

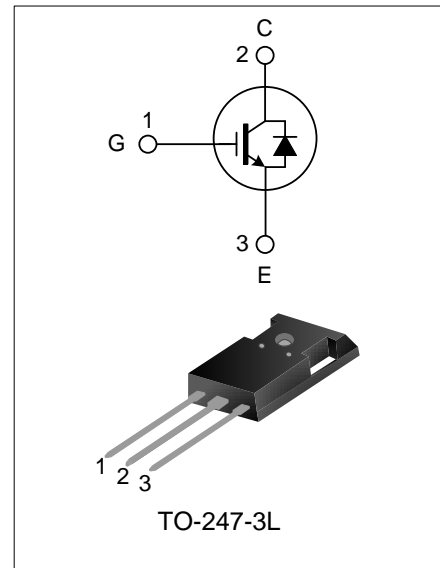
## 40A, 1200V FIELD STOP IGBT

### DESCRIPTION

The SGTP40U120FDB1P7 field stop IGBT adopts Silan Field Stop IV+ technology, features low conduction loss and switching loss. This device is applicable to photovoltaic, UPS, SMPS, and PFC fields.

### FEATURES

- ◆ 40A, 1200V,  $V_{CE(sat)(typ.)}=2.1V@I_C=40A$
- ◆ Low conduction loss
- ◆ Ultra-fast switching
- ◆ High input impedance
- ◆  $T_{Jmax}=175^{\circ}C$



### NOMENCLATURE

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

### ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing Type
SGTP40U120FDB1P7	TO-247-3L	P40U120FDB1	Halogen free	Tube

## ABSOLUTE MAXIMUM RATINGS (UNLESS OTHERWISE NOTED, T<sub>C</sub>=25°C)

Characteristics	Symbol	Ratings	Unit
Collector to Emitter Voltage	V <sub>CE</sub>	1200	V
Gate to Emitter Voltage	V <sub>GE</sub>	±20	V
Collector Current	I <sub>C</sub>	T <sub>C</sub> =25°C	80
		T <sub>C</sub> =100°C	40
Pulsed Collector Current	I <sub>CM</sub>	160	A
Diode Current	I <sub>F</sub>	T <sub>C</sub> =25°C	80
		T <sub>C</sub> =100°C	40
Diode Pulsed Current	I <sub>FM</sub>	160	A
Power Dissipation (T <sub>C</sub> =25°C)	P <sub>D</sub>	469	W
Operating Junction Temperature	T <sub>J</sub>	-40~+175	°C
Storage Temperature Range	T <sub>stg</sub>	-55~+150	°C

## THERMAL CHARACTERISTICS

Characteristics	Symbol	Ratings	Unit
Thermal Resistance, Junction to Case (IGBT)	R <sub>θJC</sub>	0.32	°C/W
Thermal Resistance, Junction to Case (FRD)	R <sub>θJC</sub>	0.50	°C/W
Thermal Resistance, Junction to Ambient (IGBT)	R <sub>θJA</sub>	40	°C/W

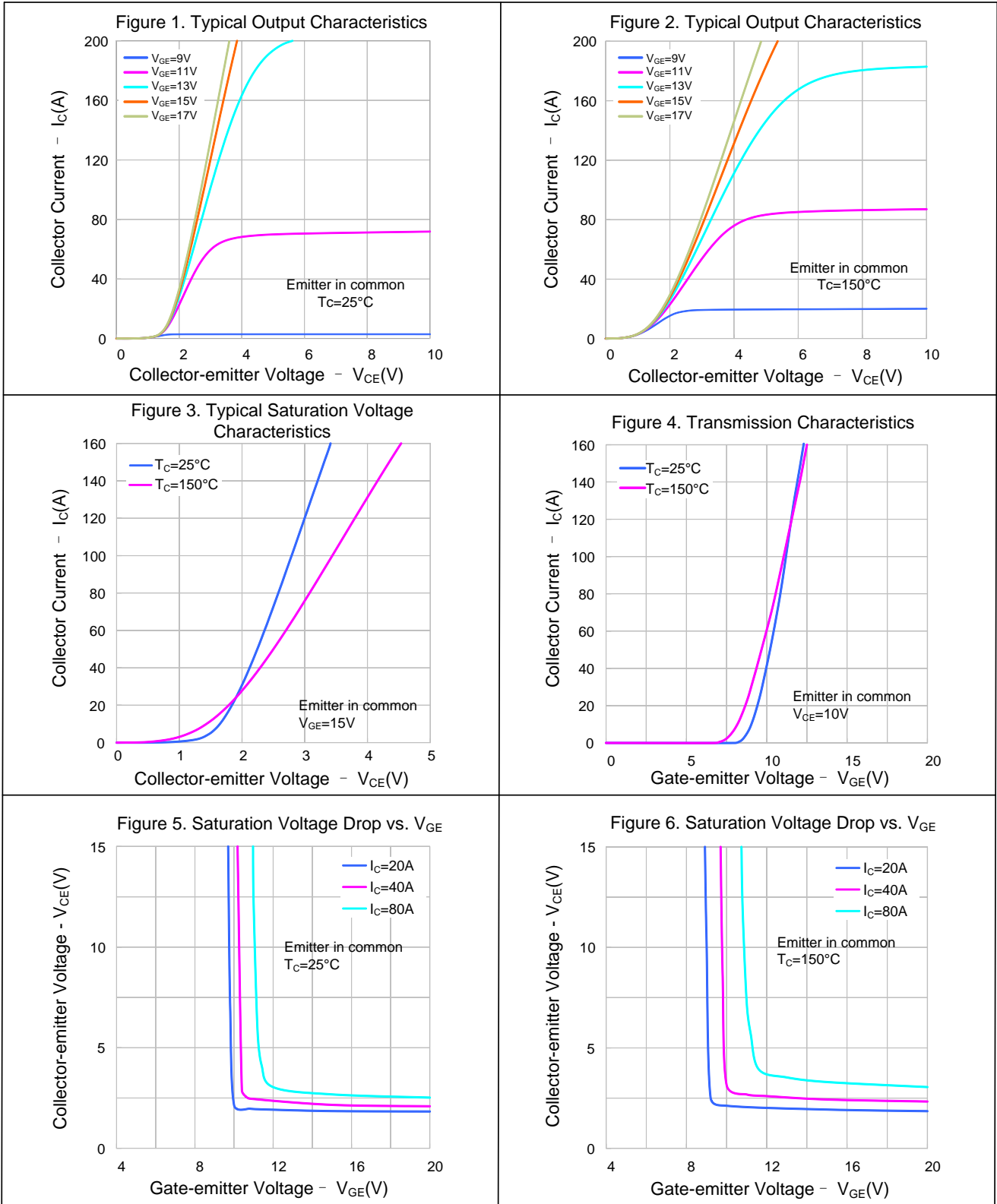
**ELECTRICAL CHARACTERISTICS OF IGBT (UNLESS OTHERWISE NOTED,  $T_C=25^\circ\text{C}$ )**

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Collector to Emitter Breakdown Voltage	$BV_{CE}$	$V_{GE}=0V, I_C=1mA$	1200	--	--	V
C-E Leakage Current	$I_{CES}$	$V_{CE}=1200V, V_{GE}=0V$	--	--	10	$\mu A$
G-E Leakage Current	$I_{GES}$	$V_{GE}=20V, V_{CE}=0V$	--	--	$\pm 120$	nA
G-E Threshold Voltage	$V_{GE(th)}$	$I_C=1mA, V_{CE}=V_{GE}$	4.5	--	7.5	V
Collector to Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=40A, V_{GE}=15V, T_C=25^\circ\text{C}$	--	2.1	2.6	V
		$I_C=40A, V_{GE}=15V, T_C=150^\circ\text{C}$	--	2.4	--	V
Input Capacitance	$C_{ies}$	$V_{CE}=30V$	--	4372	--	pF
Output Capacitance	$C_{oes}$	$V_{GE}=0V$	--	191	--	
Reverse Transfer Capacitance	$C_{res}$	$f=1MHz$	--	29	--	
Turn-On Delay Time	$T_{d(on)}$	$V_{CE}=600V$ $I_C=40A$ $R_g=10\Omega$	--	61	--	ns
Rise Time	$T_r$		--	28	--	
Turn-Off Delay Time	$T_{d(off)}$		--	145	--	
Fall Time	$T_f$		--	41	--	
Turn-On Switching Loss	$E_{on}$	$V_{GE}=15V$ inductive load	--	2.06	--	mJ
Turn-Off Switching Loss	$E_{off}$		--	0.98	--	
Total Switching Loss	$E_{st}$		--	3.04	--	
Turn-On Delay Time	$T_{d(on)}$	$V_{CE}=600V$ $I_C=20A$ $R_g=10\Omega$	--	57	--	ns
Rise Time	$T_r$		--	15	--	
Turn-Off Delay Time	$T_{d(off)}$		--	144	--	
Fall Time	$T_f$		--	47	--	
Turn-On Switching Loss	$E_{on}$	$V_{GE}=15V$ inductive load	--	0.70	--	mJ
Turn-Off Switching Loss	$E_{off}$		--	0.46	--	
Total Switching Loss	$E_{st}$		--	1.16	--	
Total Gate Charge	$Q_g$	$V_{CE}=600V, I_C=40A, V_{GE}=15V$	--	140	--	nC
Gate to Emitter Charge	$Q_{ge}$		--	50	--	
Gate to Collector Charge	$Q_{gc}$		--	44	--	

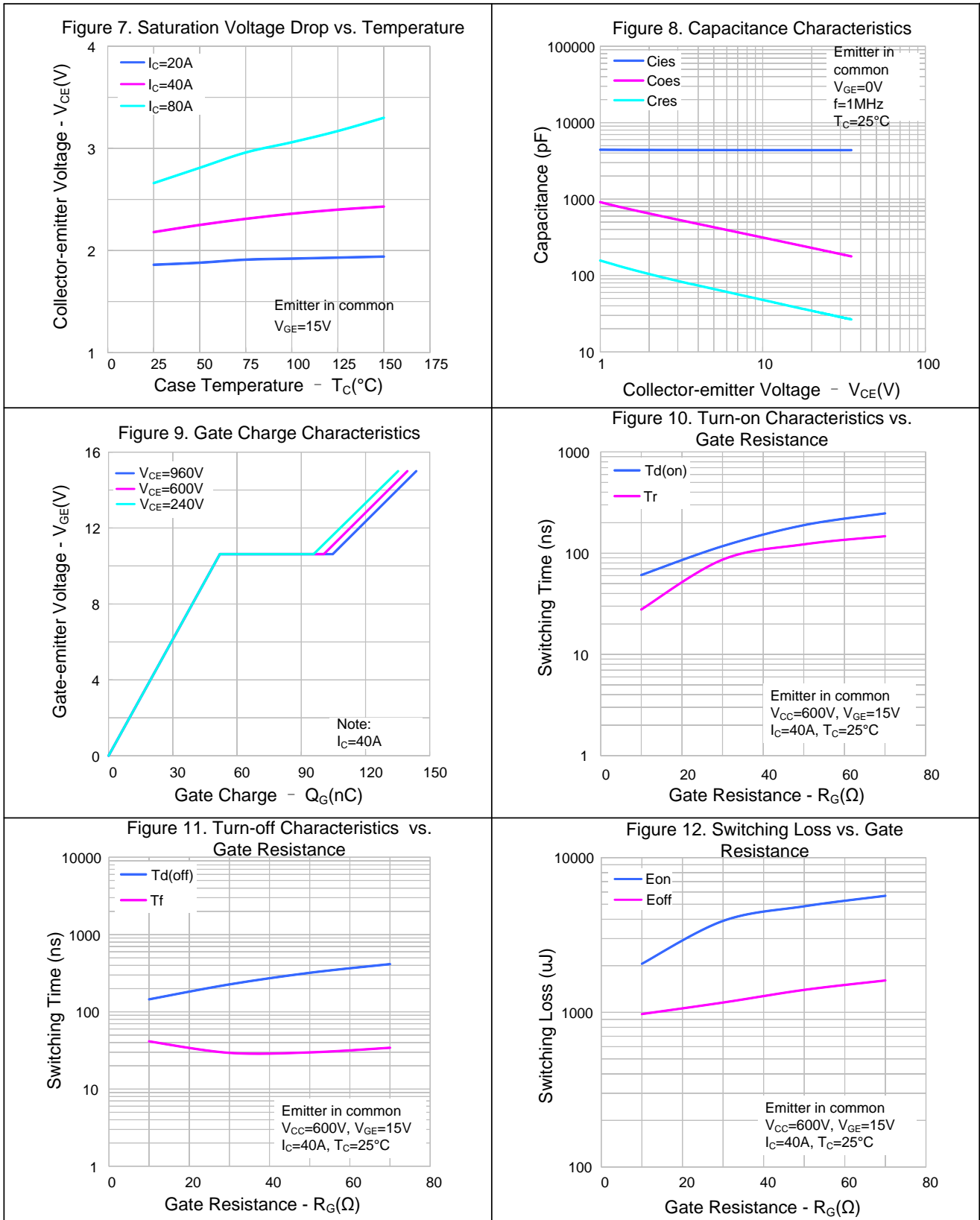
**ELECTRICAL CHARACTERISTICS OF FRD (UNLESS OTHERWISE NOTED,  $T_C=25^\circ\text{C}$ )**

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Diode Forward Voltage	$V_{FM}$	$I_F=40A, T_C=25^\circ\text{C}$	--	1.75	2.2	V
		$I_F=40A, T_C=150^\circ\text{C}$	--	1.5	--	
Diode Reverse Recovery Time	$T_{rr}$	$I_{EC}=40A, dl_{EC}/dt=200A/\mu s,$ $T_C=25^\circ\text{C}$	--	86	--	ns
Diode Reverse Recovery Charge	$Q_{rr}$		--	0.37	--	$\mu C$
Diode Reverse Recovery Current	$I_{rm}$		--	7.8	--	A

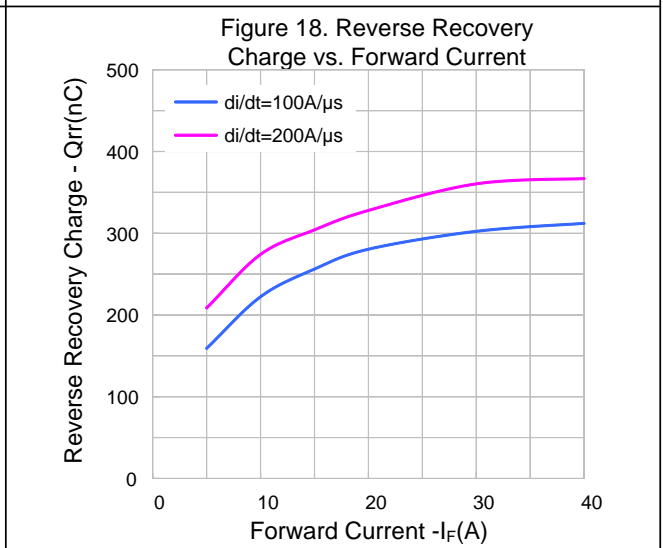
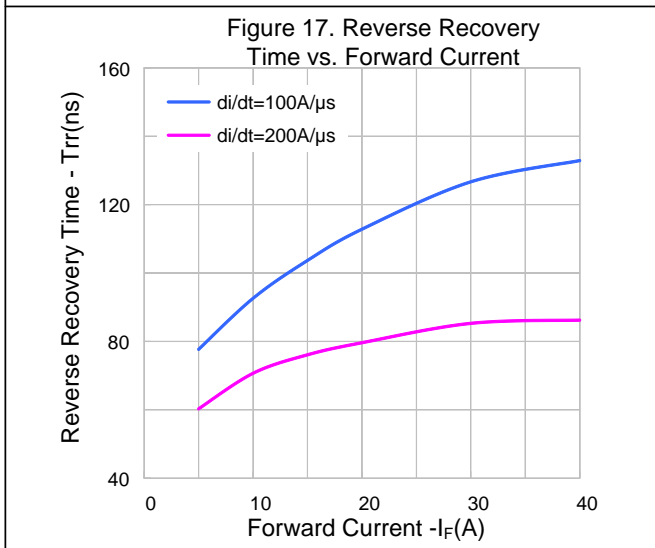
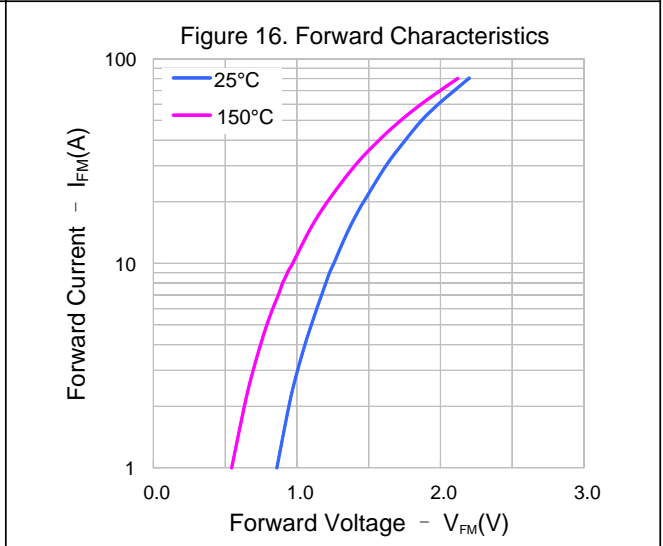
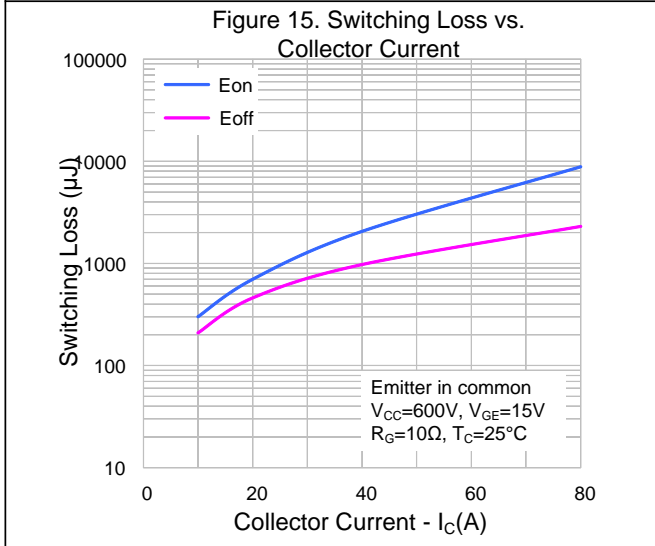
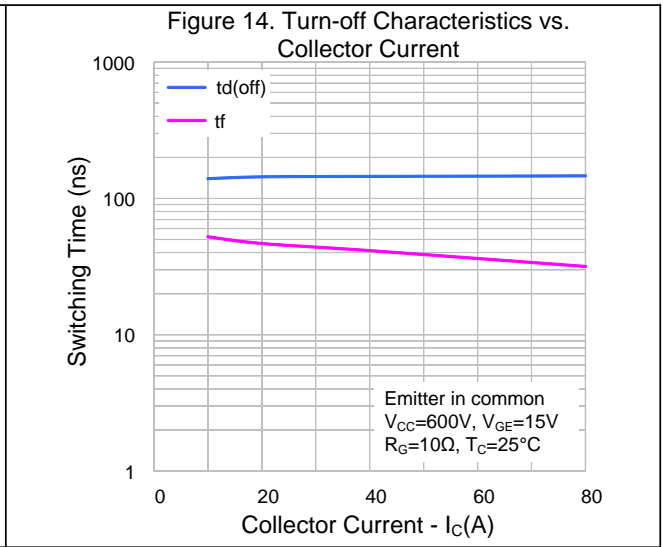
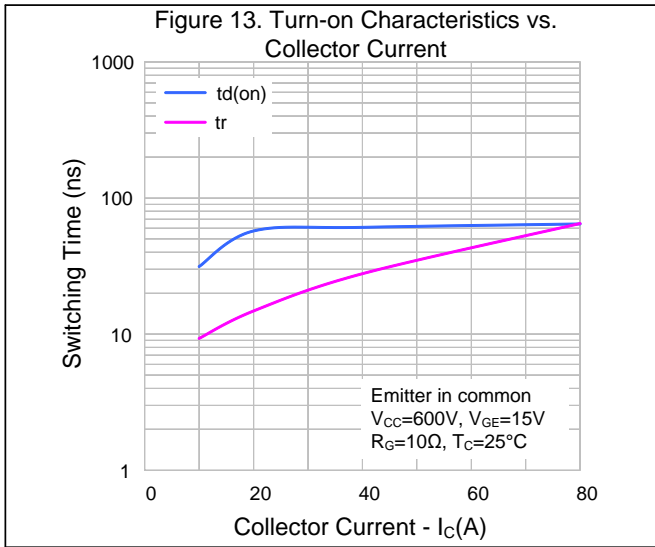
**TYPICAL CHARACTERISTICS**



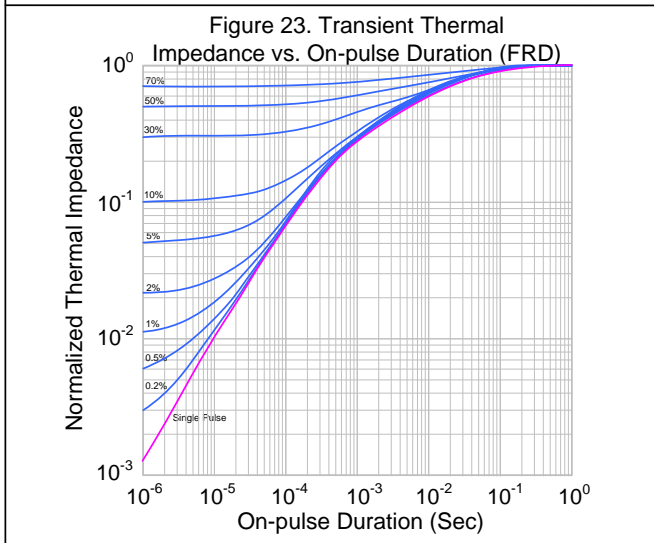
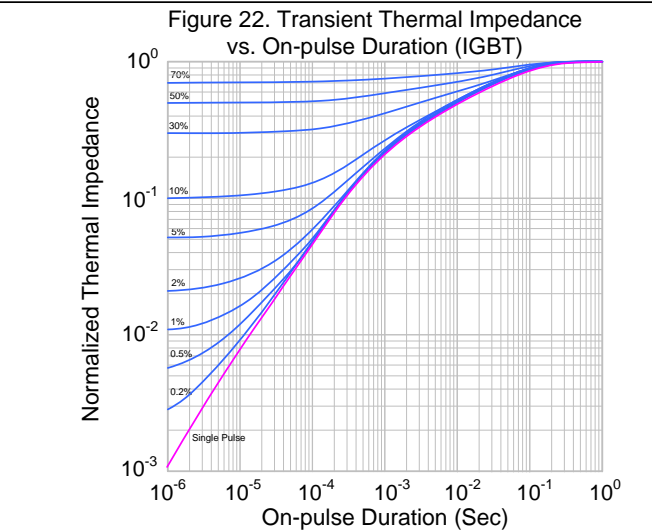
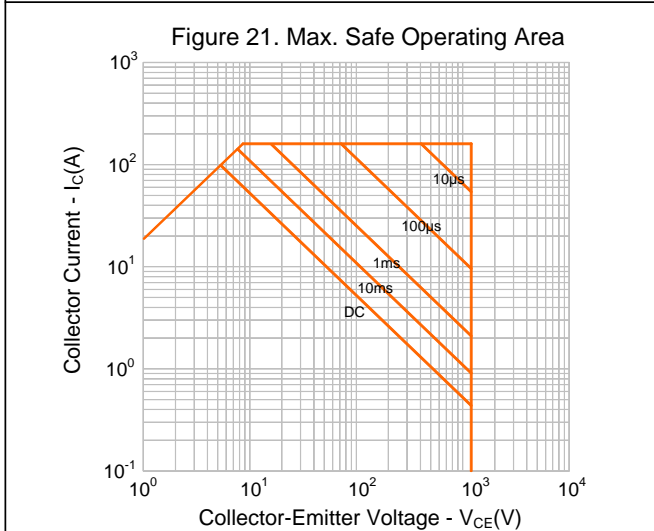
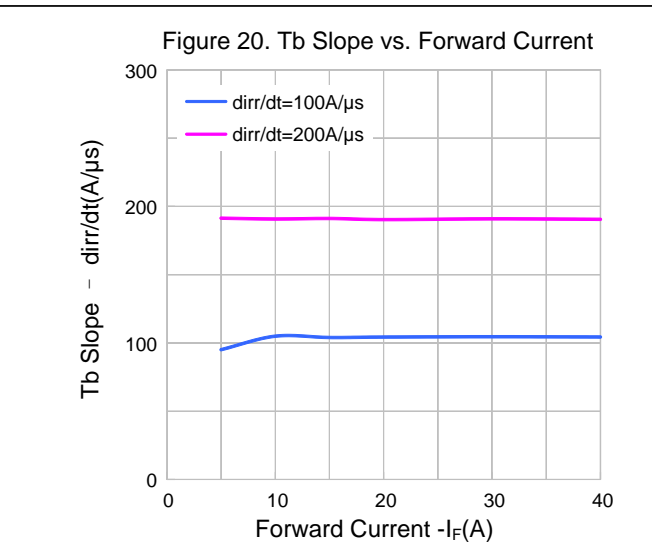
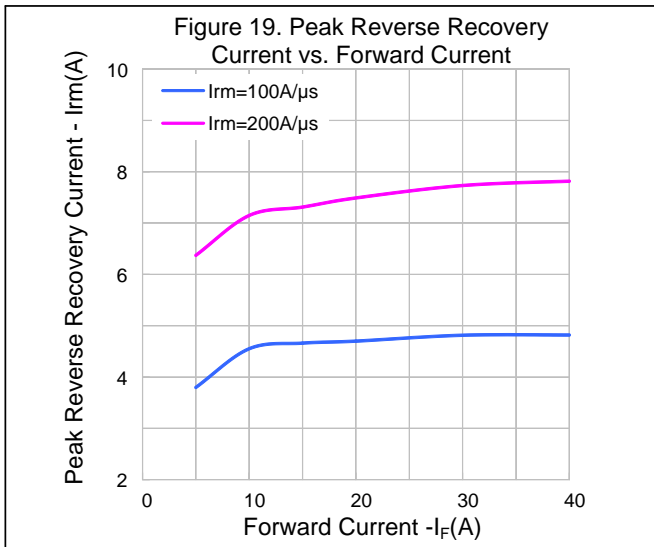
TYPICAL CHARACTERISTICS (CONTINUED)



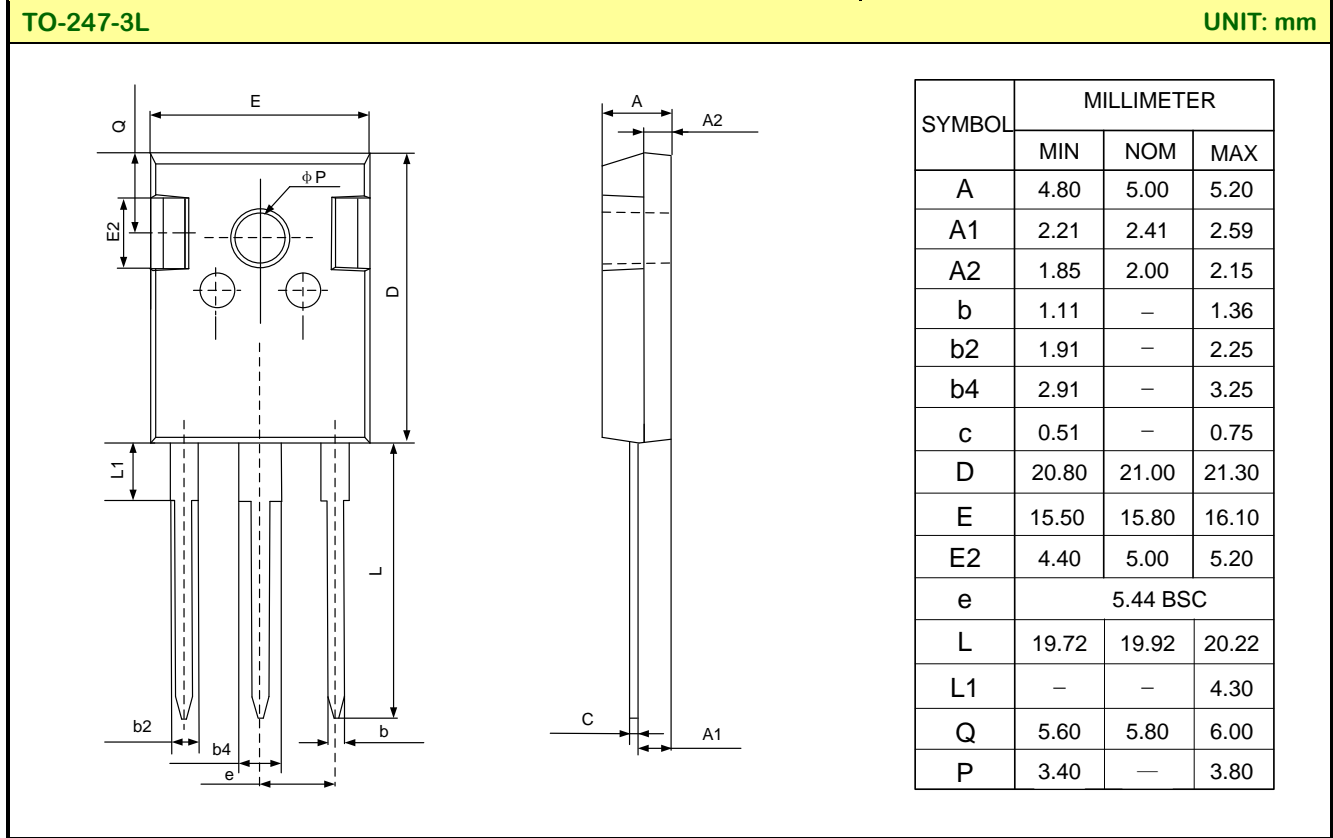
**TYPICAL CHARACTERISTICS (CONTINUED)**



**TYPICAL CHARACTERISTICS (CONTINUED)**



**PACKAGE OUTLINE**



**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: 1.0

Revision History:

1. First release
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