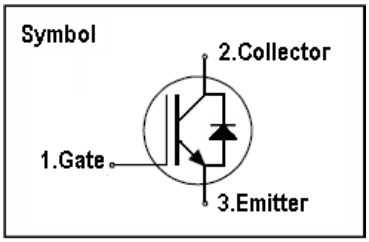
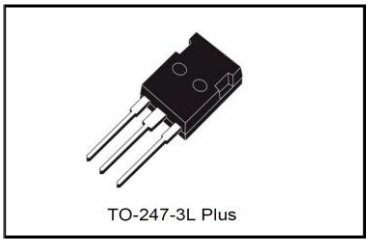
IGBT

Features





- 1200V,75A
- $V_{CE(sat)(typ.)}$=1.85V@V_{GE}=15V,I_C=75A
- High speed switching
- Higher system efficiency
- Soft current turn-off waveforms
- Square RBSOA

General Description

JIAEN FS-IGBTs offer lower losses and higher energy efficiency for application such as general inverter and other soft switching applications.

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
V_{CES}	Collector-Emitter Voltage	1200	V
V_{GES}	Gate-Emitter Voltage	± 30	V
I_C	Continuous Collector Current (T_C=25 ℃)	115	A
	Continuous Collector Current (T_C=100℃)	75	A
I_{CM}	Pulsed Collector Current (Note 1)	225	A
I_F	Diode Continuous Forward Current (T_C=100 ℃)	75	A
I_{FM}	Diode Maximum Forward Current (Note 1)	225	A
t_{sc}	Short Circuit Withstand Time（Tj≤150℃）	10	us
P_D	Maximum Power Dissipation (T_C=25 ℃)	625	W
	Maximum Power Dissipation (T_C=100℃)	250	W
T_J	Operating Junction Temperature Range	-55 to +150	℃
T_{STG}	Storage Temperature Range	-55 to +150	℃

Thermal Characteristics

Symbol	Parameter	Max.	Units
$R_{th\ j\text{-}c}$	Thermal Resistance, Junction to case for IGBT	0.2	℃/ W
$R_{th\ j\text{-}c}$	Thermal Resistance, Junction to case for Diode	0.4	℃/ W
$R_{th\ j\text{-}a}$	Thermal Resistance, Junction to Ambient	40	℃/ W

Electrical Characteristics (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{CES}	Collector-Emitter Breakdown Voltage	V_{GE}= 0V, I_C= 250uA	1200	-	-	V
I_{CES}	Collector-Emitter Leakage Current	V_{CE}= 1200V, V_{GE}= 0V	-	-	100	uA
I_{GES}	Gate Leakage Current, Forward	V_{GE}=30V, V_{CE}= 0V	-	-	100	nA
	Gate Leakage Current, Reverse	V_{GE}= -30V, V_{CE}= 0V	-	-	100	nA
$V_{GE(th)}$	Gate Threshold Voltage	V_{GE}= V_{CE}, I_C= 250uA	4.5	-	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C= 75A TC=25℃	1.45	1.85	2.30	V
		I_C= 150A TC=25℃		2.55		
		I_C= 75A TC=125℃		2.40		
		I_C= 75A TC=150℃		2.55		
Qg	Total Gate Charge	V_{CC}=600V V_{GE}=15V I_C=75A	-	270		nC
Qge	Gate-Emitter Charge		-	105		nC
Qgc	Gate-Collector Charge		-	140		nC
$t_{d(on)}$	Turn-on Delay Time	V_{CC}=600V V_{GE}=15V I_C=75A R_G=15Ω Inductive Load T_C=25 ℃ note2	-	168	-	ns
t_r	Turn-on Rise Time		-	108	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	816	-	ns
t_f	Turn-off Fall Time		-	119	-	ns
Eon	Turn-on Switching Loss		-	8.75	-	mJ
Eoff	Turn-off Switching Loss		-	8.60	-	mJ
Ets	Total Switching Loss		-	17.35	-	mJ
Cies	Input Capacitance	V_{CE}=25V V_{GE}=0V f = 1MHz	-	7350	-	pF
Coes	Output Capacitance		-	320	-	pF
Cres	Reverse Transfer Capacitance		-	40	-	pF

Electrical Characteristics of Diode (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage	I_F=75A	-	2.10	3.10	V
		I_F=75A TC=125℃		1.75		
		I_F=75A TC=150℃		1.67		
t_{rr}	Diode Reverse Recovery Time	V_{CE} = 600V I_F= 75A dI_F/dt = 100A/us	-	430		ns
I_{rr}	Diode peak Reverse Recovery Current		-	36.5		A
Q_{rr}	Diode Reverse Recovery Charge		-	4.4		uC

Notes：

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. From jiaen labroratory

Typical Performance Characteristics

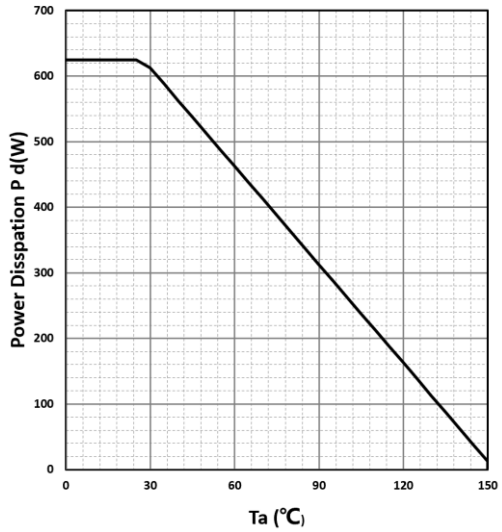


Figure1: power dissipation VS. case temprature

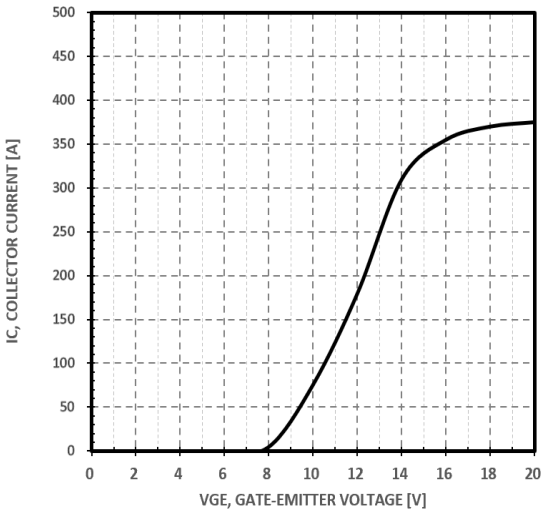


Figure2: VGE VS IC

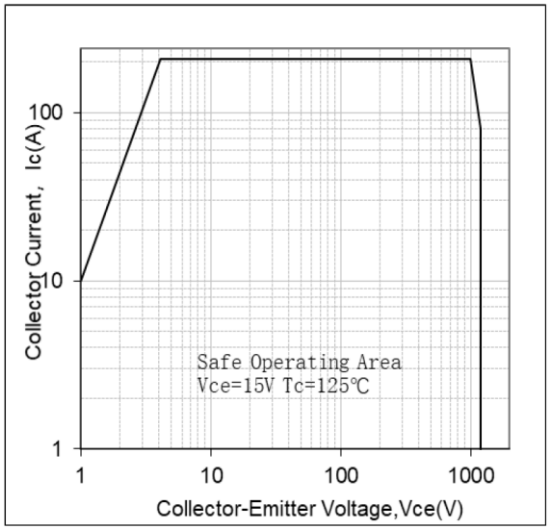


Figure3: reverse bias SOA,TJ=125℃,VGE=15V

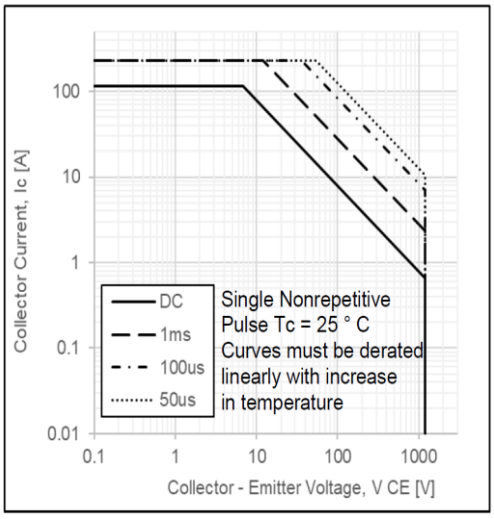


Figure4: forward SOA,TC=25℃,TJ≤150℃

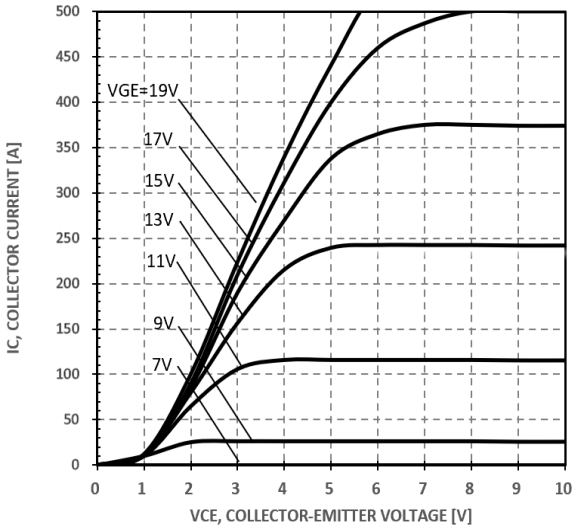


Figure5:typical IGBT output characteristics, TJ=25℃

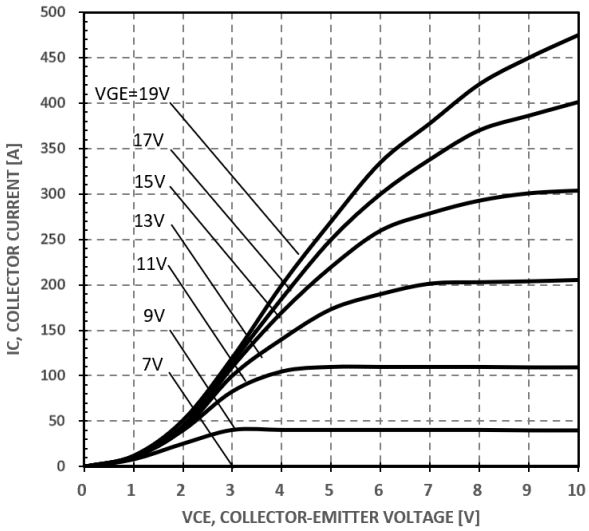


Figure6: typical IGBT output characteristics, TJ=150℃

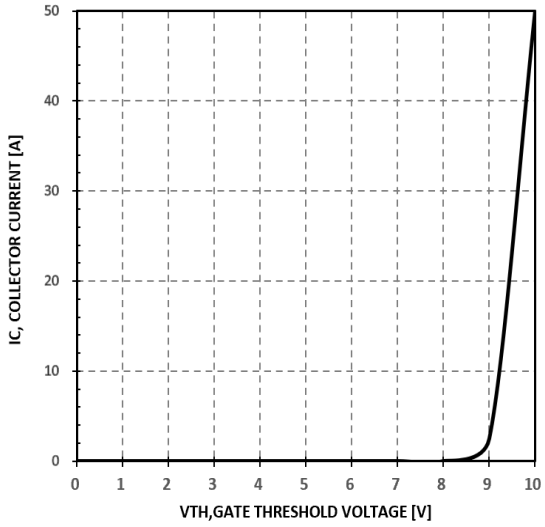


Figure7: gate threshold voltage

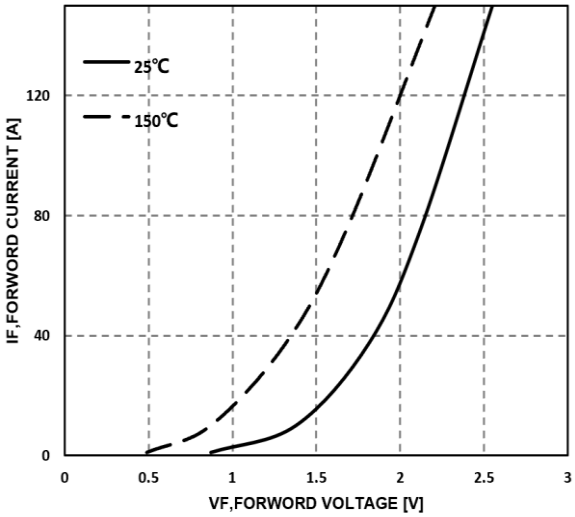


Figure8: typical diode forward characteristic

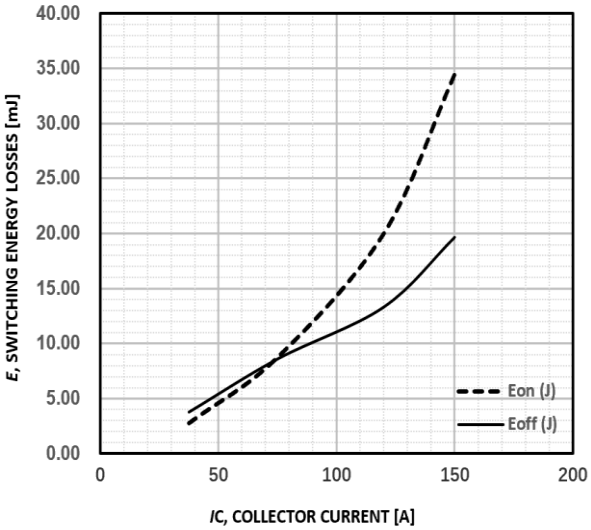


Figure9: typical energy loss VS. IC, TC=25℃,

L=100uH， VCE=600V,VGE=15V,Rg=15Ω

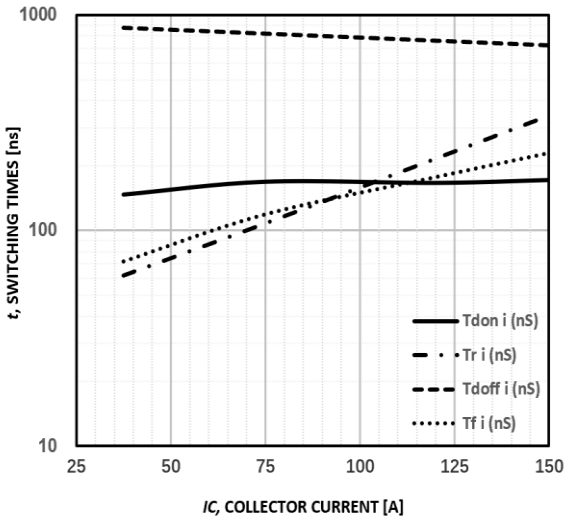


Figure10: typical switching time VS. IC, TC=25℃,

L=100uH, VCE=600V,VGE=15V,Rg=15Ω

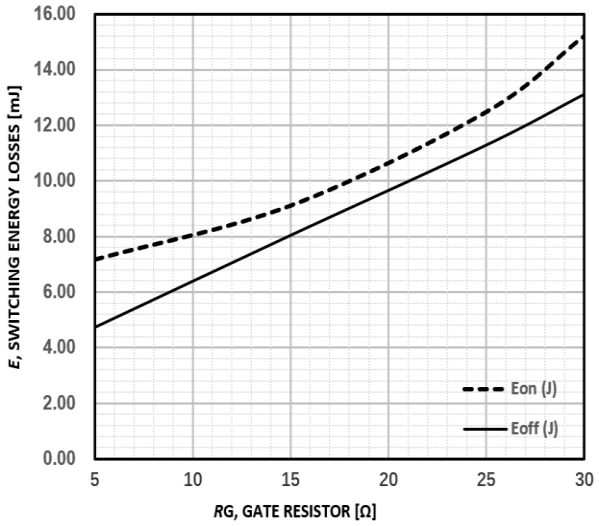


Figure11: typical energy loss VS. Rg,TC=25℃,

L=100uH, VCE=600V, VGE=15V ,IC=75A

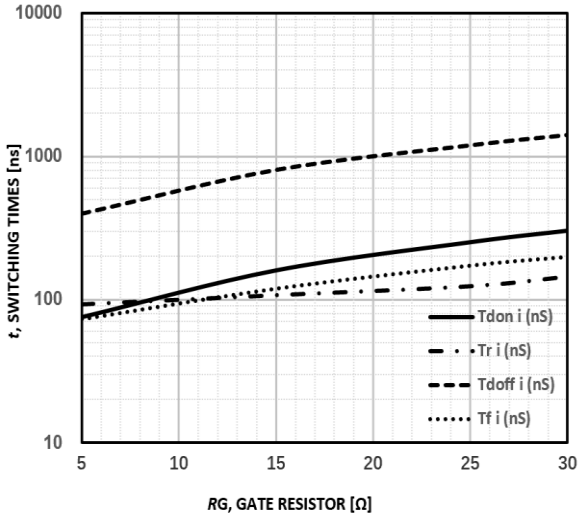


Figure12: typical switching time VS. Rg,TC=25℃,

L=100uH,VCE=600V,VGE=15V,IC=75A

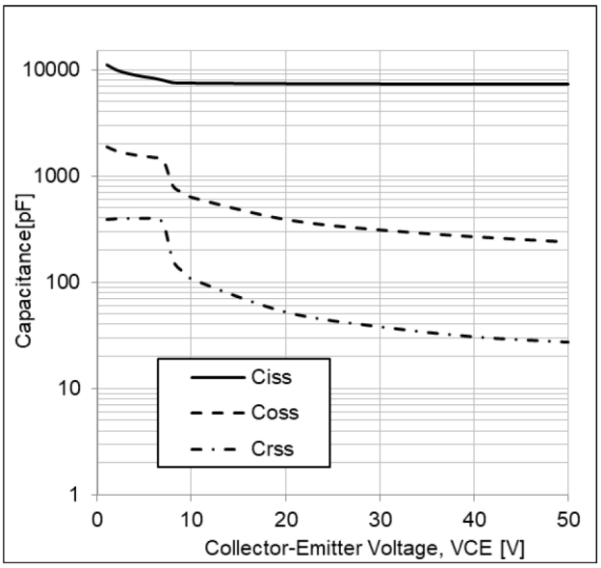


Figure13:typical capacitance VS. VCE, VGE=0V,f=100kHz

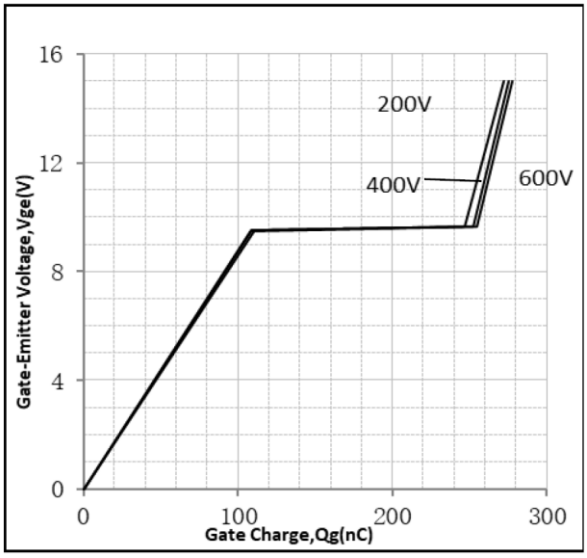
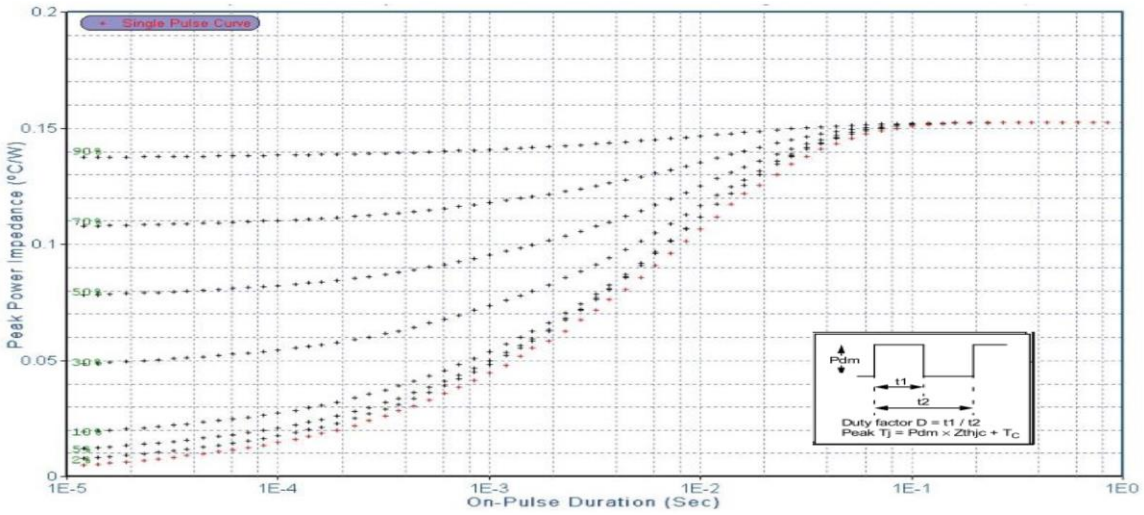


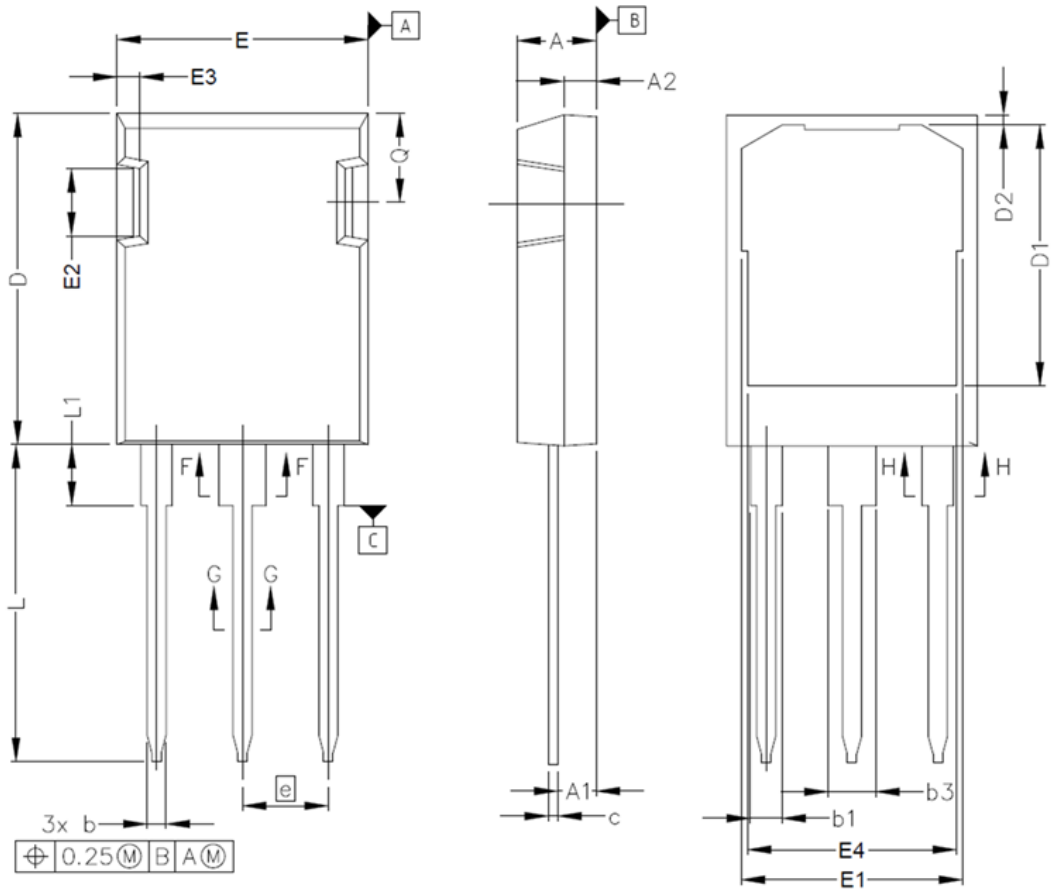
Figure14:typical gate charge VS. VGE,IC=75A

Figure15: normalized transient thermal impedance, junction-to-case

Note1.Duty factor D=t1/t2 Note2: peak TJ=PDM × Zthjc + TC



TO247 PLUS PACKAGE OUTLINE



SYMBOL	MIN	MAX
A	4.83	5.21
A1	2.29	2.54
A2	1.91	2.16
b'	1.07	1.28
b	1.07	1.33
b1	1.91	2.41
b2	1.91	2.16
b3	2.87	3.38
b4	2.87	3.13
c'	0.55	0.65
c	0.55	0.68
D	20.80	21.10
D1	16.25	17.65
D2	0.50	0.80

SYMBOL	MIN	MAX
E	15.75	16.13
E1	13.10	14.15
E2	3.68	5.10
E3	1.00	1.90
E4	12.38	13.43
e	5.44 BSC	
N	3	
L	19.81	20.32
L1	3.70	4.00
Q	5.49	6.00

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