

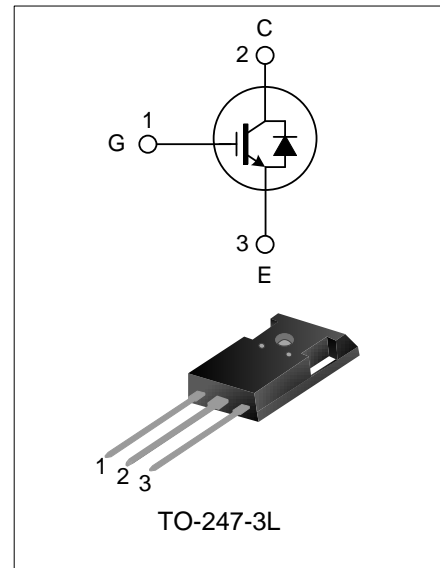
75A, 650V FIELD STOP IGBT

DESCRIPTION

The SGTP75V65FDB1P7 field stop IGBT adopts Silan Field Stop V technology, features low conduction loss and switching loss. This device is applicable to photovoltaic, UPS, SMPS, and PFC fields.

FEATURES

- ◆ 75A, 650V, $V_{CE(sat)(typ.)}=1.65V@I_C=75A$
- ◆ Low conduction loss
- ◆ Ultra-fast switching
- ◆ High input impedance
- ◆ $T_{Jmax.}=175^{\circ}C$



NOMENCLATURE

SGT P 75 V 65 F D B 1 P7	
IGBT series	Package
Technical grade	P7 : TO-247-3L
Current, 75: 75A	1,2,3... : Version No.
N : N Channel	Blank: Standard diode
NE : N-channel planar gate with ESD	M : Standard Diode, full range
T : Field Stop 3/4	R : Rapid Diode
U : Field Stop 4+	B : Rapid Diode, full range
V : Field Stop 5	S : Soft Diode, full range
W: Field Stop 5+	D : Packaged with fast recovery diode
X : Field Stop 6	R : RC IGBT
Y : Field Stop 7	Empty:Single IGBT chip
Voltage, 65: 650V	C : SiC diode
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~
	I : IGNITION

ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing Type
SGTP75V65FDB1P7	TO-247-3L	P75V65FDB1	Halogen free	Tube

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

Characteristics		Symbol	Ratings	Unit
Collector to Emitter Voltage		V _{CE}	650	V
Gate to Emitter Voltage		V _{GE}	±20	V
Transient Gate-Emitter Voltage (t _p ≤10μs, D<0.010)		V _{GE}	±30	V
Collector Current	T _C =25°C	I _C	150	A
	T _C =100°C		75	
Pulsed Collector Current		I _{CM}	300	A
Diode Current	T _C =25°C	I _F	150	A
	T _C =100°C		75	
Pulsed Diode Current		I _{FM}	300	A
Power Dissipation (T _C =25°C)		P _D	395	W
Operating Junction Temperature		T _J	-40~+175	°C
Storage Temperature Range		T _{stg}	-55~+150	°C

THERMAL CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Thermal Resistance, Junction to Case (IGBT)	R _{θJC}	--	--	--	0.38	°C/W
Thermal Resistance, Junction to Case (FRD)	R _{θJC}	--	--	--	0.4	°C/W
Thermal Resistance, Junction to Ambient (IGBT)	R _{θJA}	--	--	--	40	°C/W
Soldering Temperature (in line)	T _{sold}	15 ⁺² ₋₀ sec, 1time	--	--	260	°C

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}	$V_{GE}=0V, I_C=250\mu A$	650	--	--	V
C-E Leakage Current	I_{CES}	$V_{CE}=650V, V_{GE}=0V$	--	--	75	μA
G-E Leakage Current	I_{GES}	$V_{GE}=20V, V_{CE}=0V$	--	--	± 100	nA
G-E Threshold Voltage	$V_{GE(th)}$	$I_C=250\mu A, V_{CE}=V_{GE}$	3.2	4.0	4.8	V
Collector to Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=75A, V_{GE}=15V, T_C=25^{\circ}\text{C}$	--	1.65	2.2	V
		$I_C=75A, V_{GE}=15V, T_C=125^{\circ}\text{C}$	--	1.95	--	V
		$I_C=75A, V_{GE}=15V, T_C=150^{\circ}\text{C}$	--	2.05	--	V
Input Capacitance	C_{ies}	$V_{CE}=30V$	--	4829	--	pF
Output Capacitance	C_{oes}	$V_{GE}=0V$	--	132	--	
Reverse Transfer Capacitance	C_{res}	$f=1\text{MHz}$	--	21	--	
Turn-On Delay Time	$T_{d(on)}$	$V_{CE}=400V$ $I_C=75A$ $R_g=10\Omega$ $V_{GE}=15V$ inductive load $T_C=25^{\circ}\text{C}$	--	39	--	ns
Rise Time	T_r		--	44	--	
Turn-Off Delay Time	$T_{d(off)}$		--	186	--	
Fall Time	T_f		--	38	--	
Turn-On Switching Loss	E_{on}		--	2.39	--	mJ
Turn-Off Switching Loss	E_{off}		--	0.90	--	
Total Switching Loss	E_{st}		--	3.29	--	
Turn-On Delay Time	$T_{d(on)}$	$V_{CE}=400V$ $I_C=37.5A$ $R_g=10\Omega$ $V_{GE}=15V$ inductive load $T_C=25^{\circ}\text{C}$	--	34	--	ns
Rise Time	T_r		--	26	--	
Turn-Off Delay Time	$T_{d(off)}$		--	191	--	
Fall Time	T_f		--	39	--	
Turn-On Switching Loss	E_{on}		--	0.65	--	mJ
Turn-Off Switching Loss	E_{off}		--	0.35	--	
Total Switching Loss	E_{st}		--	1.0	--	
Total Gate Charge	Q_g	$V_{CE}=520V, I_C=75A, V_{GE}=15V$	--	186	--	nC
Gate to Emitter Charge	Q_{ge}		--	38	--	
Gate to Collector Charge	Q_{gc}		--	50	--	

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}	$I_F=75A, T_C=25^{\circ}\text{C}$	--	1.55	1.9	V
		$I_F=75A, T_C=150^{\circ}\text{C}$	--	1.45	--	
Diode Reverse Recovery Time	T_{rr}	$I_{ES}=75A, di_{ES}/dt=200A/\mu s,$ $T_C=25^{\circ}\text{C}$	--	120	--	ns
Diode Reverse Recovery Charge	Q_{rr}		--	0.4	--	μC
Diode Reverse Recovery Current	I_{rrm}		--	6.3	--	A

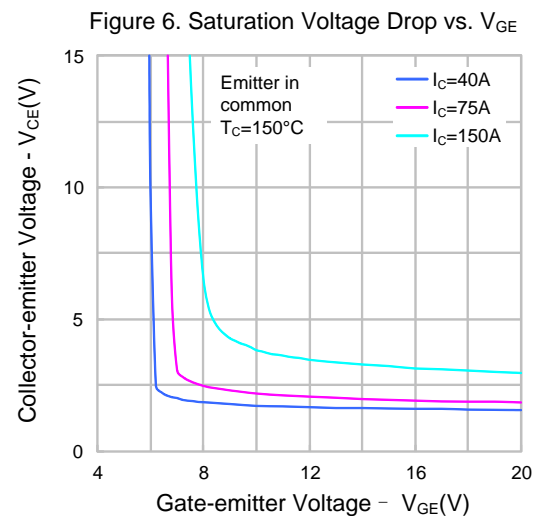
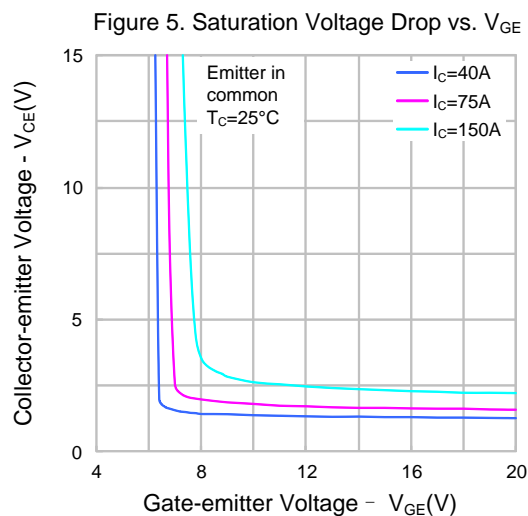
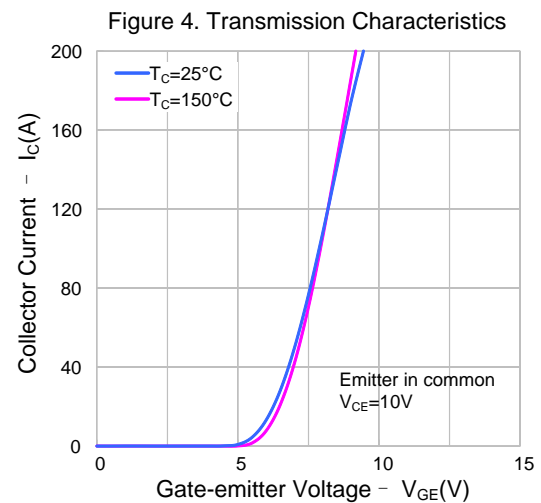
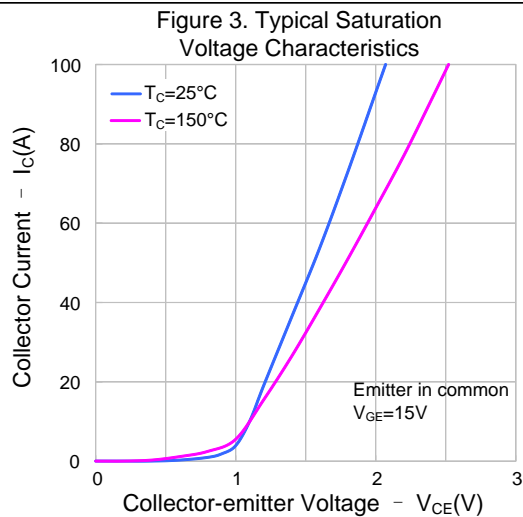
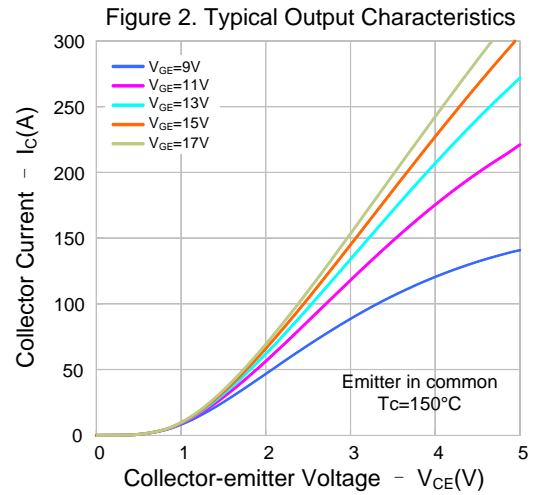
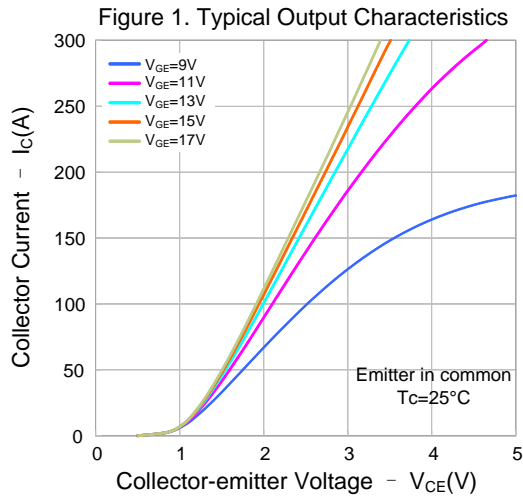
ELECTRICAL CHARACTERISTICS OF IGBT (UNLESS OTHERWISE NOTED, $T_C=150^{\circ}\text{C}$)

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Turn-On Delay Time	$T_{d(on)}$	$V_{CE}=400\text{V}$ $I_C=75\text{A}$ $R_g=10\Omega$ $V_{GE}=15\text{V}$ inductive load $T_C=150^{\circ}\text{C}$	--	51	--	ns
Rise Time	T_r		--	38	--	
Turn-Off Delay Time	$T_{d(off)}$		--	217	--	
Fall Time	T_f		--	22	--	
Turn-On Switching Loss	E_{on}	$V_{CE}=400\text{V}$ $I_C=37.5\text{A}$ $R_g=10\Omega$ $V_{GE}=15\text{V}$ inductive load $T_C=150^{\circ}\text{C}$	--	2.67	--	mJ
Turn-Off Switching Loss	E_{off}		--	1.52	--	
Total Switching Loss	E_{st}		--	4.19	--	
Turn-On Delay Time	$T_{d(on)}$	$V_{CE}=400\text{V}$ $I_C=37.5\text{A}$ $R_g=10\Omega$ $V_{GE}=15\text{V}$ inductive load $T_C=150^{\circ}\text{C}$	--	47	--	ns
Rise Time	T_r		--	20	--	
Turn-Off Delay Time	$T_{d(off)}$		--	235	--	
Fall Time	T_f		--	20	--	
Turn-On Switching Loss	E_{on}	$V_{CE}=400\text{V}$ $I_C=37.5\text{A}$ $R_g=10\Omega$ $V_{GE}=15\text{V}$ inductive load $T_C=150^{\circ}\text{C}$	--	0.62	--	mJ
Turn-Off Switching Loss	E_{off}		--	0.70	--	
Total Switching Loss	E_{st}		--	1.32	--	

ELECTRICAL CHARACTERISTICS OF FRD (UNLESS OTHERWISE NOTED, $T_C=150^{\circ}\text{C}$)

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Diode Reverse Recovery Time	T_{rr}	$I_{ES}=75\text{A}$, $dI_{ES}/dt=200\text{A}/\mu\text{s}$, $T_C=150^{\circ}\text{C}$	--	141	--	ns
Diode Reverse Recovery Charge	Q_{rr}		--	2.8	--	μC
Diode Reverse Recovery Current	I_{rrm}		--	17	--	A

TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS (CONTINUED)

Figure 7. Saturation Voltage Drop vs. Temperature

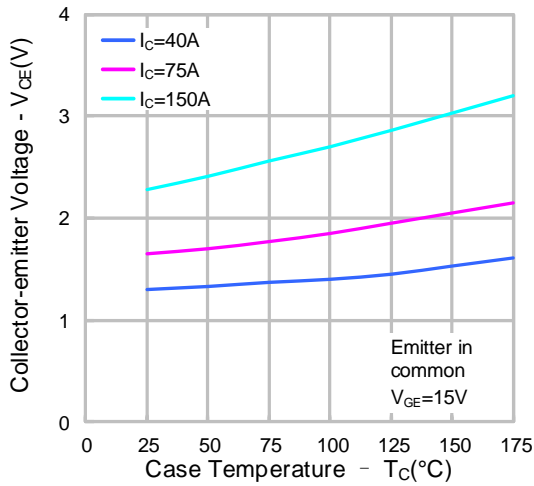


Figure 8. Capacitance Characteristics

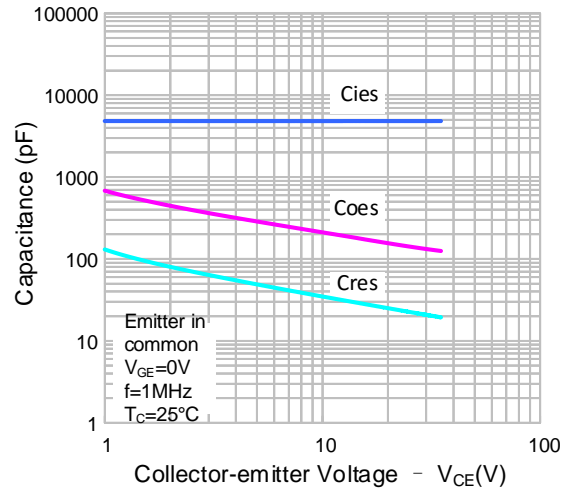


Figure 9. Gate Charge Characteristics

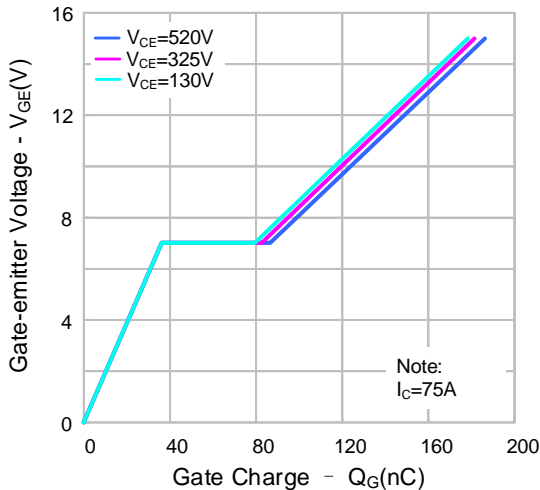


Figure 10. Forward Characteristics

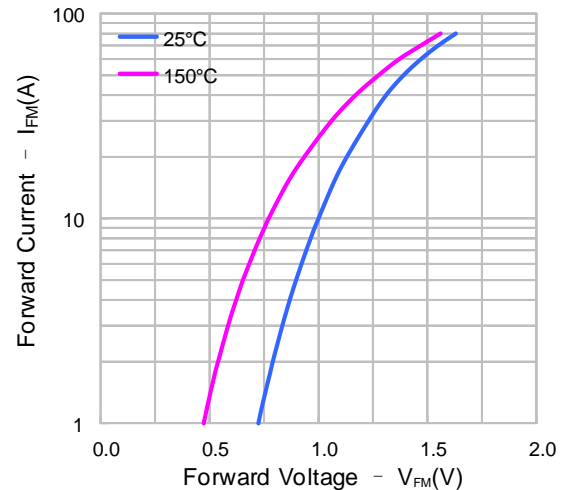


Figure 11. Turn-on Characteristics vs. Gate Resistance

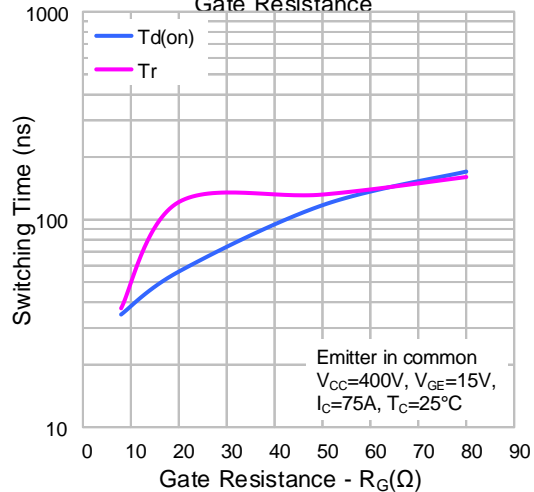
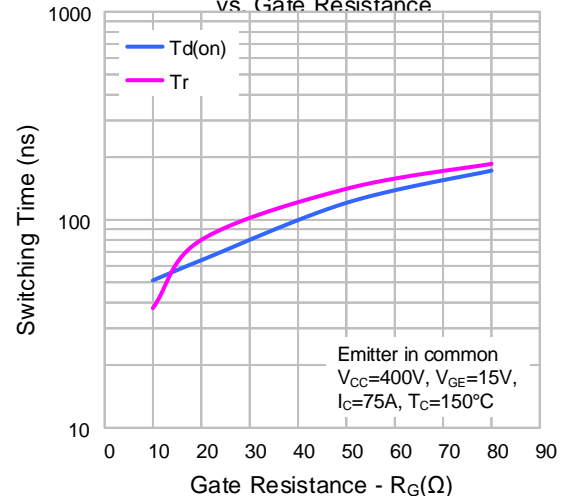
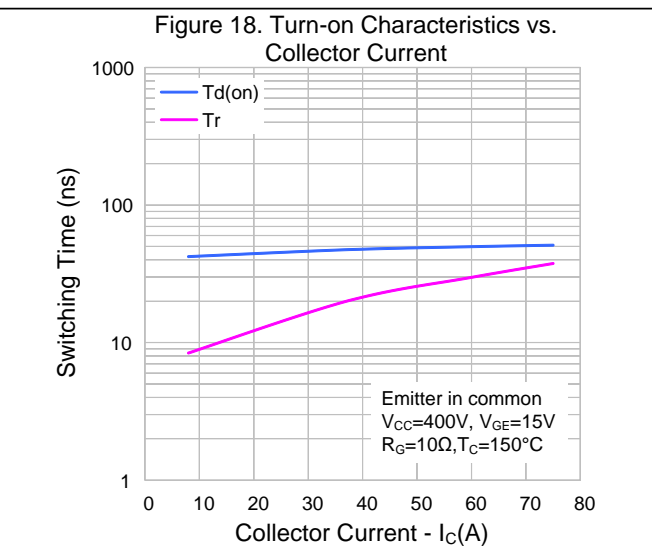
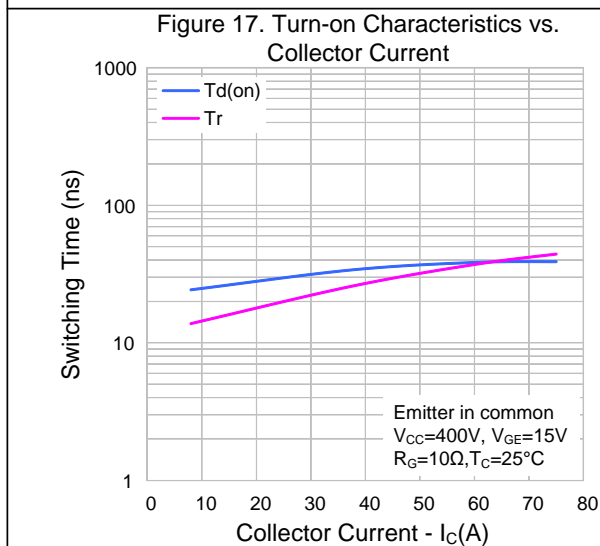
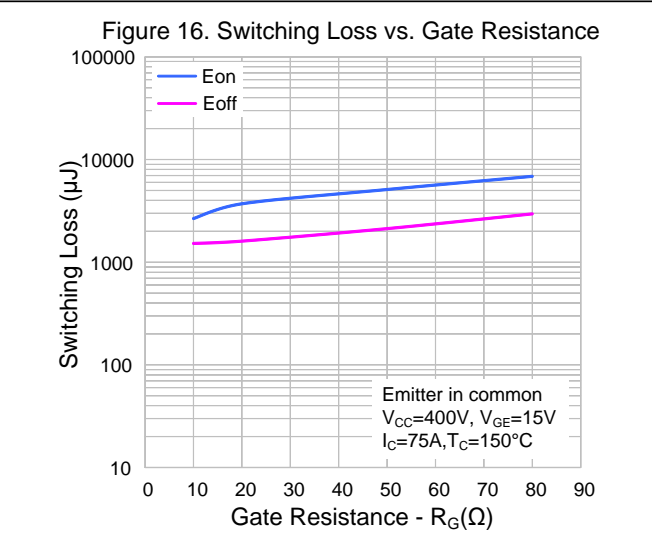
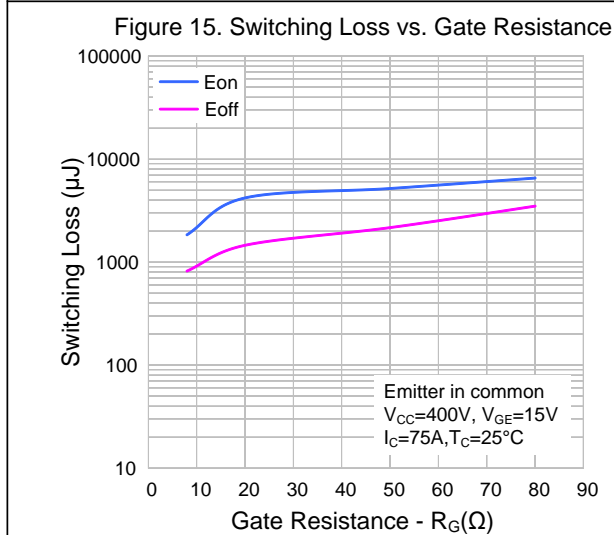
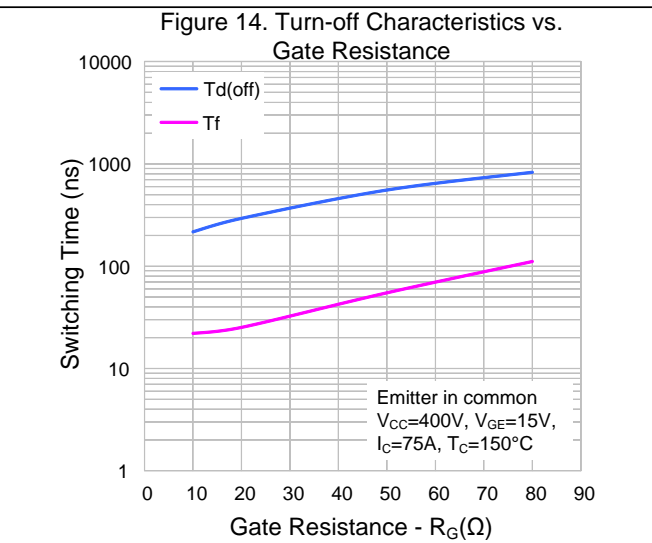
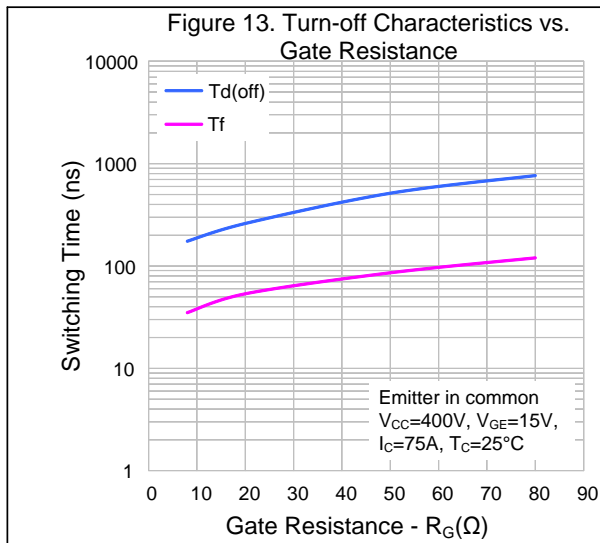


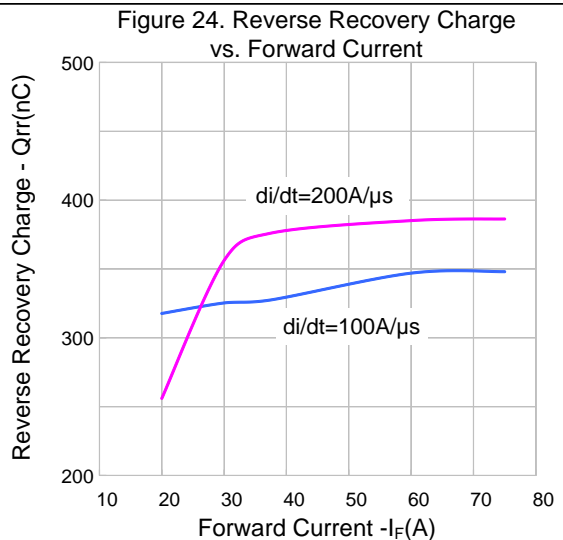
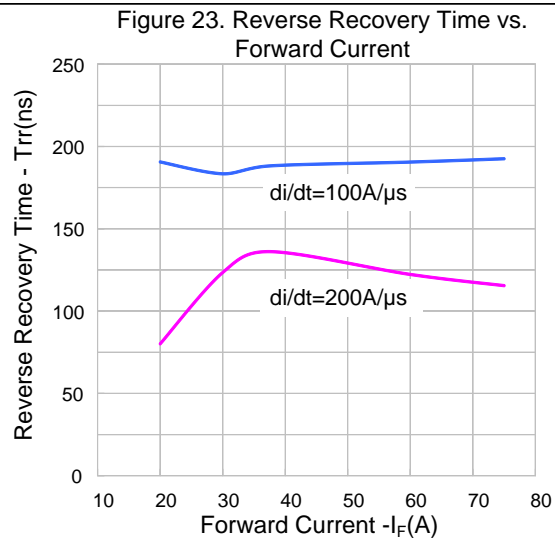
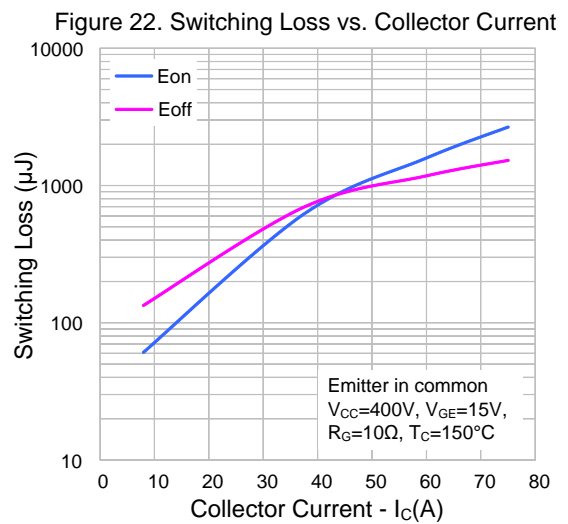
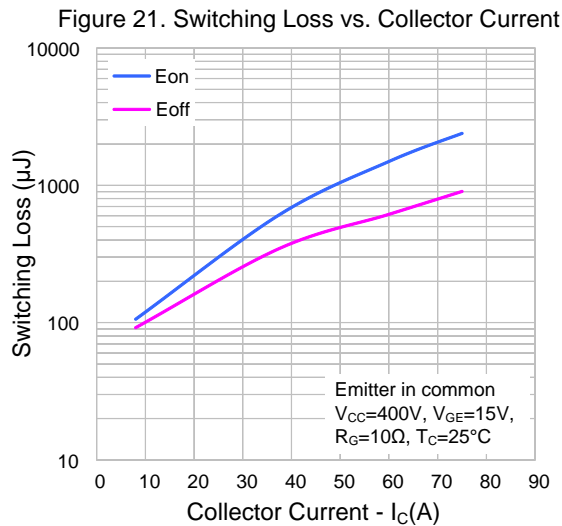
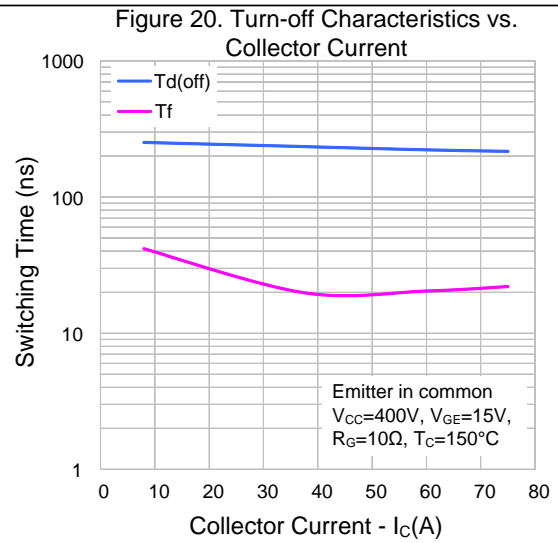
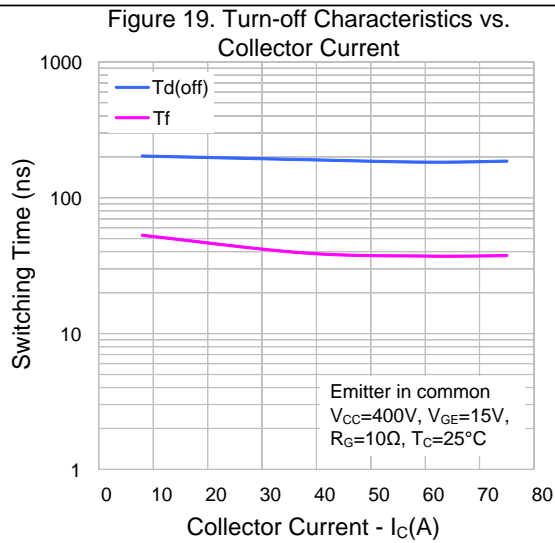
Figure 12. Turn-on Characteristics vs. Gate Resistance



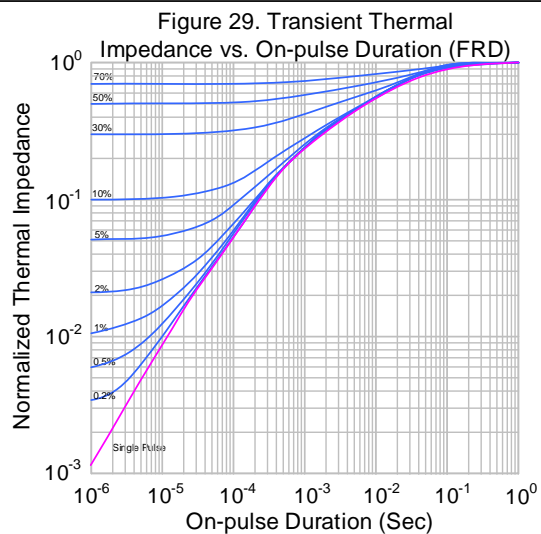
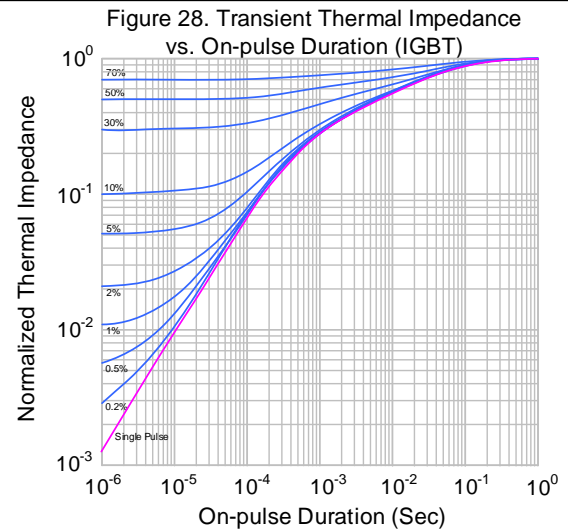
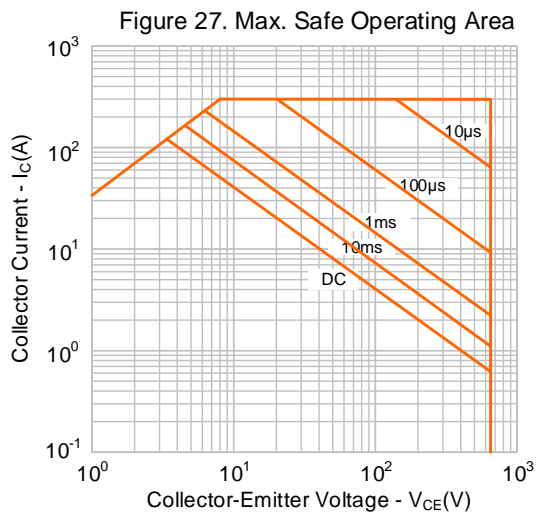
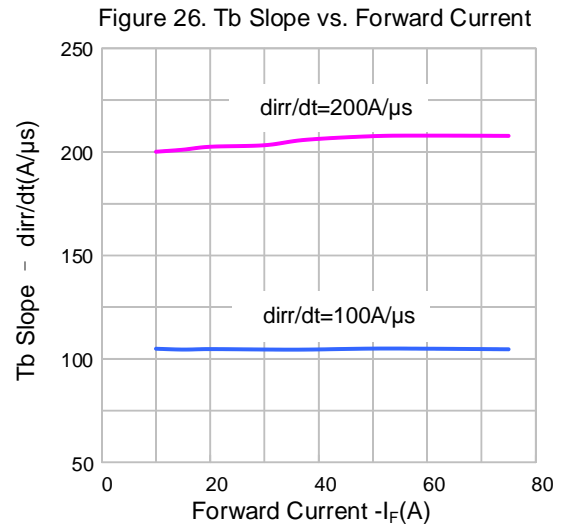
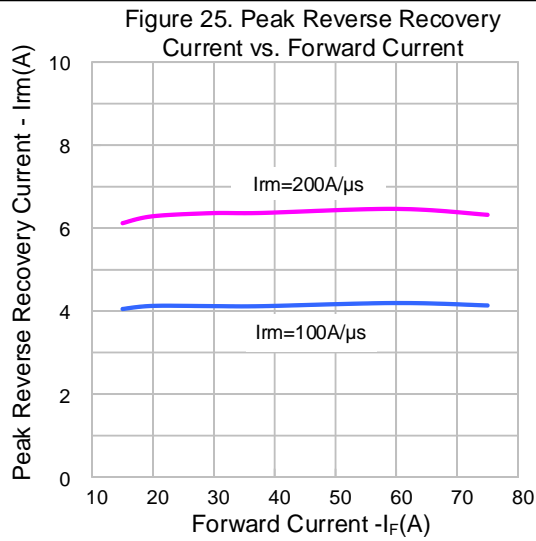
TYPICAL CHARACTERISTICS (CONTINUED)



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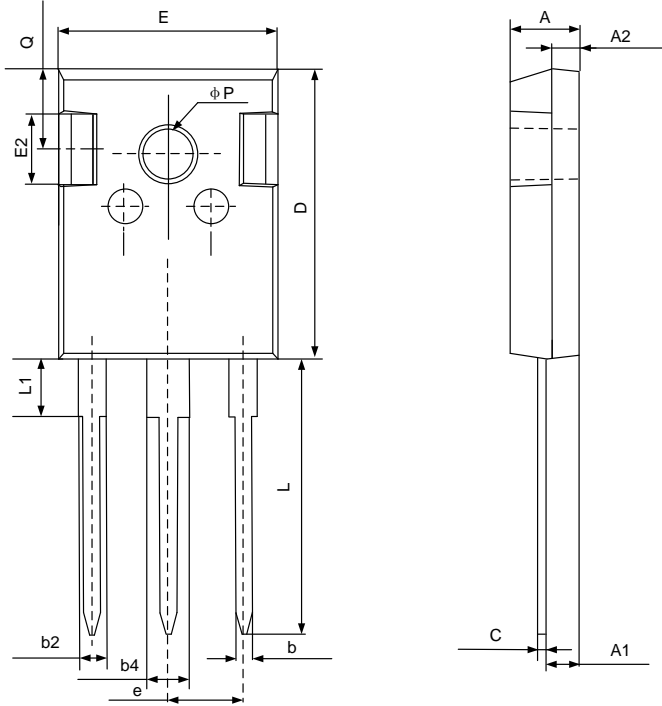
TYPICAL CHARACTERISTICS (CONTINUED)



PACKAGE OUTLINE

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



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.

Important notice :

1. Silan reserves the right to make changes of this instruction without notice.
2. Customers should obtain the latest relevant information when purchasing and should verify whether such information is latest and complete. Please read this instruction and application manual and related materials carefully before using products, including the circuit operation precautions, etc.
3. It is neither tested nor verified in accordance with AEC-Q series standards testing or application requirements. Silan does not give any warranties as to the suitability of the Silan's product for any specific use. The design intent, design definition and design of the product are not intended for application (the application stated in this instruction includes use, etc.) in transportation equipment, medical equipment, life-saving equipment, aerospace equipment, non-civil equipment or non-civil use, etc. (the equipment stated in this instruction includes systems, devices, etc., all referred to as equipment). The product should not be used in any equipment or system whose manufacture, use or sale is prohibited under any applicable laws or regulations ("unintended use"). If the product is used for unintended use, therefore the full risks of such products application are borne by the customer and Silan assumes no liability for the product used for the unintended use. If the customer intends to use the Silan's product in a application where malfunction or failure can be reasonably be expected to result in personal injury, or serious property, or environment damage, the customer shall make adequate assessment, testing and verification, and Silan shall not be liable for such applications.
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8. Product promotion is endless, our company will wholeheartedly provide customers with better products!
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Rev.: 1.2

Revision History:

1. Update characteristics
 2. Update the important notice
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Rev.: 1.1

Revision History:

1. Modify P_D and $R_{\theta JC}$ and update corresponding typical characteristics
 2. Update the important notice
-

Rev.: 1.0

Revision History:

1. First release
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-