

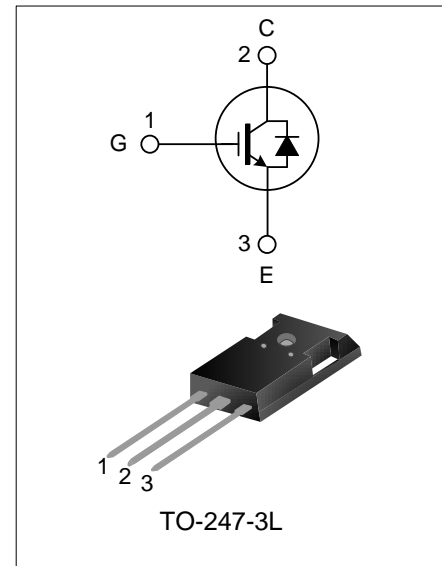
75A, 650V FIELD STOP IGBT

DESCRIPTION

The SGTP75V65SDS1P7 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, $V_{CE(sat)(typ.)}=1.42V@I_C=75A$
- ◆ Low conduction loss
- ◆ Ultra-fast switching
- ◆ High input impedance
- ◆ $T_{Jmax.}=175^{\circ}C$



NOMENCLATURE

| SGT P 75 V 65 S D S 1 P 7 | | |
|---|--|---|
| IGBT series | | Package |
| Industrial grade | | PW: TO-247-3L |
| Current, 75: 75A | | 1,2,3... : Version No. |
| N : N-channel | | Blank: Standard diode |
| NE : N-channel planner 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 : Ultra soft diode, full range |
| W: Field Stop 5+ | | D : packaged with fast recovery diode |
| Y : Field Stop5++ | | R : RC IGBT |
| A : Field Stop 6 | | Blank: single IGBT |
| Voltage, 75:750V | | C : Sic |
| 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: Igniter |

ORDERING INFORMATION

| Part No. | Package | Marking | Hazardous Substance Control | Packing Type |
|-----------------|-----------|------------|--------------------------------|--------------|
| SGTP75V65SDS1P7 | TO-247-3L | P75V65SDS1 | Halogen free | Tube |

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

| Characteristics | | Symbol | Ratings | Unit |
|--|---------------------------|-----------|-----------------|--------------------|
| Collector - Emitter Voltage | | V_{CE} | 650 | V |
| Gate - Emitter Voltage | | V_{GE} | ± 20 | V |
| Transient Gate - Emitter Voltage ($t_p \leq 10\mu\text{s}$, $D < 0.010$) | | V_{GE} | ± 30 | V |
| Collector Current | $T_C=25^{\circ}\text{C}$ | I_C | 150 | A |
| | $T_C=100^{\circ}\text{C}$ | | 75 | |
| Pulsed Collector Current | | I_{CM} | 300 | A |
| Diode Current | $T_C=25^{\circ}\text{C}$ | I_F | 150 | A |
| | $T_C=100^{\circ}\text{C}$ | | 75 | |
| Diode Pulsed Current | | I_{FM} | 300 | A |
| Power Dissipation ($T_C=25^{\circ}\text{C}$) | | P_{tot} | 395 | 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) | $R_{th(j-c)}$ | -- | -- | -- | 0.38 | $^{\circ}\text{C/W}$ |
| Thermal Resistance, Junction to Case (FRD) | $R_{th(j-c)}$ | -- | -- | -- | 0.6 | $^{\circ}\text{C/W}$ |
| Thermal Resistance, Junction to Ambient (IGBT) | $R_{th(j-a)}$ | -- | -- | -- | 40 | $^{\circ}\text{C/W}$ |
| Soldering Temperature (in line) | T_{sld} | 15^{+2}_{-0} sec, 1time | -- | -- | 260 | $^{\circ}\text{C}$ |

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

| Characteristics | Symbol | Test conditions | Min. | Typ. | Max. | Unit |
|--------------------------------------|---------------|--|------|------|-----------|---------|
| Collector-emitter Breakdown Voltage | $V_{(BR)CES}$ | $V_{GE}=0V, I_C=250\mu A$ | 650 | -- | -- | V |
| Zero Gate Voltage Collector Current | I_{CES} | $V_{CE}=650V, V_{GE}=0V$ | -- | -- | 50 | μA |
| Gate-emitter Leakage Current | I_{GES} | $V_{GE}=20V, V_{CE}=0V$ | -- | -- | ± 100 | nA |
| Gate-emitter Threshold Voltage | $V_{GE(th)}$ | $I_C=250\mu A, V_{CE}=V_{GE}$ | 3.4 | 4.0 | 5.0 | V |
| Collector-emitter Saturation Voltage | V_{CEsat} | $I_C=75A, V_{GE}=15V, T_J=25^{\circ}\text{C}$ | -- | 1.42 | 1.85 | V |
| | | $I_C=75A, V_{GE}=15V, T_J=175^{\circ}\text{C}$ | -- | 1.76 | -- | V |
| Input Capacitance | C_{ies} | $V_{CE}=30V$ | -- | 4914 | -- | pF |
| Output Capacitance | C_{oes} | $V_{GE}=0V$ | -- | 182 | -- | |
| Reverse Transfer Capacitance | C_{res} | $f=1\text{MHz}$ | -- | 20 | -- | |
| Turn-On Delay Time | $T_{d(on)}$ | $V_{CE}=400V$ $I_C=75A$ $R_g=10\Omega$ $V_{GE}=15V$ inductive load $T_J=25^{\circ}\text{C}$ | -- | 36 | -- | ns |
| Rise Time | T_r | | -- | 63 | -- | |
| Turn-Off Delay Time | $T_{d(off)}$ | | -- | 218 | -- | |
| Fall Time | T_f | | -- | 71 | -- | |
| Turn-on Energy | E_{on} | $V_{CE}=400V$ $I_C=37.5A$ $R_g=10\Omega$ $V_{GE}=15V$ inductive load $T_J=25^{\circ}\text{C}$ | -- | 1.06 | -- | mJ |
| Turn-off Energy | E_{off} | | -- | 1.10 | -- | |
| Total Switching Energy | E_{st} | | -- | 2.26 | -- | |
| Turn-On Delay Time | $T_{d(on)}$ | | -- | 31 | -- | |
| Rise Time | T_r | $V_{CE}=400V$ $I_C=37.5A$ $R_g=10\Omega$ $V_{GE}=15V$ inductive load $T_J=25^{\circ}\text{C}$ | -- | 25 | -- | ns |
| Turn-Off Delay Time | $T_{d(off)}$ | | -- | 221 | -- | |
| Fall Time | T_f | | -- | 39 | -- | |
| Turn-on Energy | E_{on} | | -- | 0.48 | -- | |
| Turn-off Energy | E_{off} | $V_{CE}=520V, I_C=75A, V_{GE}=15V$ | -- | 0.57 | -- | mJ |
| Total Switching Energy | E_{st} | | -- | 1.05 | -- | |
| Total Gate Charge | Q_g | | -- | 181 | -- | |
| Gate to Emitter Charge | Q_{ge} | | -- | 38 | -- | |
| Gate to Collector Charge | Q_{gc} | | -- | 48 | -- | nC |

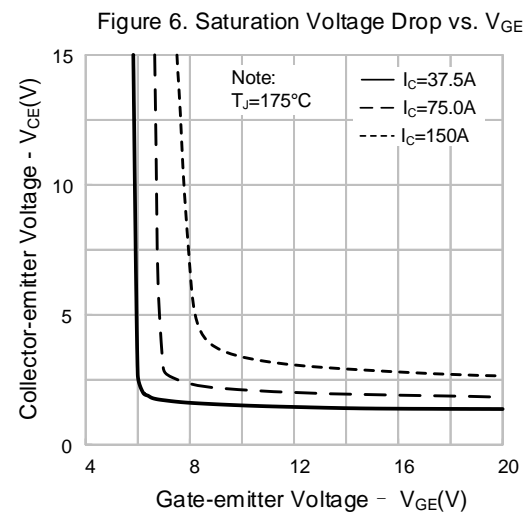
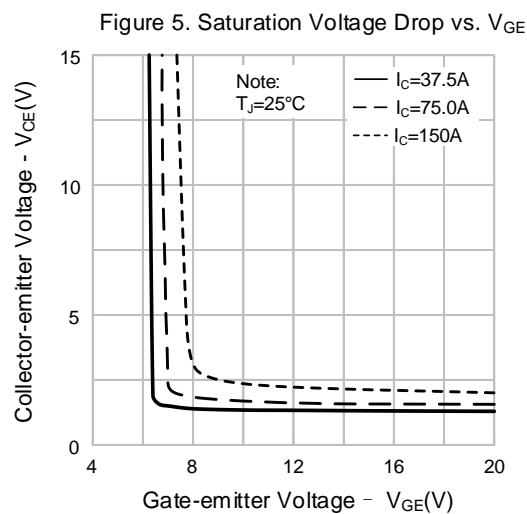
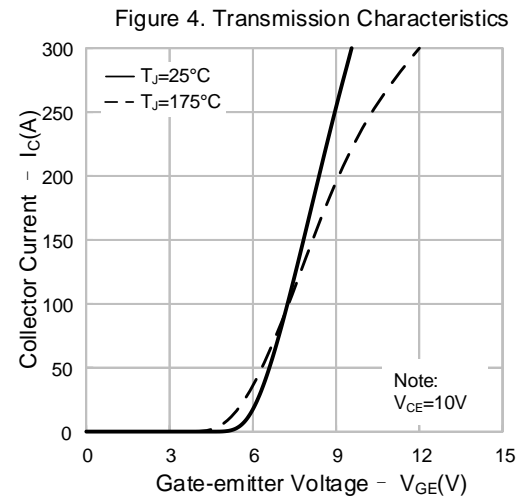
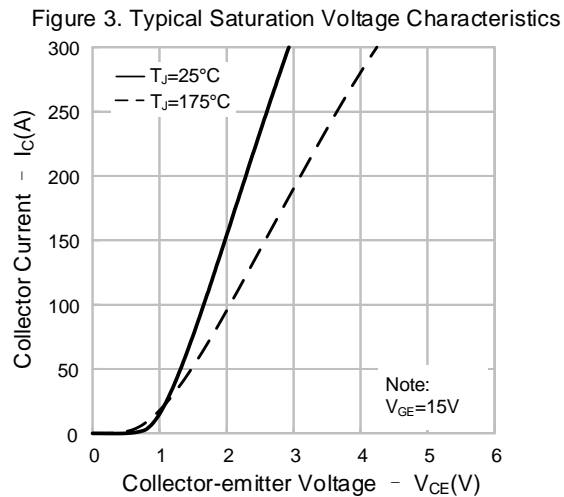
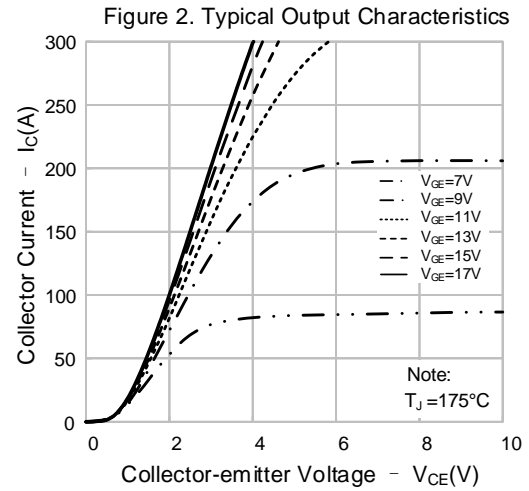
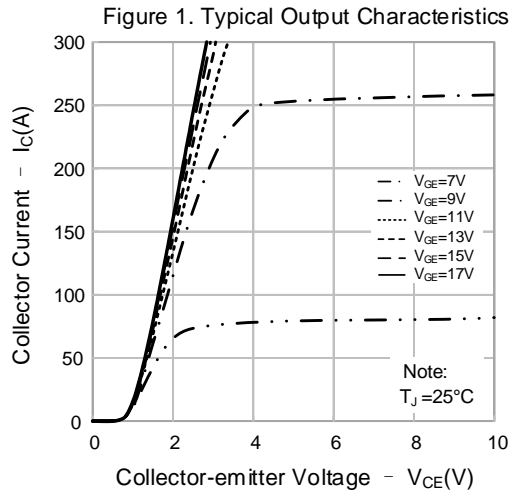
ELECTRICAL CHARACTERISTICS OF FRD (UNLESS OTHERWISE NOTED, $T_J=25^{\circ}\text{C}$)

| Characteristics | Symbol | Test conditions | Min. | Typ. | Max. | Unit |
|--------------------------------|-----------|--|------|------|------|------|
| Diode Forward Voltage | V_F | $I_F=75A, T_J=25^{\circ}\text{C}$ | -- | 1.65 | 2.0 | V |
| | | $I_F=75A, T_J=175^{\circ}\text{C}$ | -- | 1.55 | -- | |
| Diode Reverse Recovery Time | T_{rr} | $I_{ES}=75A, di_{ES}/dt=200A/\mu s,$ $T_J=25^{\circ}\text{C}$ | -- | 61 | -- | ns |
| Diode Reverse Recovery Charge | Q_{rr} | | -- | 0.20 | -- | nC |
| Diode Reverse Recovery Current | I_{rrm} | | -- | 6.3 | -- | A |

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

| 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 $T_J=150^{\circ}\text{C}$ | -- | 38 | -- | ns |
| Rise Time | T_r | | -- | 52 | -- | |
| Turn-Off Delay Time | $T_{d(off)}$ | | -- | 235 | -- | |
| Fall Time | T_f | | -- | 74 | -- | |
| Turn-on Energy | E_{on} | inductive load $T_J=150^{\circ}\text{C}$ | -- | 1.44 | -- | mJ |
| Turn-off Energy | E_{off} | | -- | 1.60 | -- | |
| Total Switching Energy | E_{st} | | -- | 3.04 | -- | |
| 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 $T_J=150^{\circ}\text{C}$ | -- | 34 | -- | ns |
| Rise Time | T_r | | -- | 30 | -- | |
| Turn-Off Delay Time | $T_{d(off)}$ | | -- | 246 | -- | |
| Fall Time | T_f | | -- | 72 | -- | |
| Turn-on Energy | E_{on} | inductive load $T_J=150^{\circ}\text{C}$ | -- | 0.60 | -- | mJ |
| Turn-off Energy | E_{off} | | -- | 0.86 | -- | |
| Total Switching Energy | E_{st} | | -- | 1.46 | -- | |

TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS (CONTINUED)

Figure 7. Saturation Voltage Drop vs. Temperature

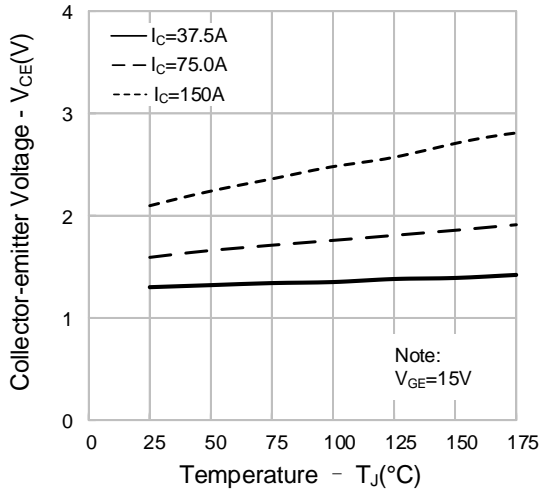


Figure 8. Capacitance Characteristics

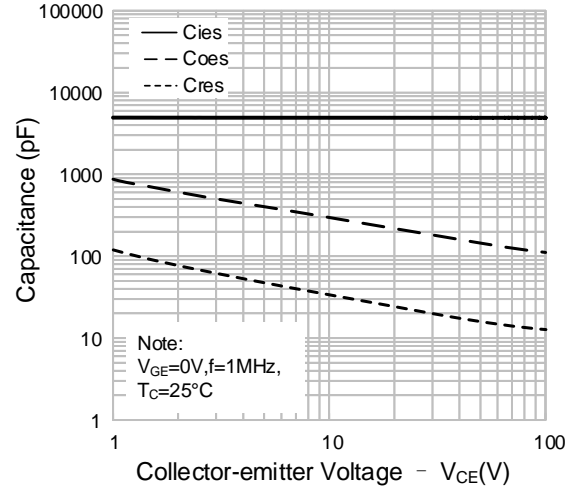


Figure 9. Gate Charge Characteristics

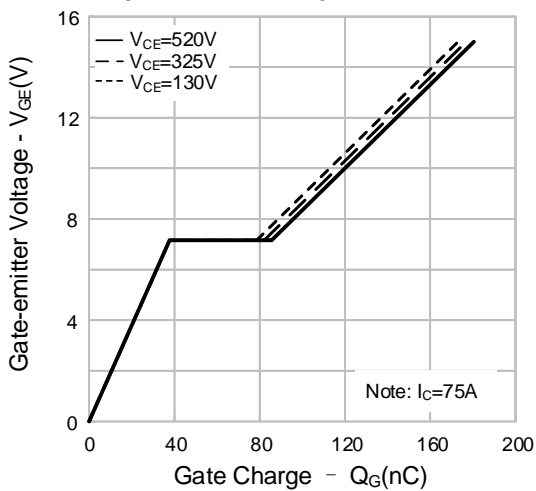


Figure 10. Forward Characteristics

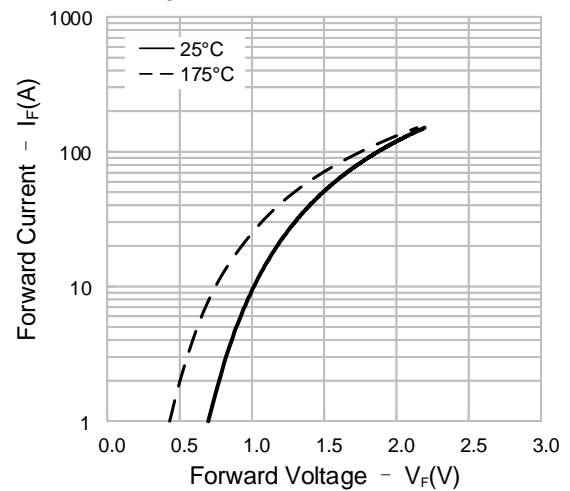


Figure 11. Turn-on Characteristics vs. Gate Resistance

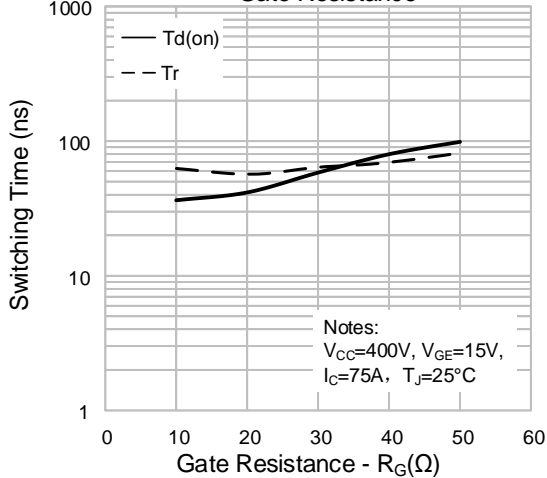
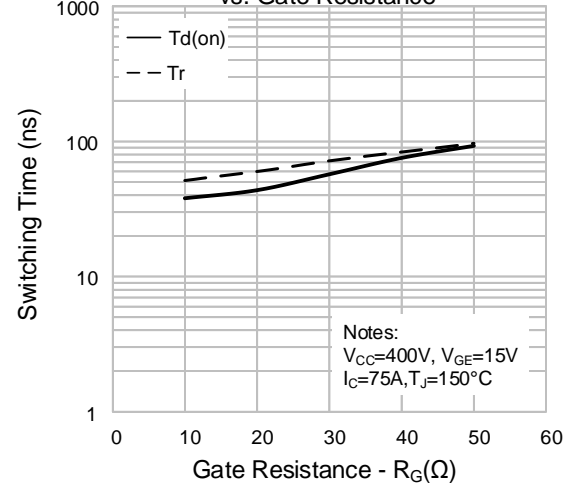
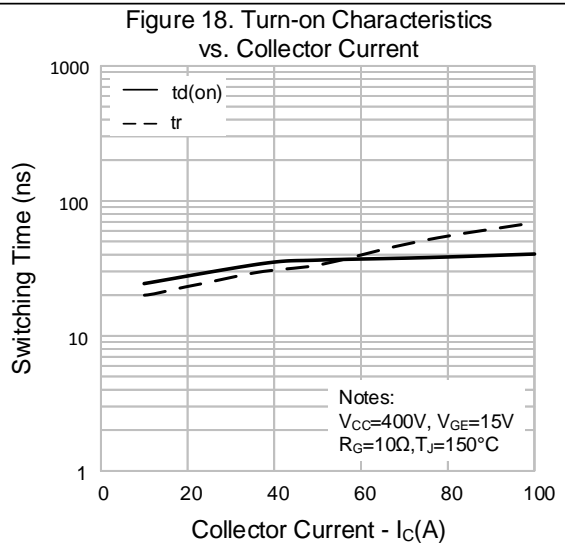
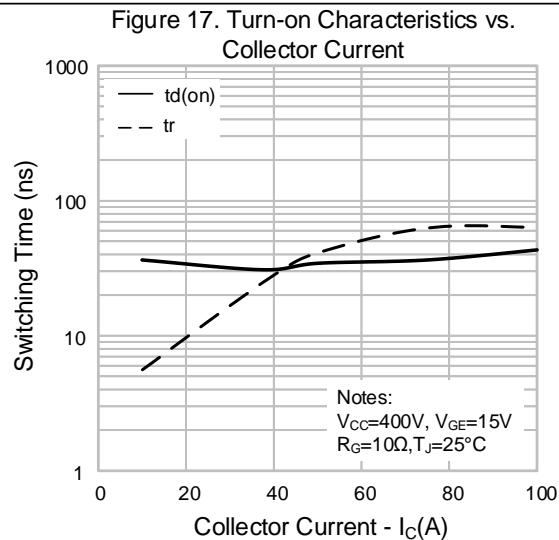
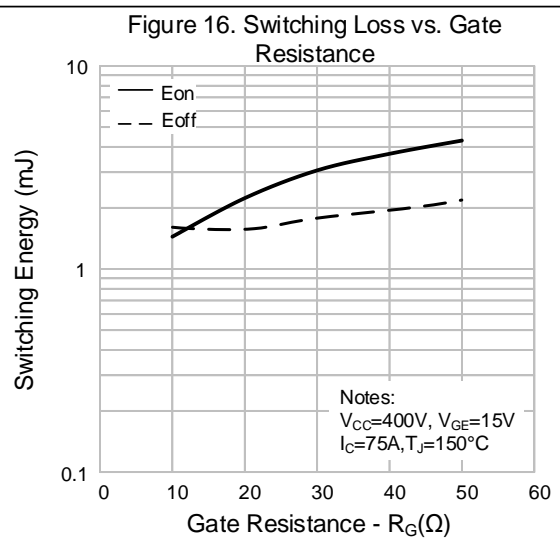
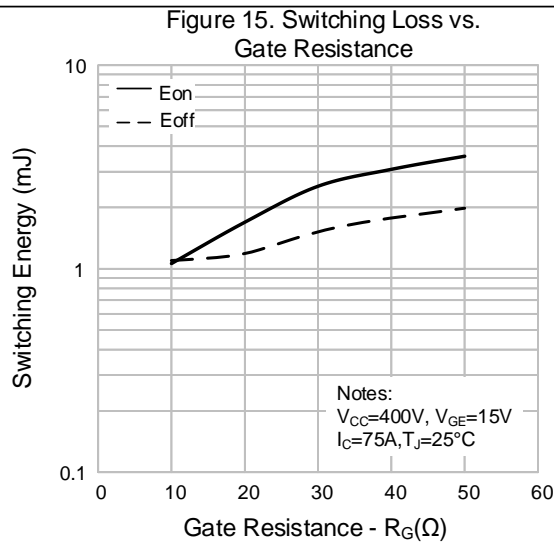
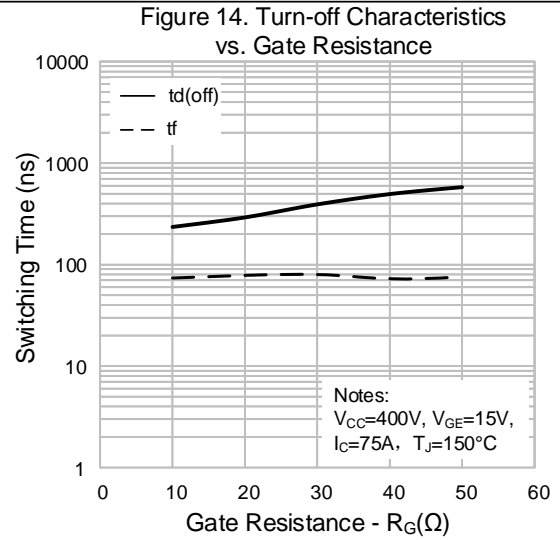
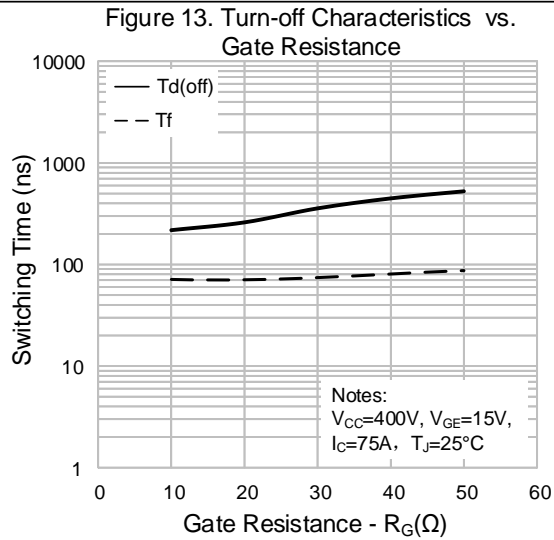


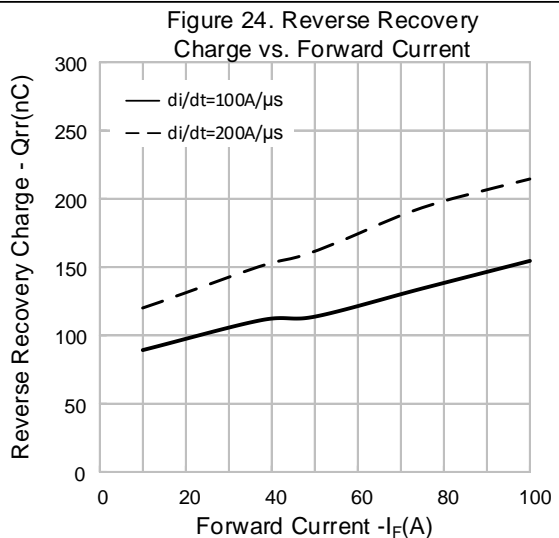
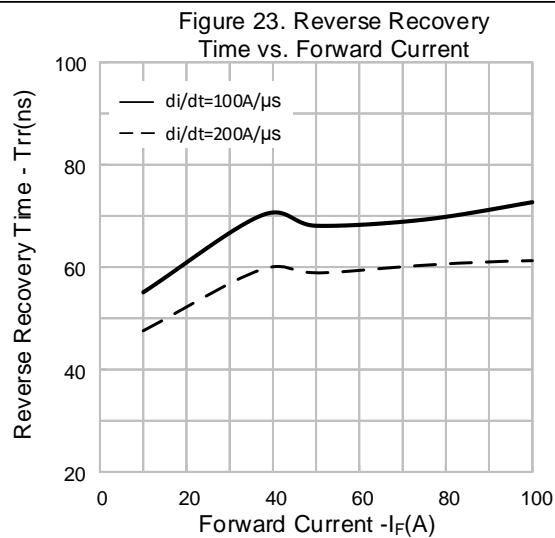
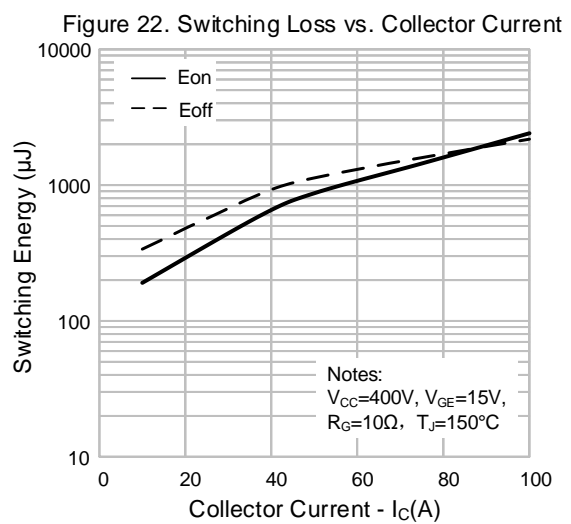
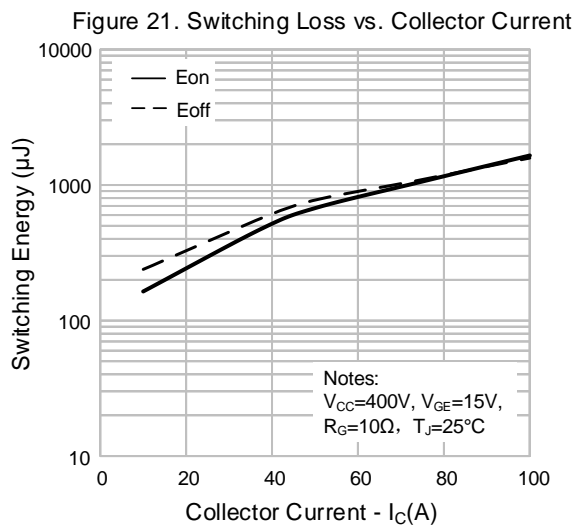
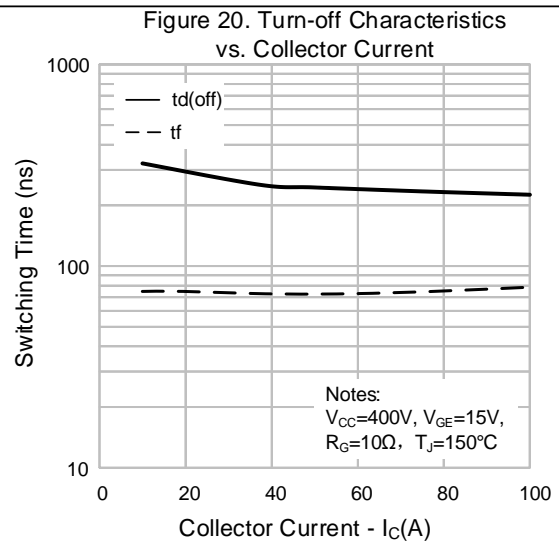
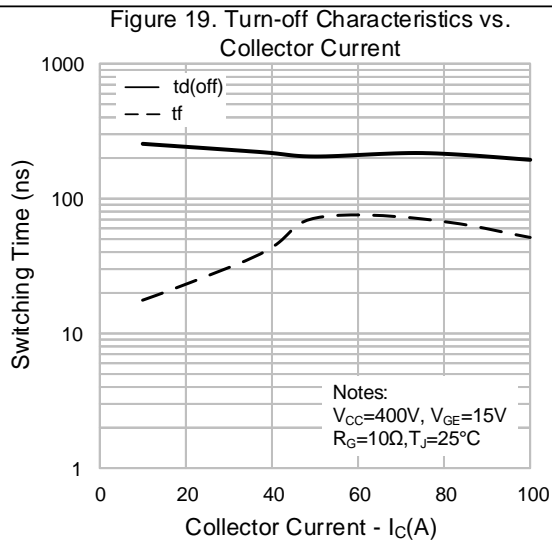
Figure 12. Turn-on Characteristics vs. Gate Resistance



TYPICAL CHARACTERISTICS (CONTINUED)

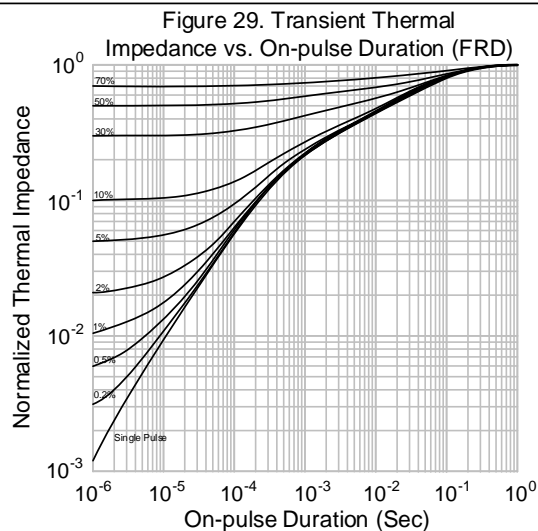
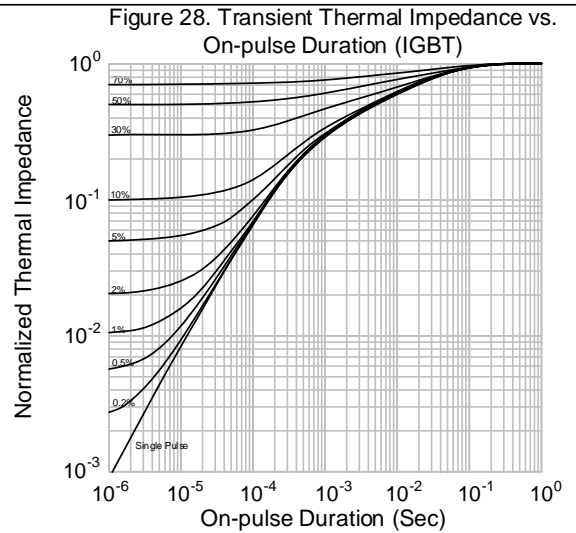
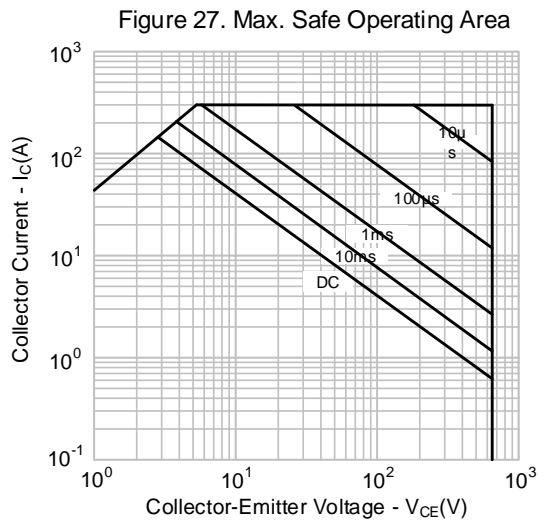
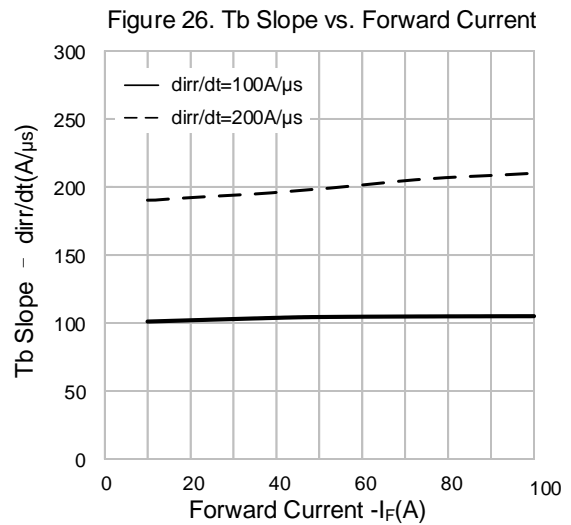
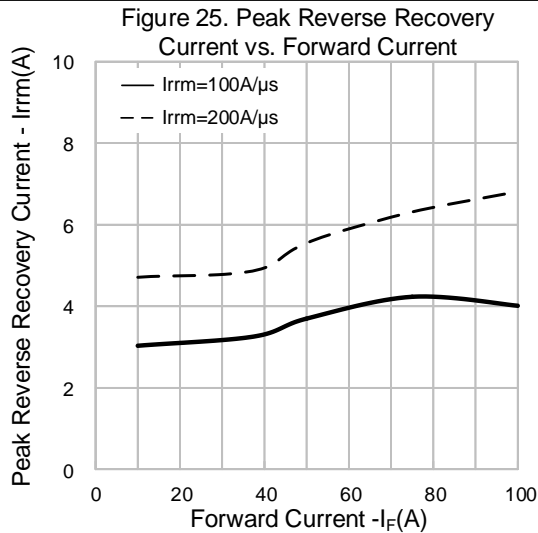


TYPICAL CHARACTERISTICS (CONTINUED)





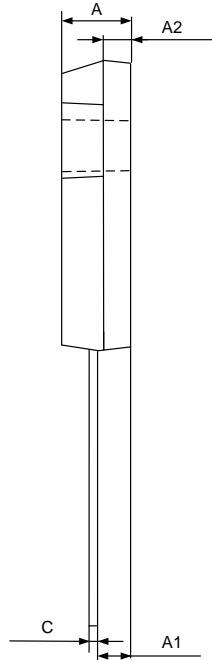
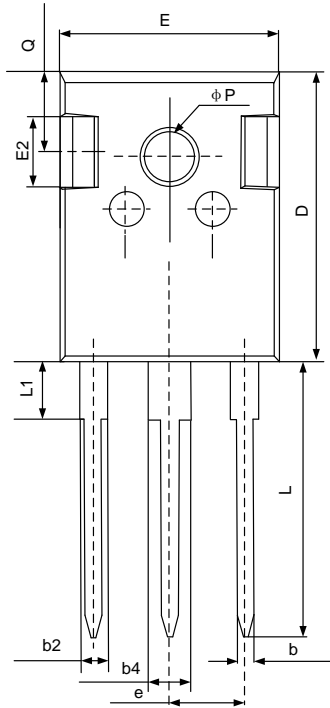
TYPICAL CHARACTERISTICS (CONTINUED)



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 |



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

| | | | |
|------------|---|----------------|---|
| Part No.: | SGTP75V65SDS1P7 | Document Type: | Datasheet |
| Copyright: | HANGZHOU SILAN MICROELECTRONICS CO.,LTD | Website: | http://www.silan.com.cn |

Rev.: 1.2

Revision History:

1. Update nomenclature and parameter names
 2. Update the important notice
-

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
-