

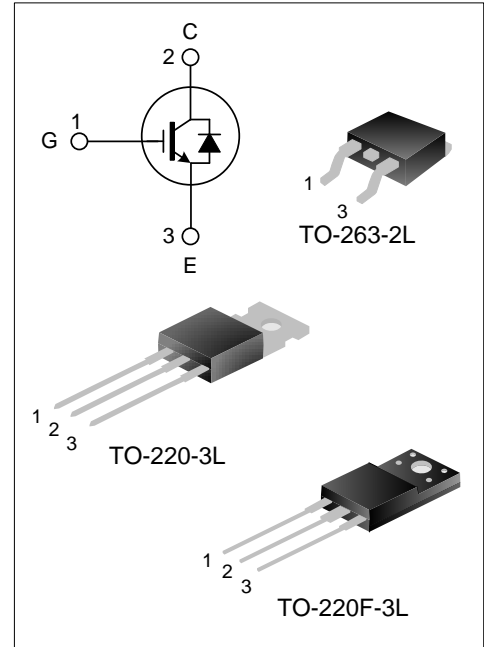
15A, 600V FIELD STOP IGBT

DESCRIPTION

The SGT15T60SD1T/F/S field stop III IGBT features low conduction loss and switching loss, is applicable to UPS, SMPS, motor application and PFC fields.

FEATURES

- ◆ 15A, 600V, $V_{CE(sat)(typ.)}=1.65V@I_C=15A$
- ◆ Low conduction loss
- ◆ Fast switching
- ◆ High input impedance



NOMENCLATURE

SGT 15 T 60 S D X 1 P7		
IGBT series	SGT	Package
Current, 70: 70A	15	P7 : TO-247-3L F : TO-220F-3L etc.
N : N Channel	T	1,2,3... : Version No.
NE : N-channel planar gate with ESD	60	Blank: Standard diode
T : Field Stop 3/4	S	M : Standard Diode, full range
U : Field Stop 4+	D	R : Rapid Diode
V : Field Stop 5	X	B : Rapid Diode, full range
W : Field Stop 6	1	S : Soft Diode, full range
X : Field Stop 7	P	D : Packaged with fast recovery diode
Voltage, 65: 650V	7	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
SGT15T60SD1T	TO-220-3L	15T60SD1T	Pb free	Tube
SGT15T60SD1F	TO-220F-3L	15T60SD1F	Pb free	Tube
SGT15T60SD1STR	TO-263-2L	15T60SD1S	Halogen free	Tape&Reel

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

Parameter	Symbol	Ratings			Units
		SGT15T60SD1F	SGT15T60SD1T	SGT15T60SD1S	
Collector to Emitter Voltage	V _{CE}	600			V
Gate to Emitter Voltage	V _{GE}	±20			V
Collector Current	I _C	T _C =25°C			A
		T _C =100°C			
Pulsed Collector Current	I _{CM}	45			A
Short-circuit time (V _{GE} =15V, V _{CC} =300V)	T _{sc}	10			μs
Diode current	I _F	T _C =25°C			A
		T _C =100°C			
Power Dissipation (T _C =25°C)	P _D	43	109	136	W
Operating Junction Temperature	T _J	-55~+150			°C
Storage Temperature Range	T _{stg}	-55~+150			°C

THERMAL CHARACTERISTICS

Parameter	Symbol	Ratings			Units
		SGT15T60SD1F	SGT15T60SD1T	SGT15T60SD1S	
Thermal Resistance, Junction to Case (IGBT)	R _{θJC}	2.9	1.15	0.92	°C/W
Thermal Resistance, Junction to Case (FRD)	R _{θJC}	4.6	2.0	2.33	°C/W

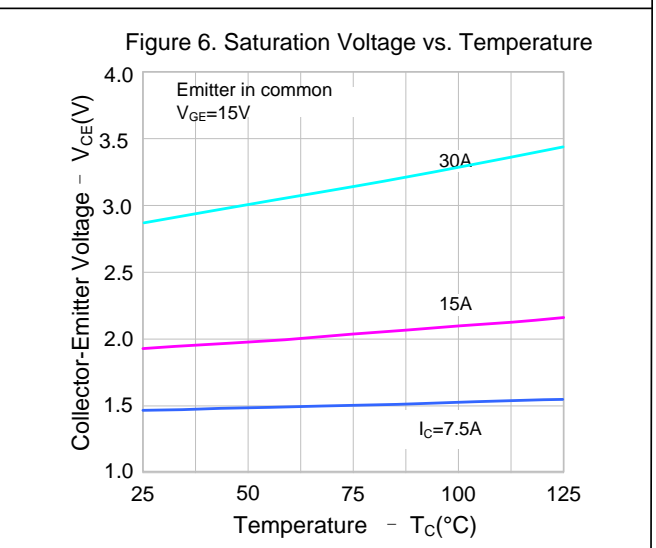
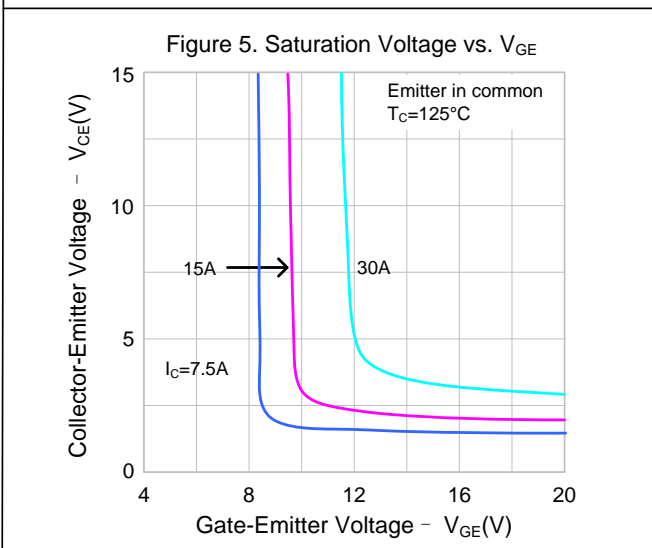
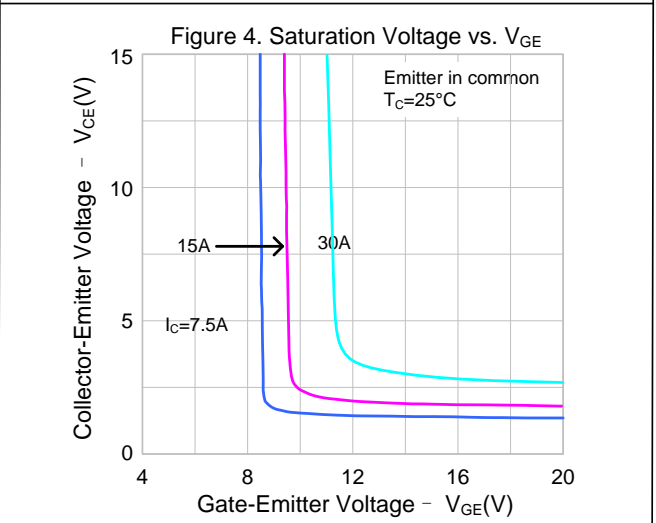
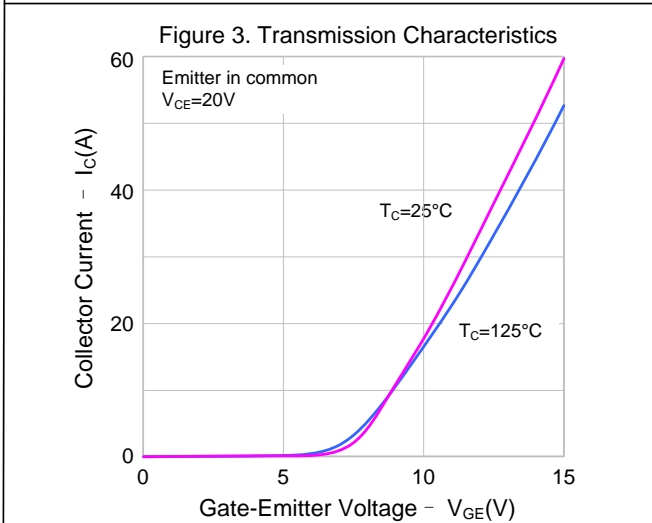
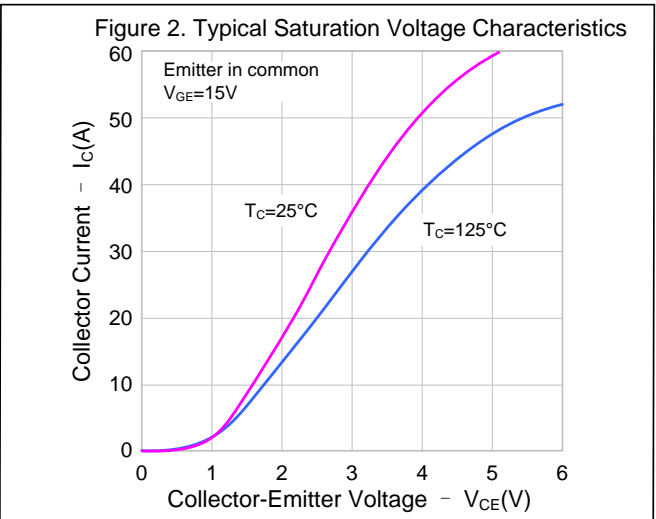
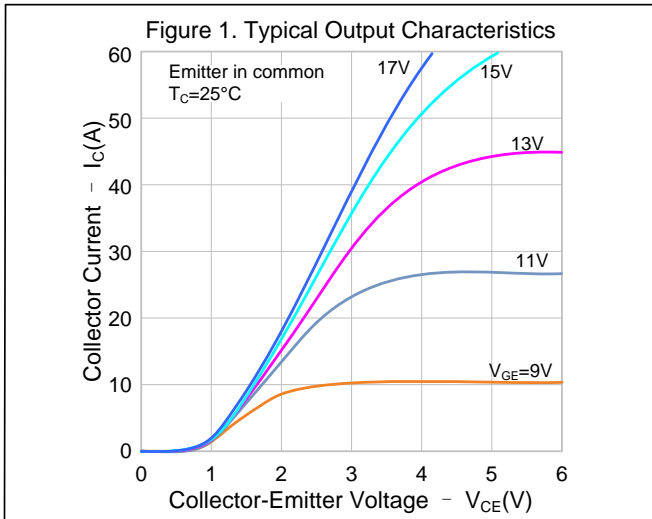
ELECTRICAL CHARACTERISTICS OF IGBT (T_C = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Units
Collector to Emitter Breakdown Voltage	BV _{CE}	V _{GE} =0V, I _C =250μA	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	--	--	±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 =15A, V _{GE} =15V	--	1.65	2.4	V
		I _C =15A, V _{GE} =15V, T _C =125°C	--	1.9	--	V
Input Capacitance	C _{ies}	V _{CE} =30V	--	950	--	pF
Output Capacitance	C _{oes}	V _{GE} =0V	--	55	--	
Reverse Transfer Capacitance	C _{res}	f=1MHz	--	16	--	
Turn-On Delay Time	T _{d(on)}	V _{CE} =400V I _C =15A R _g =10Ω	--	14	--	ns
Rise Time	T _r		--	41	--	
Turn-Off Delay Time	T _{d(off)}		--	35	--	
Fall Time	T _f		--	140	--	
Turn-On Switching Loss	E _{on}	V _{GE} =15V	--	0.66	--	mJ
Turn-Off Switching Loss	E _{off}	Inductive Load	--	0.29	--	
Total Switching Loss	E _{st}		--	0.95	--	
Total Gate Charge	Q _g	V _{CE} =400V, I _C =15A, V _{GE} =15V	--	38	--	nC
Gate to Emitter Charge	Q _{ge}		--	12	--	
Gate to Collector Charge	Q _{gc}		--	14	--	

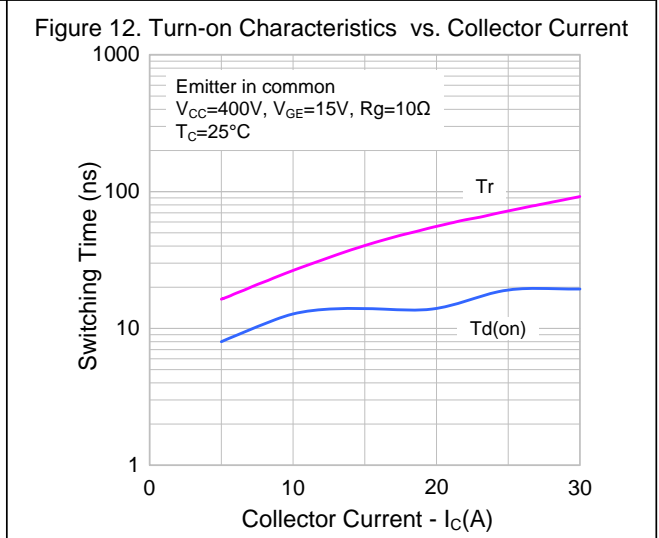
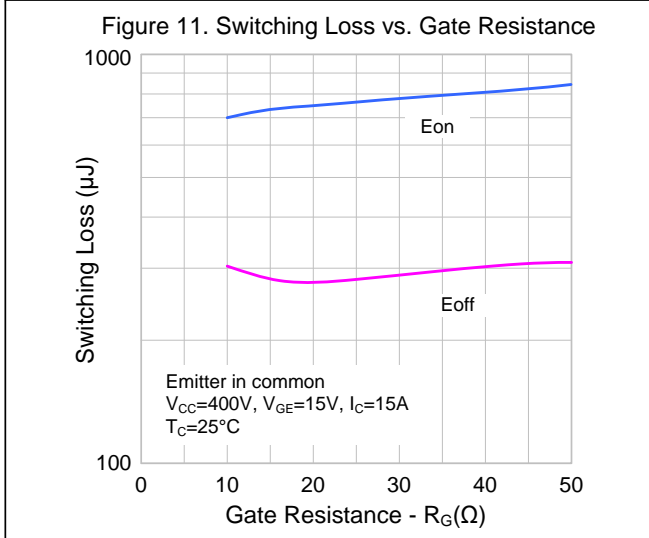
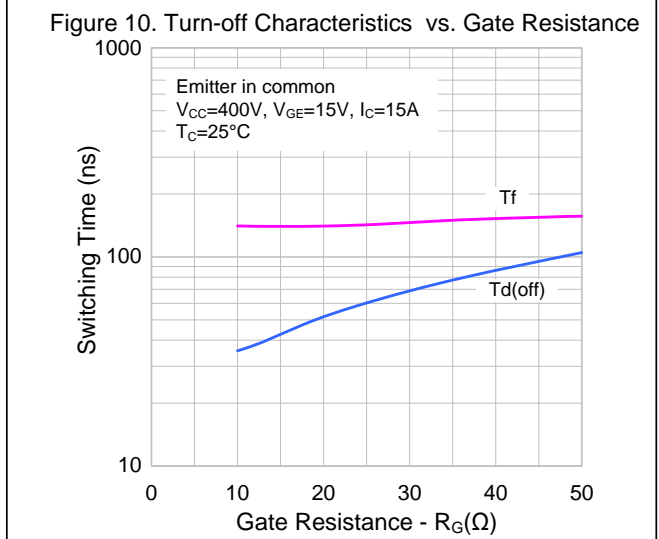
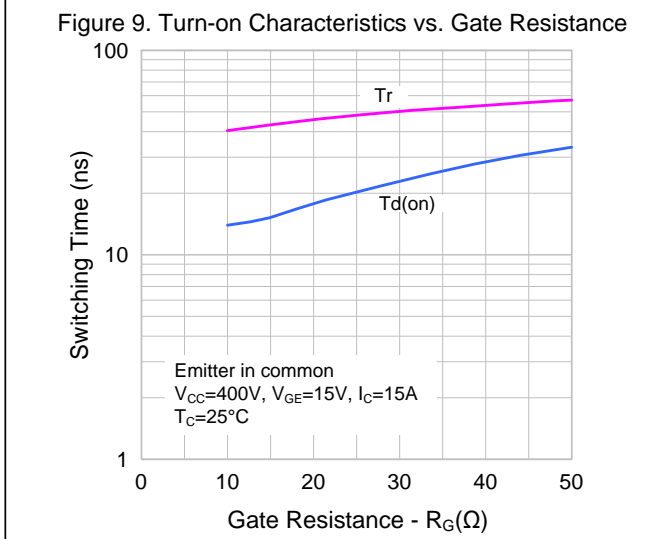
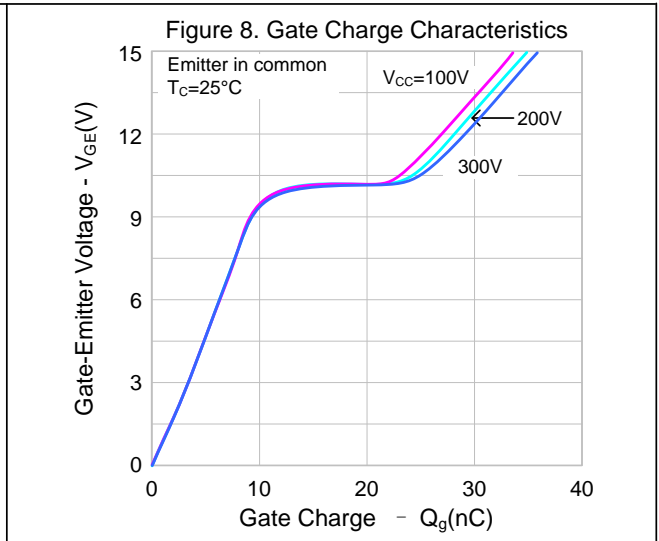
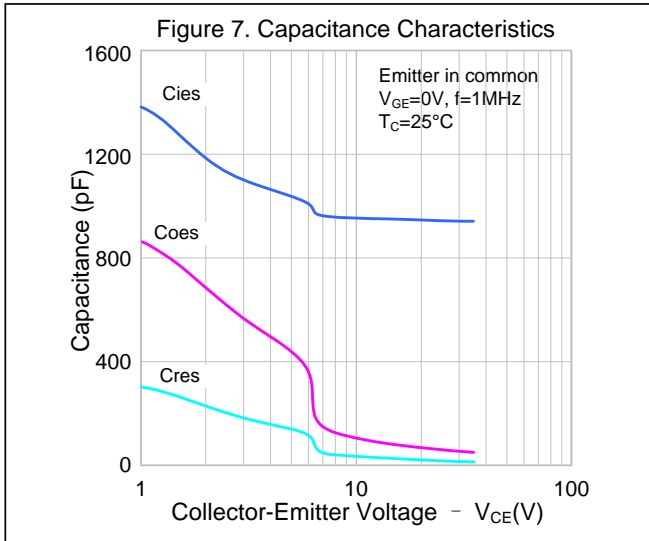
ELECTRICAL CHARACTERISTICS OF FRD (T_C = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Units
Diode Forward Voltage	V _{FM}	I _F =8A, T _C =25°C	--	1.7	2.2	V
		I _F =8A, T _C =125°C	--	1.4	--	
Diode Reverse Recovery Time	T _{rr}	I _{ES} =8A, dI _{ES} /dt=200A/μs	--	22	--	ns
Diode Reverse Recovery Charge	Q _{rr}	I _{ES} =8A, dI _{ES} /dt=200A/μs	--	36	--	nC

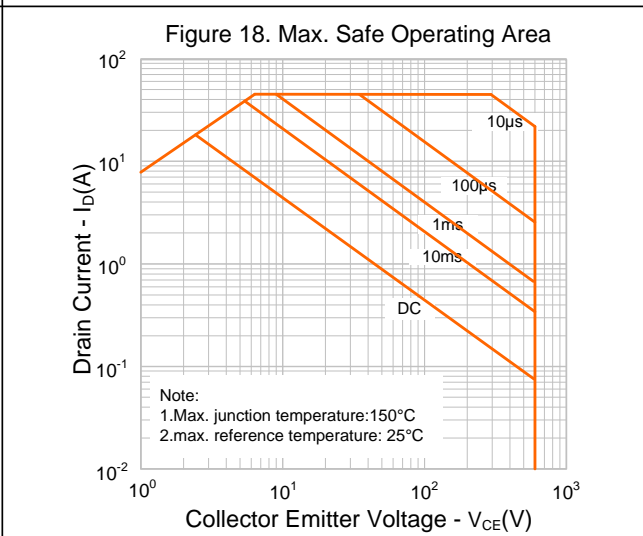
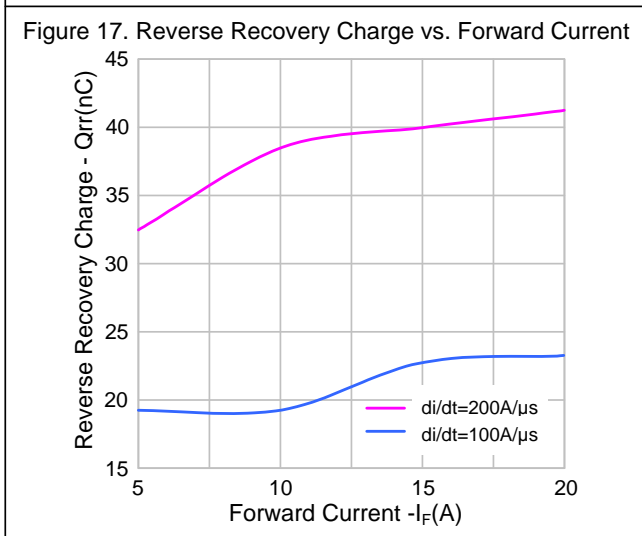
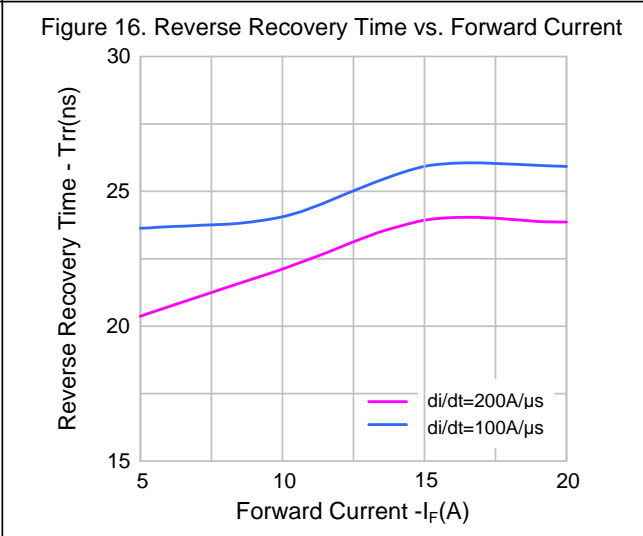
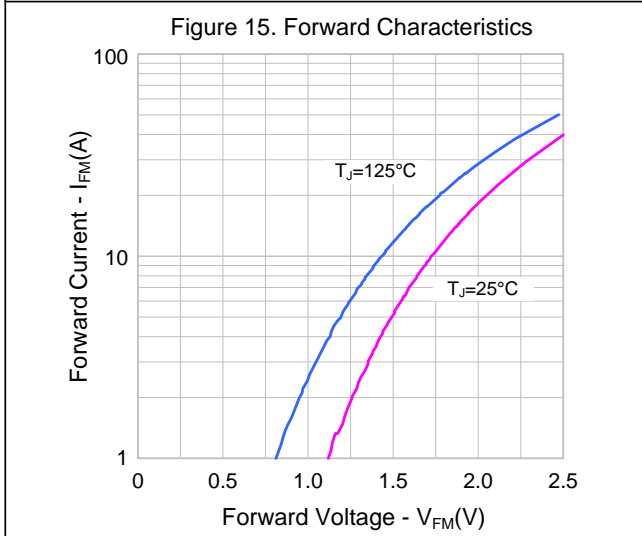
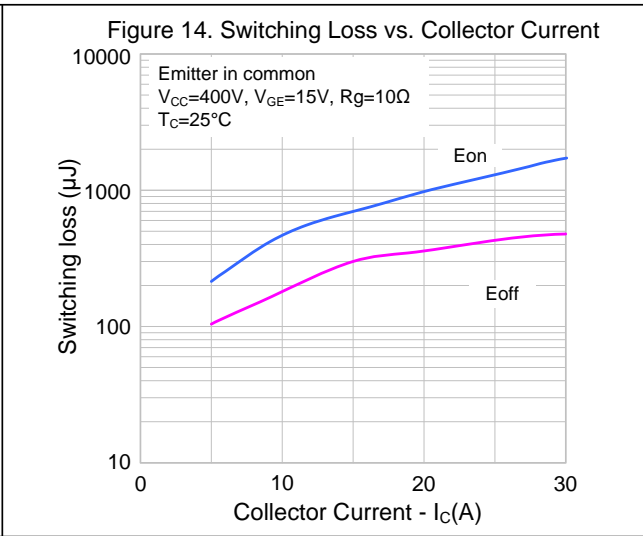
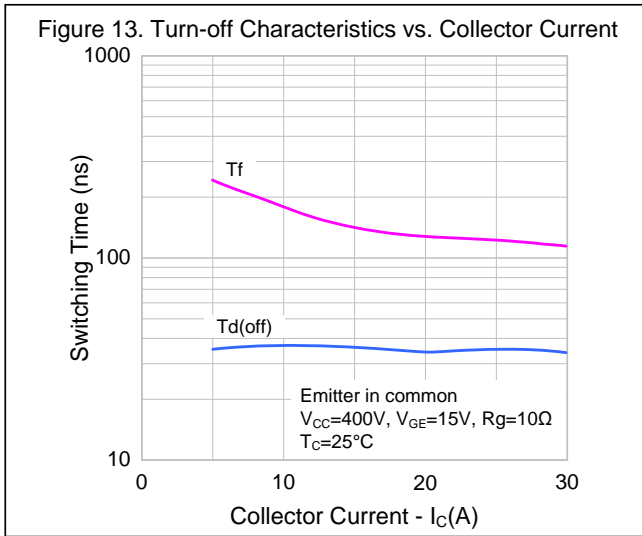
TYPICAL CHARACTERISTICS CURVE



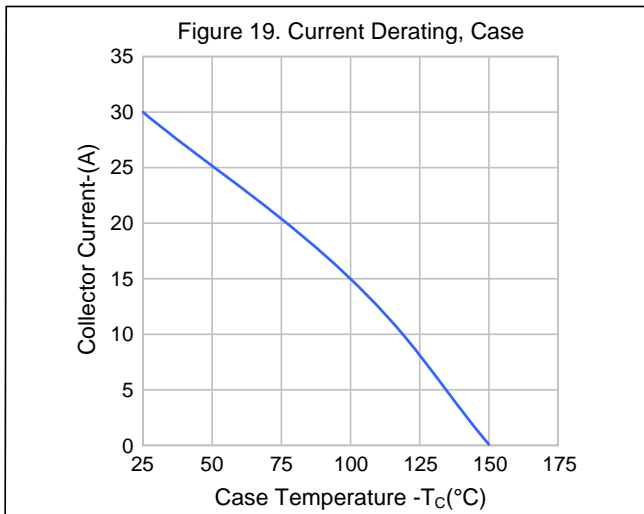
TYPICAL CHARACTERISTICS CURVE (CONTINUED)



TYPICAL CHARACTERISTICS CURVE (CONTINUED)

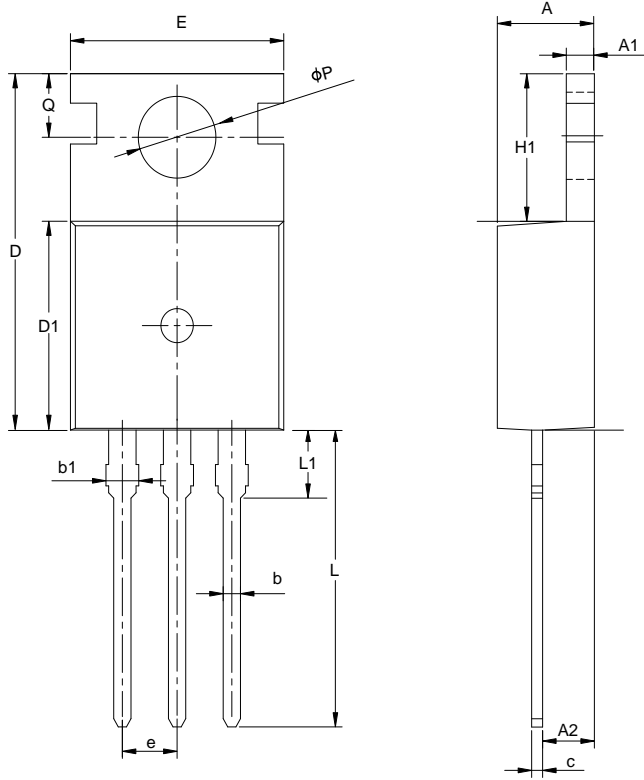


TYPICAL CHARACTERISTICS CURVE (CONTINUED)



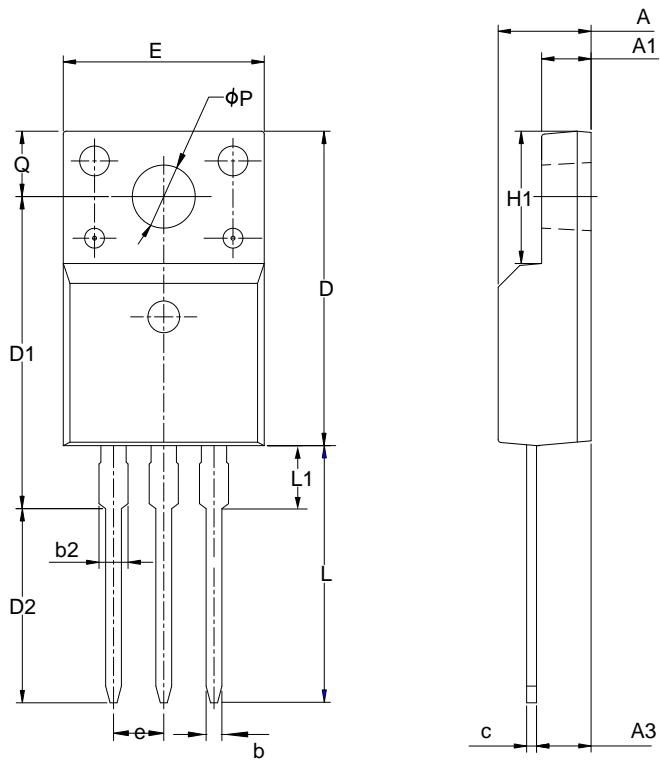
PACKAGE OUTLINE

TO-220-3L UNIT: mm



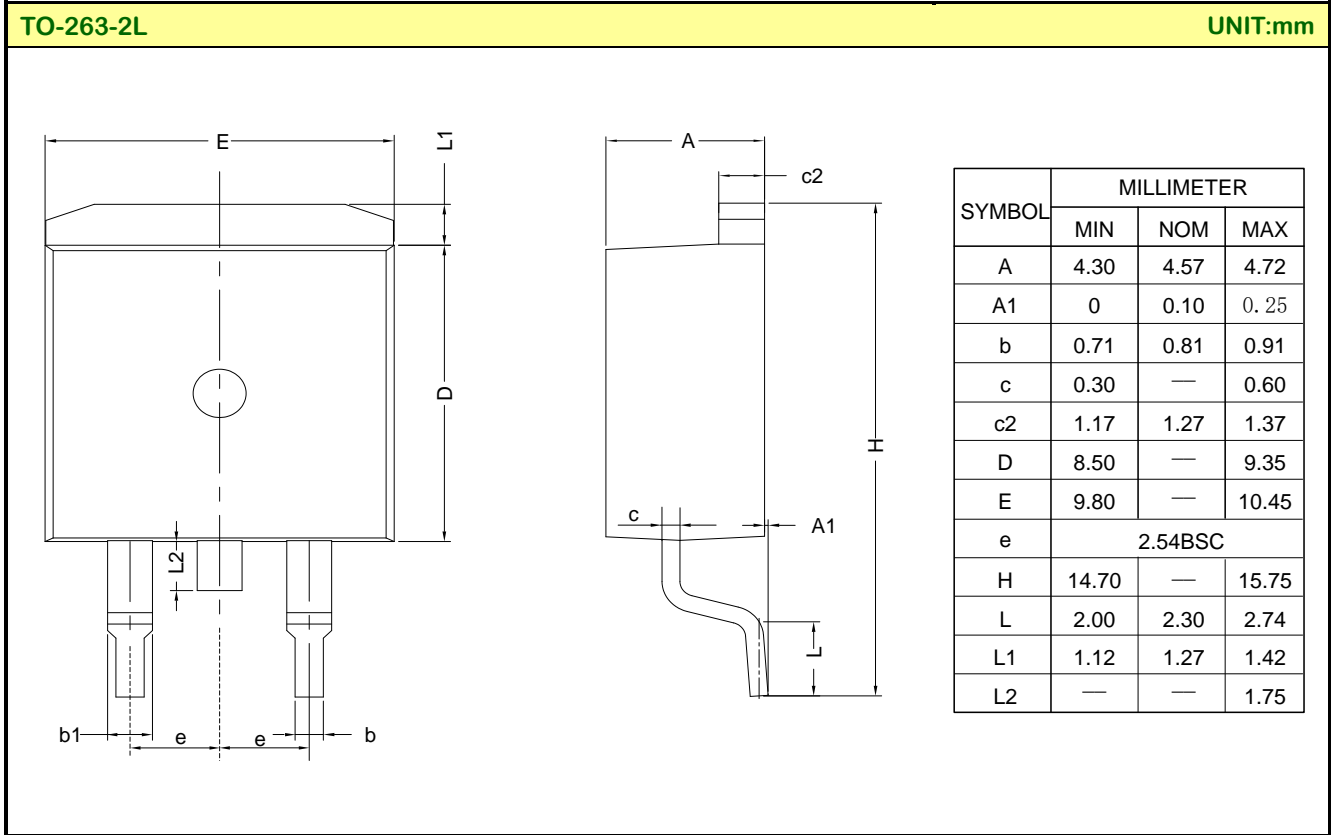
SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.30	4.50	4.70
A1	1.00	1.30	1.50
A2	1.80	2.40	2.80
b	0.60	0.80	1.00
b1	1.00	—	1.60
c	0.30	—	0.70
D	15.10	15.70	16.10
D1	8.10	9.20	10.00
E	9.60	9.90	10.40
e	2.54BSC		
H1	6.10	6.50	7.00
L	12.60	13.08	13.60
L1	—	—	3.95
ϕP	3.40	3.70	3.90
Q	2.60	—	3.20

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

PACKAGE OUTLINE(CONTINUED)



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.
6. Product promotion is endless, our company will wholeheartedly provide customers with better products!
7. Website: <http://www.silan.com.cn>

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Rev.: 1.8

Revision History:

1. Update SOA
-

Rev.: 1.7

Revision History:

1. Update ABSOLUTE MAXIMUM RATINGS
 2. Update important notice
-

Rev.: 1.6

Revision History:

1. Update FEATURES
 2. Update the template of curves
-

Rev.: 1.5

Revision History:

1. Update THERMAL CHARACTERISTICS
 2. Update ABSOLUTE MAXIMUM RATINGS
-

Rev.: 1.4

Revision History:

1. Update Package stereogram
 2. Update characteristics
 3. Update important notice
-

Rev.: 1.3

Revision History:

1. Update NOMENCLATURE
-

Rev.: 1.2

Revision History:

1. Add the package outline of TO-263-2L
-

Rev.: 1.1

Revision History:

1. Delete the package outline of TO-220FQ-3L
-

Rev.: 1.0

Revision History:

1. First release
-