

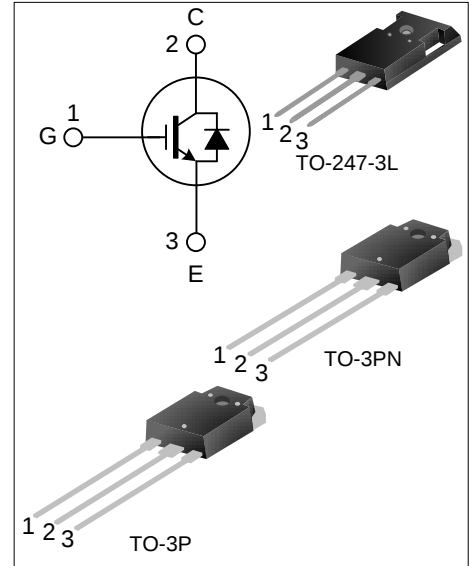
40A, 600V FIELD STOP IGBT

DESCRIPTION

SGT40N60FD2PN(P7)(PT) using Field Stop III IGBT technology, offers the optimum performance for induction Heating, UPS, SMPS and PFC application.

FEATURES

- 40A, 600V, $V_{CE(sat)}(typ.)=1.8V@I_C=40A$
- Low conduction loss
- Fast switching
- High input impedance



NOMENCLATURE

SGT 40 N 60 S D M 1 P7	
IGBT series	Package
Current, 40: 40A	P7 : TO-247-3L
N : N Channel	1,2,3... : Version No.
NE : N-channel planar gate with ESD	Blank: Standard diode
T : Field Stop 3/4	M : Standard Diode, full range
U : Field Stop 4+	R : Rapid Diode
V : Field Stop 5	B : Rapid Diode, full range
W : Field Stop 6	S : Soft Diode, full range
X : Field Stop 7	D : Packaged with fast recovery diode
Voltage, 65: 650V	R : RC IGBT
120: 1200V	L : Ultra low switching, recommended frequency ~2KHz
	Q : Low switching, recommended frequency 2~20K
	S : Standard frequency, recommended frequency 5~40K
	F : Fast switching, recommended frequency 10~60K
	UF : Ultra fast switching, recommended frequency 40K~

ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing Type
SGT40N60FD2PN	TO-3P	40N60FD2	Pb free	Tube
SGT40N60FD2P7	TO-247-3L	40N60FD2	Pb free	Tube
SGT40N60FD2PT	TO-3PN	40N60FD2	Pb free	Tube

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

Parameter	Symbol	Ratings	Units
Collector to Emitter Voltage	V _{CE}	600	V
Gate to Emitter Voltage	V _{GE}	±20	V
Collector Current	I _C	T _C =25°C 80	A
		T _C =100°C 40	
Pulsed Collector Current	I _{CM}	120	A
Power Dissipation(T _C =25°C) -Derate above 25°C	P _D	380	W
		3.04	W/°C
Operating Junction Temperature Range	T _J	-55~+150	°C
Storage Temperature Range	T _{stg}	-55~+150	°C

THERMAL CHARACTERISTICS

Parameter	Symbol	Ratings	Units
Thermal Resistance, Junction to Case (IGBT)	R _{θJC}	0.33	°C/W
Thermal Resistance, Junction to Case (FRD)	R _{θJC}	1.9	°C/W
Thermal Resistance, Junction to Ambient	R _{θJA}	40	°C/W

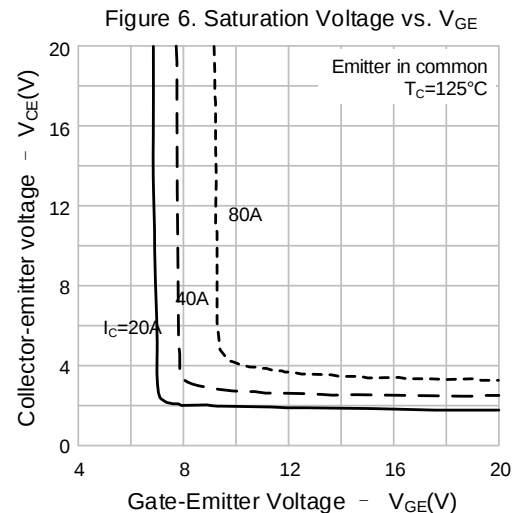
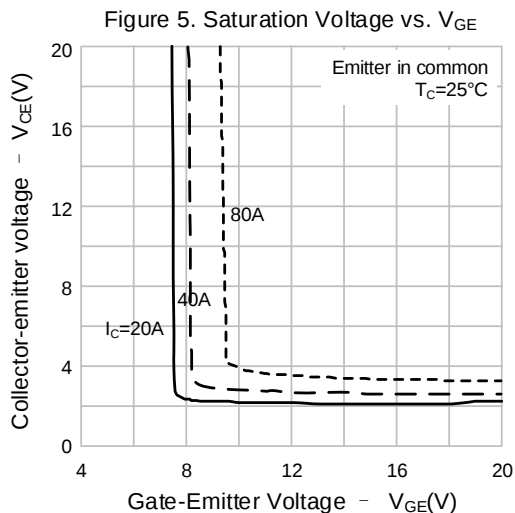
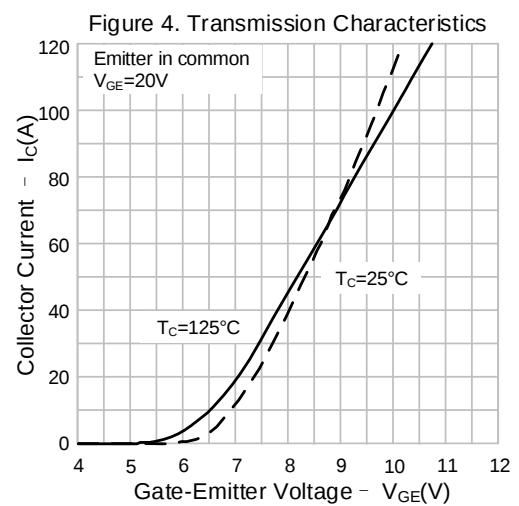
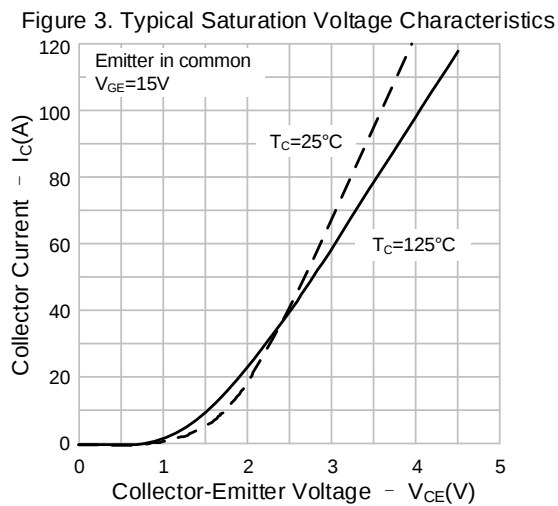
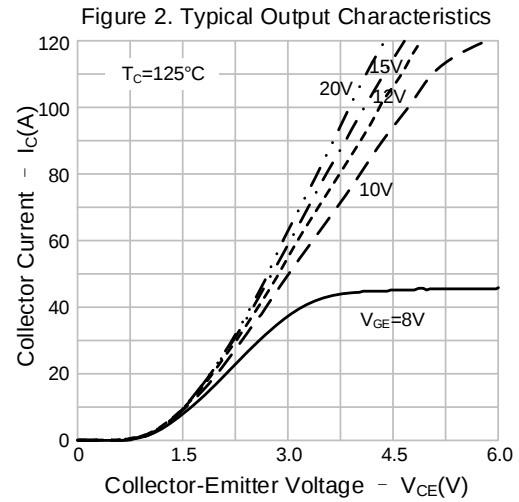
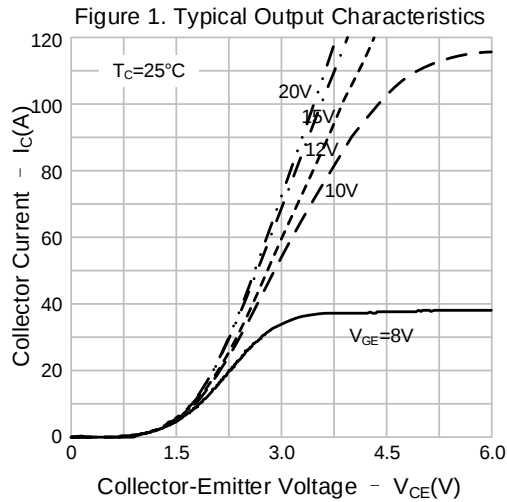
ELECTRICAL CHARACTERISTICS OF IGBT ($T_C = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Units
Collector to Emitter Breakdown Voltage	BV_{CE}	$V_{GE}=0V, I_C=100\mu A$	600	--	--	V
C-E Leakage Current	I_{CES}	$V_{CE}=600V, V_{GE}=0V$	--	--	200	μA
G-E Leakage Current	I_{GES}	$V_{GE}=20V, V_{CE}=0V$	--	--	± 500	nA
G-E Threshold Voltage	$V_{GE(th)}$	$I_C=250\mu A, V_{CE}=V_{GE}$	4.0	5.0	6.5	V
Collector to Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=40A, V_{GE}=15V$	--	1.8	2.7	V
		$I_C=40A, V_{GE}=15V, T_C=125^\circ\text{C}$	--	2.5	--	V
Input Capacitance	C_{ies}	$V_{CE}=30V$	--	1850	--	pF
Output Capacitance	C_{oes}	$V_{GE}=0V$	--	190	--	
Reverse Transfer Capacitance	C_{res}	$f=1\text{MHz}$	--	50	--	
Turn-On Delay Time	$T_{d(on)}$	$V_{CE}=400V$ $I_C=40A$ $R_g=10\Omega$	--	16	--	ns
Rise Time	T_r		--	88	--	
Turn-Off Delay Time	$T_{d(off)}$		--	110	--	
Fall Time	T_f		--	96	--	
Turn-On Switching Loss	E_{on}	$V_{GE}=15V$ Inductive Load	--	1.8	--	mJ
Turn-Off Switching Loss	E_{off}		--	0.8	--	
Total Switching Loss	E_{st}		--	2.6	--	
Total Gate Charge	Q_g	$V_{CE} = 300V, I_C=40A,$ $V_{GE} = 15V$	--	100	--	nC
Gate to Emitter Charge	Q_{ge}		--	11	--	
Gate to Collector Charge	Q_{gc}		--	52	--	

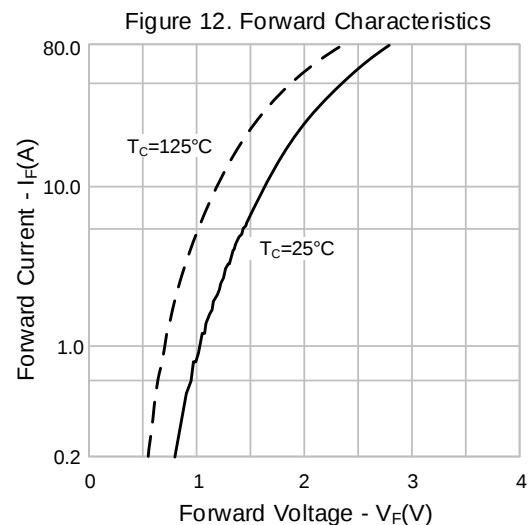
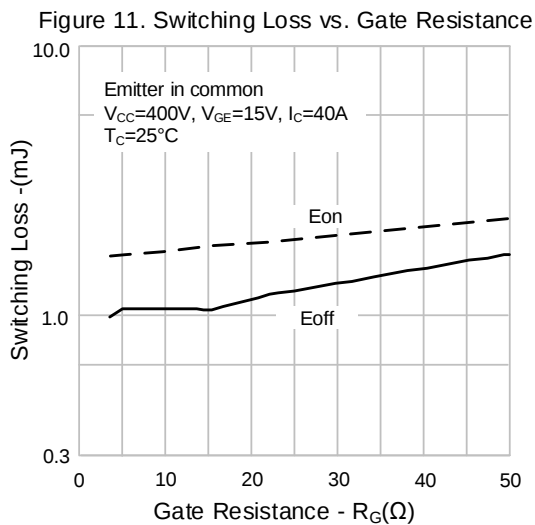
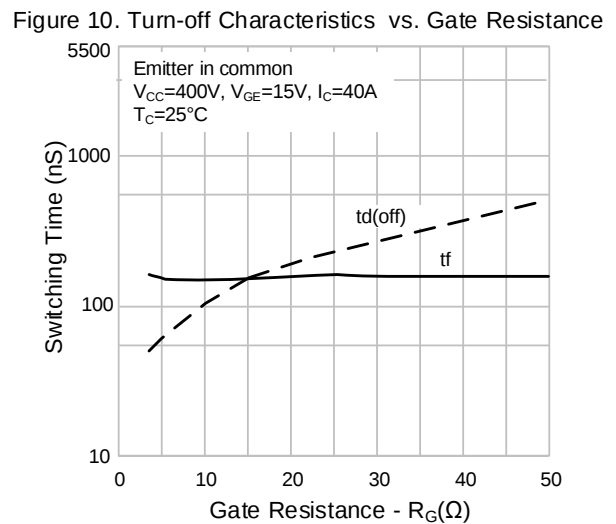
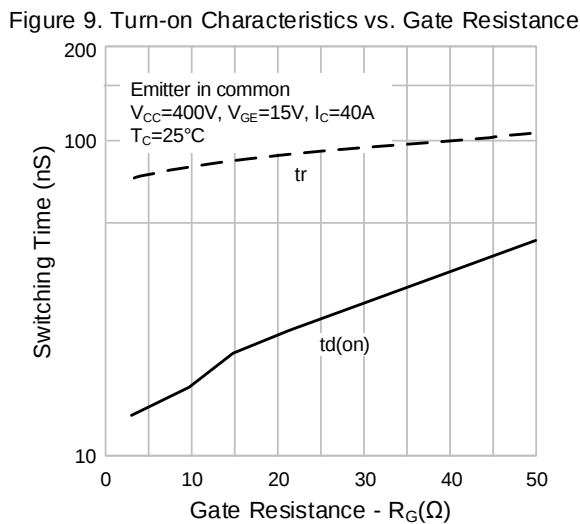
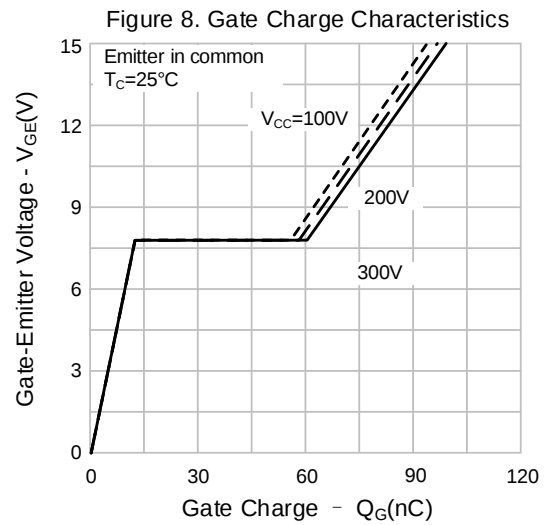
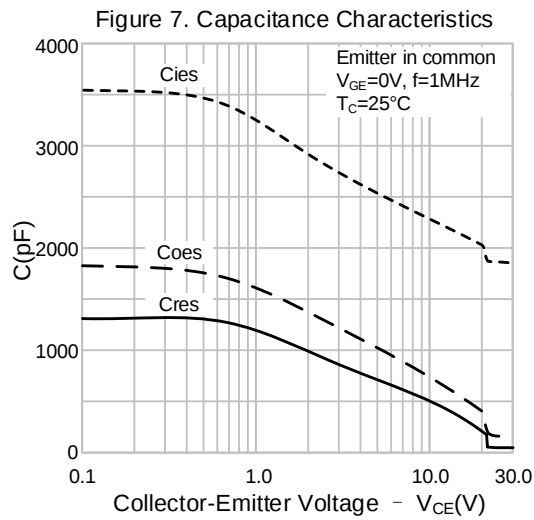
ELECTRICAL CHARACTERISTICS OF FRD ($T_C=25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Units
Diode Forward Voltage	V_{FM}	$I_F = 20A, T_C=25^\circ\text{C}$	--	1.9	2.6	V
		$I_F = 20A, T_C=125^\circ\text{C}$	--	1.5	--	
Diode Reverse Recovery Time	T_{rr}	$I_{ES}=20A, di_{ES}/dt=200A/\mu s$	--	32	--	ns
Diode Reverse Recovery Charge	Q_{rr}	$I_{ES}=20A, di_{ES}/dt=200A/\mu s$	--	74	--	nC

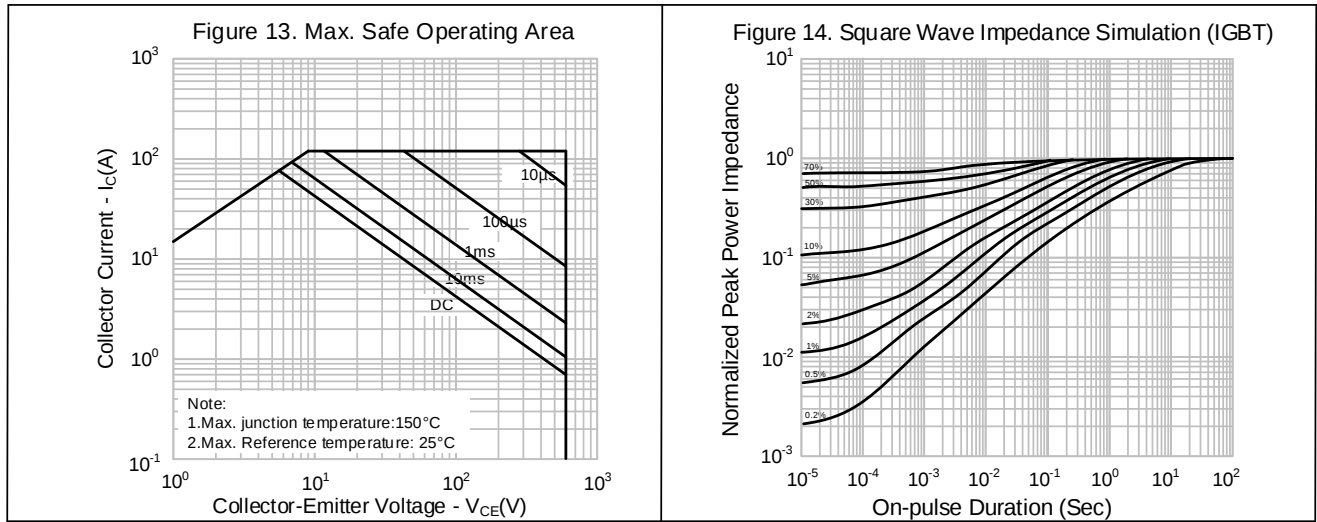
TYPICAL CHARACTERISTIC CURVES



TYPICAL CHARACTERISTIC CURVES(CONTINUED)



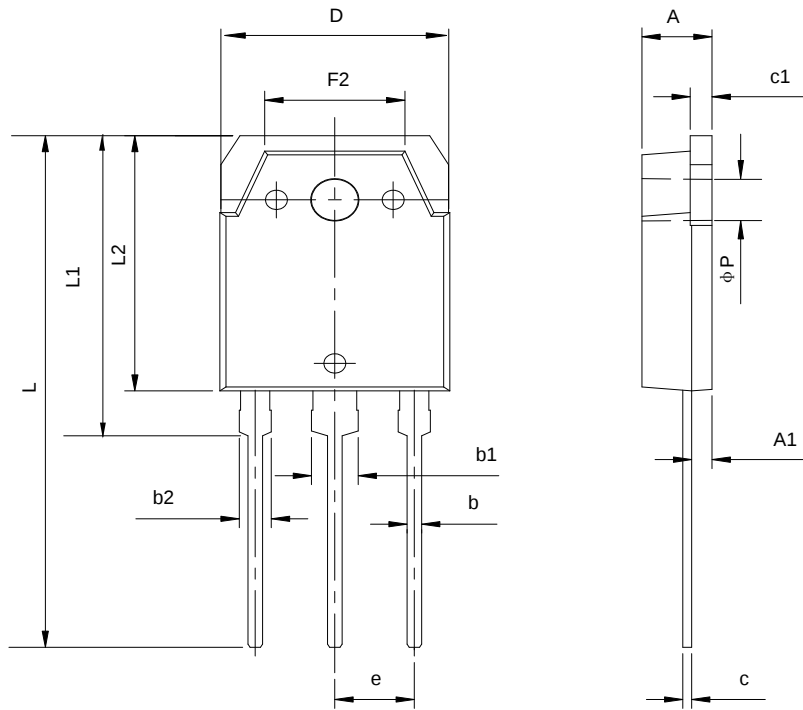
TYPICAL CHARACTERISTIC CURVES(CONTINUED)



PACKAGE OUTLINE

TO-3P

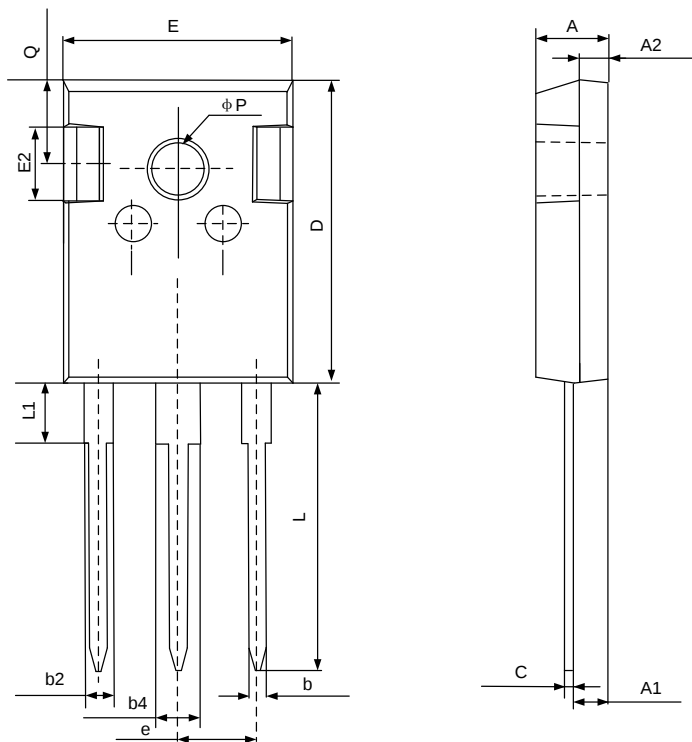
UNIT: mm



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.4	—	5.2
c1	1.2	—	1.8
A1	1.2	—	2.0
b	0.7	1.0	1.3
b1	2.7	3.0	3.3
b2	1.7	2.0	2.3
D	15.0	15.5	16.0
c	0.4	0.6	0.8
F2	8.5	—	10.0
e	5.45 TYP		
L1	22.6	—	23.6
L	39.0	—	41.5
L2	19.5	—	21.0
P	3.0	—	3.4

TO-247-3L

UNIT: mm

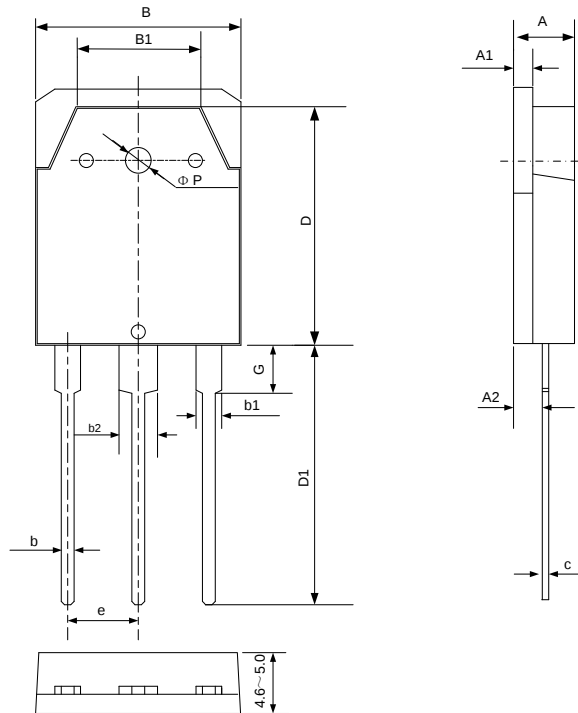


SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.59
A2	1.85	2.00	2.15
b	1.11	—	1.36
b2	1.91	—	2.25
b4	2.91	—	3.25
c	0.51	—	0.75
D	20.80	21.00	21.30
E	15.50	15.80	16.10
E2	4.40	5.00	5.20
e	5.44 BSC		
L	19.72	19.92	20.22
L1	—	—	4.30
Q	5.60	5.80	6.00
P	3.40	—	3.80

PACKAGE OUTLINE(CONTINUED)

TO-3PN

UNIT: mm



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.60	4.80	5.00
A1	1.30	1.50	1.70
A2	2.20	2.40	2.60
b	0.80	1.00	1.20
b1	1.80	2.00	2.20
b2	2.90	3.10	3.30
B	15.20	15.60	16.00
B1	9.10	9.30	9.50
c	0.50	0.60	0.70
D	18.30	18.50	18.70
D1	19.00	19.50	20.00
e	5.25	5.45	5.65
G	2.80	3.00	3.20
ØP	3.00	3.20	3.40

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Rev.: 1.3

Revision History:

1. Update the curve
 2. Update important notice
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Rev.: 1.2

Revision History:

1. Add the package outline of TO-3PN
 2. Update the template of datasheet
-

Rev.: 1.1

Revision History:

1. Update NOMENCLATURE
 2. Update Marking
 3. Update package outline
-

Rev.: 1.0

Revision History:

1. First release
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