

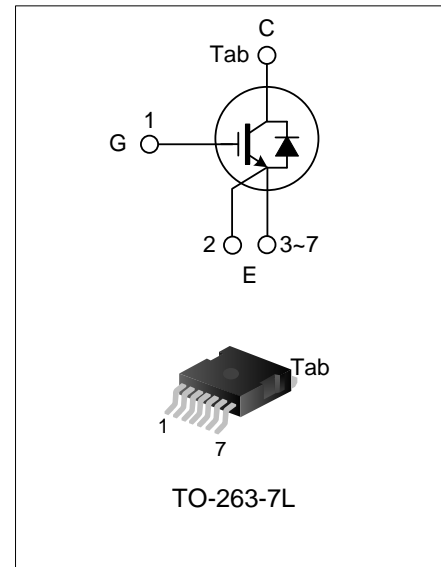
## 50A, 650V FIELD STOP IGBT

### DESCRIPTION

The SGTQ50V65UF1S7 field stop IGBT adopts Silan Field Stop 5 technology. It features low conduction loss and switching loss, is applicable to photovoltaic, UPS, SMPS and PFC fields.

### FEATURES

- ◆ 50A, 650V,  $V_{CE(sat)(typ.)}=1.75V@I_C=50A$
- ◆ Low conduction loss
- ◆ Fast switching
- ◆ High input impedance
- ◆  $T_{Jmax}=175^{\circ}C$



### NOMENCLATURE

SGT Q 50 V 65 UF 1 S7	
IGBT series Automotive Current, 50: 50A  N : N-channel NE: N-channel planner gate with ESD T : Field Stop 3和4 U : Field Stop 4+ V : Field Stop 5 W: Field Stop 5+ Y : Field Stop 5++ A : Field Stop 6  Voltage, 65: 650V 120: 1200V	Package S7 : TO-263-7L  1,2,3... : Version No.  Blank: Standard diode M : Standard diode, full range R : Rapid diode B : Rapid diode, full range S : Ultra soft diode, full range  D : packaged with fast recovery diode R : RC IGBT Blank: single IGBT C : Sic  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: Igniter

### ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing Type
SGTQ50V65UF1S7	TO-263-7L	Q50V65UF1	Halogen free	Tube
SGTQ50V65UF1S7TR	TO-263-7L	Q50V65UF1	Halogen free	Tape & Reel

### ABSOLUTE MAXIMUM RATINGS ( $T_C=25^\circ\text{C}$ , UNLESS OTHERWISE NOTED)

Characteristics	Symbol	Ratings	Unit	
Collector-emitter Voltage	$V_{CE}$	650	V	
Gate-emitter Voltage	$V_{GE}$	$\pm 20$	V	
Transient Gate-emitter Voltage ( $t_p \leq 10\mu\text{s}$ , $D < 0.010$ )	$V_{GE}$	$\pm 30$	V	
Collector Current	$I_C$	$T_C=25^\circ\text{C}$	100	A
		$T_C=100^\circ\text{C}$	50	
Pulsed Collector Current	$I_{CM}$	150	A	
Power Dissipation ( $T_C=25^\circ\text{C}$ )	$P_{tot}$	200	W	
Operating Junction Temperature	$T_J$	$-40 \sim +175$	$^\circ\text{C}$	
Storage Temperature Range	$T_{stg}$	$-55 \sim +150$	$^\circ\text{C}$	

### THERMAL CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Thermal Resistance, Junction to Case (IGBT)	$R_{th(j-c)}$	--	--	--	0.75	$^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient (IGBT)	$R_{th(j-a)}$	--	--	--	40	$^\circ\text{C/W}$
Soldering Temperature (SMD)	$T_{sold}$	Reflow soldering: $10 \pm 1$ sec, 3times	--	--	260	$^\circ\text{C}$

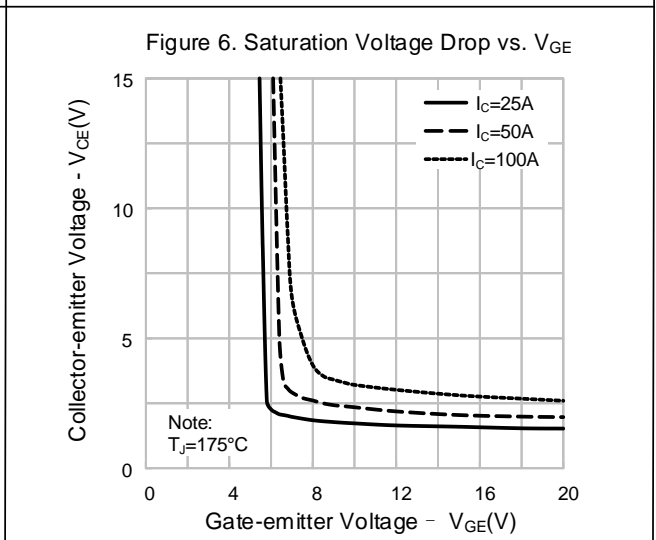
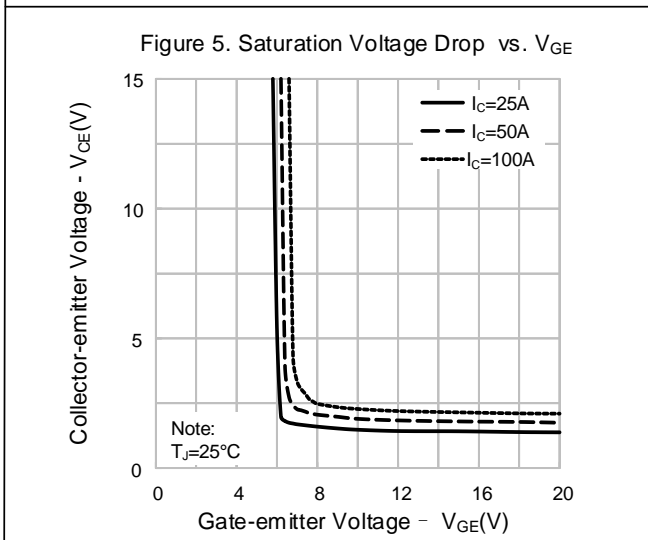
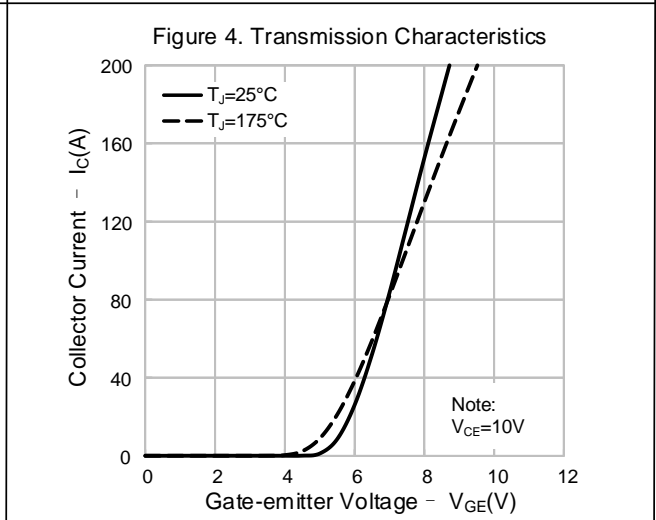
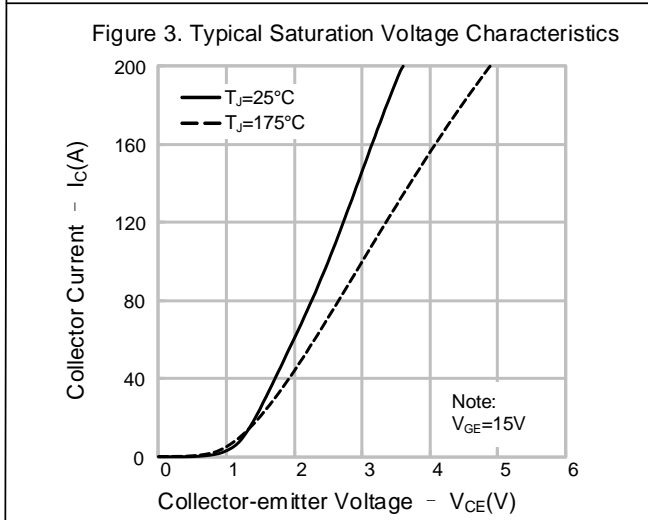
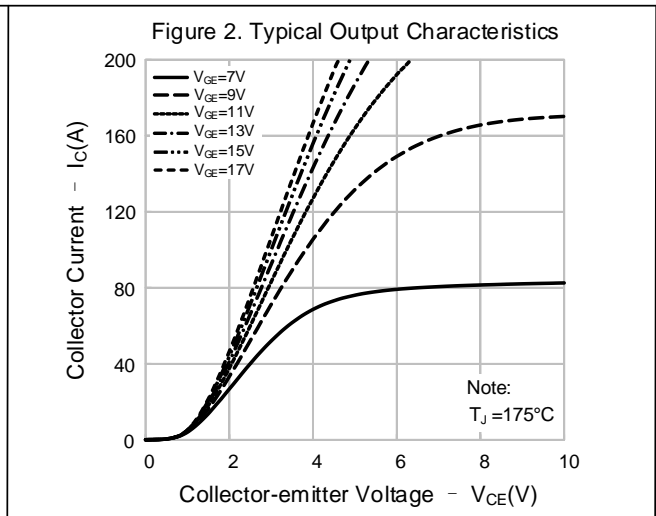
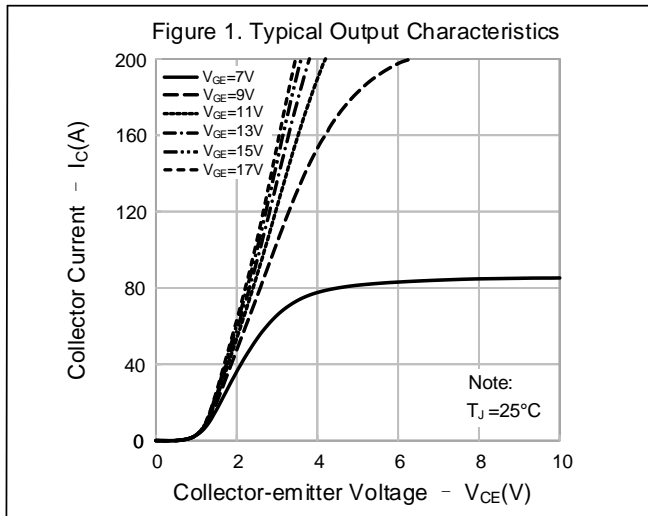
**ELECTRICAL CHARACTERISTICS OF IGBT (T<sub>J</sub>=25°C, UNLESS OTHERWISE NOTED)**

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Collector-emitter Breakdown Voltage	BV <sub>CE</sub>	V <sub>GE</sub> =0V, I <sub>C</sub> =250μA	650	--	--	V
Zero Gate Voltage Collector Current	I <sub>CES</sub>	V <sub>CE</sub> =650V, V <sub>GE</sub> =0V	--	--	40	μA
Gate-emitter Leakage Current	I <sub>GES</sub>	V <sub>GE</sub> =20V, V <sub>CE</sub> =0V	--	--	±100	nA
Gate-emitter Threshold Voltage	V <sub>GE(th)</sub>	I <sub>C</sub> =250μA, V <sub>CE</sub> =V <sub>GE</sub>	3.2	4.1	5.0	V
Collector-emitter Saturation Voltage	V <sub>CEsat</sub>	I <sub>C</sub> =50A, V <sub>GE</sub> =15V, T <sub>J</sub> =25°C	--	1.75	2.30	V
		I <sub>C</sub> =50A, V <sub>GE</sub> =15V, T <sub>J</sub> =175°C	--	2.05	--	V
Input Capacitance	C <sub>ies</sub>	V <sub>CE</sub> =30V V <sub>GE</sub> =0V f=1MHz	--	3472	--	pF
Output Capacitance	C <sub>oes</sub>		--	46	--	
Reverse Transfer Capacitance	C <sub>res</sub>		--	10	--	
Turn-on Delay Time	T <sub>d(on)</sub>	V <sub>CE</sub> =400V I <sub>C</sub> =50A R <sub>g</sub> =10Ω V <sub>GE</sub> =15V Inductive load T <sub>J</sub> =25°C	--	33	--	ns
Rise Time	T <sub>r</sub>		--	28	--	
Turn-off Delay Time	T <sub>d(off)</sub>		--	159	--	
Fall Time	T <sub>f</sub>		--	18	--	
Turn-on Energy	E <sub>on</sub>	Inductive load T <sub>J</sub> =25°C	--	0.83	--	mJ
Turn-off Energy	E <sub>off</sub>		--	0.38	--	
Total Switching Energy	E <sub>st</sub>		--	1.21	--	
Turn-on Delay Time	T <sub>d(on)</sub>	V <sub>CE</sub> =400V I <sub>C</sub> =25A R <sub>g</sub> =10Ω V <sub>GE</sub> =15V Inductive load T <sub>J</sub> =25°C	--	31	--	ns
Rise Time	T <sub>r</sub>		--	19	--	
Turn-off Delay Time	T <sub>d(off)</sub>		--	164	--	
Fall Time	T <sub>f</sub>		--	19	--	
Turn-on Energy	E <sub>on</sub>	Inductive load T <sub>J</sub> =25°C	--	0.21	--	mJ
Turn-off Energy	E <sub>off</sub>		--	0.17	--	
Total Switching Energy	E <sub>st</sub>		--	0.38	--	
Total Gate Charge	Q <sub>g</sub>	V <sub>CE</sub> =520V, I <sub>C</sub> =50A, V <sub>GE</sub> =15V	--	129	--	nC
Gate to Emitter Charge	Q <sub>ge</sub>		--	25	--	
Gate to Collector Charge	Q <sub>gc</sub>		--	35	--	

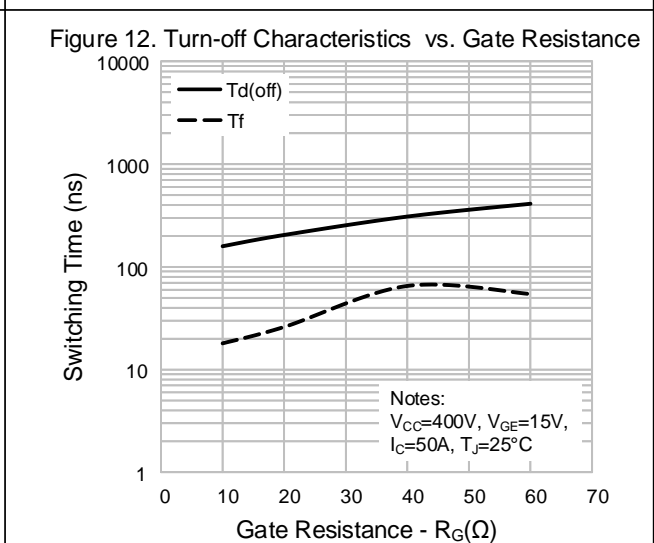
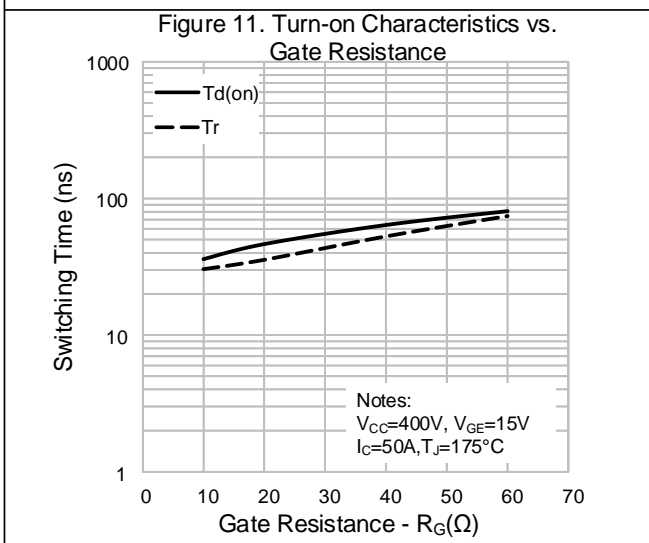
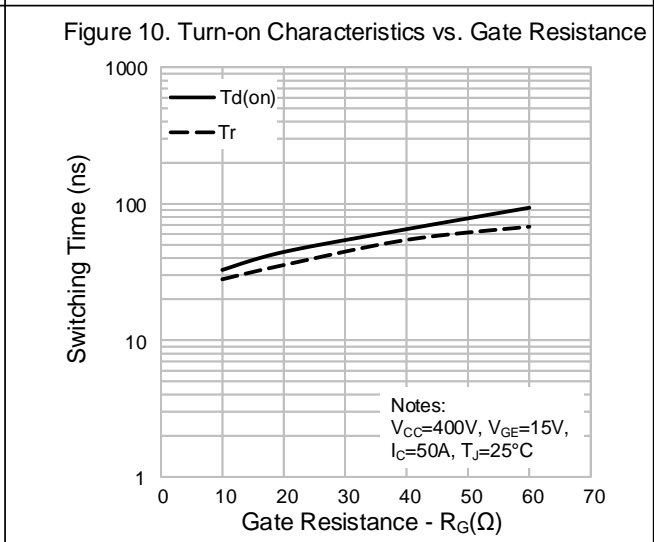
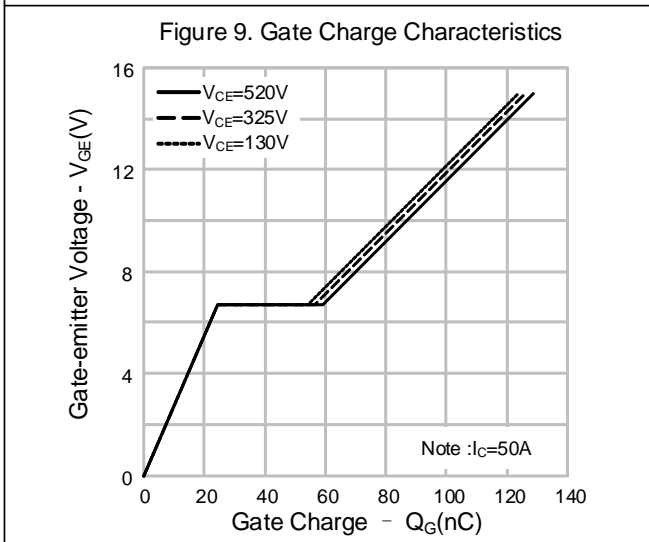
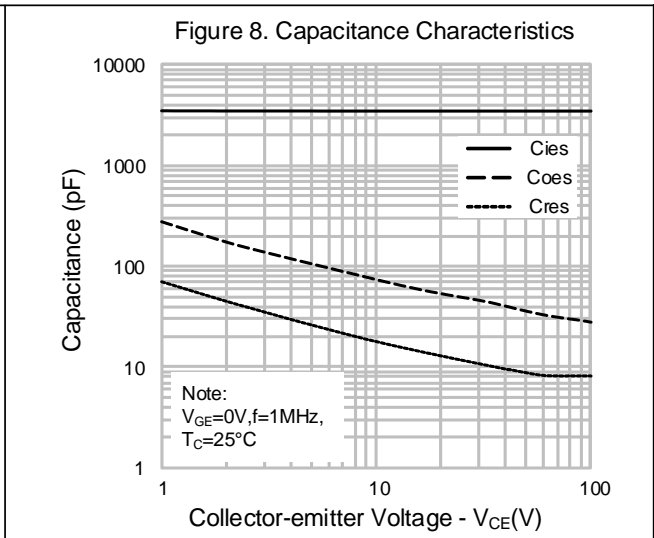
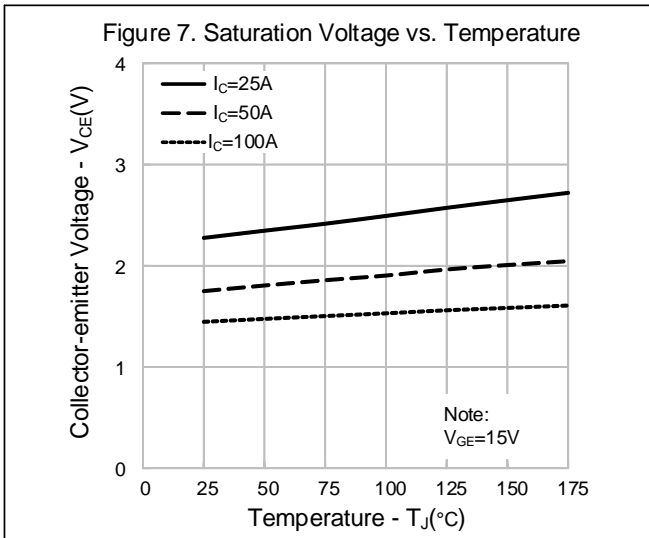
**ELECTRICAL CHARACTERISTICS OF IGBT (T<sub>J</sub>=175°C)**

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Turn-on Delay Time	T <sub>d(on)</sub>	V <sub>CE</sub> =400V I <sub>C</sub> =50A R <sub>g</sub> =10Ω V <sub>GE</sub> =15V Inductive load T <sub>J</sub> =175°C	--	36	--	ns
Rise Time	T <sub>r</sub>		--	31	--	
Turn-off Delay Time	T <sub>d(off)</sub>		--	179	--	
Fall Time	T <sub>f</sub>		--	19	--	
Turn-on Energy	E <sub>on</sub>	Inductive load T <sub>J</sub> =175°C	--	1.81	--	mJ
Turn-off Energy	E <sub>off</sub>		--	1.07	--	
Total Switching Energy	E <sub>st</sub>		--	2.88	--	
Turn-on Delay Time	T <sub>d(on)</sub>	V <sub>CE</sub> =400V I <sub>C</sub> =25A R <sub>g</sub> =10Ω V <sub>GE</sub> =15V Inductive load T <sub>J</sub> =175°C	--	31	--	ns
Rise Time	T <sub>r</sub>		--	20	--	
Turn-off Delay Time	T <sub>d(off)</sub>		--	193	--	
Fall Time	T <sub>f</sub>		--	19	--	
Turn-on Energy	E <sub>on</sub>	Inductive load T <sub>J</sub> =175°C	--	0.26	--	mJ
Turn-off Energy	E <sub>off</sub>		--	0.24	--	
Total Switching Energy	E <sub>st</sub>		--	0.50	--	

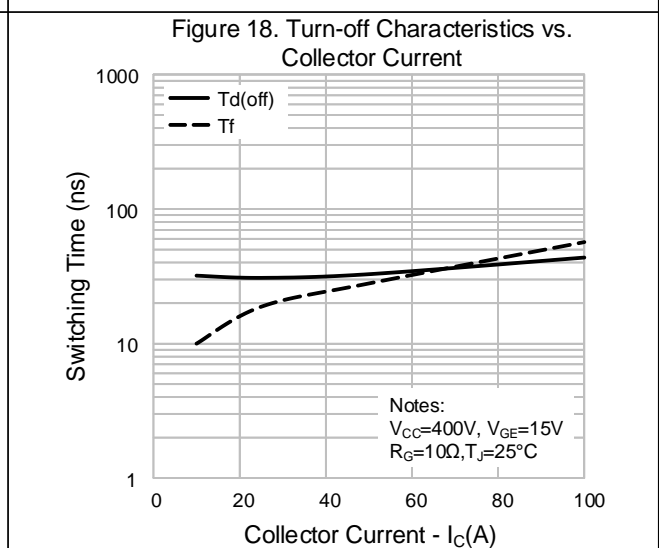
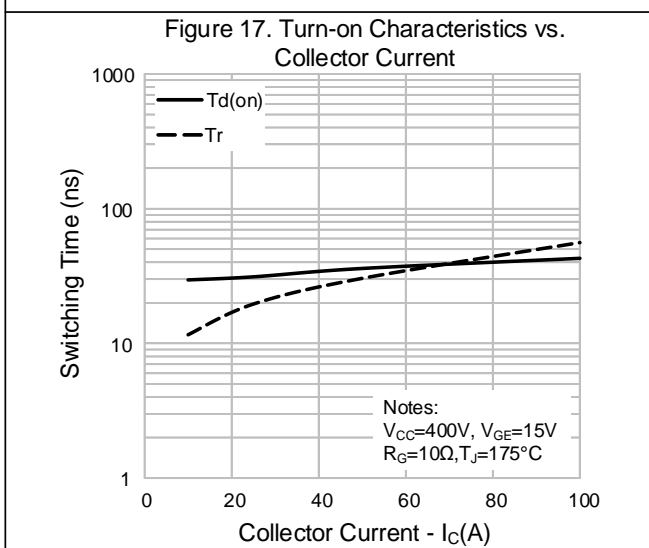
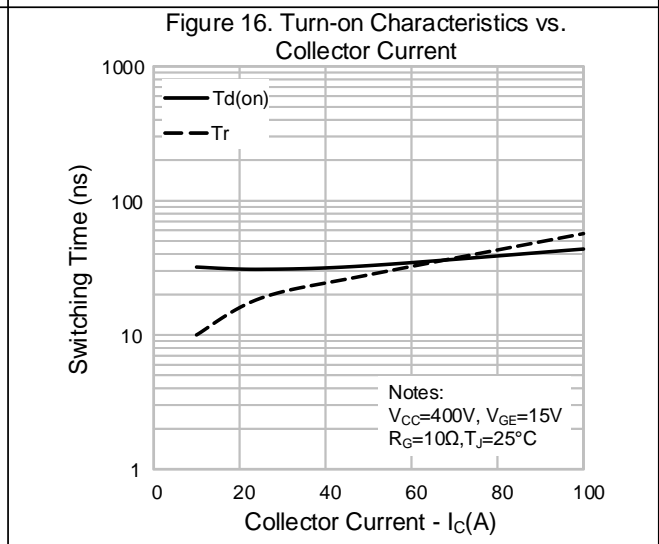
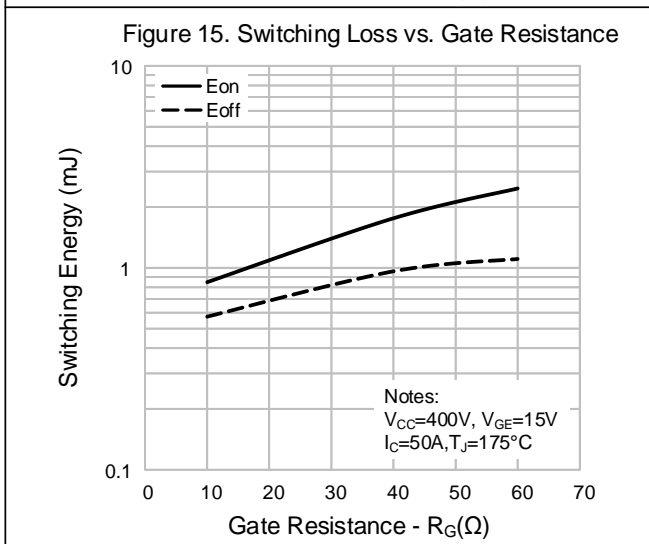
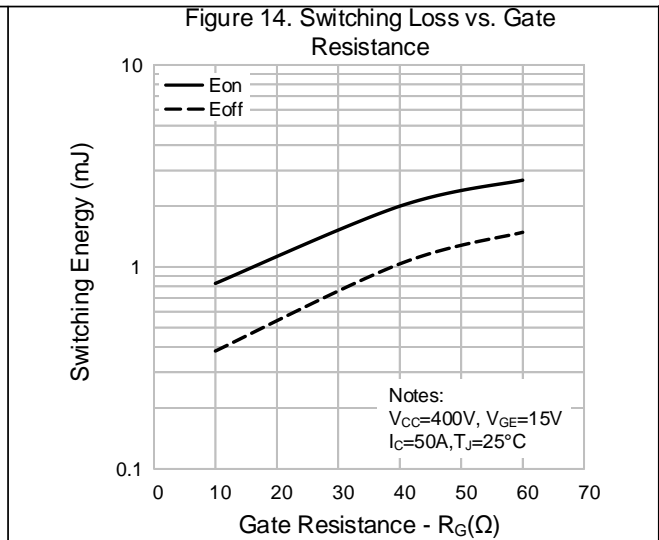
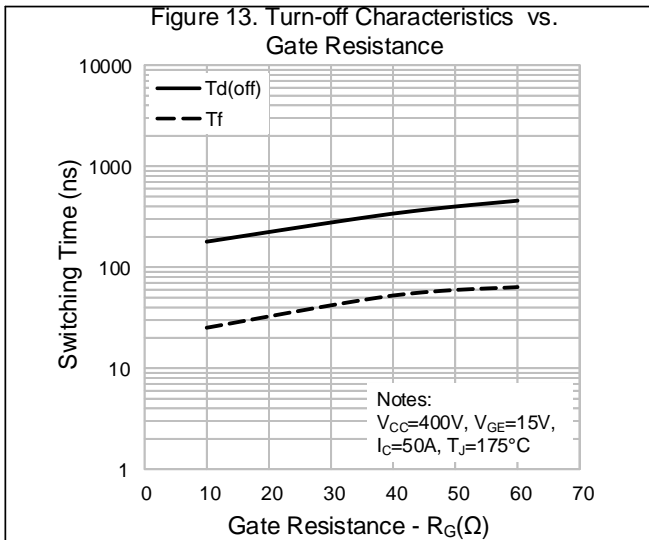
**TYPICAL CHARACTERISTICS**



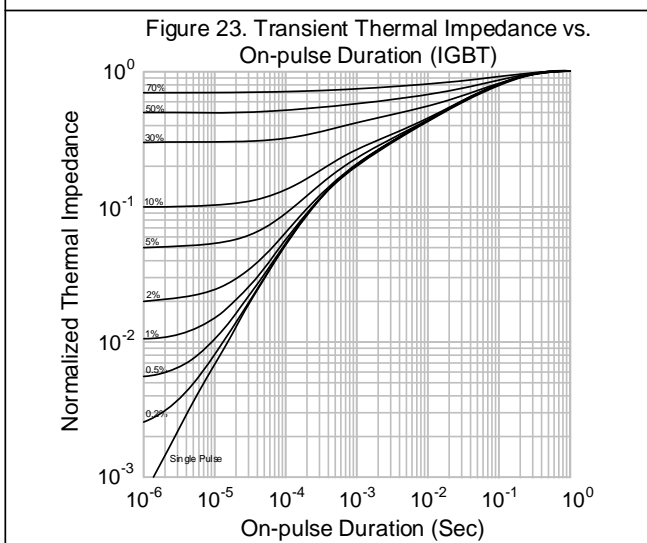
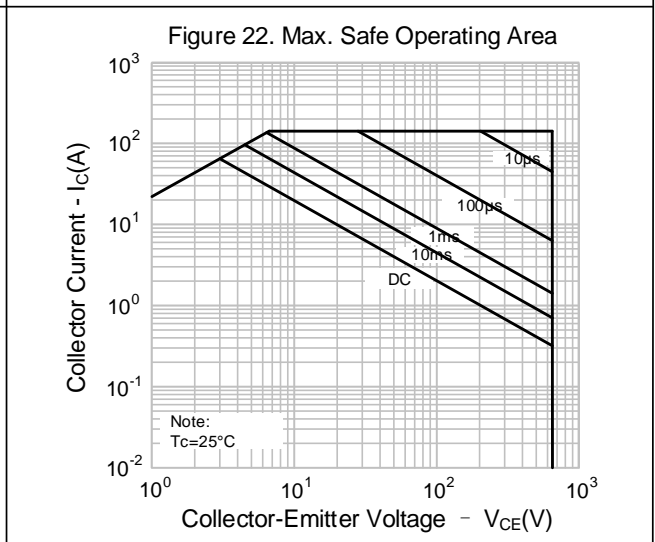
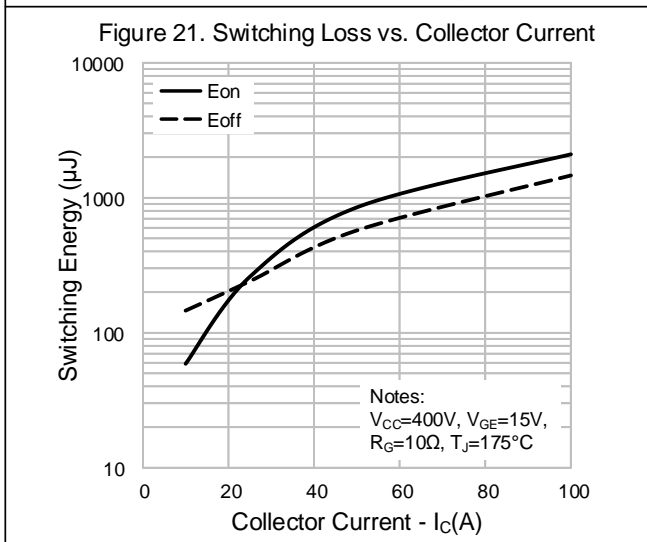
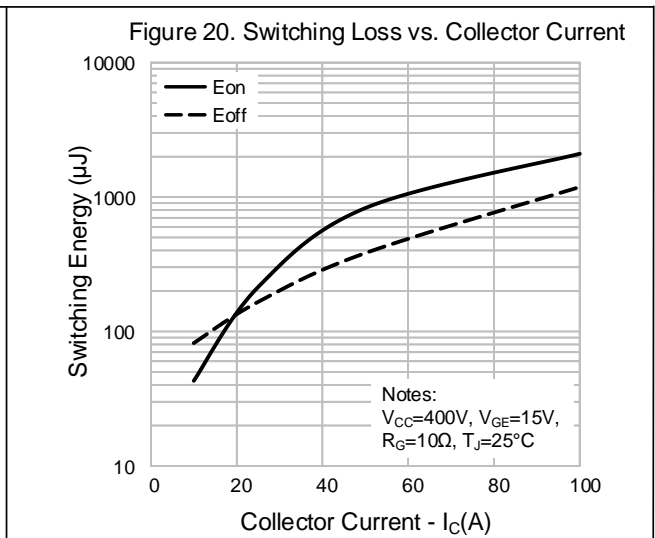
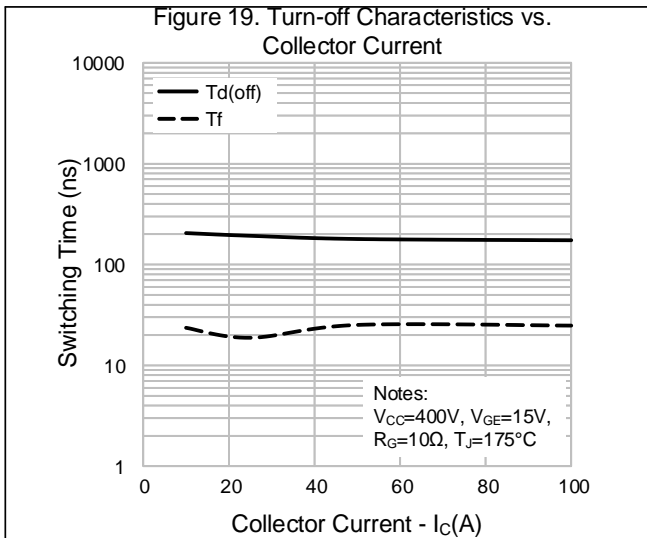
**TYPICAL CHARACTERISTICS (CONTINUED)**



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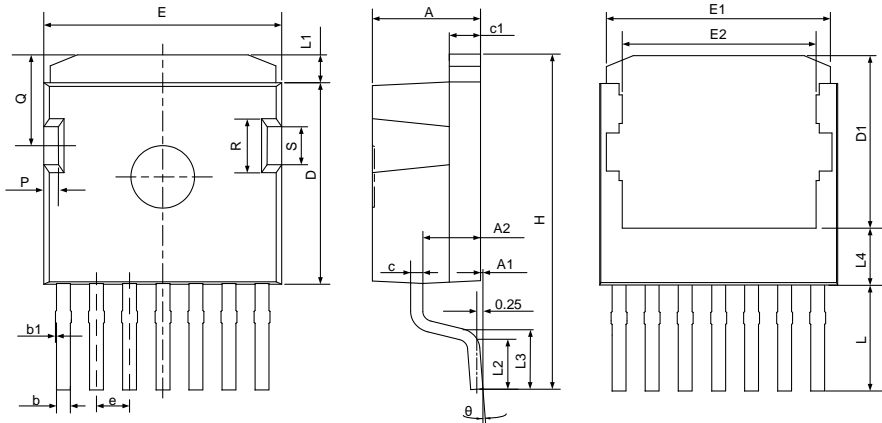




**PACKAGE OUTLINE**

**TO-263-7L**

**UNIT: mm**



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.30	4.40	4.50
A1	0.00	0.10	0.20
A2	2.30	2.40	2.50
b	0.50	0.60	0.70
b1	0.00	0.075	0.15
c	0.40	0.50	0.60
c1	1.17	1.27	1.37
D	9.05	9.25	9.45
D1	7.30	7.40	7.50
E	9.80	10.00	10.20
E1	9.36	9.46	9.56
E2	8.40	8.50	8.60
e	1.27 REF		
H	15.00 REF		
L	4.20	4.70	5.20
L1	0.70	1.00	1.30
L2	1.70	2.00	2.30
L3	2.70 REF		
L4	2.85 REF		
P	0.35	0.45	0.55
Q	4.02	4.12	4.22
R	2.03	2.13	2.23
S	1.40	1.50	1.60
θ	0°	4°	8°



**IGBT DEVICES OPERATE NOTES:**

Electrostatic charges may exist in many things. Please take following preventive measures to prevent effectively the IGBT 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.
- IGBT 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.
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9. Website: <http://www.silan.com.cn>

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Rev.: 1.1

Revision History:

1. Update the nomenclature
  2. Update curves
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Rev.: 1.0

Revision History:

1. First release
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