

Key performance:

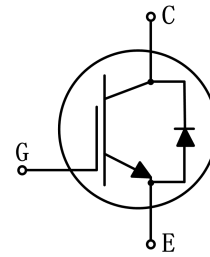
- $V_{CE}=1200V$
- $I_C=75A@T_C=100^{\circ}C$
- $V_{CE(sat)}=2.0V$

Features:

- Trench and field-stop technology
- Easy parallel switching capability
- Low V_{CEsat}
- High ruggedness performance
- RoHS compliant

Applications:

- Solar converters
- On-Board Charger

TO-247PLUS

Package parameters

Type	Marking	Package	Packaging Method
JJT75N120HA	T75120HA	TO-247PLUS	Tube

Maximum ratings

Symbol	Parameter	Values	Unit
V_{CES}	Collector-emitter voltage	1200	V
V_{GES}	Gate-emitter voltage	±20	V
I_C	Continuous collector current ($T_C=25^\circ\text{C}$)	150	A
	Continuous collector current ($T_C=100^\circ\text{C}$)	75	A
I_{CM}	Pulsed collector current, t_p limited by T_{vjmax}	300	A
I_F	Diode continuous forward current ($T_C=100^\circ\text{C}$)	75	A
I_{FM}	Diode maximum current, t_p limited by T_{vjmax}	150	A
P_{tot}	Power dissipation ($T_C=25^\circ\text{C}$)	1456	W
	Power dissipation ($T_C=100^\circ\text{C}$)	728	W
T_{vj}	Operating junction temperature range	-40 to +175	°C
T_{stg}	Storage temperature range	-55 to +150	°C

Thermal characteristics

Symbol	Parameter	Values		Unit
		Typ.	Max.	
$R_{th(j-c)}$	Thermal resistance, junction to case for IGBT	-	0.10	K/ W
$R_{th(j-c)}$	Thermal resistance, junction to case for Diode	-	0.44	K/ W
$R_{th(j-a)}$	Thermal resistance, junction to ambient	-	40	K/ W

Electrical characteristics of IGBT ($T_{vj}=25^{\circ}\text{C}$ unless otherwise specified)

Static characteristics

Symbol	Parameter	Test condition	Values			Unit
			Min.	Typ.	Max.	
BV_{CES}	Collector-emitter breakdown voltage	$V_{GE}=0\text{V}, I_C=250\mu\text{A}$	1200	-	-	V
I_{CES}	Collector-emitter leakage current	$V_{CE}=1200\text{V}, V_{GE}=0\text{V}$	-	-	100	μA
I_{GES}	Gate leakage current, forward	$V_{GE}=20\text{V}, V_{CE}=0\text{V}$	-	-	100	nA
	Gate leakage current, reverse	$V_{GE}=-20\text{V}, V_{CE}=0\text{V}$	-	-	-100	nA
$V_{GE(th)}$	Gate-emitter threshold voltage	$V_{GE}=V_{CE}, I_C=1\text{mA}$	5.2	5.6	6.0	V
$V_{CE(sat)}$	Collector-emitter saturation voltage	$V_{GE}=15\text{V}, I_C=75\text{A}$	-	2.0	-	V
		$V_{GE}=15\text{V}, I_C=75\text{A}, T_{vj}=175^{\circ}\text{C}$	-	2.6	-	V

Dynamic characteristics

Symbol	Parameter	Test condition	Values			Unit
			Min.	Typ.	Max.	
C_{ies}	Input capacitance	$V_{CE}=30\text{V}$ $V_{GE}=0\text{V}$ $f=1\text{MHz}$	-	18650	-	pF
C_{oes}	Output capacitance		-	340	-	pF
C_{res}	Reverse transfer capacitance		-	80	-	pF
Q_g	Total gate charge	$V_{CC}=960\text{V}$ $V_{GE}=15\text{V}$ $I_C=75\text{A}$	-	560	-	nC

Switching characteristics

Symbol	Parameter	Test condition	Values			Unit
			Min.	Typ.	Max.	
$t_{d(on)}$	Turn-on delay time	$V_{CC}=600V$ $V_{GE}=0/15V$ $I_C=75A$ $R_G=10\Omega$ Inductive load	-	138	-	ns
t_r	Rise time		-	120	-	ns
$t_{d(off)}$	Turn-off delay time		-	676	-	ns
t_f	Fall time		-	71	-	ns
E_{on}	Turn-on energy		-	7.7	-	mJ
E_{off}	Turn-off energy		-	3.7	-	mJ
E_{ts}	Total switching energy		-	11.4	-	mJ
$t_{d(on)}$	Turn-on delay time		$V_{CC}=600V$ $V_{GE}=0/15V$ $I_C=75A$ $R_G=10\Omega$ Inductive load $T_{vj}=175^\circ C$	-	124	-
t_r	Rise time	-		121	-	ns
$t_{d(off)}$	Turn-off delay time	-		691	-	ns
t_f	Fall time	-		82	-	ns
E_{on}	Turn-on energy	-		8.4	-	mJ
E_{off}	Turn-off energy	-		4.1	-	mJ
E_{ts}	Total switching energy	-		12.5	-	mJ

Electrical characteristics of Diode ($T_{vj}=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Test condition	Values			Unit
			Min.	Typ.	Max.	
V_F	Diode forward voltage	$I_F=75\text{A}$	-	2.1	-	V
		$I_F=75\text{A}, T_{vj}=175^{\circ}\text{C}$	-	1.8	-	V
t_{rr}	Diode reverse recovery time	$V_R=600\text{V}$ $I_F=75\text{A}$ $di_F/dt=-600\text{A}/\mu\text{s}$	-	163	-	ns
I_{rrm}	Diode peak reverse recovery current		-	20	-	A
Q_{rr}	Diode reverse recovery charge		-	2046	-	nC
t_{rr}	Diode reverse recovery time	$V_R=600\text{V}$ $I_F=75\text{A}$ $di_F/dt=-600\text{A}/\mu\text{s}$ $T_{vj}=175^{\circ}\text{C}$	-	278	-	ns
I_{rrm}	Diode peak reverse recovery current		-	39	-	A
Q_{rr}	Diode reverse recovery charge		-	6679	-	nC

Typical performance characteristics

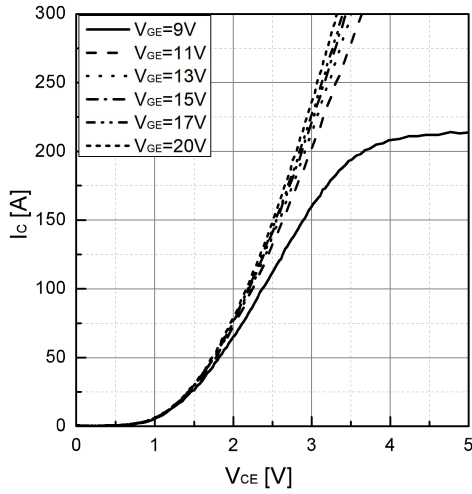


Fig 1. Typical output characteristic ($T_{vj}=25^{\circ}\text{C}$)

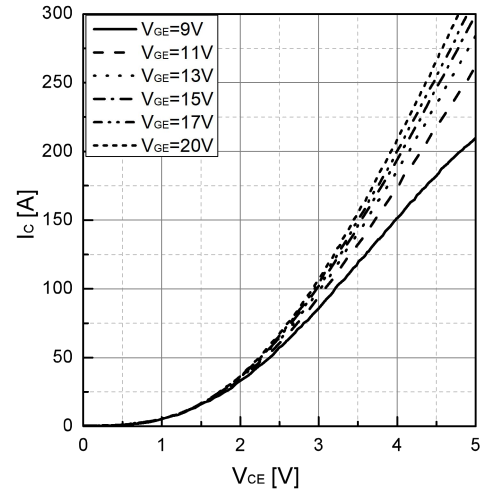


Fig 2. Typical output characteristic ($T_{vj}=175^{\circ}\text{C}$)

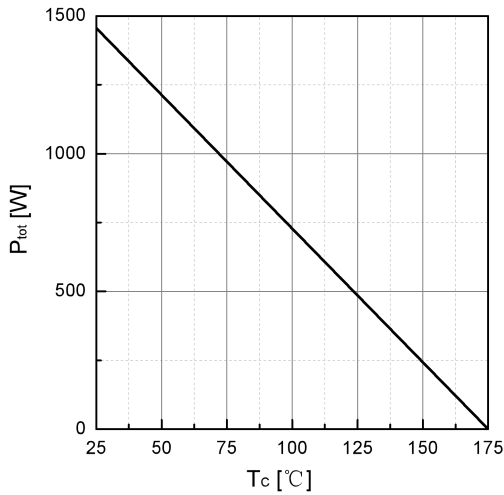


Fig 3. Power dissipation as a function of T_c

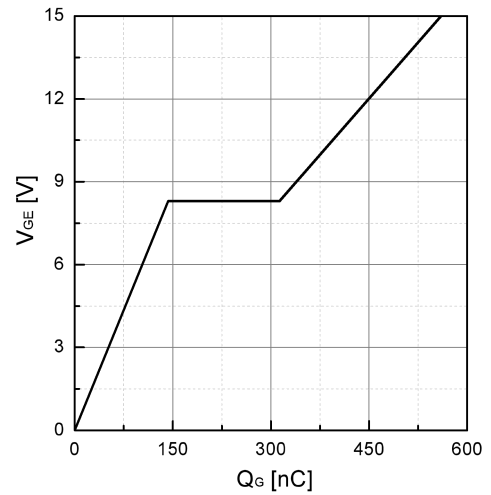


Fig 4. Typical Gate charge

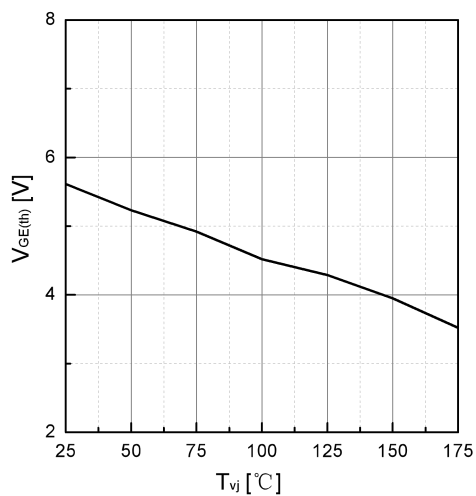


Fig 5. Typical $V_{GE(th)}$ as a function of T_{vj}
($I_C=1\text{mA}$)

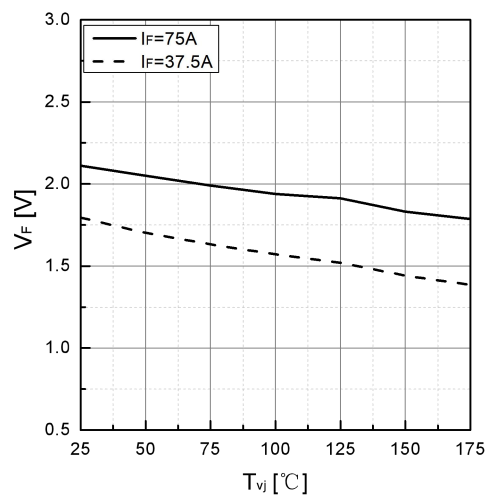


Fig 6. Typical V_F as a function of T_{vj}

Typical performance characteristics

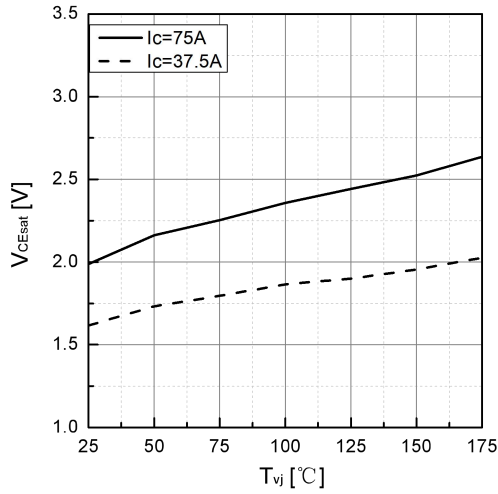


Fig 7. Typical V_{CEsat} as a function of T_{vj}

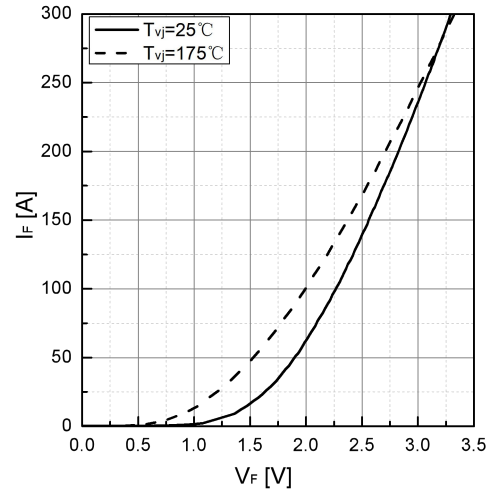


Fig 8. Typical I_F as a function of V_F

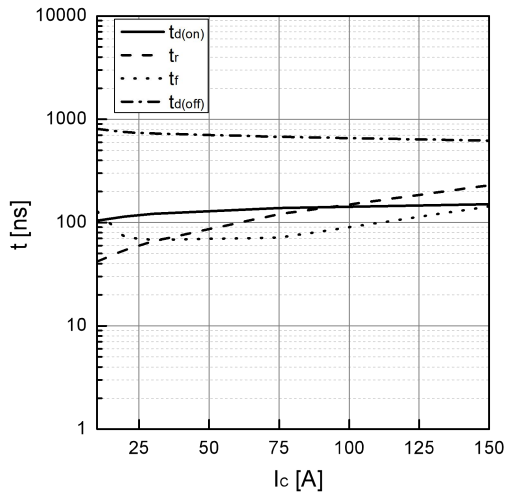


Fig 9. Typical switching time as a function of I_c

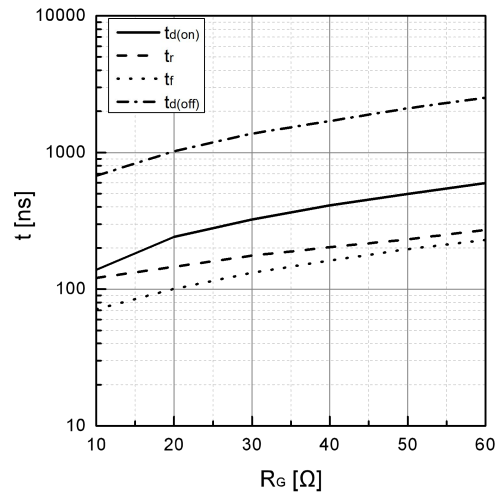


Fig 10. Typical switching times as a function of R_G

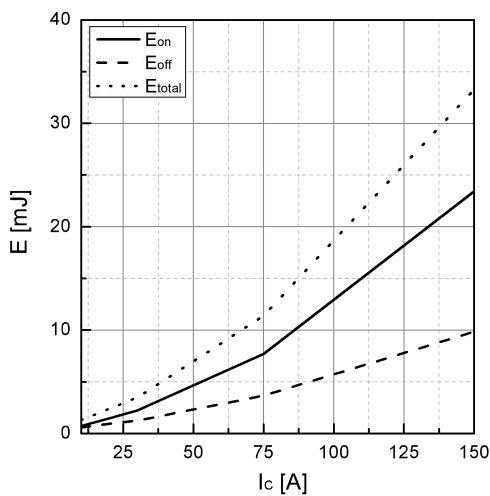


Fig 11. Typical switching energy losses as a function of I_c

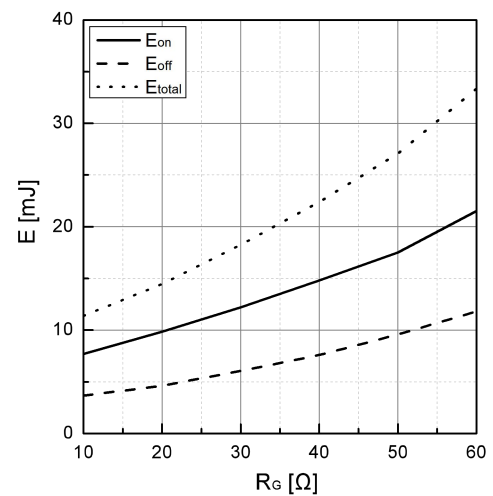


Fig 12. Typical switching energy losses as a function of R_G

Typical performance characteristics

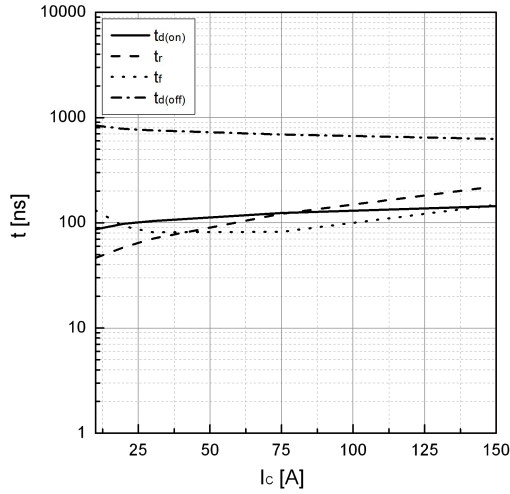


Fig 13. Typical switching time as a function of I_C
($T_{vj}=175^\circ\text{C}$)

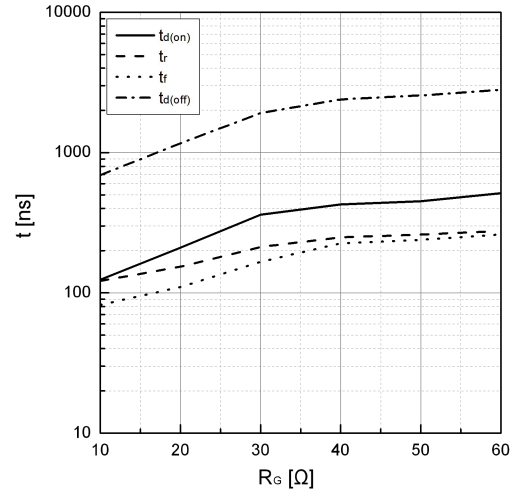


Fig 14. Typical switching times as a function of R_G
($T_{vj}=175^\circ\text{C}$)

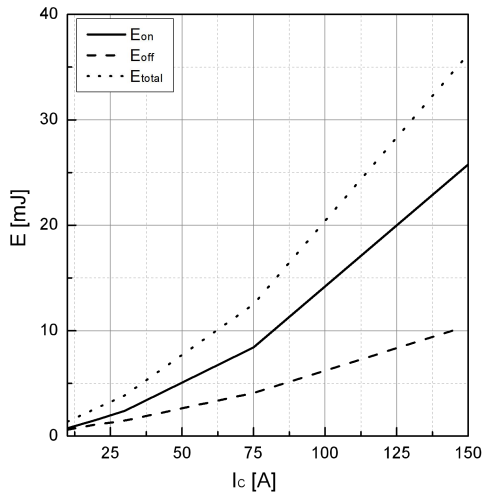


Fig 15. Typical switching energy losses as a function of I_C ($T_{vj}=175^\circ\text{C}$)

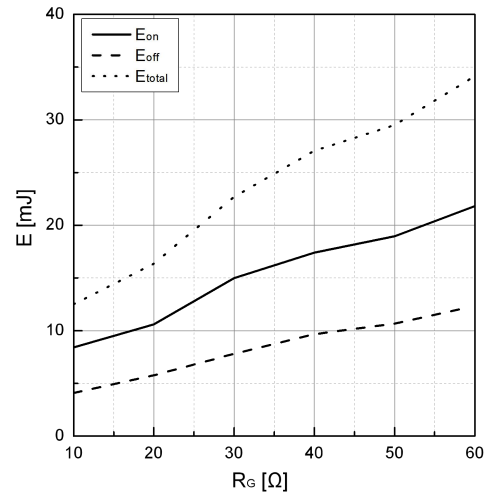


Fig 16. Typical switching energy losses as a function of R_G ($T_{vj}=175^\circ\text{C}$)

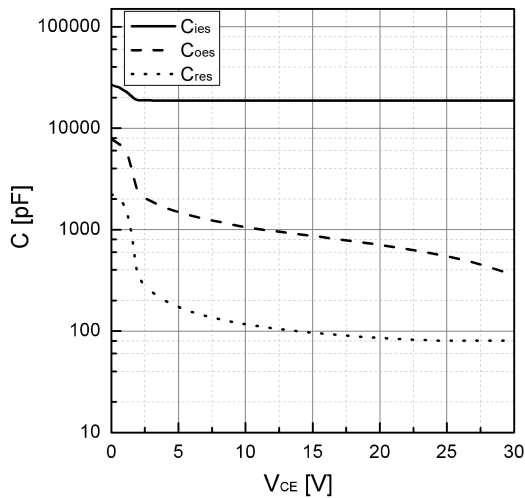


Fig 17. Typical capacitance as a function of V_{CE}
($f=1\text{Mhz}$, $V_{GE}=0\text{V}$)

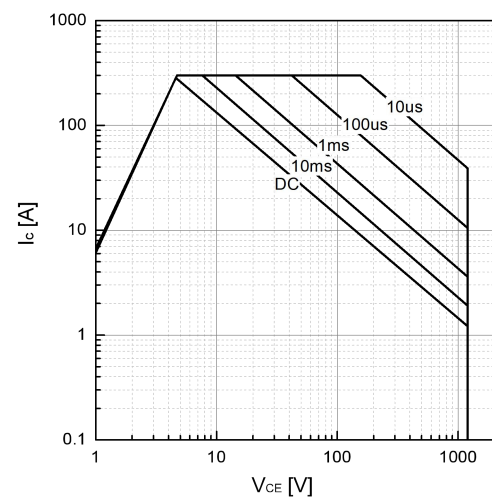


Fig 18. Safe operating area

Typical performance characteristics

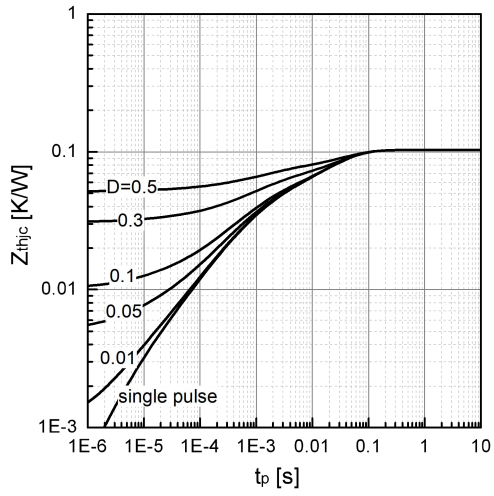
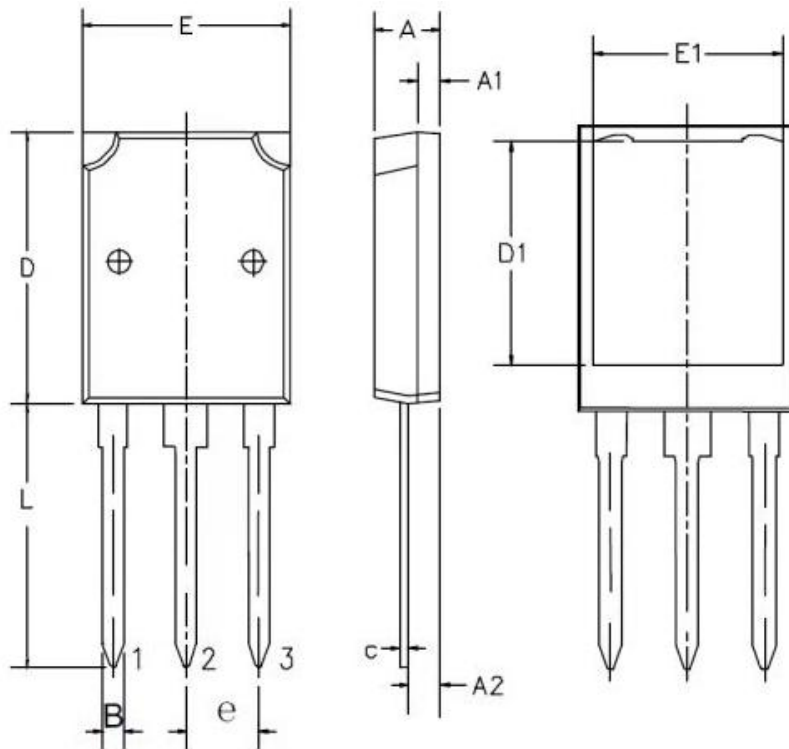


Fig 19. Transient thermal impedance of IGBT

Package dimension

TO-247PLUS



Ref.	Min.(mm)	Typ.(mm)	Max.(mm)
A	4.92	5.00	5.08
A1	2.27	2.35	2.43
A2	1.92	2.00	2.08
B	1.16	1.20	1.24
C	0.58	0.60	0.62
D	20.80	20.90	21.00
E	15.80	15.90	16.00
E1	13.94	14.02	14.10
e	5.34	5.44	5.54
L	19.80	20.00	20.20

Revision history

Date	Revision	Changes
2024-05-30	Rev. 1.0	Release of the datasheet.
2024-09-25	Rev. 1.1	Update
2025-01-26	Rev. 1.2	Add SOA and Rth graph

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