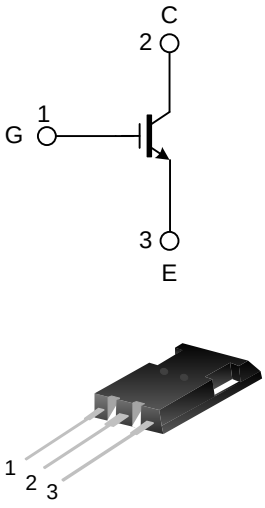
160A, 650V FIELD STOP IGBT

DESCRIPTION

The SGT160U65S1PWA field stop IGBT adopts Silan Field Stop IV+ technology. it is adopted for converter application. It features low conduction loss and switching loss, is applicable to Motor Drives、DC/AC converter.



TO-247PN-3L

FEATURES

- $V_{CE(sat)}$ =1.6$V_{(典型值)}$@I_C=160A
- T_{jmax}=175°C
- Positive temperature coefficient
- Optimized parameter consistence
- High input impedance
- 100% dynamic test
- 100% short-circuited test
- Anti short-circuit capability >6uS@25°C

NOMENCLATURE

SGT 160 U 65 S 1 PWA

IGBT series

Current,
70: 70A

N : N-channel
NE : N-channel planner gate with ESD
T : Field Stop 3/4
U : Field Stop 4+
V : Field Stop 5
W: Field Stop 6
X : Field Stop 7

Voltage,
65: 650V
120: 1200V

Package
P7: TO-247P-3L

1,2,3… : Version No.

L : Ultra low switching，recommended frequency ~2KHz
Q : Low switching，recommended frequency2~20KHz
S : Standard frequency ，recommended frequency5~40KHz
F : Fast switching，recommended frequency10~60KHz
UF : Ultra fast switching，recommended frequency 40KHz~

ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing Type
SGT160U65S1PWA	TO-247PN-3L	160U65S1	Halogen free	Tube

ABSOLUTE MAXIMUM RATINGS (T_C=25°C UNLESS OTHERWISE NOTED)

Parameter		Symbol	Ratings	Units
Collector to Emitter Voltage		V_{CE}	650	V
Gate to Emitter Voltage		V_{GE}	±20	V
Collector Current	T_C=25°C	I_C	240	A
	T_C=100°C		220	
Collector nominal current		$I_{Nominal}$	160	A
Pulsed Collector Current		I_{CM}	480	A
Power Dissipation	T_C=25°C	P_D	880	W
	T_C=100°C		440	W
短路维持时间	T_C=25°C	TSC	6	μS
Operating Junction Temperature		T_J	-55～+175	°C
Storage Temperature Range		T_{stg}	-55～+175	°C

THERMAL CHARACTERISTICS

Parameter	Symbol	Ratings	Units
Thermal Resistance, Junction to Case (IGBT)	$R_{\theta JC}$	0.2	°C/W

ELECTRICAL CHARACTERISTICS OF IGBT (T_C = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Units
Collector to Emitter Breakdown Voltage	BV_{CE}	V_{GE}=0V, I_C=1mA	650	--	--	V
C-E Leakage Current	I_{CES}	V_{CE}=650V, V_{GE}=0V	--	--	20	μA
G-E Leakage Current	I_{GES}	V_{GE}=20V, V_{CE}=0V	--	--	±400	nA
G-E Threshold Voltage	$V_{GE(th)}$	I_C=1mA, V_{CE}=V_{GE}	4.0	5.0	6	V
Collector to Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=160A,V_{GE}=15V, T_C=25°C	--	1.60	2.0	V
		I_C=160A,V_{GE}=15V, T_C=175°C	--	1.9	--	V
Input Capacitance	C_{ies}	V_{CE}=30V V_{GE}=0V f=1MHz	--	7730	--	pF
Output Capacitance	C_{oes}		--	527	--	
Reverse Transfer Capacitance	C_{res}		--	87	--	
Turn-On Delay Time	$T_{d(on)}$	V_{CE}=400V, I_C=160A, R_g=5Ω V_{GE}=15V, T_J=25°C, inductive load	--	27	--	ns
Rise Time	T_r		--	105	--	
Turn-Off Delay Time	$T_{d(off)}$		--	164	--	
Fall Time	T_f		--	87	--	
Turn-On Switching Loss	E_{on}		--	12.2	--	mJ
Turn-Off Switching Loss	E_{off}		--	4.4	--	
Total Switching Loss	E_{st}		--	16.6	--	
Total Gate Charge	Q_g	V_{CE} = 400V, I_C=160A, V_{GE} = 15V	--	200	--	nC
Gate to Emitter Charge	Q_{ge}		--	60	--	
Gate to Collector Charge	Q_{gc}		--	60	--	

TYPICAL CHARACTERISTICS CURVE

Figure 1. Typical output characteristics

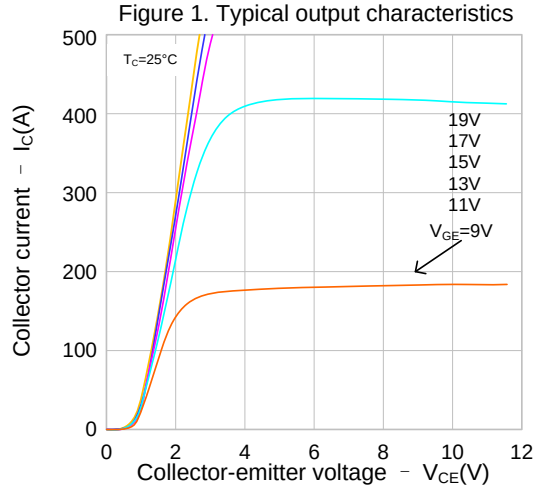


Figure 2. Typical output characteristics

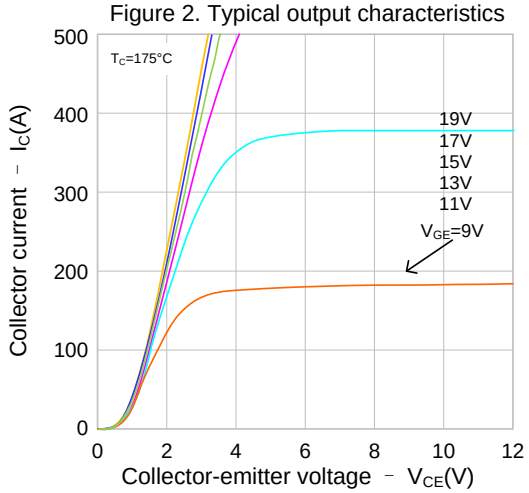


Figure 3. Typical saturation voltage characteristics

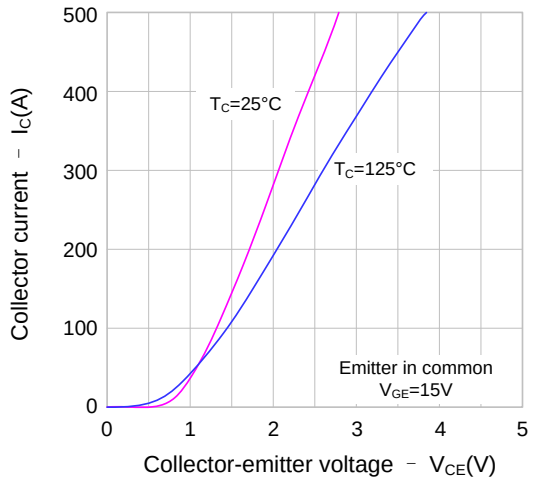


Figure 4. Transmission characteristics

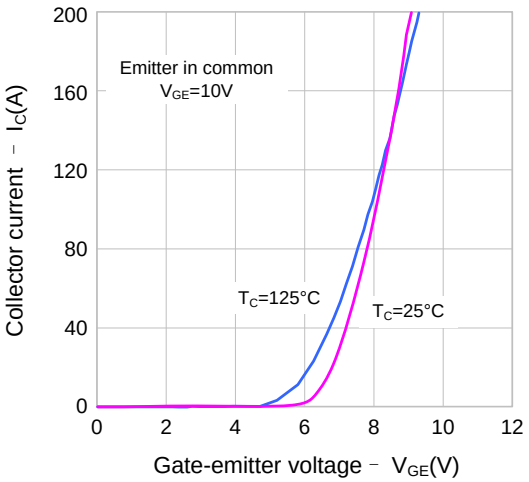


Figure 5. Saturation Voltage Drop vs. Temperature

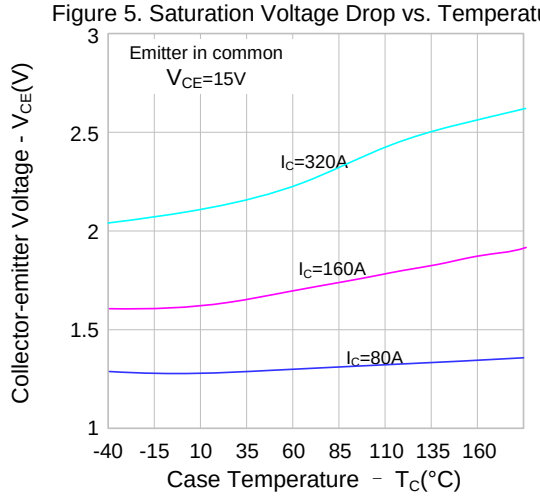
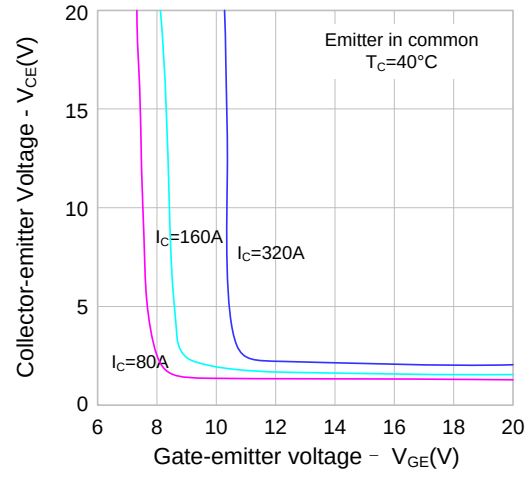


Figure 6. Saturation voltage vs. V_{GE}



TYPICAL CHARACTERISTICS CURVE (CONTINUED)

Figure 7. Saturation voltage vs. V_{GE}

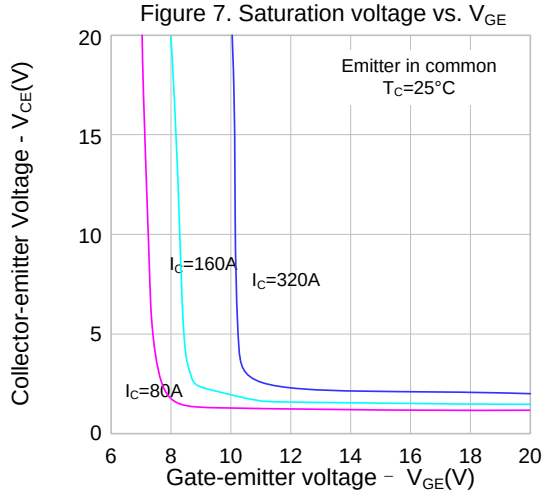


Figure 8. Saturation voltage vs. V_{GE}

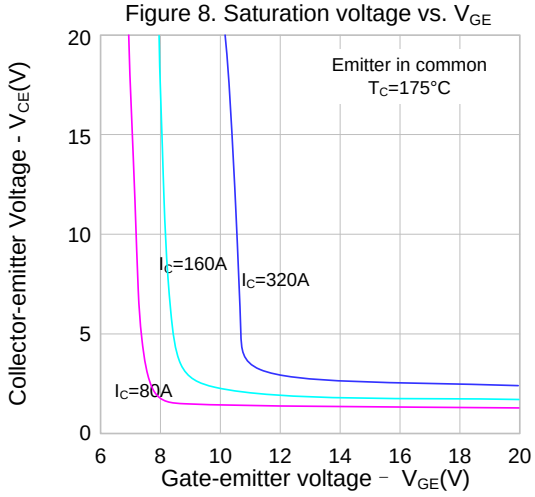


Figure 9. Capacitance Characteristics

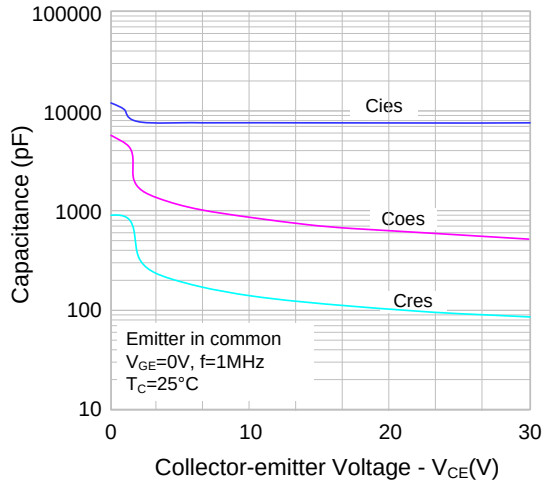


Figure 10. Gate Charge Characteristics

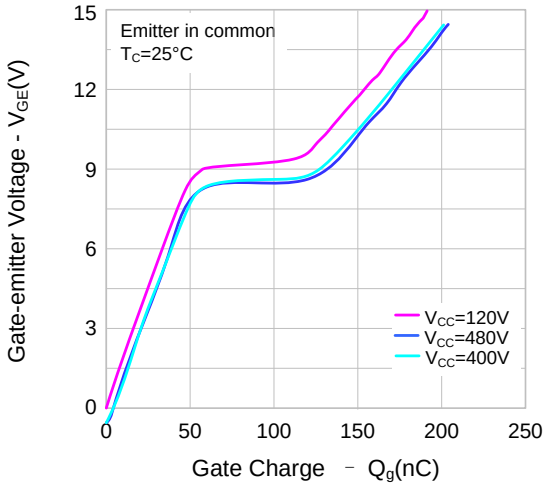


Figure 11. Turn-on Characteristics vs. Gate Resistance

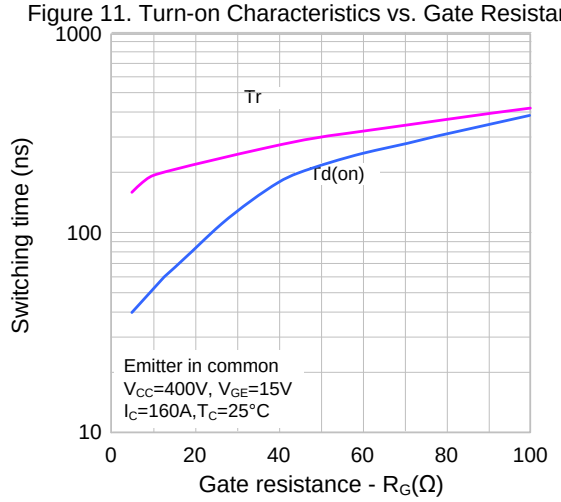
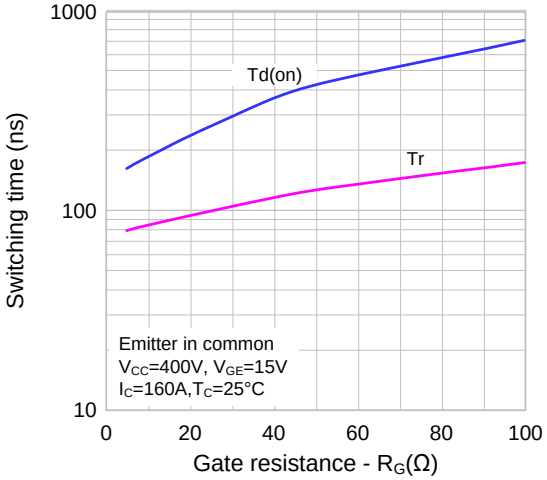


Figure 12. Turn-off characteristics vs. Gate resistance



TYPICAL CHARACTERISTICS CURVE (CONTINUED)

Figure 13. Switching Loss vs. Gate Resistance

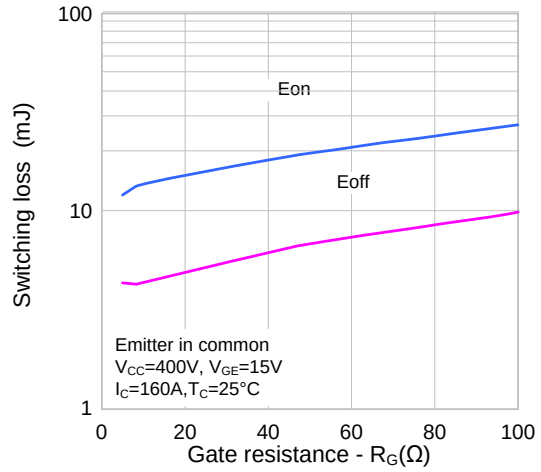


Figure 14. Conduction characteristics vs. Collector current

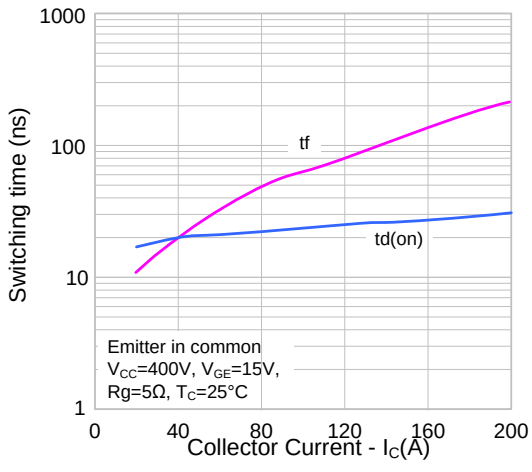


Figure 15. Turn-off characteristics vs. Collector current

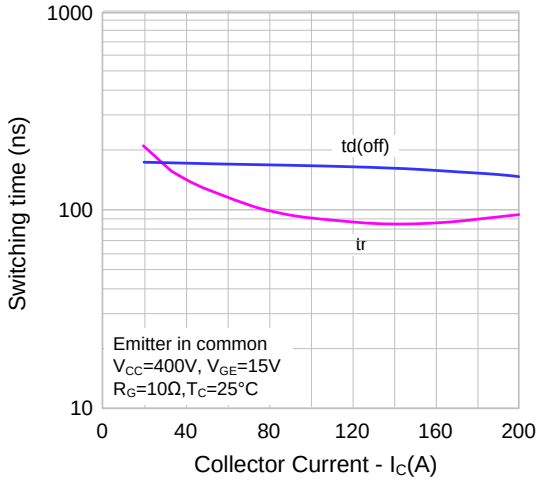


Figure 16. Switching Loss vs. Collector Current

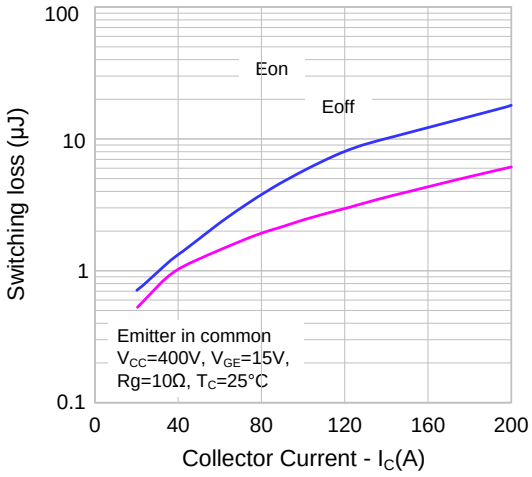


Figure 17. Max. Safe Operating Area

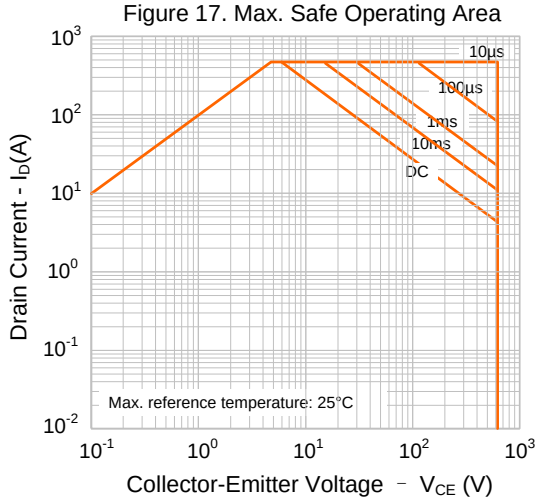
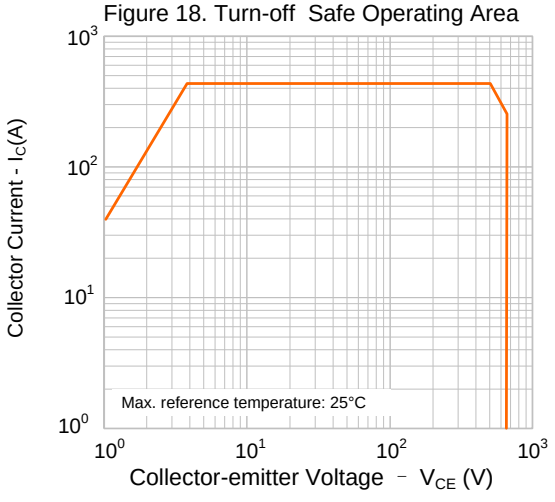
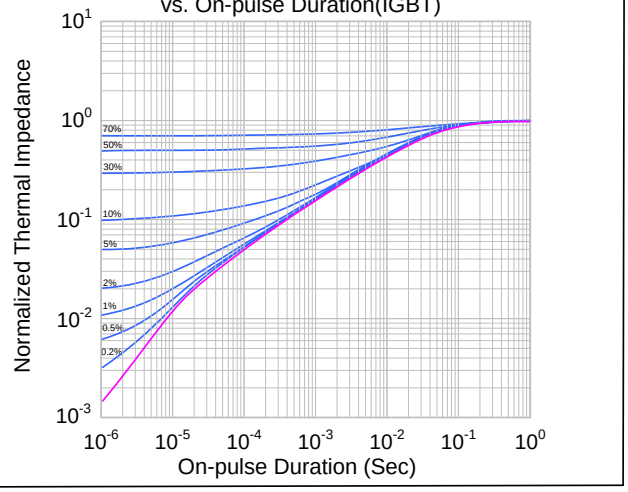


Figure 18. Turn-off Safe Operating Area



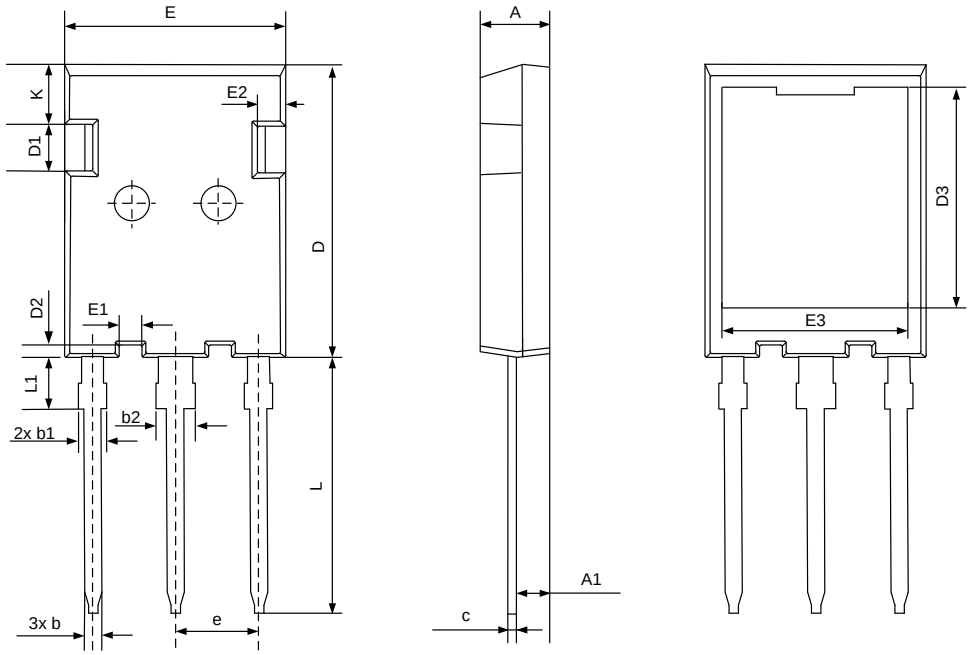
TYPICAL CHARACTERISTICS CURVE (CONTINUED)

Figure 19. Transient Thermal Impedance vs. On-pulse Duration(IGBT)



PACKAGE OUTLINE

TO-247P-3L **UNIT: mm**



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.90	5.00	5.10
A1	2.31	2.41	2.51
b	1.16	—	1.26
b1	—	—	2.25
b2	—	—	3.25
c	0.59	—	0.66
D	20.90	21.00	21.10
D1	2.90	3.00	3.10
D2	0.58	0.68	0.78
D3	16.25	16.55	16.85
e	5.34	5.44	5.54
E	15.70	15.80	15.90
E1	1.35	1.45	1.55
E2	1.14	1.24	1.34
E3	13.10	13.26	13.50
L	19.80	19.92	20.10
L1	3.90	—	4.30
K	4.25	4.35	4.45

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Rev.: 1.0

Revision History:

1. First release