Applications

- General purpose inverters
- Motor drives
- Uninterruptible power supply

Features

- High speed smooth switching device for hard & soft switching
- Maximum junction temperature 175°C
- Positive temperature coefficient
- High ruggedness, temperature stable

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-Emitter Breakdown Voltage	V_{CE}	650	V
DC Collector Current, limited by T_{jmax} $T_C=25^{\circ}C$ value limited by bondwire $T_C=100^{\circ}C$	I_C	160 100	A
Diode Forward Current, limited by T_{jmax} $T_C=25^{\circ}C$ value limited by bondwire $T_C=100^{\circ}C$	I_F	160 100	A
Continuous Gate-Emitter Voltage	V_{GE}	± 20	V
Transient Gate-Emitter Voltage ($t_p \leq 10\mu s, D < 0.010$)	V_{GE}	± 30	V
Turn off Safe Operating Area $V_{CE} \leq 650V$, $T_j \leq 150^{\circ}C$		400	A
Pulsed Collector Current, $V_{GE}=15V$, t_p limited by T_{jmax}	I_{CM}	400	A
Diode Pulsed Current, t_p limited by T_{jmax}	I_{Fpuls}	400	A
Power Dissipation, $T_j=175^{\circ}C$, $T_C=25^{\circ}C$	P_{tot}	428	W



Operating Junction Temperature	T_j	-40...+175	°C
Storage Temperature	T_s	-55...+150	°C
Soldering Temperature, wave soldering 1.6mm (0.063in.) from case for 10s		260	°C

Electrical Characteristics of the IGBT ($T_j = 25^\circ\text{C}$ 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		-	V
Gate Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=1.20mA$	4.25	4.75	5.25	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=100A$ $T_j=25^\circ\text{C}$, $T_j=125^\circ\text{C}$ $T_j=150^\circ\text{C}$	0.90	1.25 1.35 1.40	1.60	V
Zero Gate Voltage Collector Current	I_{CES}	$V_{CE}=650V, V_{GE}=0V$ $T_j = 25^\circ\text{C}$, $T_j=150^\circ\text{C}$			0.25 3.00	mA
Gate-Emitter Leakage Current	I_{GES}	$V_{CE}= 0V, V_{GE}= \pm 20V$			200	nA

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic						
Input Capacitance	C_{ies}	$V_{CE}= 25V, V_{GE}= 0V$, $f = 1MHz$	-	5.13	-	nF
Reverse Transfer Capacitance	C_{res}		-	0.05	-	
Gate Charge	Q_G	$V_{CC}=300V, I_C=100A$, $V_{GE}=-5V\sim+15V$	-	0.26	-	uC



Electrical Characteristics of the Diode (T_j= 25°C unless otherwise specified):

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static						
Diode Forward Voltage	V _F	I _F = 100A T _j = 25°C, T _j = 125°C T _j = 150°C		1.40 1.35 1.30	1.90	V

Switching Characteristic, Inductive Load

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic , at T _j = 25℃						
Turn-on Delay Time	t _{d(on)}	V _{CC} =300V, I _C =100A, V _{GE} = -5v~15V, R _g =10Ω Inductive Load	-	26	-	ns
Rise Time	t _r		-	110	-	ns
Turn-on Energy	E _{on}		-	4.0	-	mJ
Turn-off Delay Time	t _{d(off)}		-	204	-	ns
Fall Time	t _f		-	100	-	ns
Turn-off Energy	E _{off}		-	2.4	-	mJ
Total switching energy	E _{ts}		-	6.4	-	mJ
Dynamic , at T _j = 125℃						
Turn-on Delay Time	t _{d(on)}	V _{CC} =300V, I _C =100A, V _{GE} = -5v~15V, R _g =10Ω Inductive Load	-	27	-	ns
Rise Time	t _r		-	97	-	ns
Turn-on Energy	E _{on}		-	4.1	-	mJ
Turn-off Delay Time	t _{d(off)}		-	232	-	ns
Fall Time	t _f		-	138	-	ns
Turn-off Energy	E _{off}		-	3.1	-	mJ
Total switching energy	E _{ts}		-	7.2	-	mJ
Dynamic , at T _j = 150℃						
Turn-on Delay Time	t _{d(on)}	V _{CC} =300V, I _C =100A, V _{GE} = -5v~15V, R _g =10Ω Inductive Load	-	27	-	ns
Rise Time	t _r		-	90	-	ns
Turn-on Energy	E _{on}		-	4.2	-	mJ
Turn-off Delay Time	t _{d(off)}		-	240	-	ns
Fall Time	t _f		-	153	-	ns
Turn-off Energy	E _{off}		-	3.4	-	mJ
Total switching energy	E _{ts}		-	7.6	-	mJ

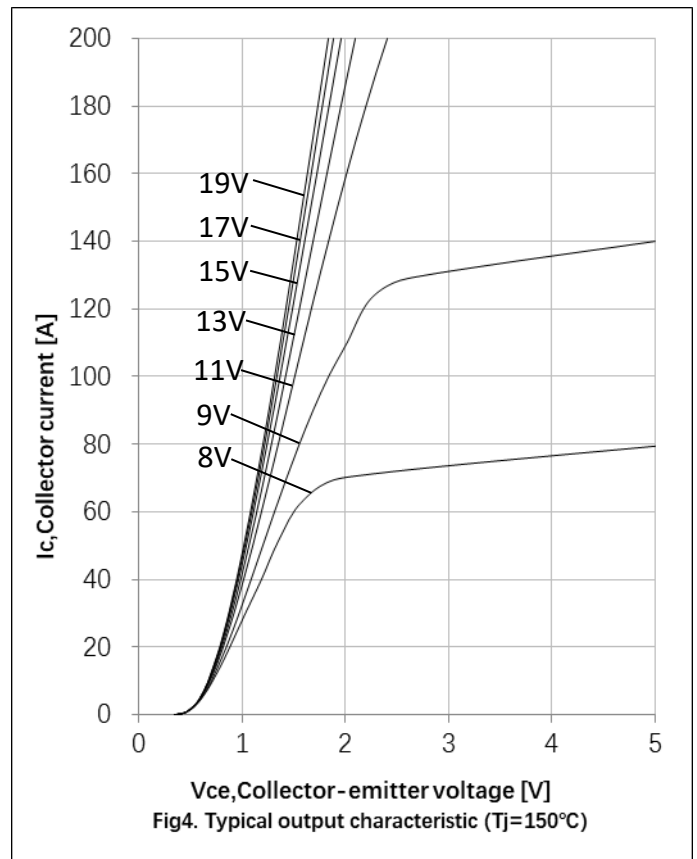
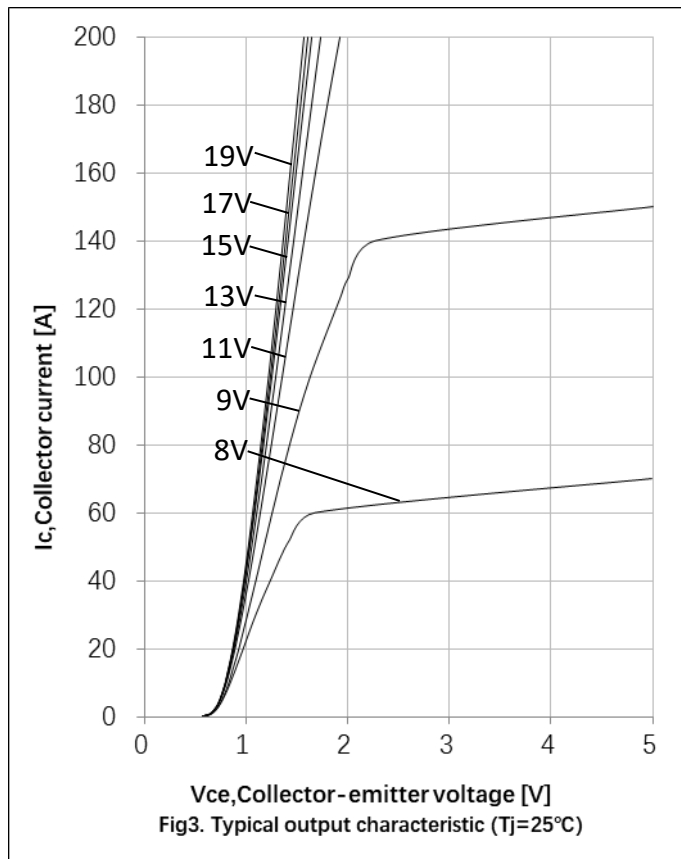
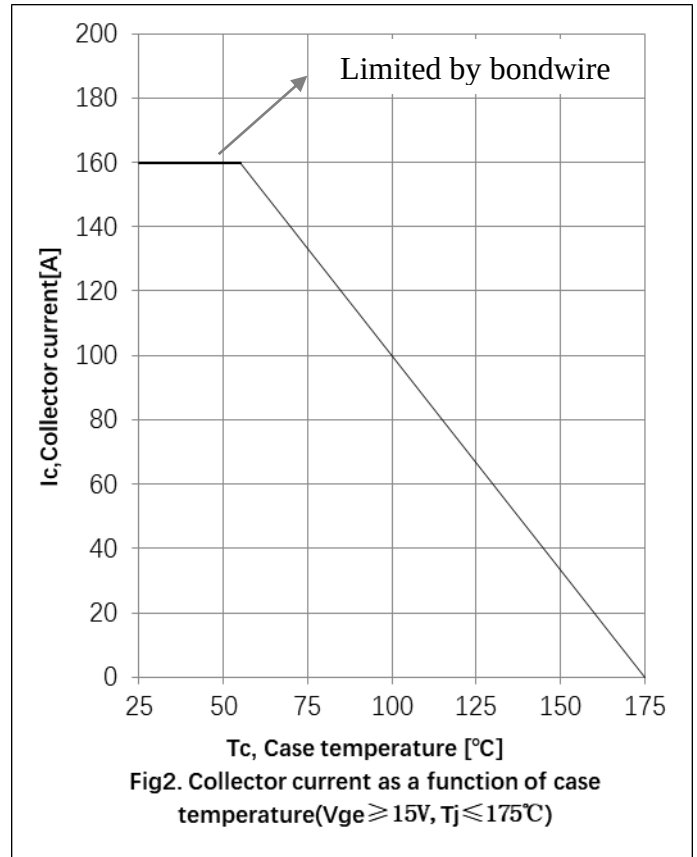
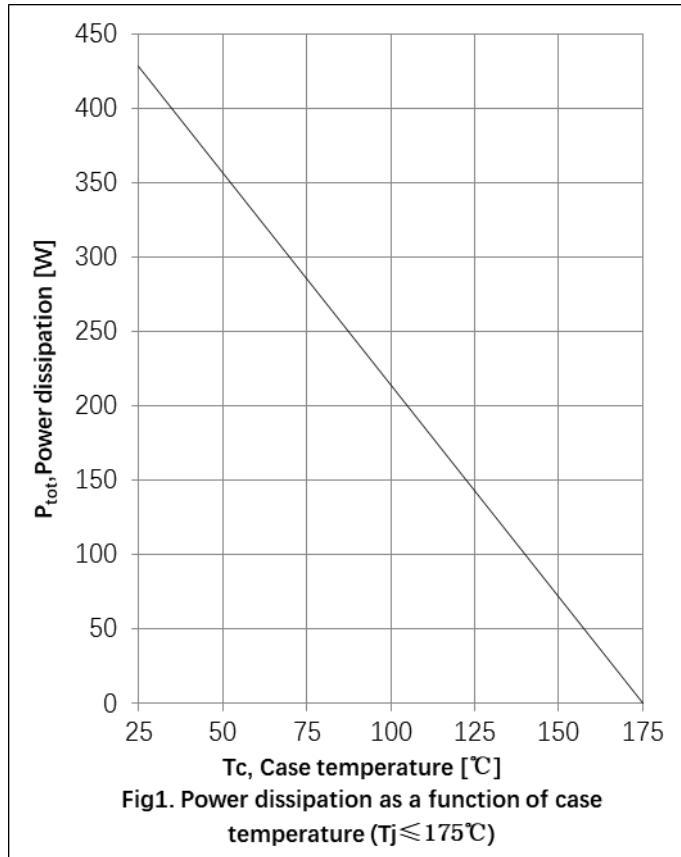


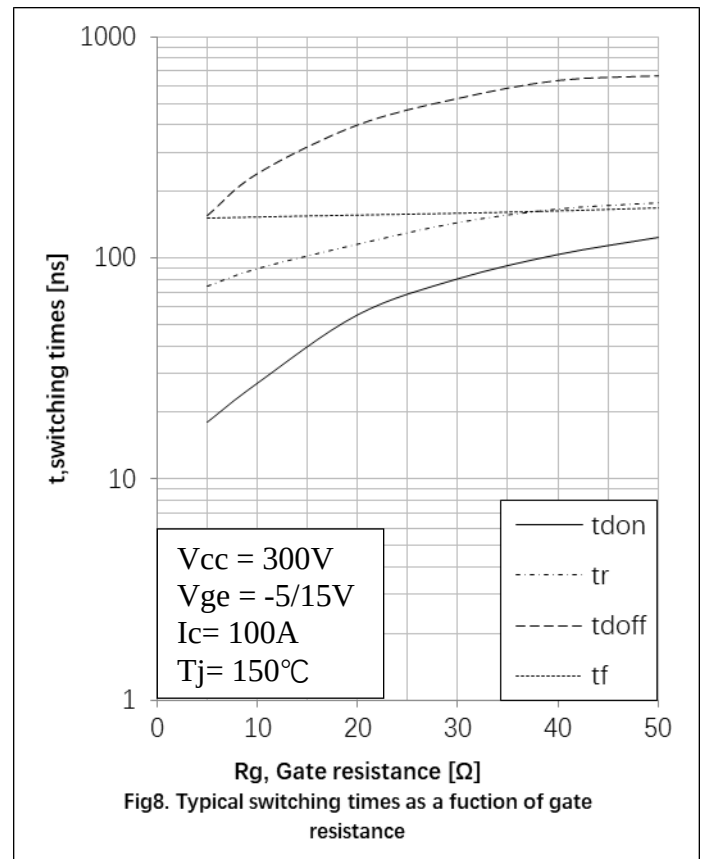
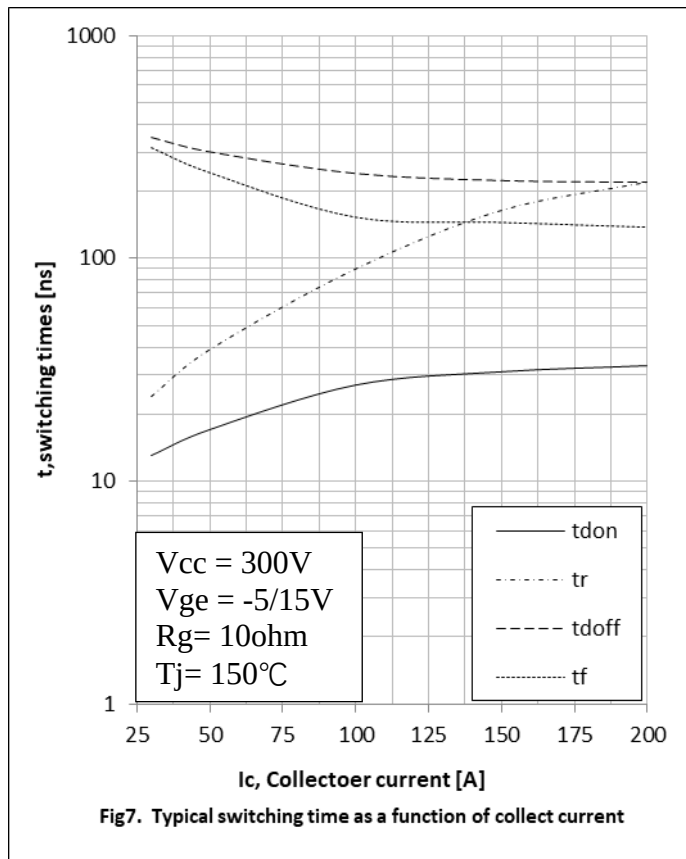
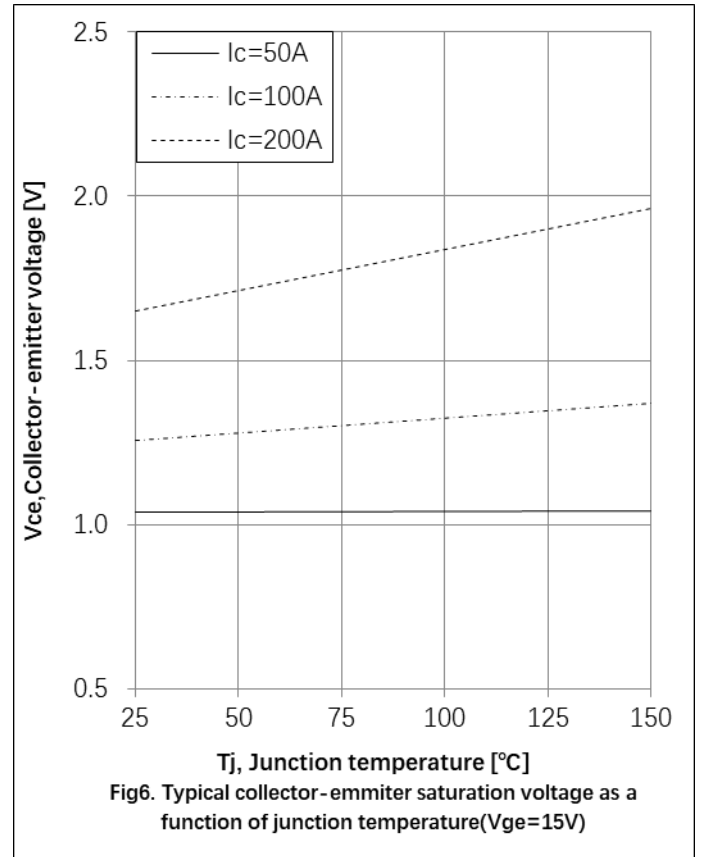
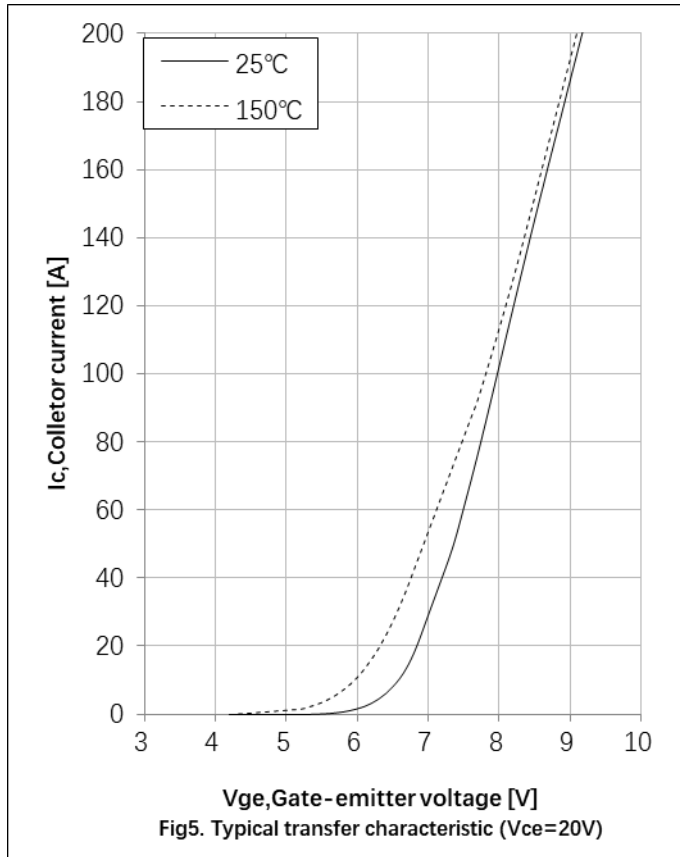
Electrical Characteristics of the DIODE

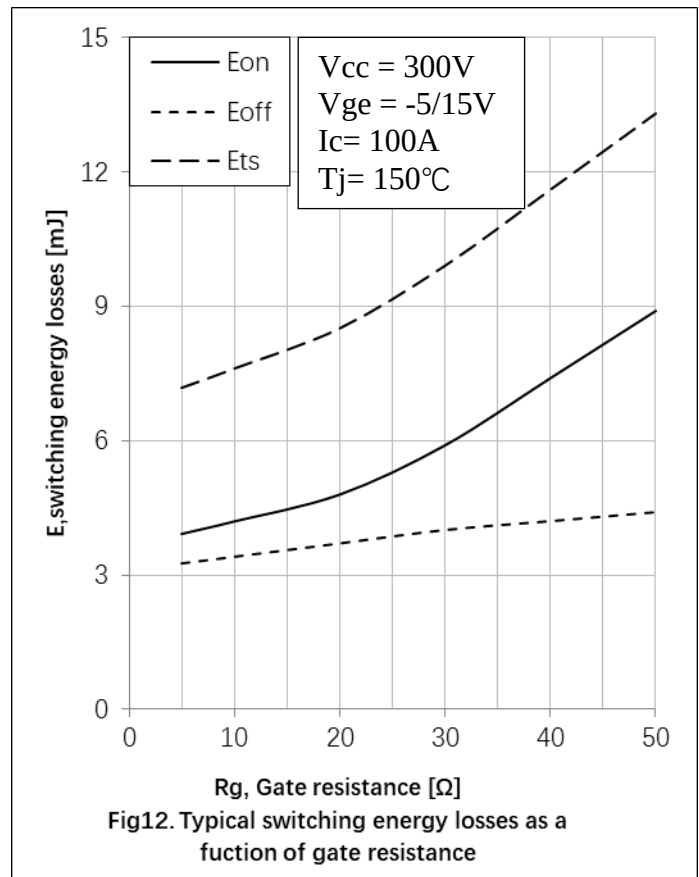
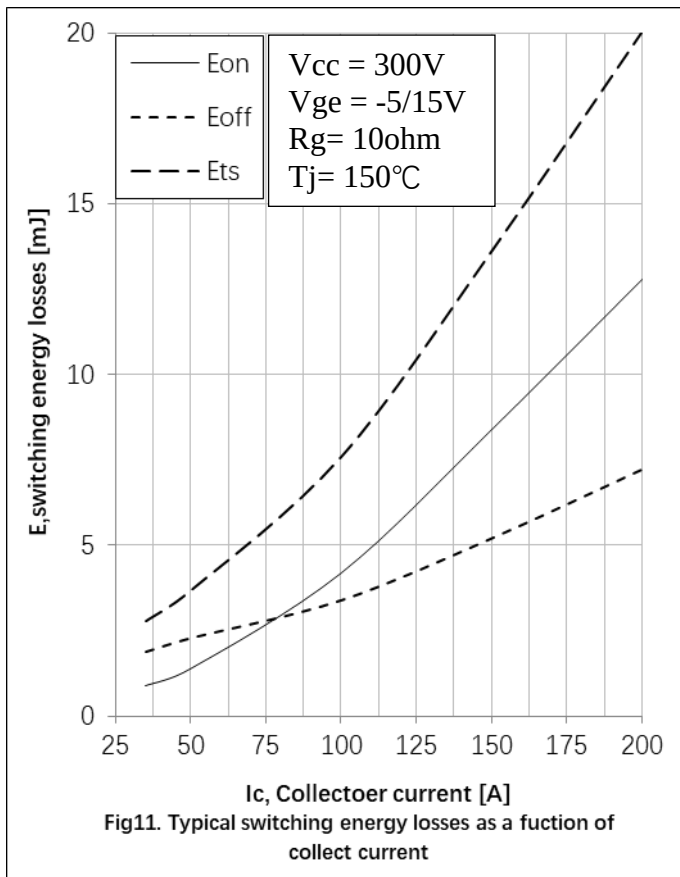
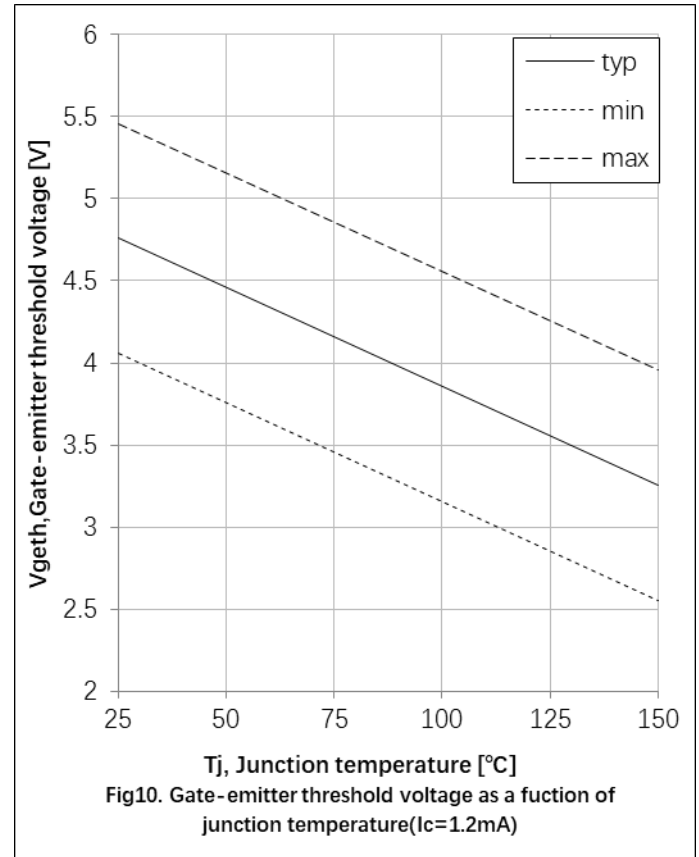
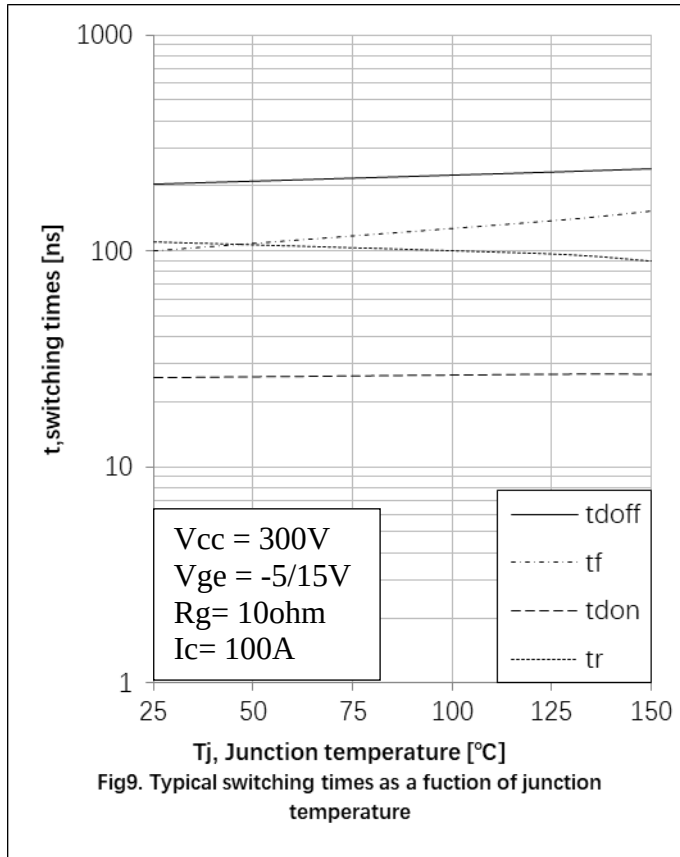
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic , at T _j = 25°C						
Reverse Recovery Current	I _{rr}	I _F =100A, V _R =300V -di/dt=550A/μs,	-	23	-	A
Reverse Recovery Charge	Q _{rr}		-	1.8	-	uC
Diode reverse recovery time	trr		-	116	-	ns
Reverse Recovery Energy	E _{rec}		-	0.16	-	mJ
Dynamic , at T _j = 125°C						
Reverse Recovery Current	I _{rr}	I _F =100A, V _R =300V -di/dt=550A/μs,	-	36	-	A
Reverse Recovery Charge	Q _{rr}		-	4.2	-	uC
Diode reverse recovery time	trr		-	158	-	ns
Reverse Recovery Energy	E _{rec}		-	0.47	-	mJ
Dynamic , at T _j = 150°C						
Reverse Recovery Current	I _{rr}	I _F =100A, V _R =300V -di/dt=550A/μs,	-	41	-	A
Reverse Recovery Charge	Q _{rr}		-	5.7	-	uC
Diode reverse recovery time	trr		-	197	-	ns
Reverse Recovery Energy	E _{rec}		-	0.61	-	mJ

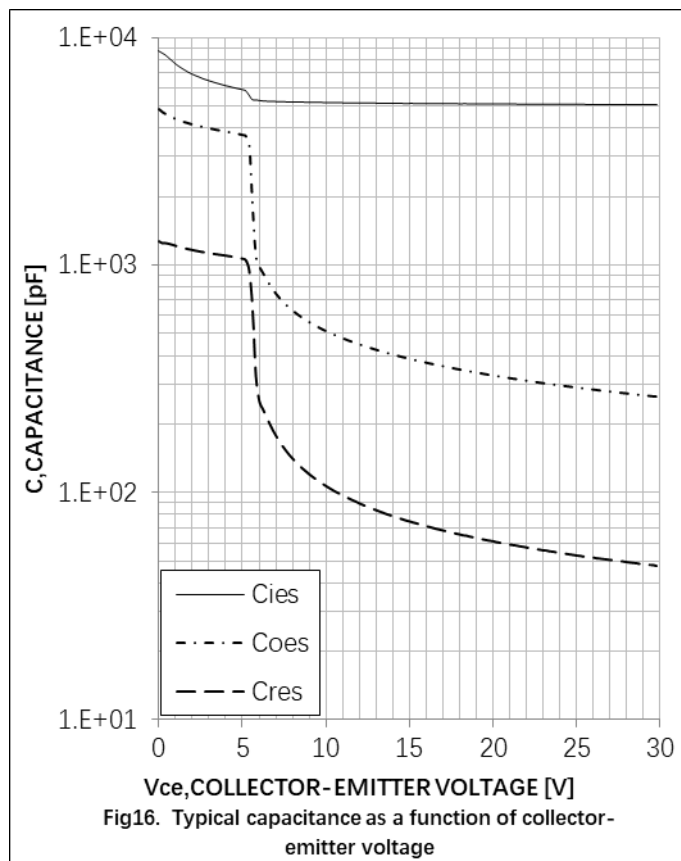
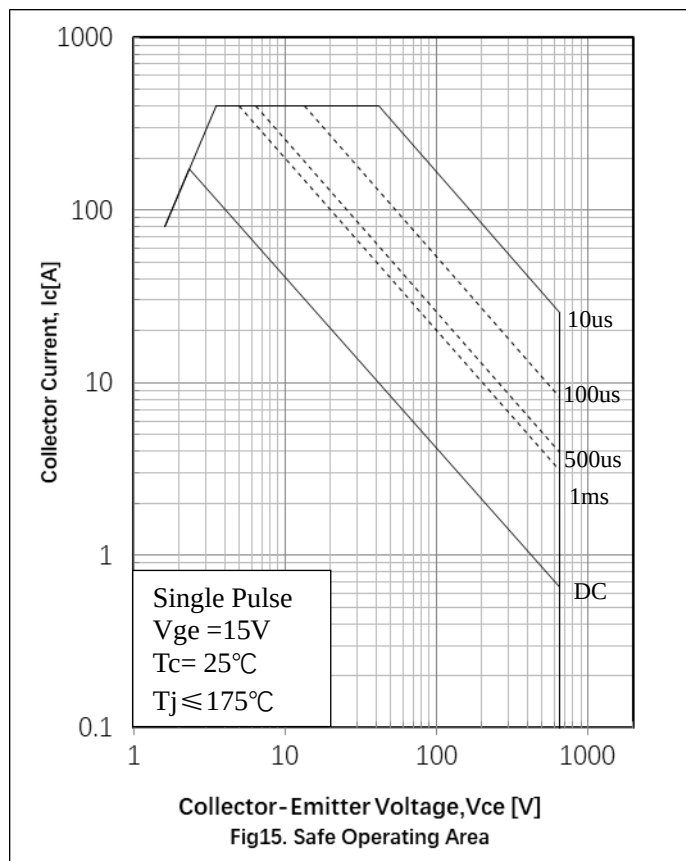
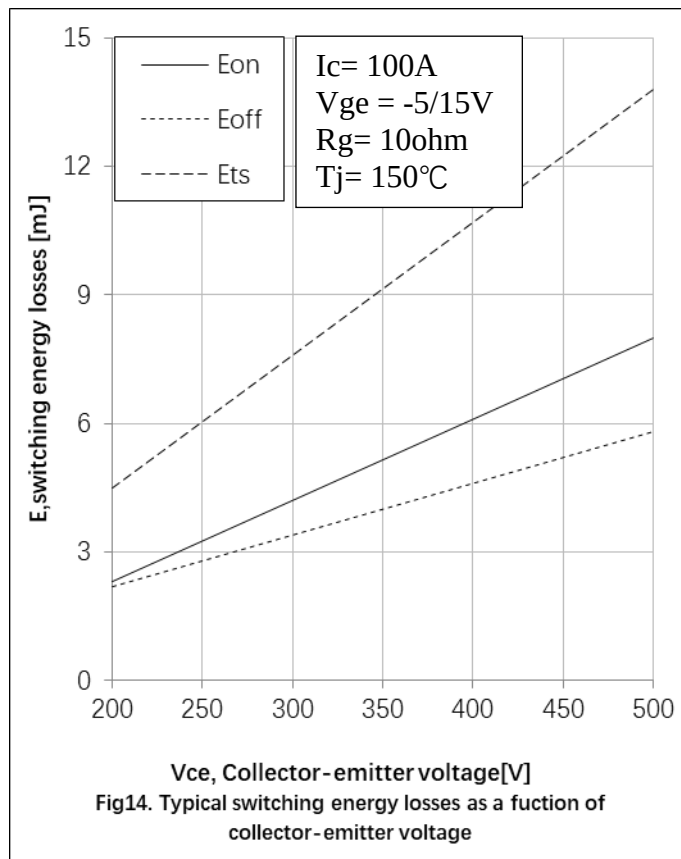
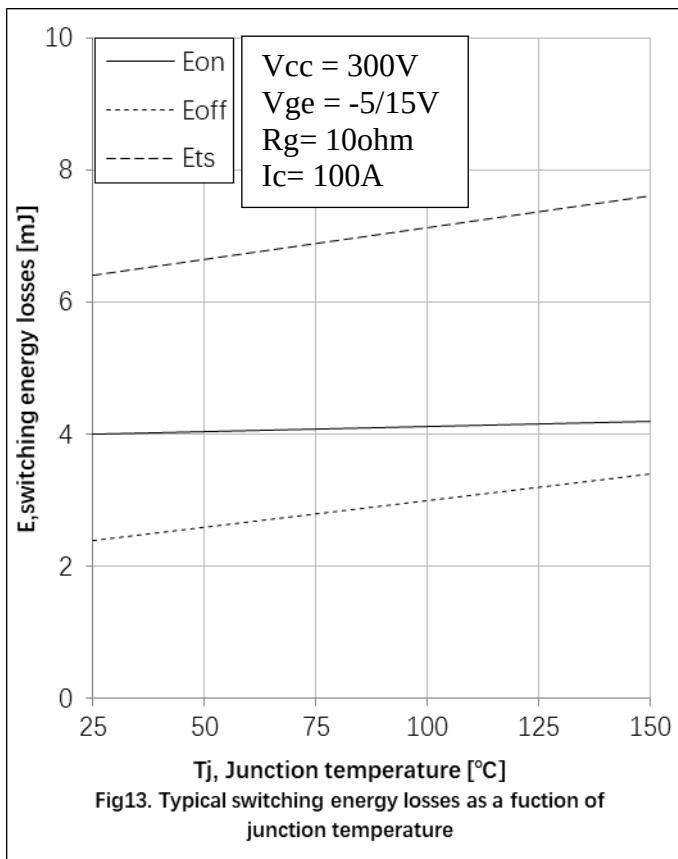
Thermal Resistance

Parameter	Symbol	Max. Value	Unit
IGBT Thermal Resistance, Junction - Case	R _{th(j-c)}	0.35	K/W
Diode Thermal Resistance, Junction - Case	R _{th(j-c)}	0.45	K/W
Thermal Resistance, Junction - Ambient	R _{th(j-a)}	40	K/W









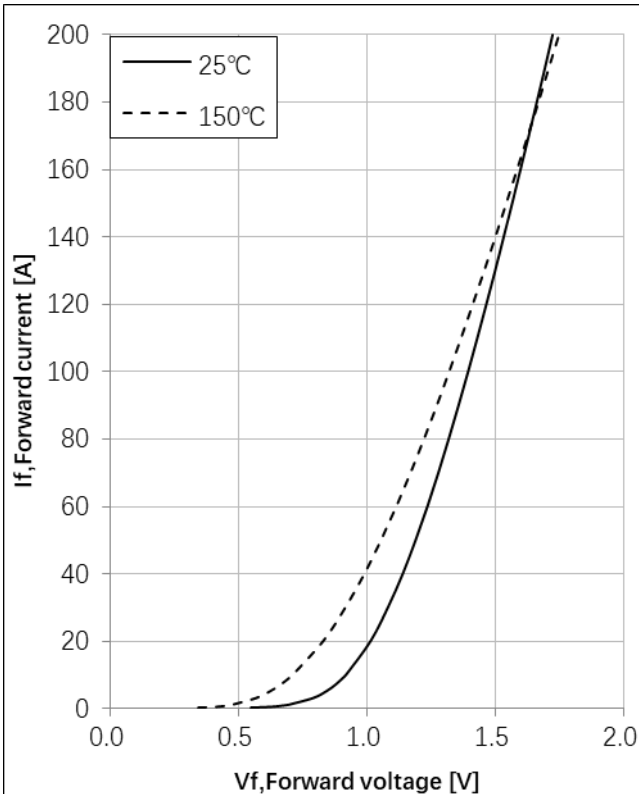


Fig17. Diode forward current as a function of forward voltage

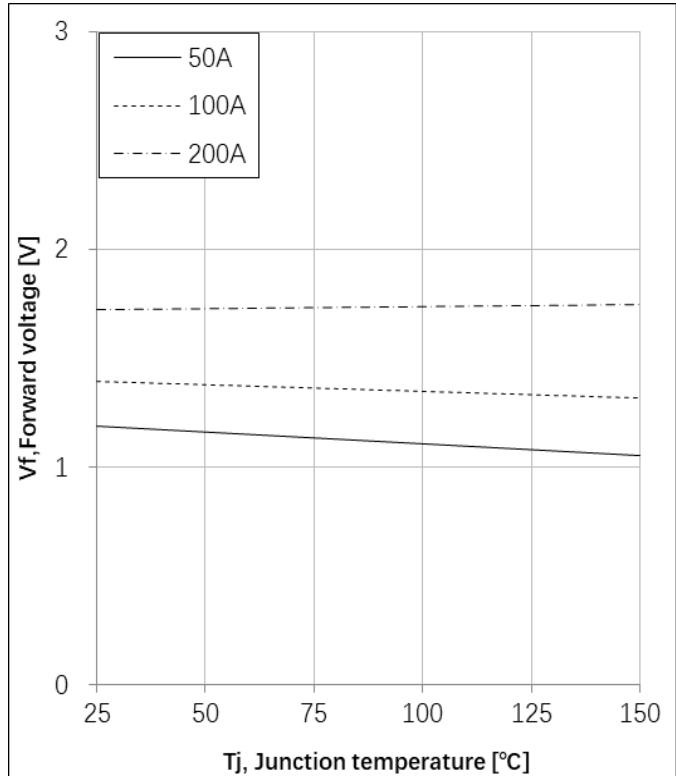


Fig18. Diode forward voltage as a function of junction temperature

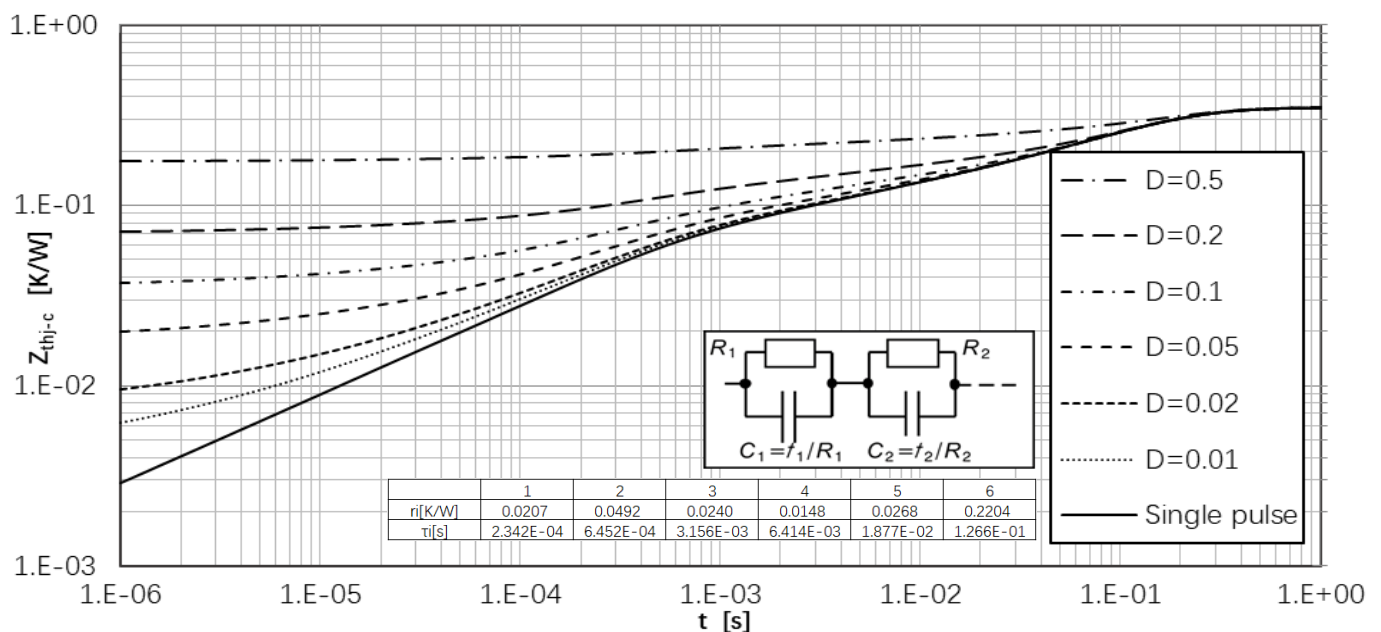
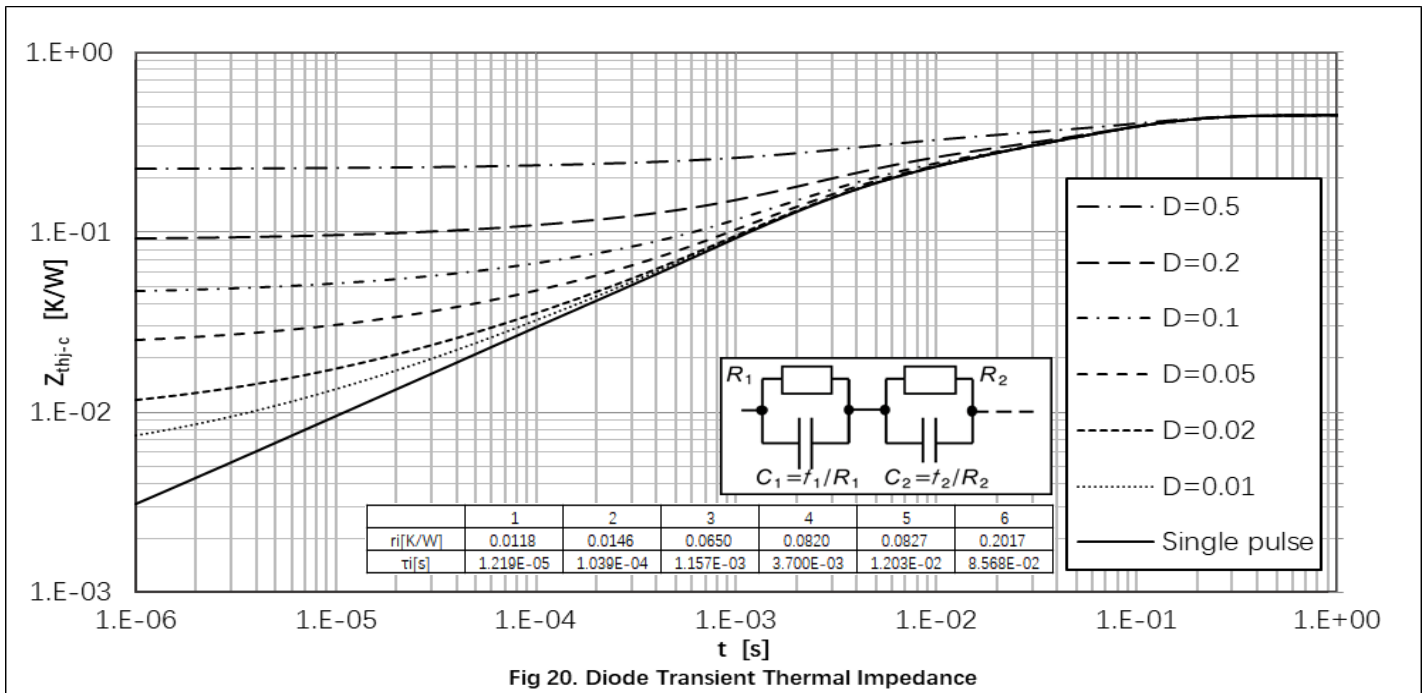
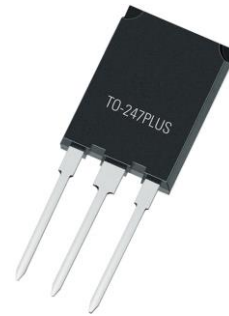
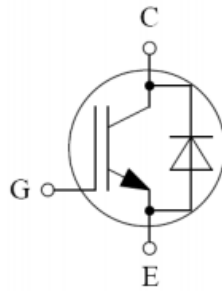


Fig 19. IGBT Transient Thermal Impedance

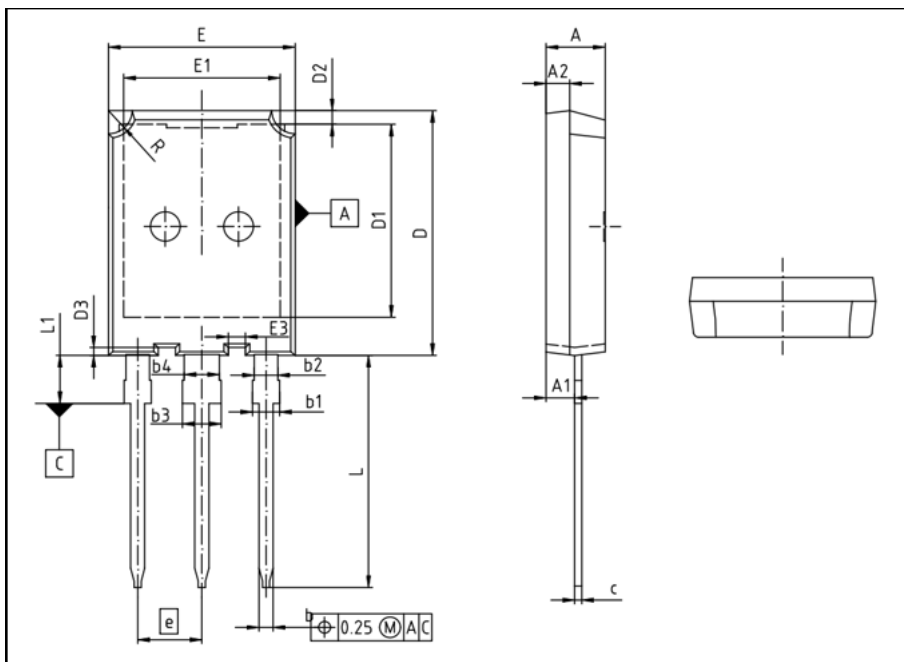


Circuit Diagram



● Package Outline Information

CASE: TO 247plus



DIM	MILLIMETERS	
	MIN	MAX
A	4.90	5.10
A1	2.31	2.51
A2	1.90	2.10
b	1.16	1.26
b1	1.86	2.16
b2	1.96	2.06
c	0.58	0.64
D	20.90	21.10
D1	16.25	16.85
D2	1.05	1.35
D3	0.58	0.78
E	15.70	15.90
E1	13.10	13.50
E3	1.35	1.55
e	5.44(BSC)	
L	19.78	20.08
L1	4.03	4.23
R	1.90	2.10