

Справочный раздел  
Интернет Портала «Радиодар»

ТЕХНИЧЕСКИЙ СПРАВОЧНИК  
«Мощный IGBT транзистор SGT50T65FD1PN  
производства фирмы Silan Microelectronics»

Версия:	1
Ревизия:	2.0.0
Дата:	2024 г.



КУПИТЬ В  
РАДИОДАРЕ



ОПИСАНИЕ НА  
ВИКИПЕДИИ



ОБСУЖДЕНИЕ  
НА ФОРУМЕ

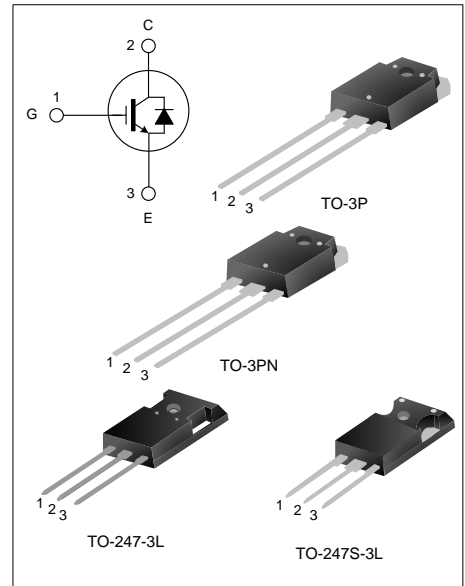
## 50A, 650V FIELD STOP IGBT

### DESCRIPTION

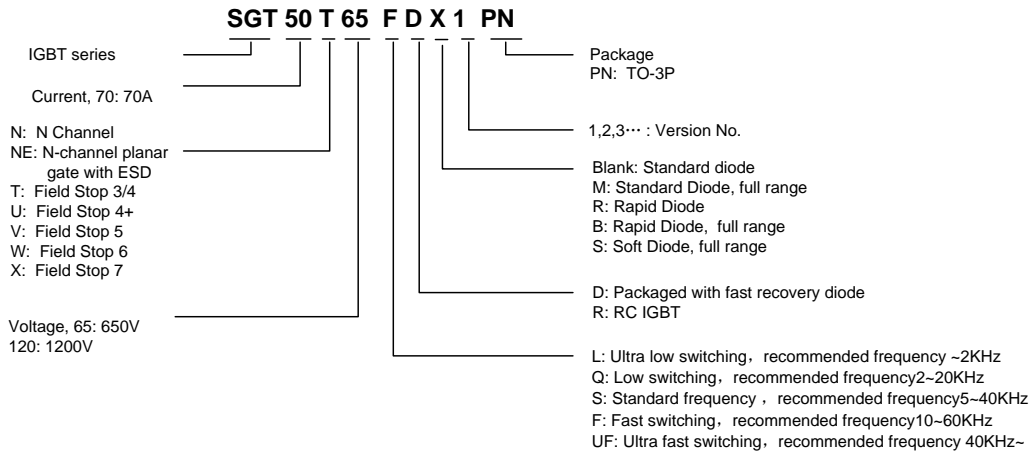
SGT50T65FD1PN/P7/PS/PT using Field Stop IV IGBT technology, offers the optimum performance for induction Heating, UPS, SMPS and PFC application.

### 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<sub>C</sub>=25°C UNLESS OTHERWISE NOTED)**

Parameter	Symbol	Ratings	Units
Collector to Emitter Voltage	V <sub>CE</sub>	650	V
Gate to Emitter Voltage	V <sub>GE</sub>	±20	V
Transient G-E voltage	V <sub>GEM</sub>	±30	V
Collector Current	I <sub>C</sub>	T <sub>C</sub> =25°C	100
		T <sub>C</sub> =100°C	50
Pulsed Collector Current	I <sub>CM</sub>	150	A
Diode Current	I <sub>F</sub>	25	A
Power Dissipation (T <sub>C</sub> =25°C)	P <sub>D</sub>	235	W
Operating Junction Temperature Range	T <sub>J</sub>	-55~+150	°C
Storage Temperature Range	T <sub>stg</sub>	-55~+150	°C

**THERMAL CHARACTERISTICS**

Parameter	Symbol	Ratings	Units
Thermal Resistance, Junction to Case (IGBT)	R <sub>θJC</sub>	0.53	°C/W
Thermal Resistance, Junction to Case (FRD)	R <sub>θJC</sub>	1.48	°C/W

### ELECTRICAL CHARACTERISTICS OF IGBT (T<sub>C</sub>=25°C UNLESS OTHERWISE NOTED)

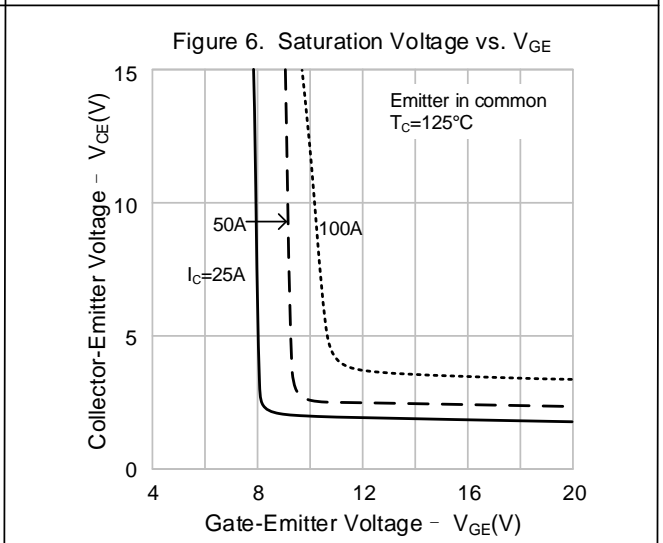
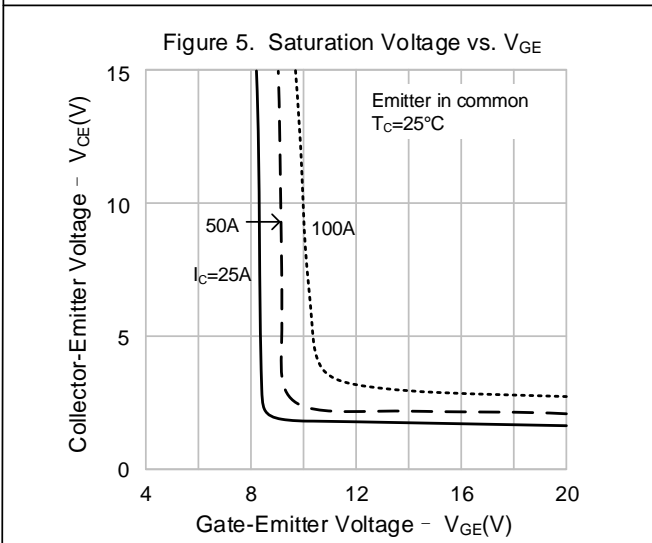
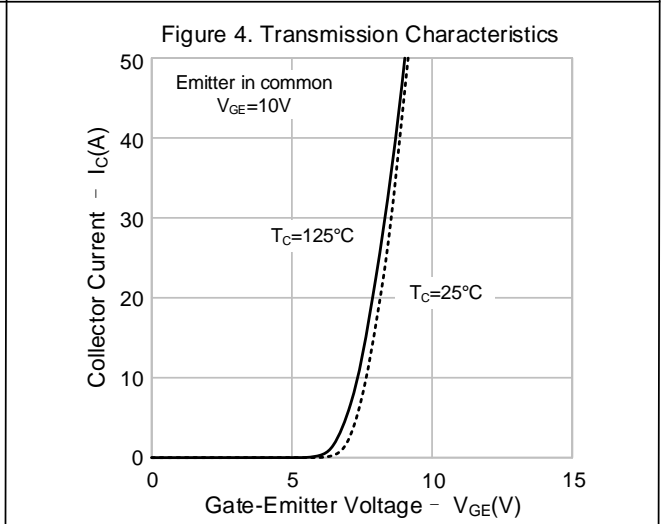
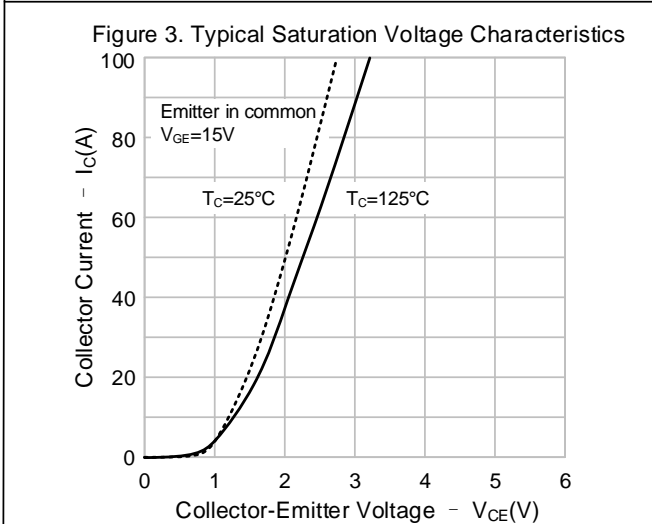
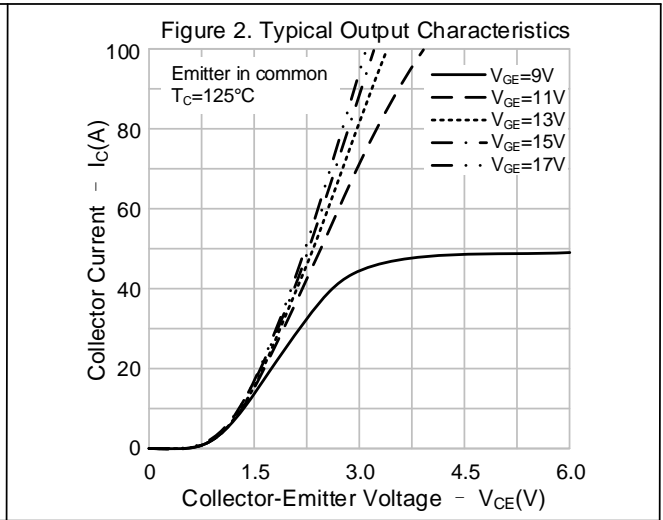
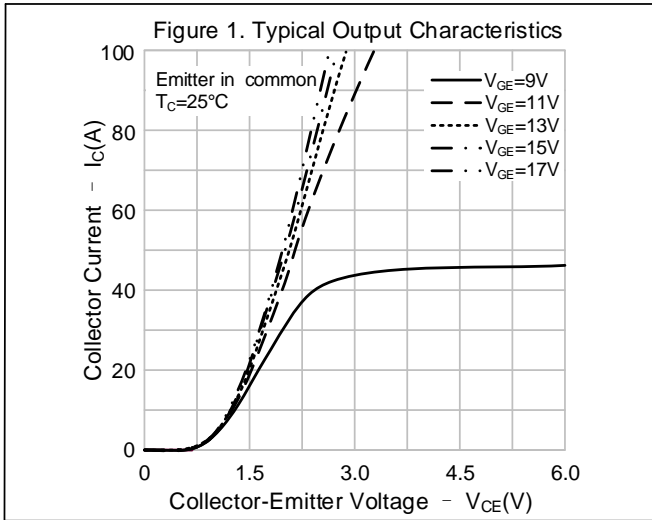
Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Units
Collector to Emitter Breakdown Voltage	BV <sub>CE</sub>	V <sub>GE</sub> =0V, I <sub>C</sub> =250μA	650	--	--	V
C-E Leakage Current	I <sub>CEs</sub>	V <sub>CE</sub> =650V, V <sub>GE</sub> =0V	--	--	200	μA
G-E Leakage Current	I <sub>GES</sub>	V <sub>GE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

### ELECTRICAL CHARACTERISTICS OF FRD (T<sub>C</sub>=25°C UNLESS OTHERWISE NOTED)

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

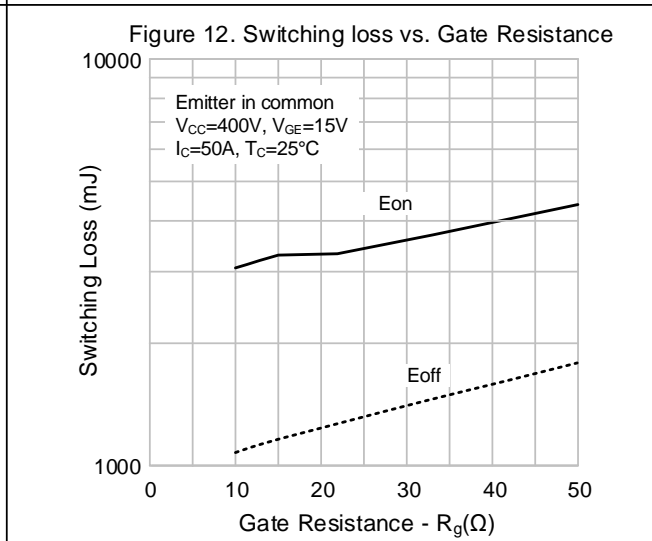
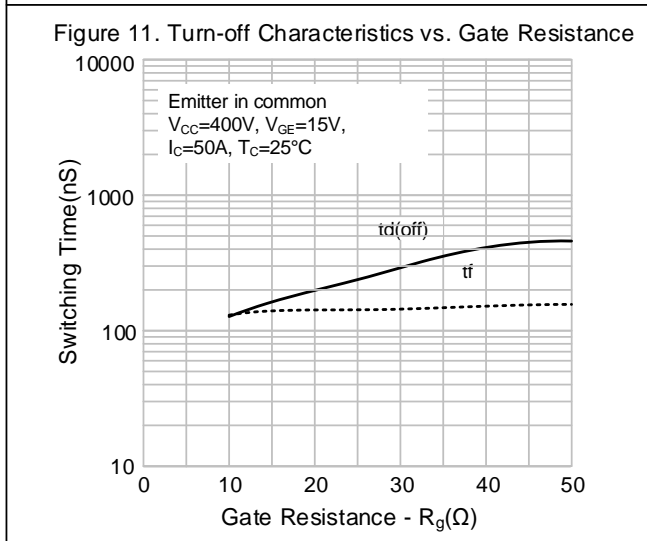
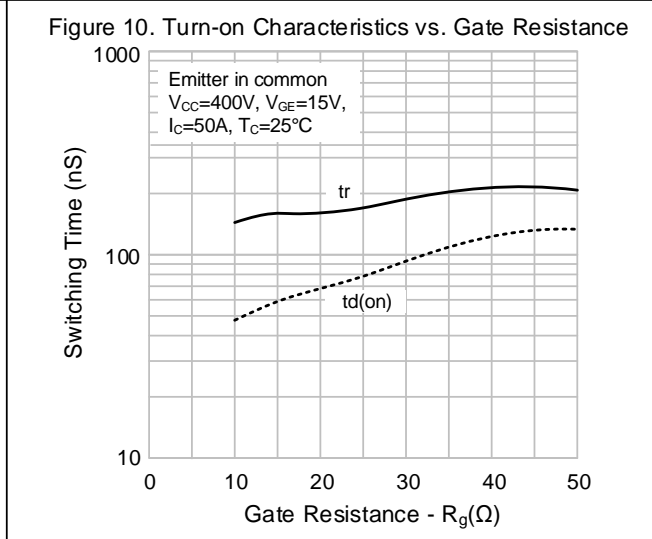
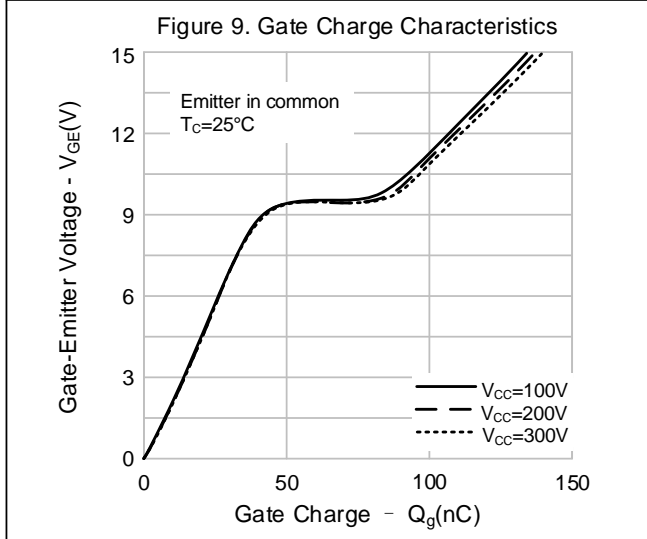
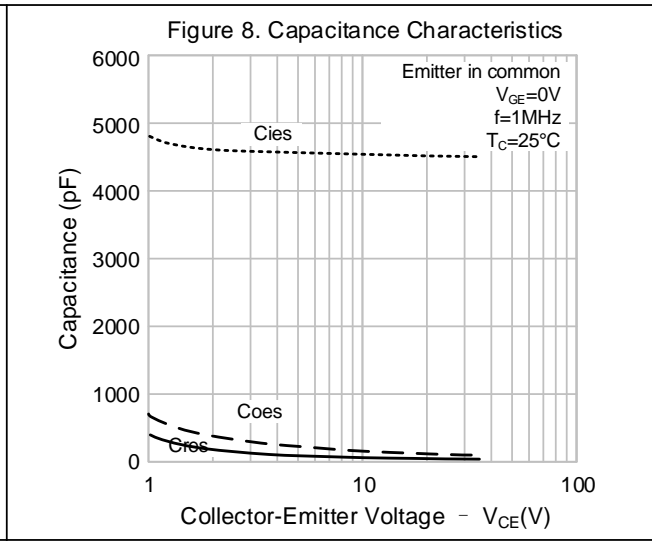
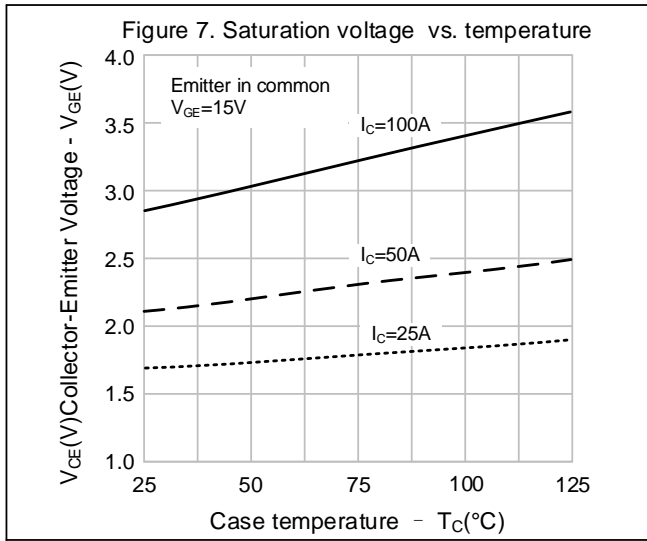


TYPICAL CHARACTERISTIC CURVES





## TYPICAL CHARACTERISTIC CURVES (CONTINUED)





TYPICAL CHARACTERISTIC CURVES (CONTINUED)

Figure 13. Turn-on Characteristics vs. Collector Current

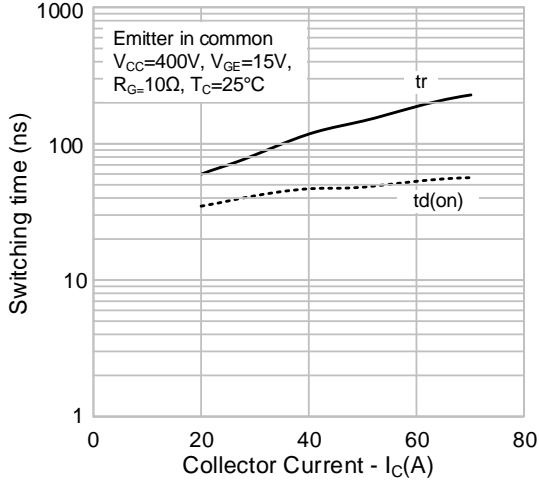


Figure 14. Turn-off Characteristics vs. Collector Current

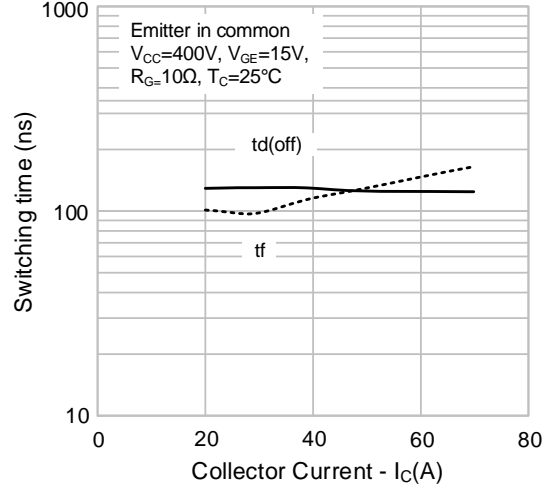


Figure 15. Switching loss vs. collector current

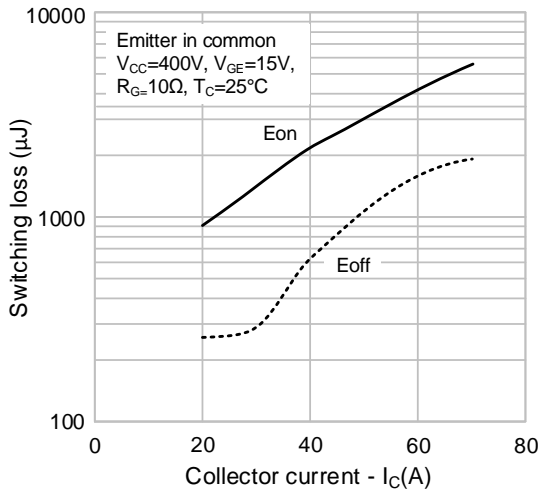


Figure 16. Forward Characteristics

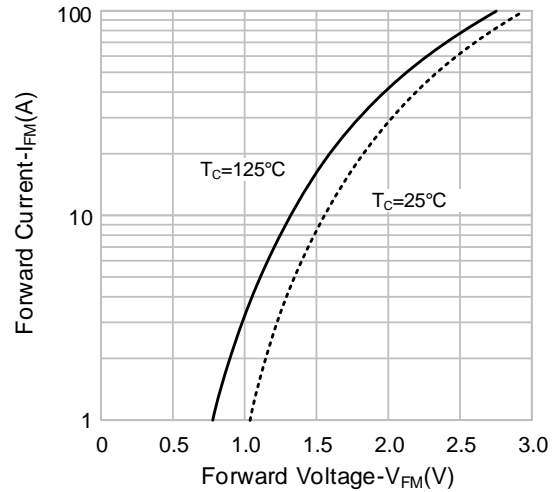


Figure 17. Reverse Recovery Time vs. Forward Current

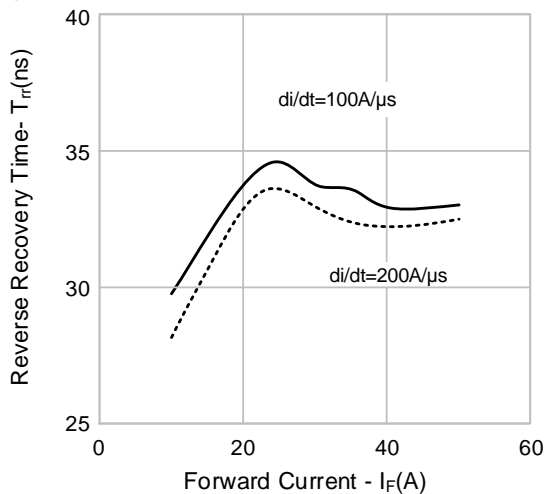
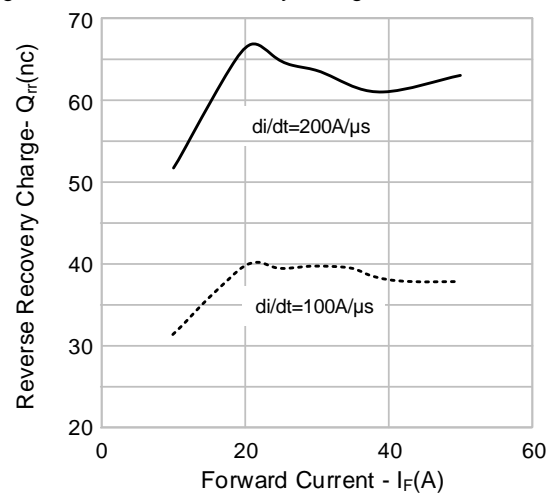
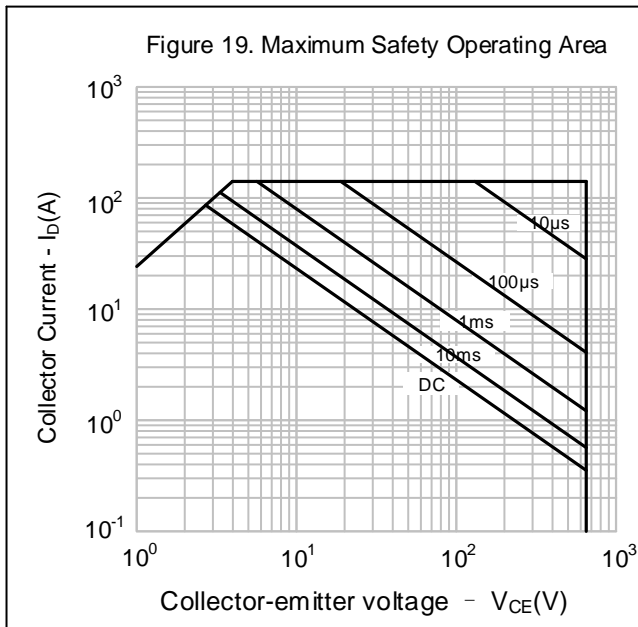


Figure 18. Reverse Recovery Charge vs. Forward Current





## TYPICAL CHARACTERISTIC CURVES (CONTINUED)

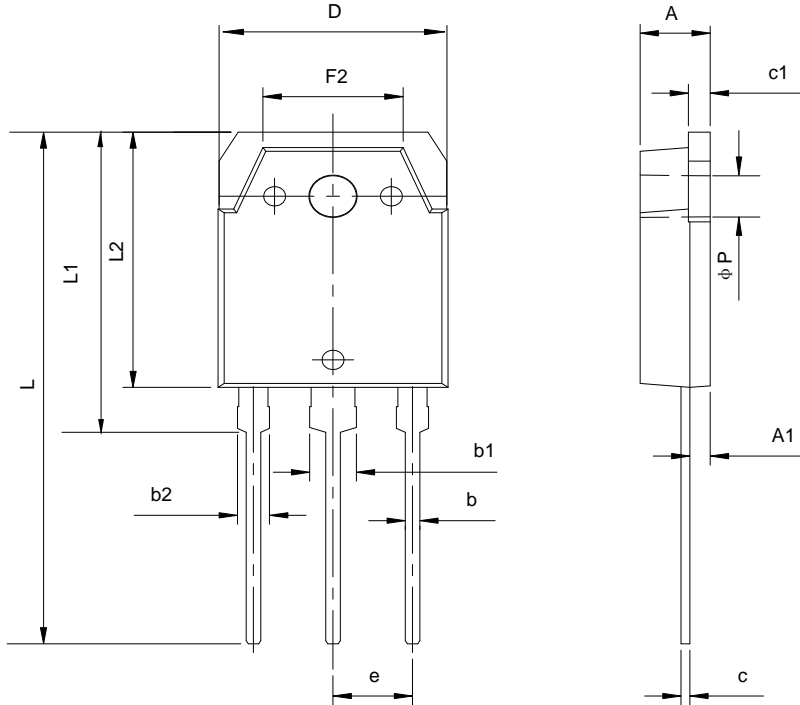




**PACKAGE OUTLINE**

**TO-3P**

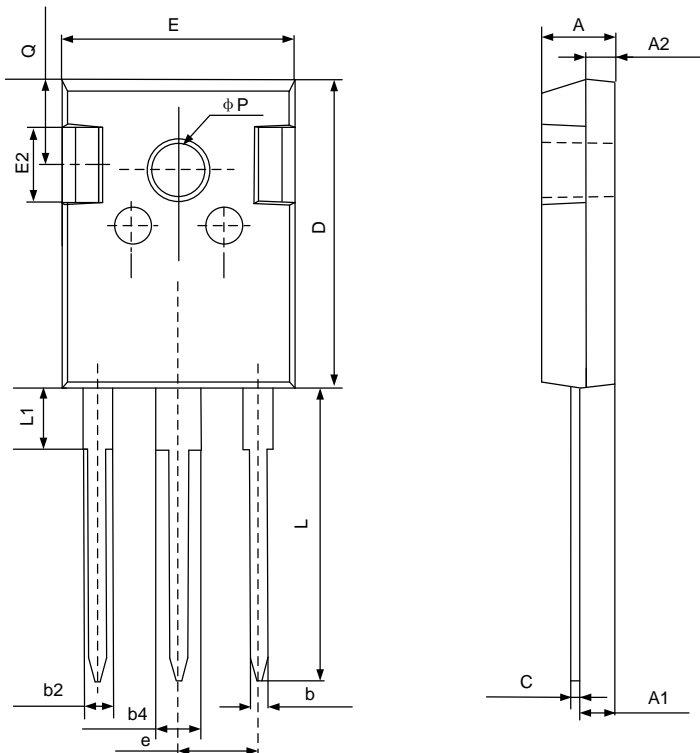
**UNIT: mm**



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**

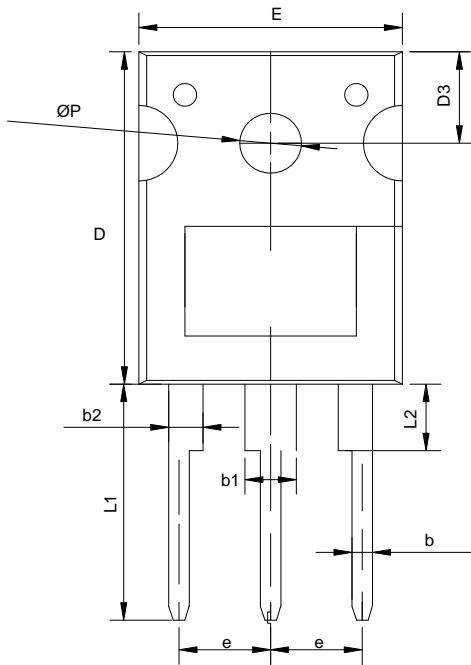


SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.59
A2	1.85	2.00	2.15
b	1.11	—	1.36
b2	1.91	—	2.25
b4	2.91	—	3.25
c	0.51	—	0.75
D	20.80	21.00	21.30
E	15.50	15.80	16.10
E2	4.40	5.00	5.20
e	5.44 BSC		
L	19.72	19.92	20.22
L1	—	—	4.30
Q	5.60	5.80	6.00
P	3.40	—	3.80

**PACKAGE OUTLINE(CONTINUED)**

**TO-247S-3L**

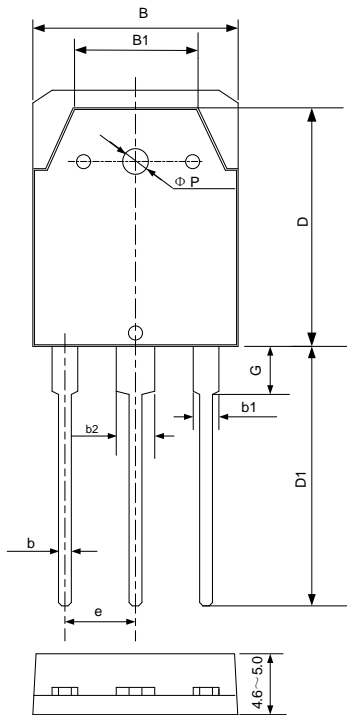
**UNIT: mm**



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



## MOS DEVICES OPERATE NOTES:

Electrostatic charges may exist in many things. Please take following preventive measures to prevent effectively the MOS electric circuit as a result of the damage which is caused by discharge:

- The operator must put on wrist strap which should be earthed to against electrostatic.
- Equipment cases should be earthed.
- All tools used during assembly, including soldering tools and solder baths, must be earthed.
- MOS devices should be packed in antistatic/conductive containers for transportation.

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Part No.: SGT50T65FD1PN/P7/PS/PT

Document Type: Datasheet

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Rev.: 2.0

Revision History:

1. Update typical characteristic curves
  2. Update important notice
- 

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
-