

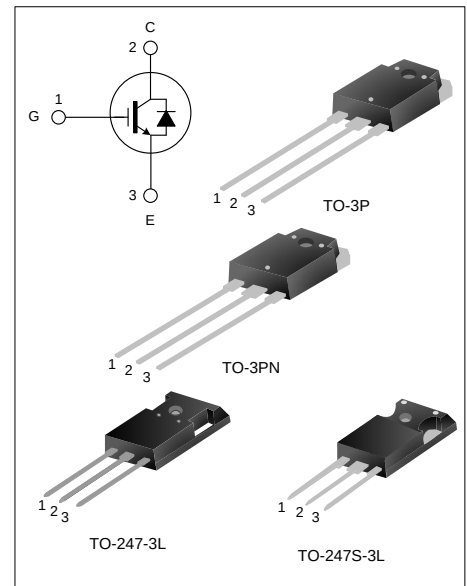
50A, 650V FIELD STOP IGBT

DESCRIPTION

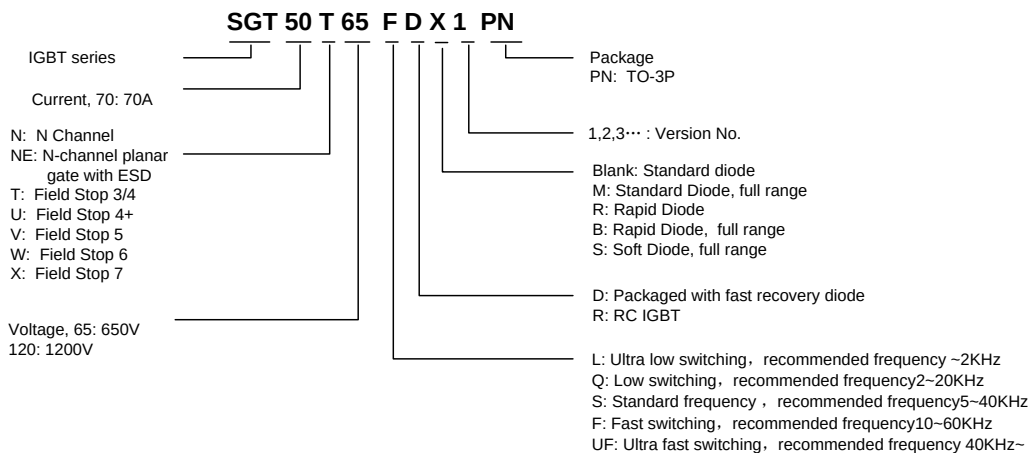
SGT50T65FD1PN/P7/PS/PT using Field Stop IV IGBT technology, offers the optimum performance for induction Heating, UPS, SMPS and PFC application.

FEATURES

- ◆ 50A, 650V, $V_{CE(sat)(typ.)}=2.2V@I_C=50A$
- ◆ Low conduction loss
- ◆ Fast switching
- ◆ High input impedance



NOMENCLATURE



ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing Type
SGT50T65FD1PN	TO-3P	50T65FD1	Pb free	Tube
SGT50T65FD1P7	TO-247-3L	50T65FD1	Pb free	Tube
SGT50T65FD1PS	TO-247S-3L	50T65D1	Pb free	Tube
SGT50T65FD1PT	TO-3PN	50T65FD1	Pb 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
Transient G-E voltage		V _{GEM}	±30	V
Collector Current	T _C =25°C	I _C	100	A
	T _C =100°C		50	
Pulsed Collector Current		I _{CM}	150	A
Diode Current		I _F	25	A
Power Dissipation (T _C =25°C)		P _D	235	W
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}	0.53	°C/W
Thermal Resistance, Junction to Case (FRD)	R _{θJC}	1.48	°C/W

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

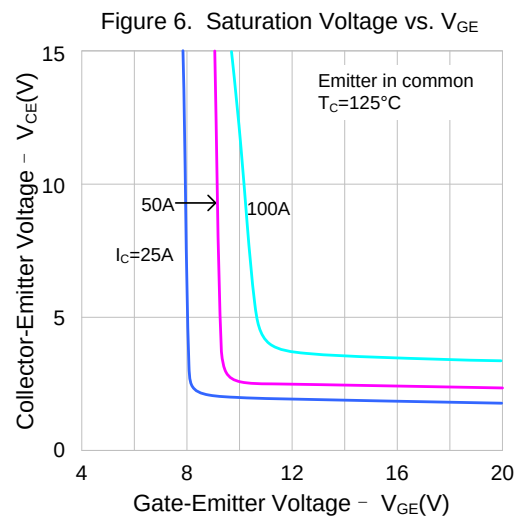
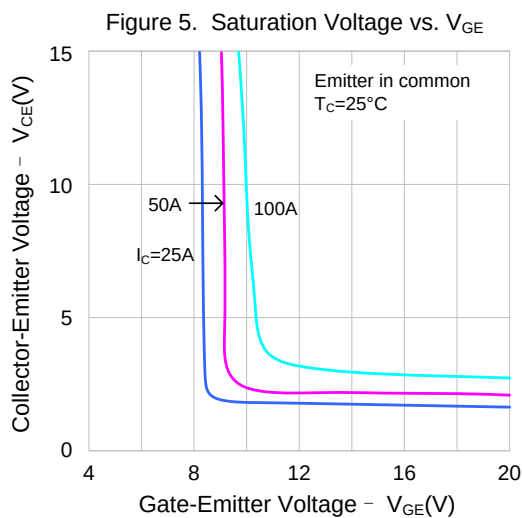
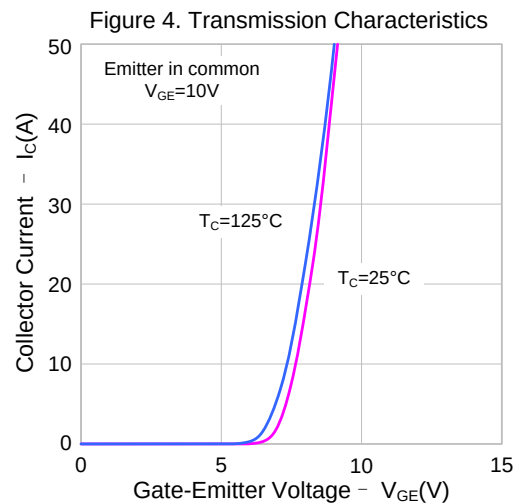
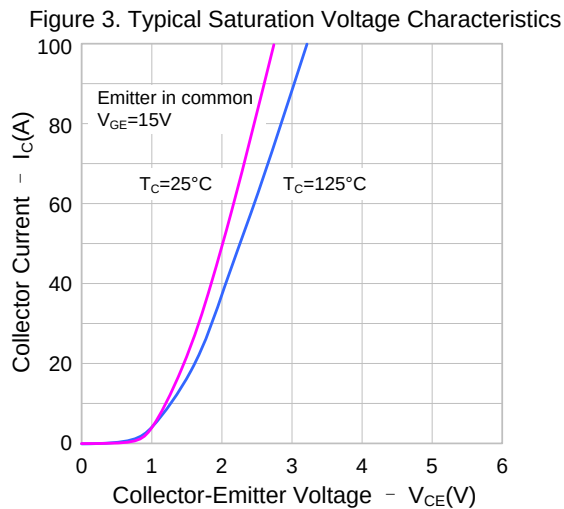
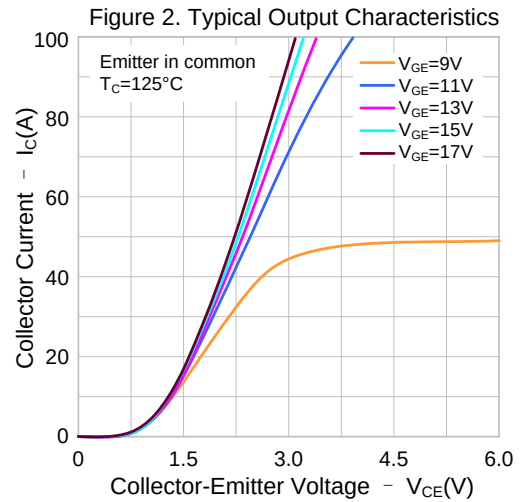
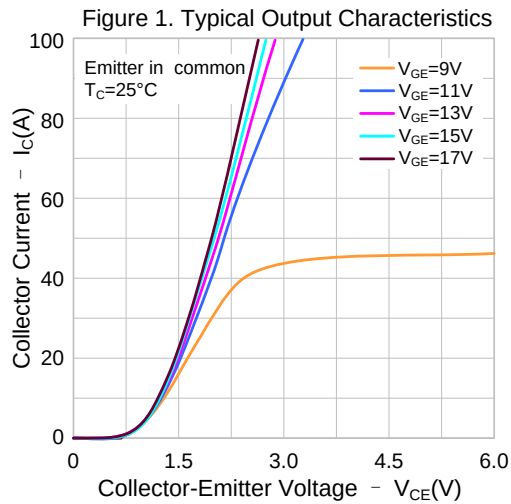
Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Units
Collector to Emitter Breakdown Voltage	BV _{CE}	V _{GE} =0V, I _C =250μA	650	--	--	V
C-E Leakage Current	I _{CES}	V _{CE} =650V, V _{GE} =0V	--	--	200	μA
G-E Leakage Current	I _{GES}	V _{GE} =20V, V _{CE} =0V	--	--	±400	nA
G-E Threshold Voltage	V _{GE(th)}	I _C =250μA, V _{CE} =V _{GE}	4.0	5.0	6.5	V
Collector to Emitter Saturation Voltage	V _{CE(sat)}	I _C =50A, V _{GE} =15V, T _C =25°C	--	2.2	2.6	V
		I _C =50A, V _{GE} =15V, T _C =125°C	--	2.4	--	V
Input Capacitance	C _{ies}	V _{CE} =30V, V _{GE} =0V, f=1MHz	--	4532	--	pF
Output Capacitance	C _{oes}		--	90	--	
Reverse Transfer Capacitance	C _{res}		--	41	--	
Turn-On Delay Time	T _{d(on)}	V _{CE} =400V I _C =50A R _g =10Ω V _{GE} =15V Inductive Load	--	45	--	ns
Rise Time	T _r		--	145	--	
Turn-Off Delay Time	T _{d(off)}		--	125	--	
Fall Time	T _f		--	130	--	
Turn-On Switching Loss	E _{on}		--	2.8	--	mJ
Turn-Off Switching Loss	E _{off}	Inductive Load	--	1.0	--	
Total Switching Loss	E _{st}		--	3.8	--	
Total Gate Charge	Q _g	V _{CE} =400V, I _C =50A, V _{GE} =15V	--	145	--	nC
Gate to Emitter Charge	Q _{ge}		--	48	--	
Gate to Collector Charge	Q _{gc}		--	46	--	

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

Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Units
Diode Forward Voltage	V _{FM}	I _F =25A, T _C =25°C	--	1.95	--	V
		I _F =25A, T _C =125°C	--	1.7	--	
Diode Reverse Recovery Time	T _{rr}	I _{EC} =25A, dI _{EC} /dt=200A/μs	--	33	--	ns
Diode Reverse Recovery Charge	Q _{rr}	I _{EC} =25A, dI _{EC} /dt=200A/μs	--	65	--	nC

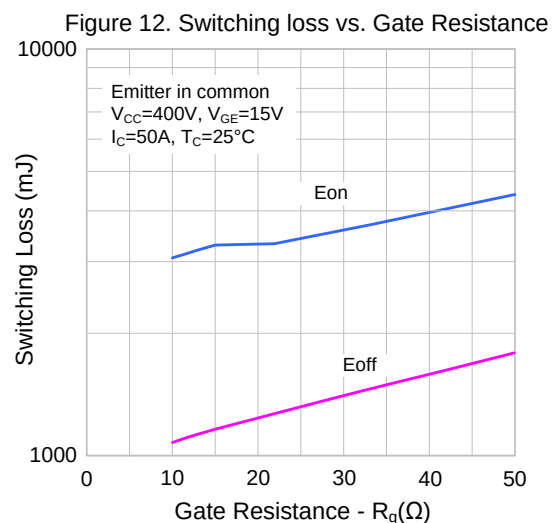
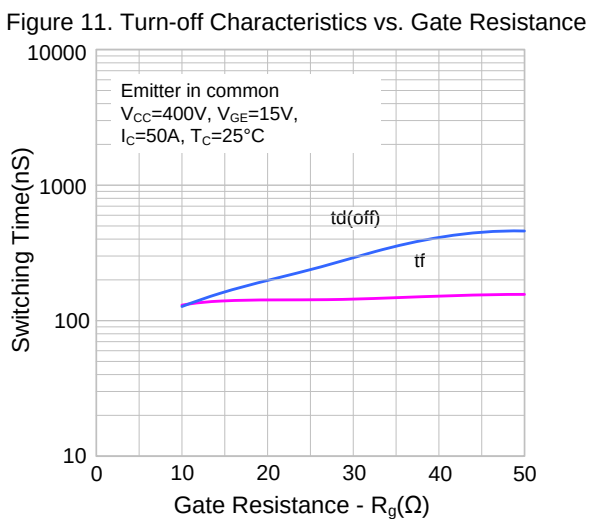
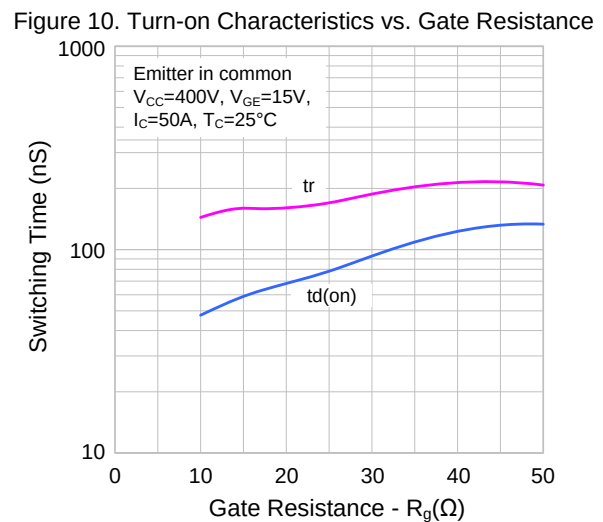
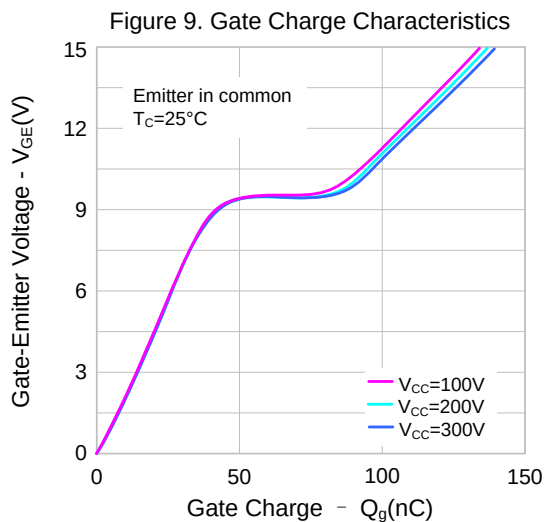
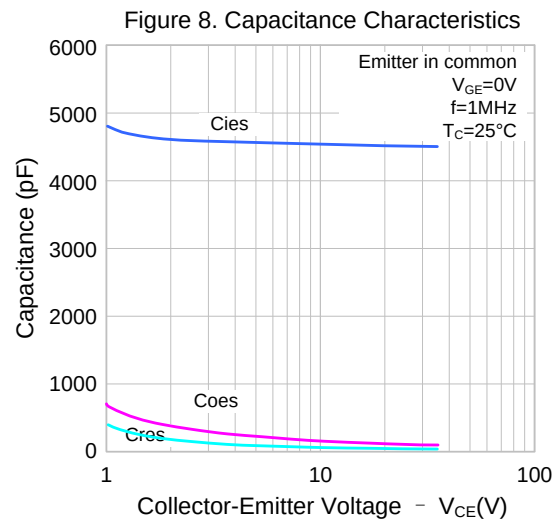
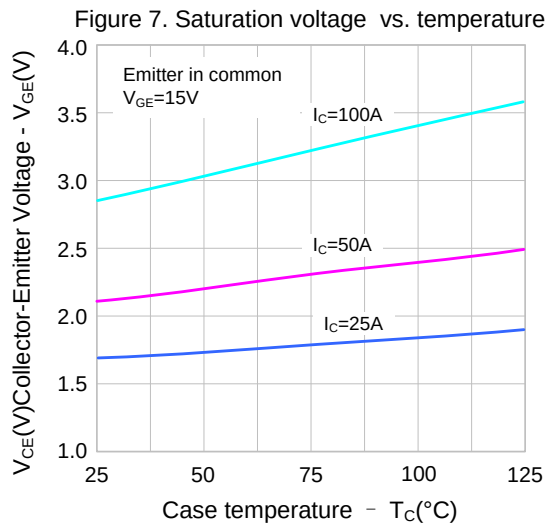


TYPICAL CHARACTERISTIC CURVES





TYPICAL CHARACTERISTIC CURVES (CONTINUED)





TYPICAL CHARACTERISTIC CURVES (CONTINUED)

Figure 13. Turn-on Characteristics vs. Collector Current

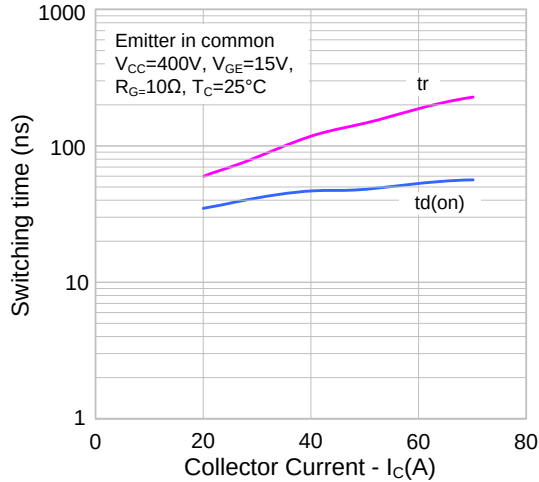


Figure 14. Turn-off Characteristics vs. Collector Current

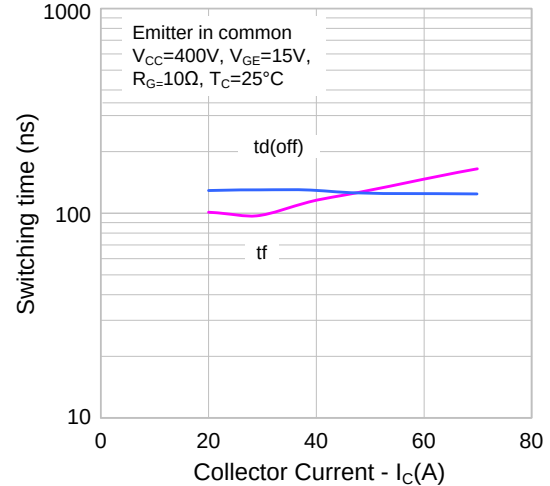


Figure 15. Switching loss vs. collector current

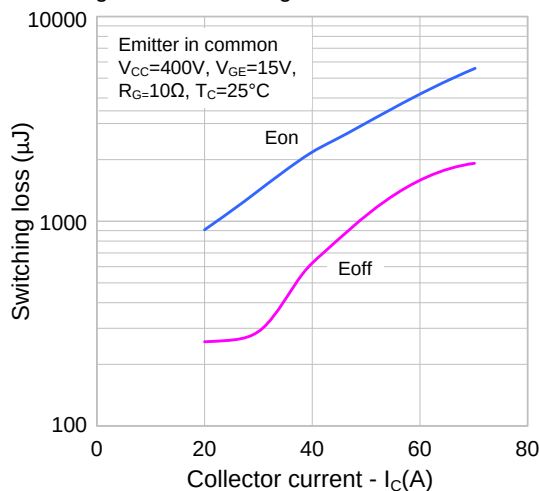


Figure 16. Forward Characteristics

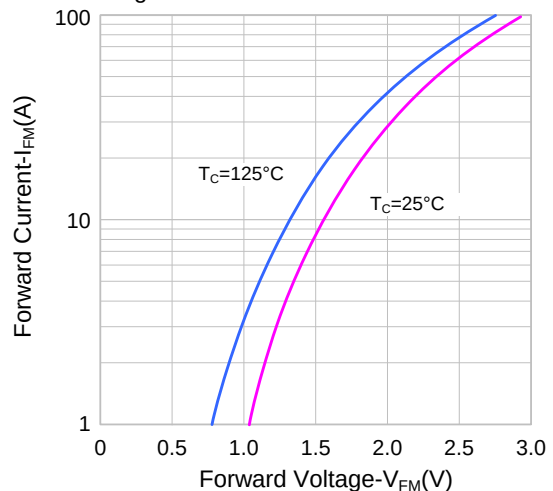


Figure 17. Reverse Recovery Time vs. Forward Current

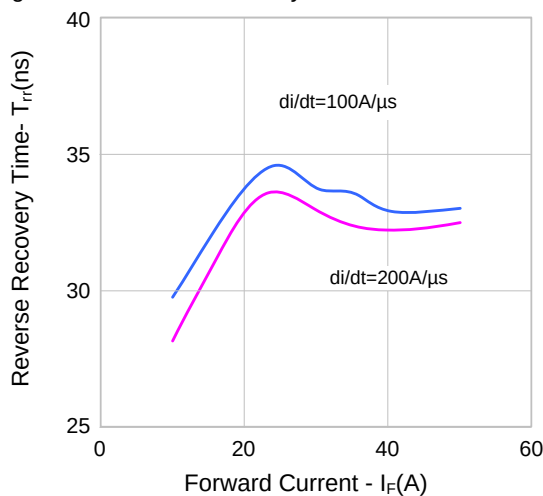
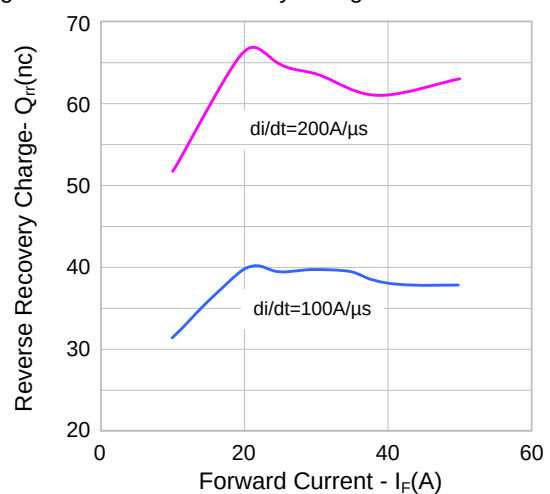
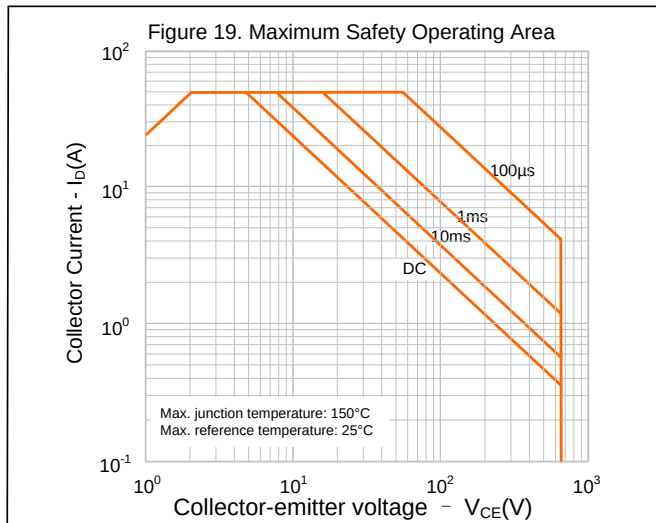


Figure 18. Reverse Recovery Charge vs. Forward Current





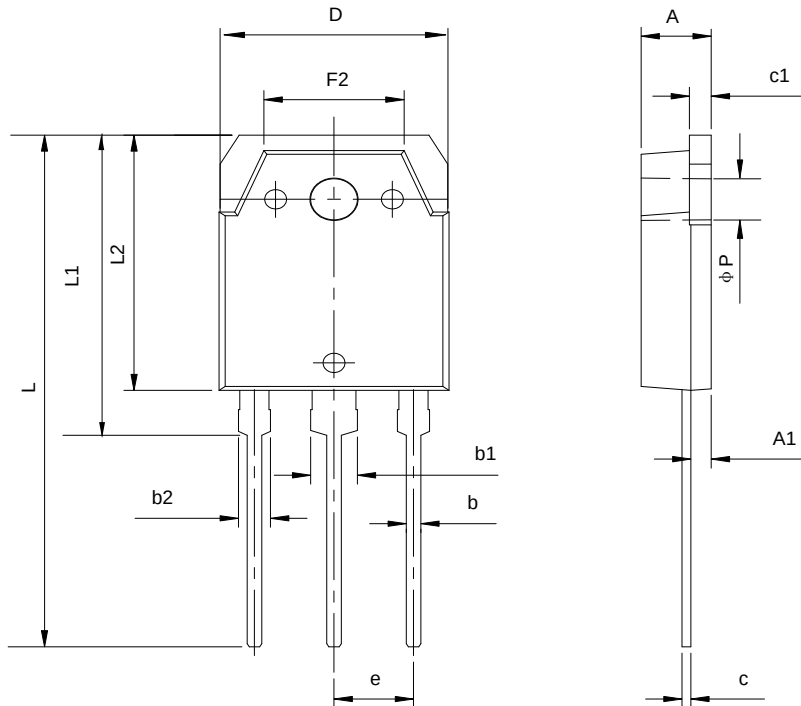
TYPICAL CHARACTERISTIC CURVES (CONTINUED)



PACKAGE OUTLINE

TO-3P

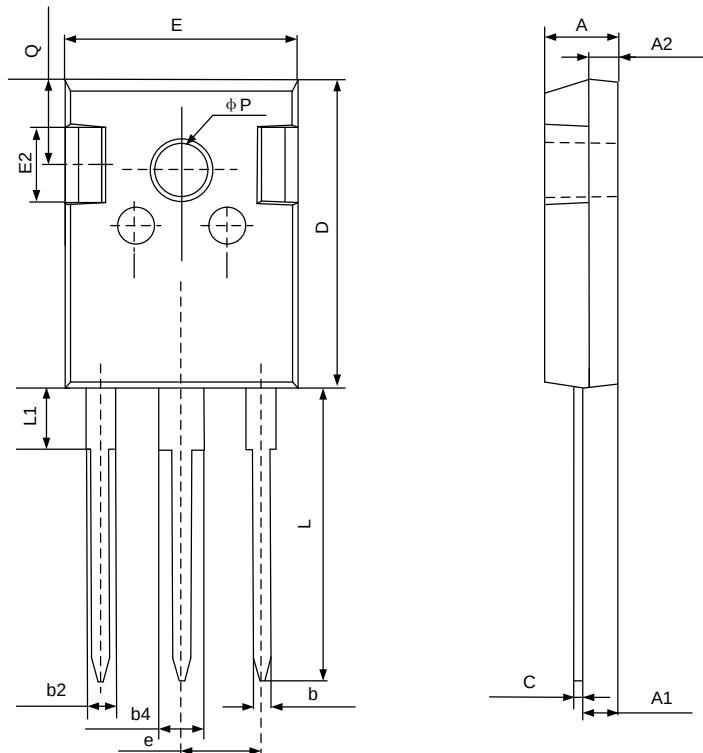
UNIT: mm



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

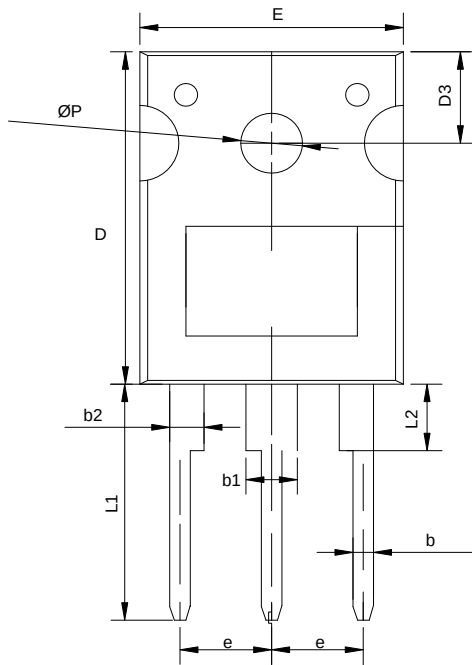


SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.59
A2	1.85	2.00	2.15
b	1.11	—	1.36
b2	1.91	—	2.25
b4	2.91	—	3.25
c	0.51	—	0.75
D	20.80	21.00	21.30
E	15.50	15.80	16.10
E2	4.40	5.00	5.20
e	5.44 BSC		
L	19.72	19.92	20.22
L1	—	—	4.30
Q	5.60	5.80	6.00
P	3.40	—	3.80

PACKAGE OUTLINE(CONTINUED)

TO-247S-3L

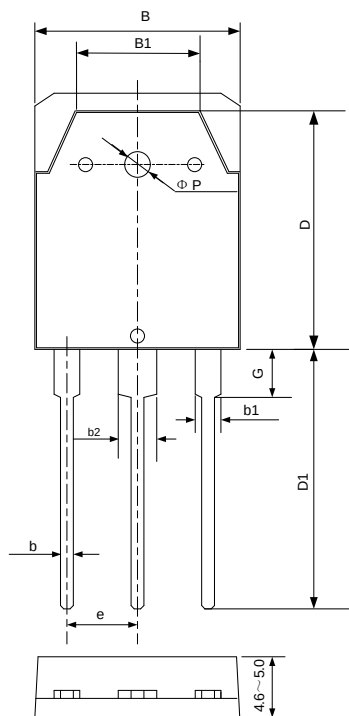
UNIT: mm



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.30	2.50	2.70
b	1.10	1.20	1.30
b1	2.90	3.10	3.30
b2	1.90	2.10	2.30
c2	5.50	6.00	6.50
c3	4.95	5.10	5.25
D	19.00	20.00	21.00
D3	5.30	5.50	5.70
e	5.34	5.44	5.54
E	15.40	15.60	15.80
L1	14.40	14.60	14.80
L2	3.85	4.00	4.15
L3	0.35	0.50	0.65
ØP	3.40	3.60	3.80

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



Important notice :

1. The instructions are subject to change without notice!
2. Customers should obtain the latest relevant information before placing orders and should verify that such information is complete and current. Please read the instructions carefully before using our products, including the circuit operation precautions.
3. Our products are consumer electronic products or the other civil electronic products.
4. When using our products, please do not exceed the maximum rating of the products, otherwise the reliability of the whole machine will be affected. There is a certain possibility of failure or malfunction of any semiconductor product under specific conditions. The buyer is responsible for complying with safety standards and taking safety measures when using our products for system design, sample and whole machine manufacturing, so as to avoid potential failure risk that may cause personal injury or property loss.
5. It is strongly recommended to identify the trademark when buying our products. Please contact us if there is any question.
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Rev.: 1.9

Revision History:

1. Modify electrical characteristics

Rev.: 1.8

Revision History:

1. Add TO-3PN
2. Update important notice

Rev.: 1.7

Revision History:

1. Update characteristics
2. Update the package outline

Rev.: 1.6

Revision History:

1. Add package outline of TO-247S-3L
2. Modify NOMENCLATURE

Rev.: 1.5

Revision History:

1. Update Electrical characteristics

Rev.: 1.4

Revision History:

1. Add Max. value of Vcesat

Rev.: 1.3

Revision History:

1. Modify TO-247-3L

Rev.: 1.2

Revision History:

1. Add TO-247-3L
2. Modify Diode Current to 25A

Rev.: 1.1

Revision History:

1. Add TransientUpdate the package outline

Rev.: 1.0

Revision History:

1. First release