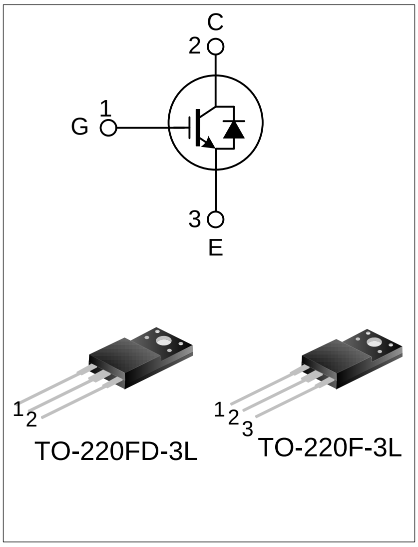
15A, 650V FIELD STOP IGBT

DESCRIPTION

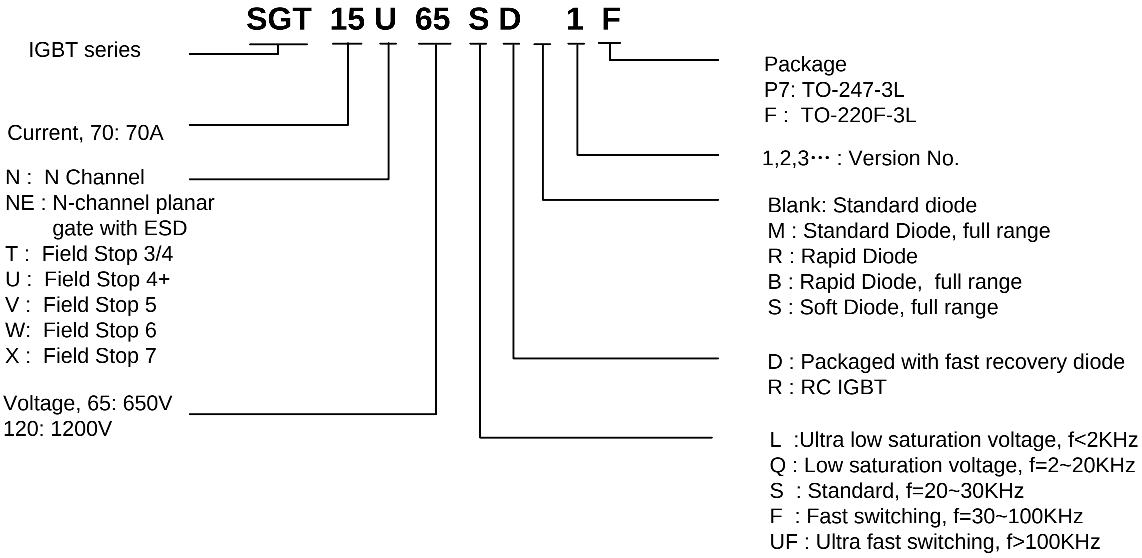
The SGT15U65SD1F(FD) field stop IGBT adopts Silan Field Stop IV+ technology, features low conduction loss and switching loss, is applicable to UPS, SMPS, motor application and PFC fields.

FEATURES

- 15A, 650V, $V_{CE(sat)(typ.)}$=1.6V@I_C=15A
- Low conduction loss
- Fast switching
- High input impedance



NOMENCLATURE



ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing Type
SGT15U65SD1F	TO-220F-3L	15U65SD1F	pb free	Tube
SGT15U65SD1FD	TO-220FD-3L	15U65SD1FD	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
Collector Current	T_C=25°C	I_C	30	A
	T_C=100°C		15	
Pulsed Collector Current		I_{CM}	45	A
Short-circuit time (V_{GE}=15V, V_{CC}=300V)		Tsc	10	μs
Diode current		I_F	16	A
			8	
Power Dissipation (T_C=25°C)		P_D	42	W
Operating Junction Temperature		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)—220F package	$R_{\theta JC}$	3.0	°C/W
Thermal Resistance, Junction to Case (FRD) —220F package	$R_{\theta JC}$	4.6	°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}=600V, 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}	4.8	6	7.2	V
Collector to Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=15A, V_{GE}=15V	--	1.6	2.3	V
		I_C=15A, V_{GE}=15V, T_C=125°C	--	1.8	--	V
Input Capacitance	C_{ies}	V_{CE}=30V	--	650	--	pF
Output Capacitance	C_{oes}	V_{GE}=0V	--	49	--	
Reverse Transfer Capacitance	C_{res}	f=1MHz	--	8	--	
Turn-On Delay Time	$T_{d(on)}$	V_{CE}=400V I_C=15A R_g=10Ω V_{GE}=15V Inductive load	--	12	--	ns
Rise Time	T_r		--	42	--	
Turn-Off Delay Time	$T_{d(off)}$		--	26	--	
Fall Time	T_f		--	120	--	
Turn-On Switching Loss	E_{on}		--	0.7	--	mJ
Turn-Off Switching Loss	E_{off}		--	0.2	--	
Total Switching Loss	E_{st}		--	0.9	--	
Total Gate Charge	Q_g	V_{CE}=400V, I_C=15A, V_{GE}=15V	--	28	--	nC
Gate to Emitter Charge	Q_{ge}		--	10	--	
Gate to Collector Charge	Q_{gc}		--	11	--	

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=8A, T_C=25°C	--	1.9	2.4	V
		I_F=8A, T_C=125°C	--	1.5	--	
Diode Reverse Recovery Time	T_{rr}	I_{ES}=8A, dI_{ES}/dt=200A/μs	--	24	--	ns
Diode Reverse Recovery Charge	Q_{rr}	I_{ES}=8A, dI_{ES}/dt=200A/μs	--	42	--	μC

TYPICAL CHARACTERISTICS CURVE

Figure 1. Typical output characteristics

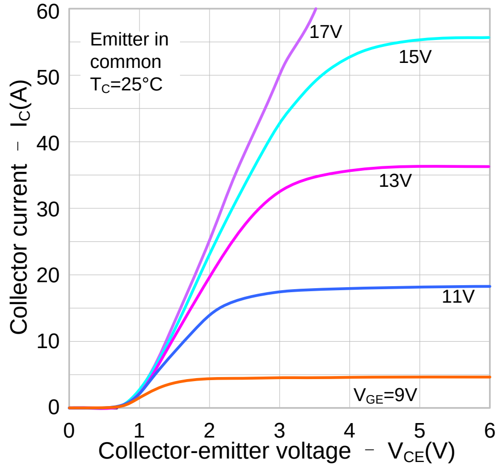


Figure 2. Typical saturation voltage characteristics

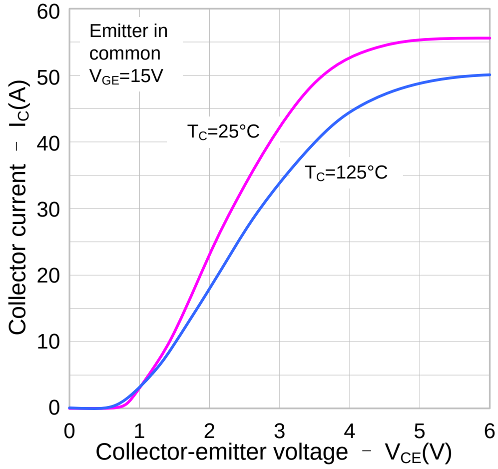


Figure 3. Transmission characteristics

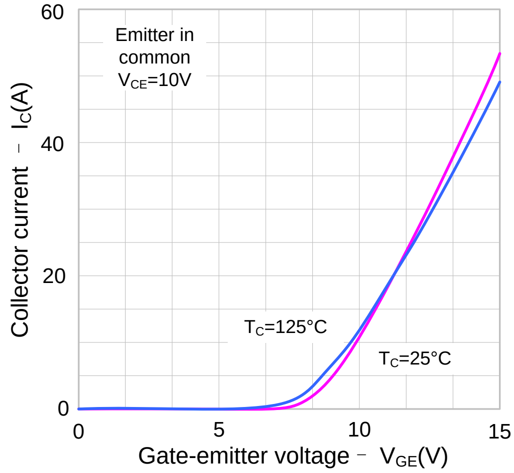


Figure 4. Saturation voltage vs. V_{GE}

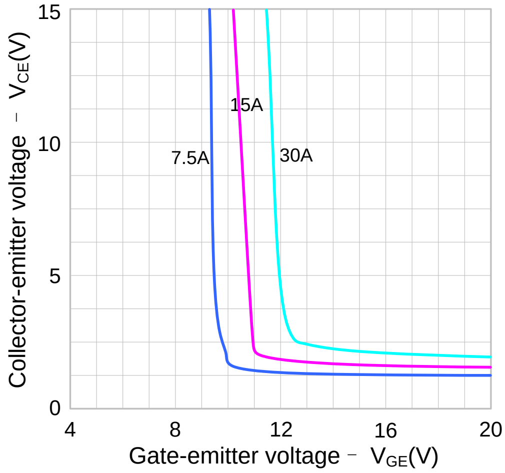


Figure 5. Saturation voltage vs. V_{GE}

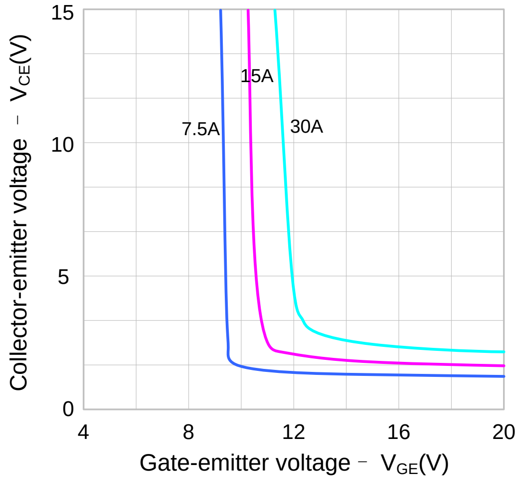
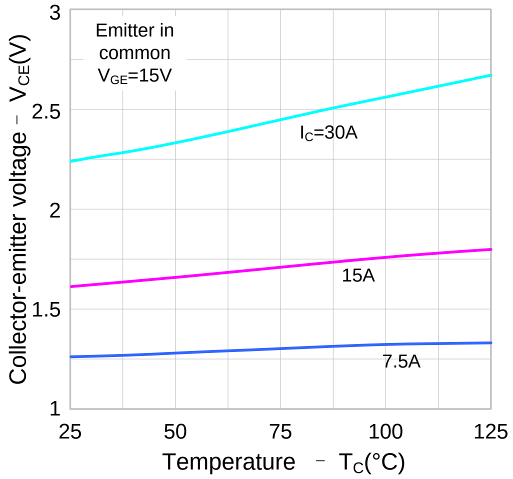
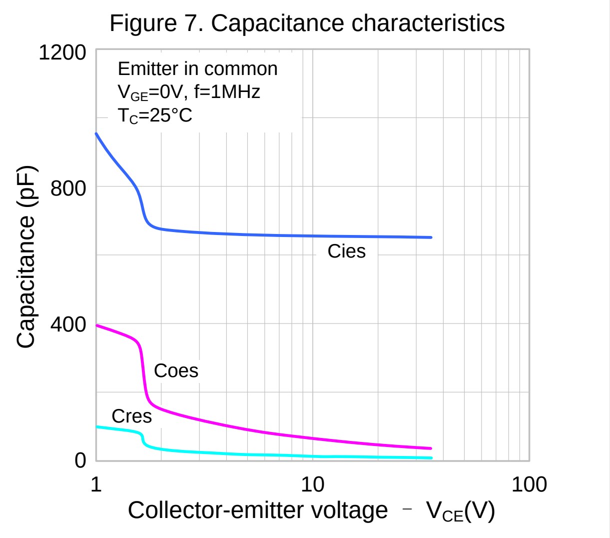
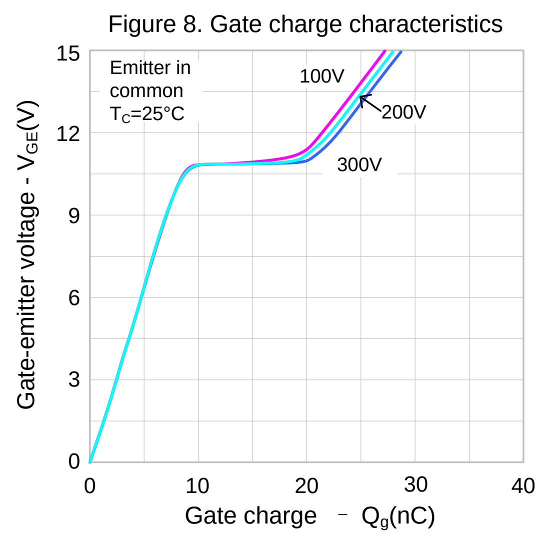


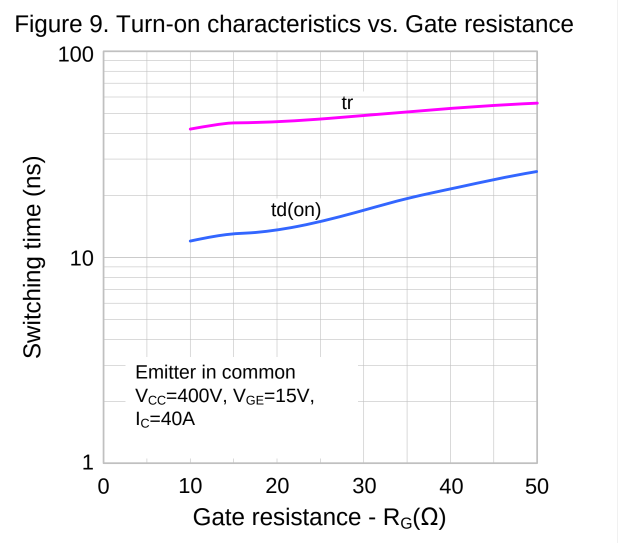
Figure 6. Saturation voltage vs. Temperature

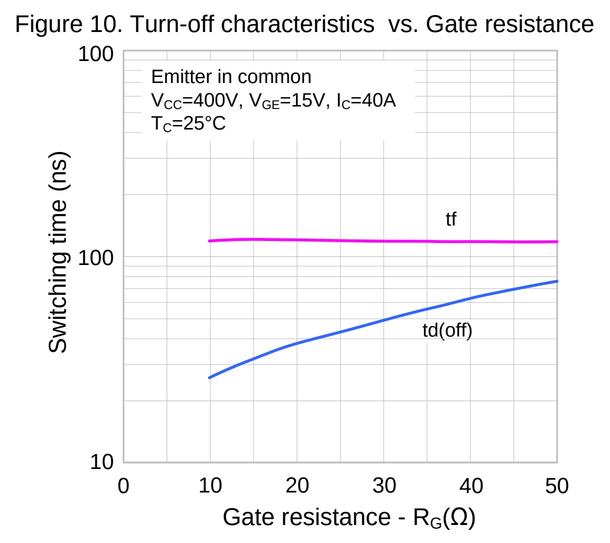


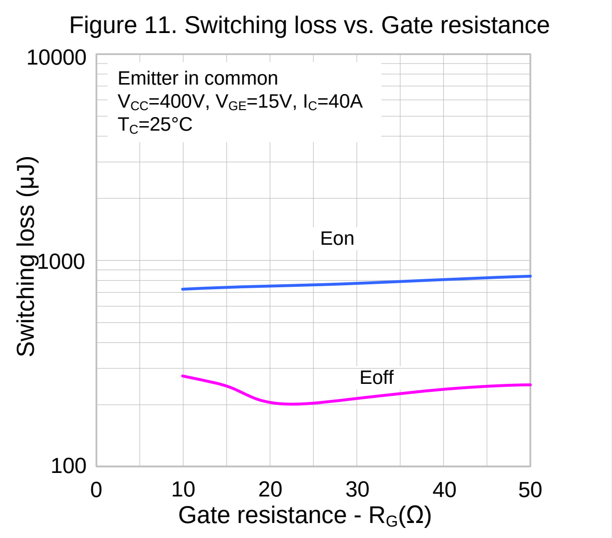
TYPICAL CHARACTERISTICS CURVE (CONTINUED)

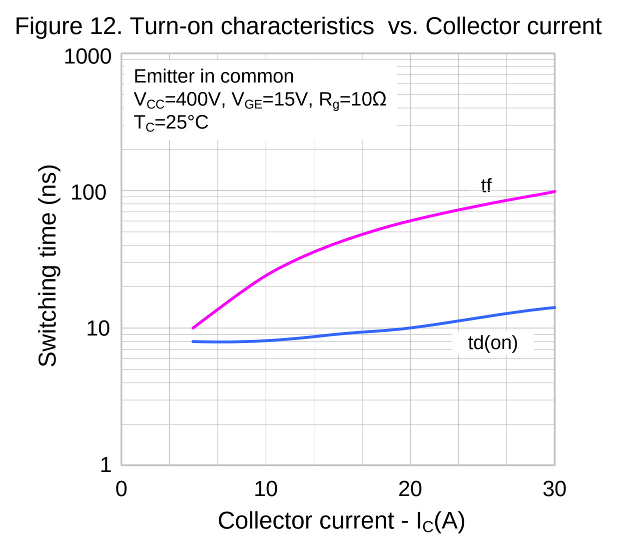












TYPICAL CHARACTERISTICS CURVE (CONTINUED)

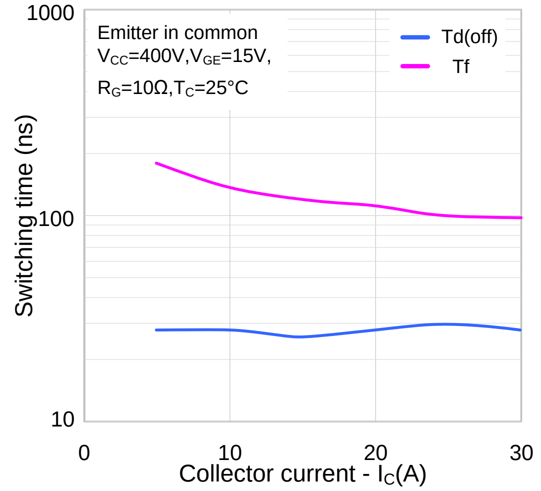


Figure 13. Turn-off characteristics vs. Collector current

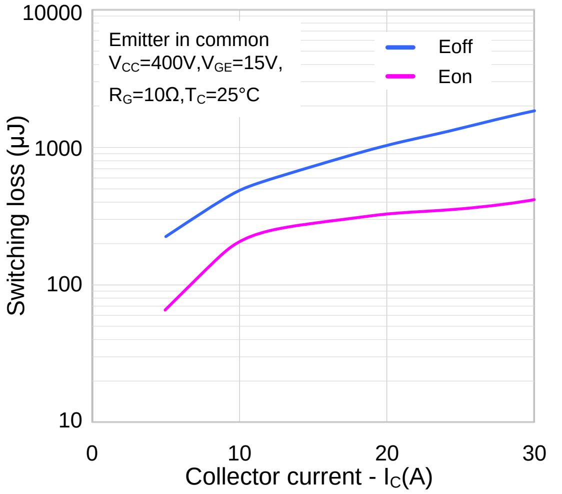


Figure 14. Switching loss vs. Collector current

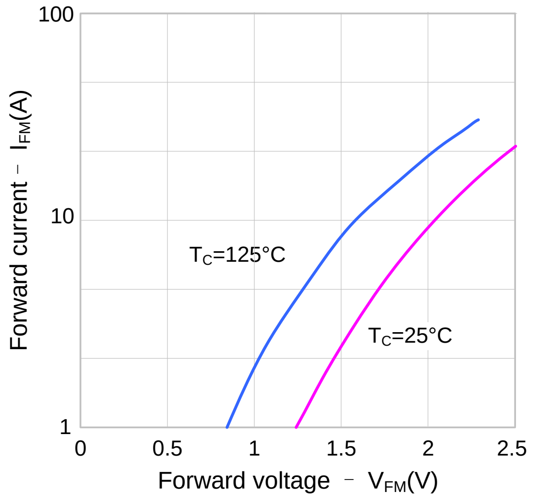


Figure 15.Forward characteristic

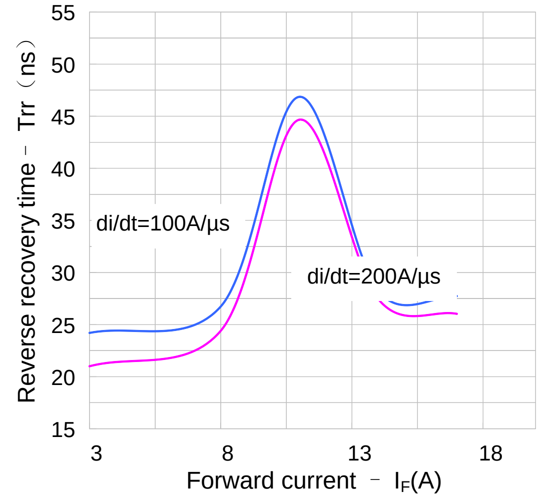


Figure 16. Reverse recovery time vs. Forward current

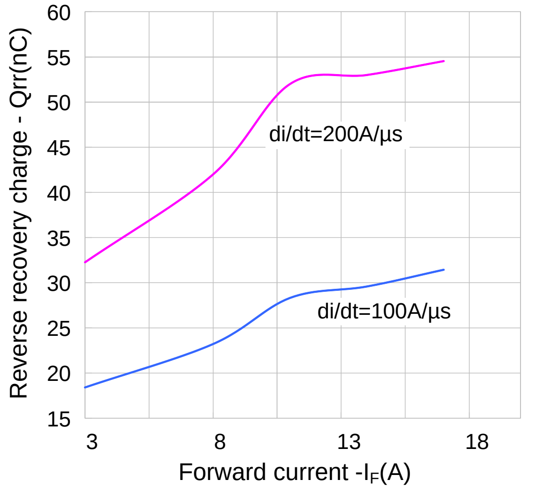


Figure 17. Reverse recovery charge vs. Forward current

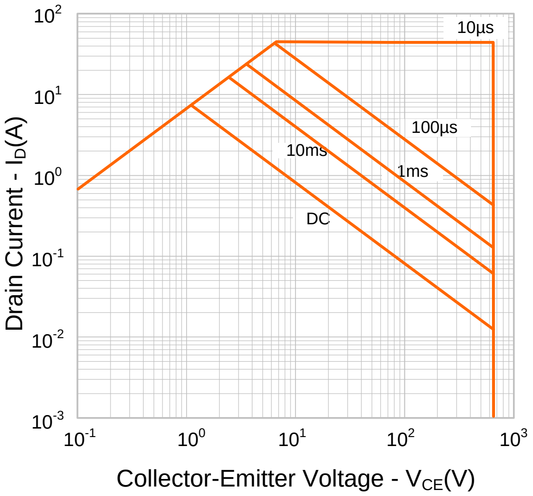
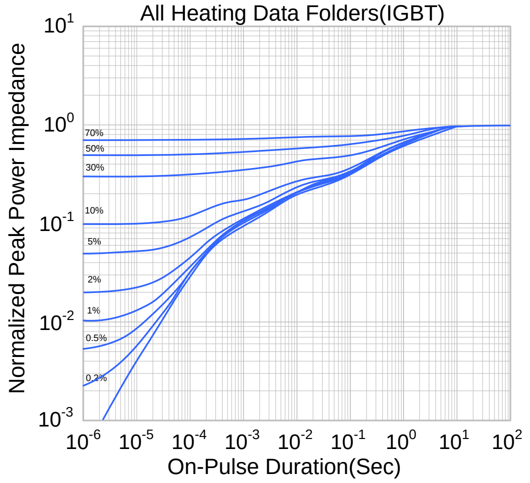


Figure 18. Max. Safe Operating Area

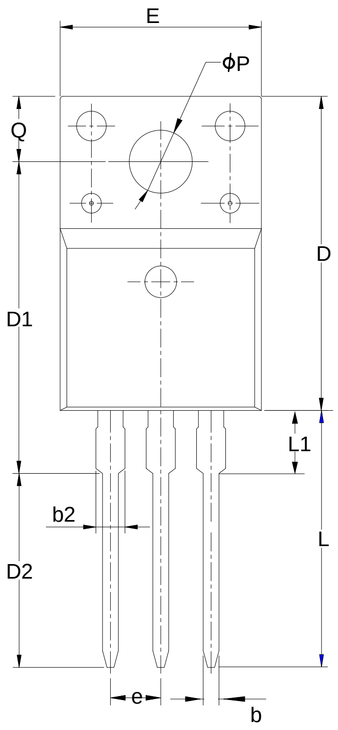
TYPICAL CHARACTERISTICS CURVE (CONTINUED)

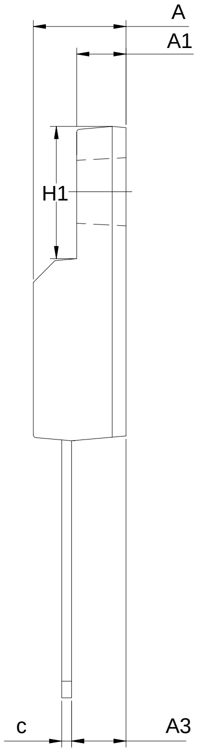
Figure 19. Square Wave Impedance Simulation For All Heating Data Folders(IGBT)



PACKAGE OUTLINE

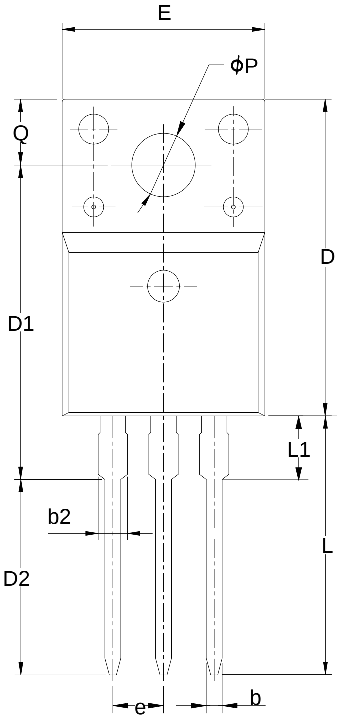
TO-220F-3L **UNIT: mm**

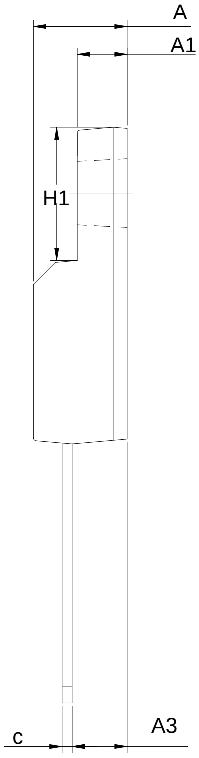




SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.42	4.70	5.02
A1	2.30	2.54	2.80
A3	2.50	2.76	3.10
b	0.70	0.80	0.90
b2	–	–	1.47
c	0.35	0.50	0.65
D	15.25	15.87	16.25
D1	15.30	15.75	16.30
D2	9.30	9.80	10.30
E	9.73	10.16	10.36
e	2.54BSC		
H1	6.40	6.68	7.00
L	12.48	12.98	13.48
L1	–	–	3.50
ϕP	3.00	3.18	3.40
Q	3.05	3.30	3.55

TO-220FD-3L **UNIT: mm**





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E	9.73	10.16	10.36
e	2.54BSC		
H1	6.40	6.68	7.00
L	12.48	12.98	13.48
L1	—	—	3.50
ϕP	3.00	3.18	3.40
Q	3.05	3.30	3.55

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.
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Rev.: 1.2

Revision History:

1. Add package of SGT15U65SD1FFD(TO-220FD-3L)
2. Update important notice

Rev.: 1.1

Revision History:

1. Update FRD parameters
2. Update curve template
3. Update important notice

Rev.: 1.0

Revision History:

1. First release