

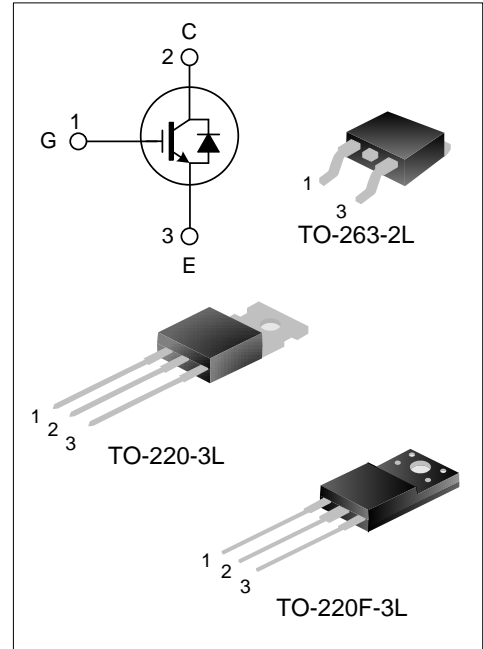
## 15A, 600V FIELD STOP IGBT

### DESCRIPTION

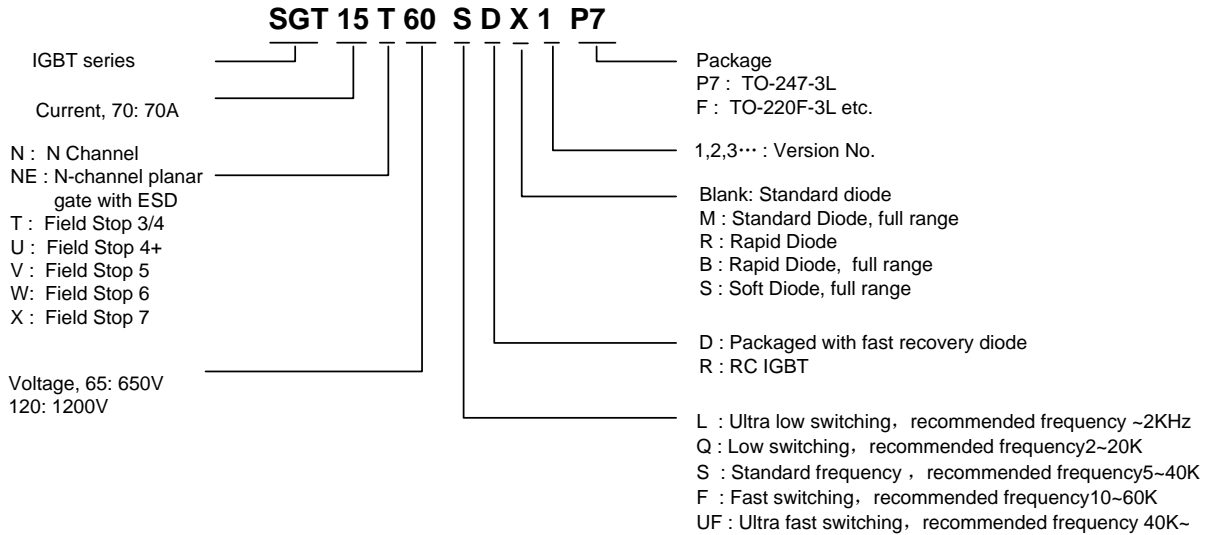
The SGT15T60SD1T/F/S field stop III IGBT features low conduction loss and switching loss, is applicable to UPS, SMPS, motor application and PFC fields.

### FEATURES

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



### NOMENCLATURE



### 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<sub>C</sub> = 25°C UNLESS OTHERWISE NOTED)**

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

**THERMAL CHARACTERISTICS**

| Parameter                                      | Symbol           | Ratings      |              |              | Units |
|--|------------------|--------------|--------------|--------------|-------|
|  |                  | SGT15T60SD1F | SGT15T60SD1T | SGT15T60SD1S |       |
| Thermal Resistance,<br>Junction to Case (IGBT) | R <sub>θJC</sub> | 2.9          | 1.15         | 0.92         | °C/W  |
| Thermal Resistance,<br>Junction to Case (FRD)  | R <sub>θJC</sub> | 4.6          | 2.0          | 2.33         | °C/W  |

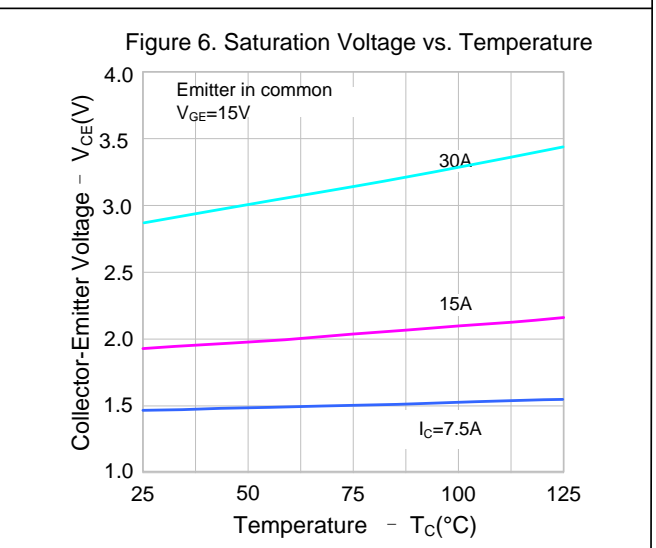
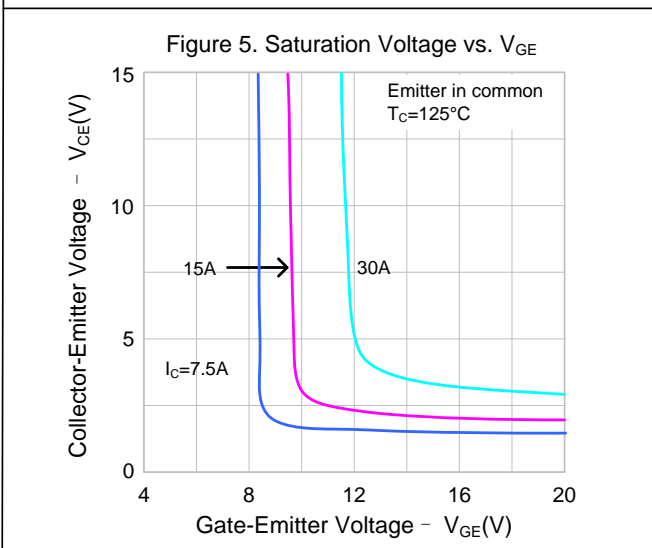
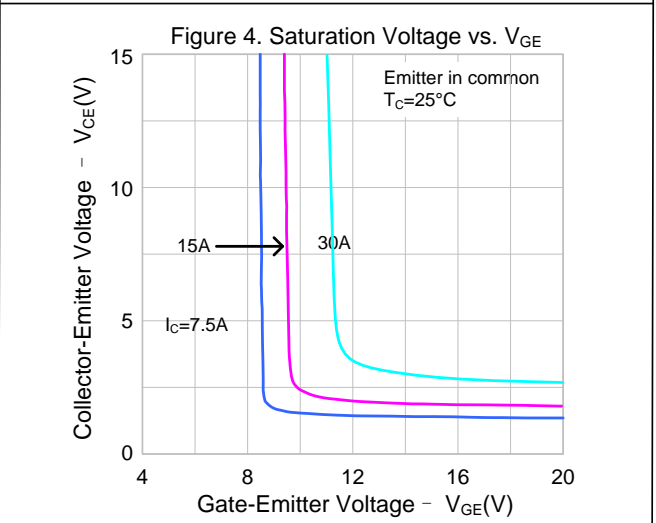
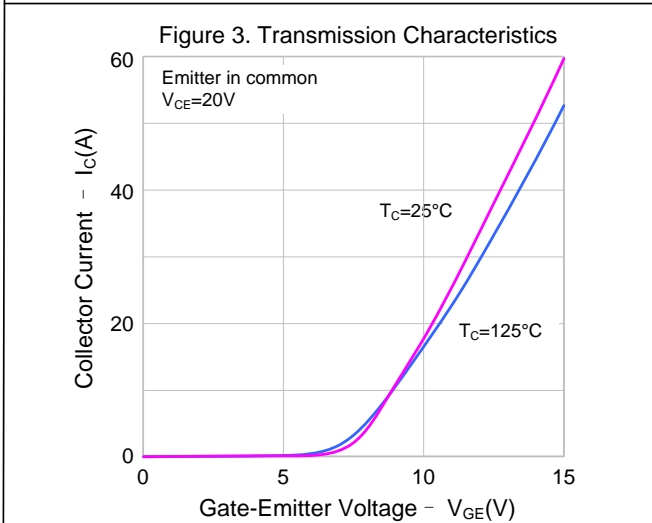
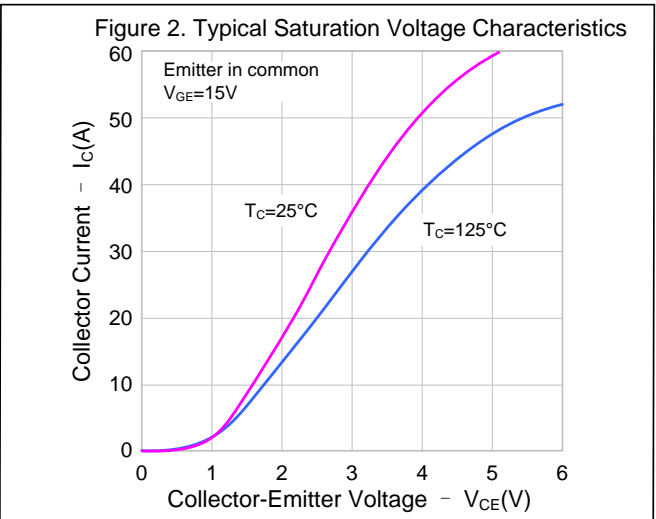
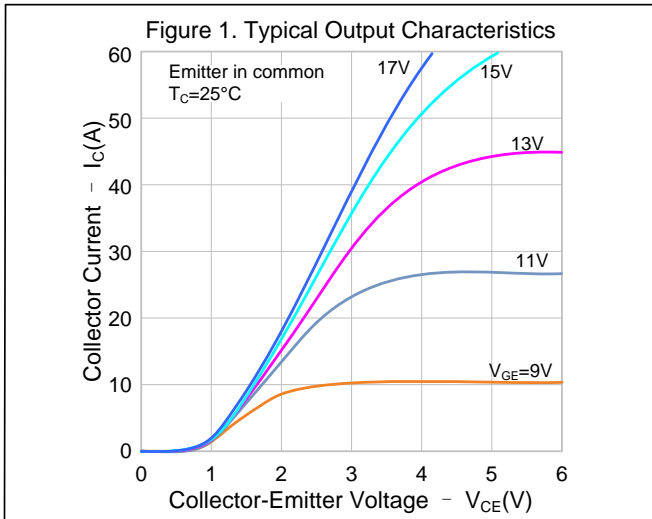
**ELECTRICAL CHARACTERISTICS OF IGBT ( $T_C = 25^\circ\text{C}$  UNLESS OTHERWISE NOTED)**

| Parameter                               | Symbol        | Test conditions                              | Min. | Typ. | Max.      | Units   |
|---|---------------|--|------|------|-----------|---------|
| Collector to Emitter Breakdown Voltage  | $BV_{CE}$     | $V_{GE}=0V, I_C=250\mu A$                    | 600  | --   | --        | V       |
| C-E Leakage Current                     | $I_{CES}$     | $V_{CE}=600V, V_{GE}=0V$                     | --   | --   | 200       | $\mu A$ |
| G-E Leakage Current                     | $I_{GES}$     | $V_{GE}=20V, V_{CE}=0V$                      | --   | --   | $\pm 400$ | nA      |
| G-E Threshold Voltage                   | $V_{GE(th)}$  | $I_C=250\mu A, V_{CE}=V_{GE}$                | 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       |
|   |               | $I_C=15A, V_{GE}=15V, T_C=125^\circ\text{C}$ | --   | 1.9  | --        | V       |
| Input Capacitance                       | $C_{ies}$     | $V_{CE}=30V$                                 | --   | 950  | --        | pF      |
| Output Capacitance                      | $C_{oes}$     | $V_{GE}=0V$                                  | --   | 55   | --        |         |
| Reverse Transfer Capacitance            | $C_{res}$     | $f=1\text{MHz}$                              | --   | 16   | --        |         |
| Turn-On Delay Time                      | $T_{d(on)}$   | $V_{CE}=400V$<br>$I_C=15A$<br>$R_g=10\Omega$ | --   | 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   | --        |         |

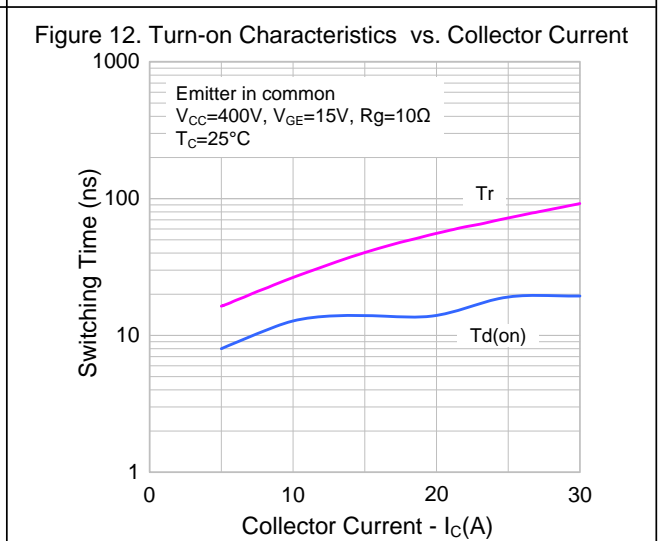
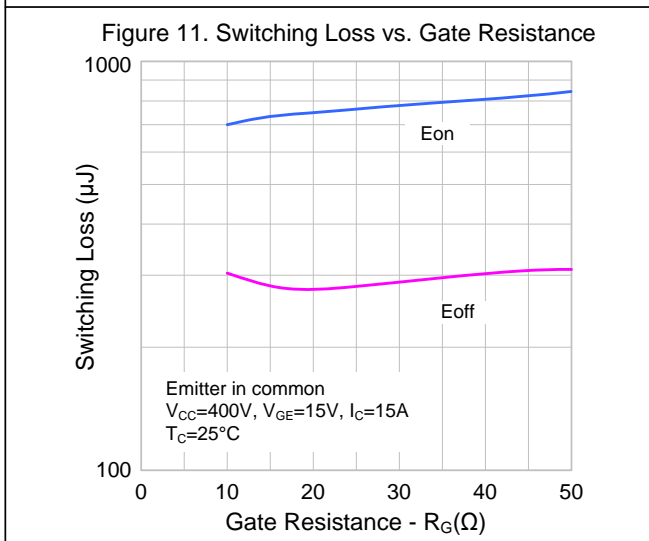
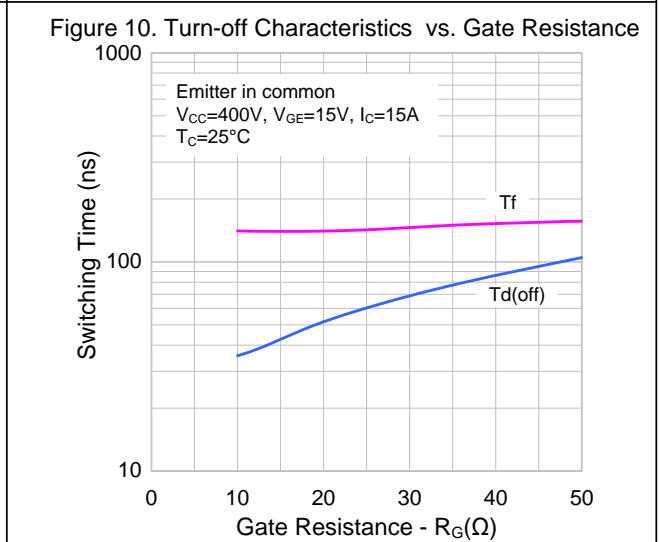
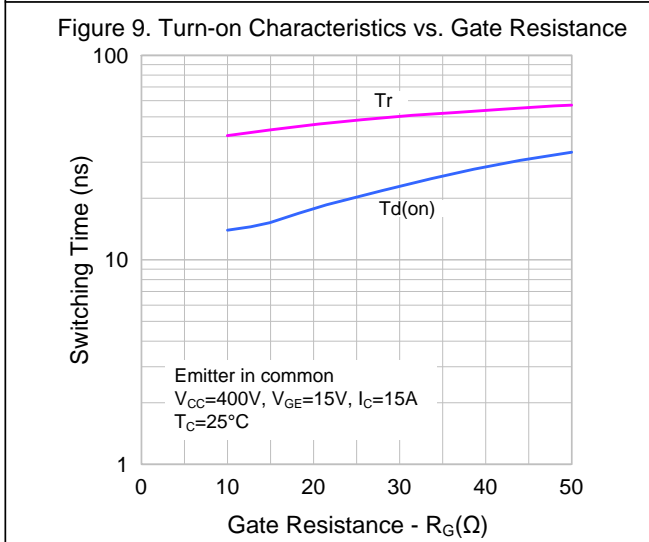
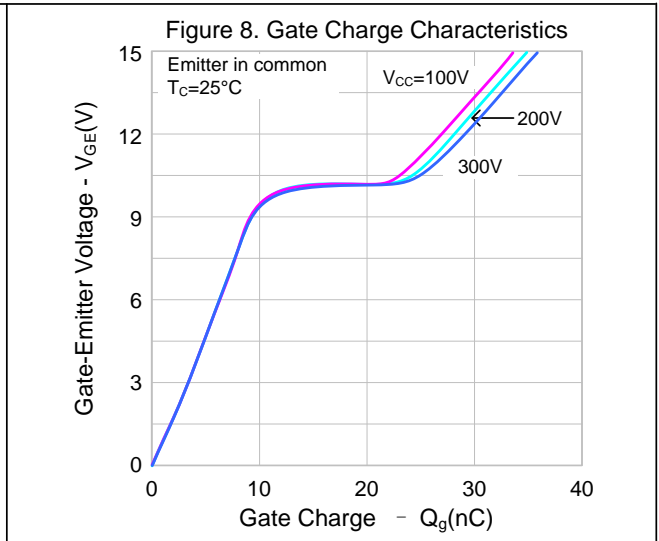
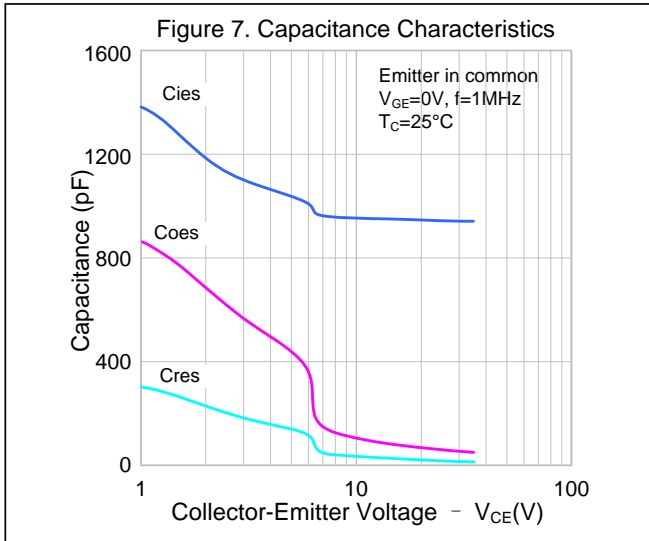
**ELECTRICAL CHARACTERISTICS OF FRD ( $T_C = 25^\circ\text{C}$  UNLESS OTHERWISE NOTED)**

| Parameter                     | Symbol   | Test conditions                    | Min. | Typ. | Max. | Units   |
|-------------------------------|----------|------------------------------------|------|------|------|---------|
| Diode Forward Voltage         | $V_{FM}$ | $I_F=8A, T_C=25^\circ\text{C}$     | --   | 1.7  | 2.2  | V       |
|                               |          | $I_F=8A, T_C=125^\circ\text{C}$    | --   | 1.4  | --   |         |
| Diode Reverse Recovery Time   | $T_{rr}$ | $I_{ES}=8A, dI_{ES}/dt=200A/\mu s$ | --   | 22   | --   | ns      |
| Diode Reverse Recovery Charge | $Q_{rr}$ | $I_{ES}=8A, dI_{ES}/dt=200A/\mu s$ | --   | 36   | --   | $\mu C$ |

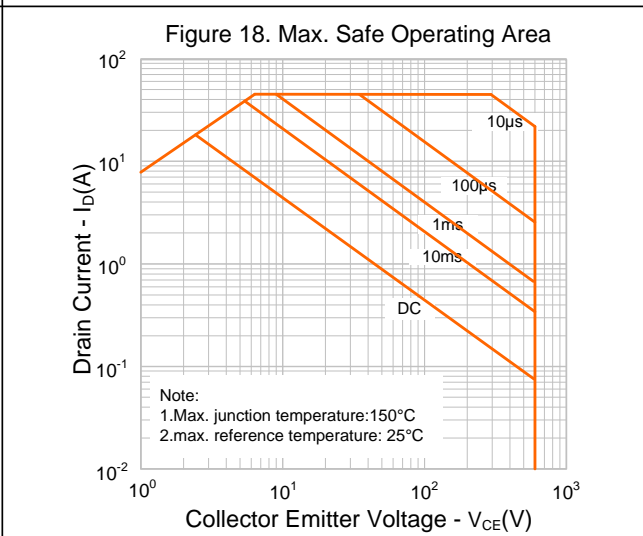
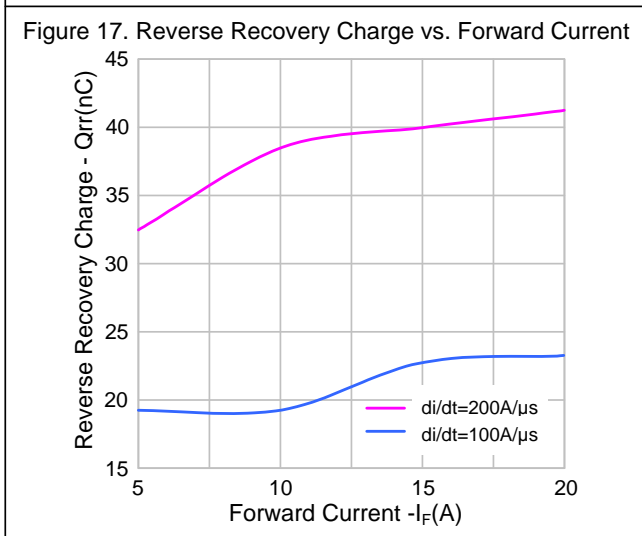
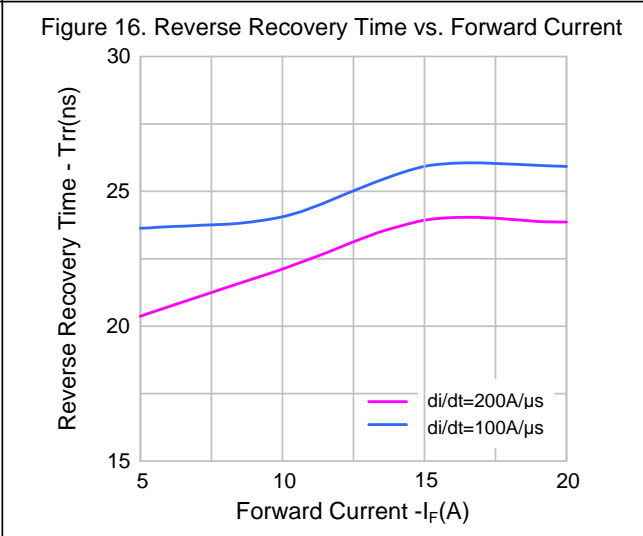
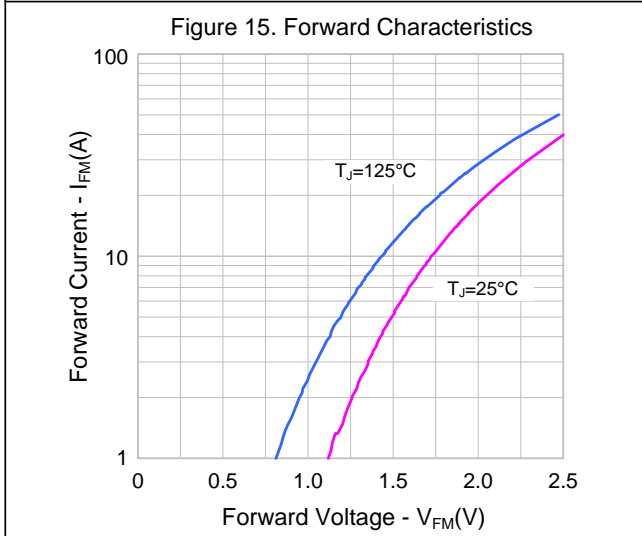
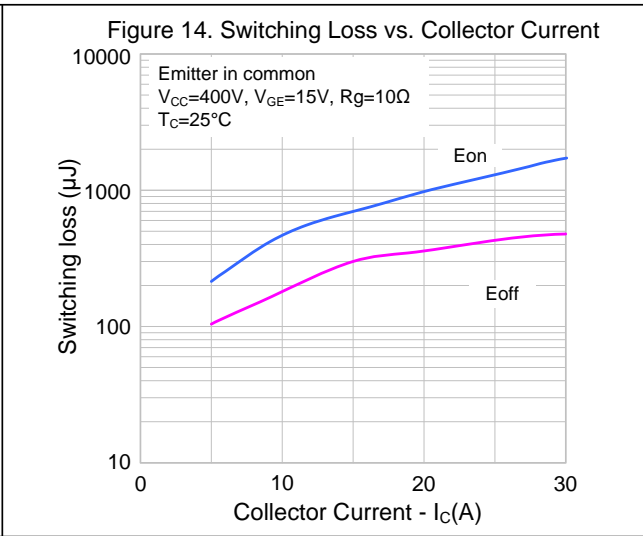
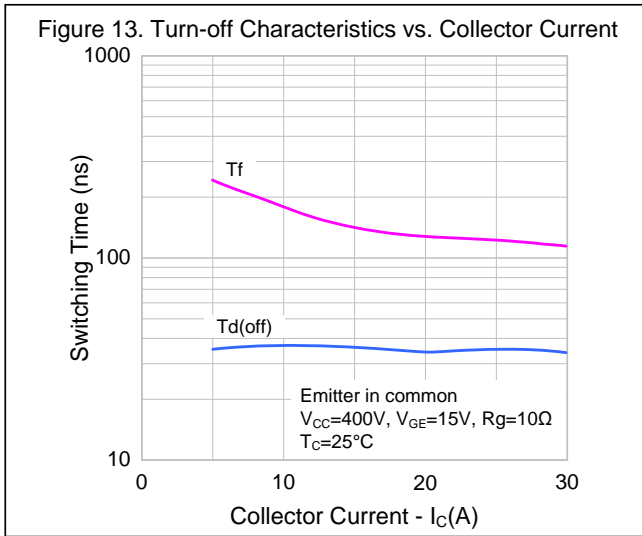
**TYPICAL CHARACTERISTICS CURVE**



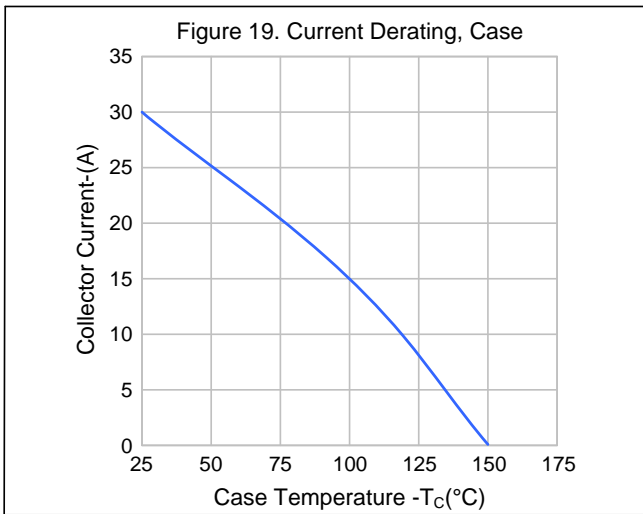
**TYPICAL CHARACTERISTICS CURVE (CONTINUED)**



**TYPICAL CHARACTERISTICS CURVE (CONTINUED)**

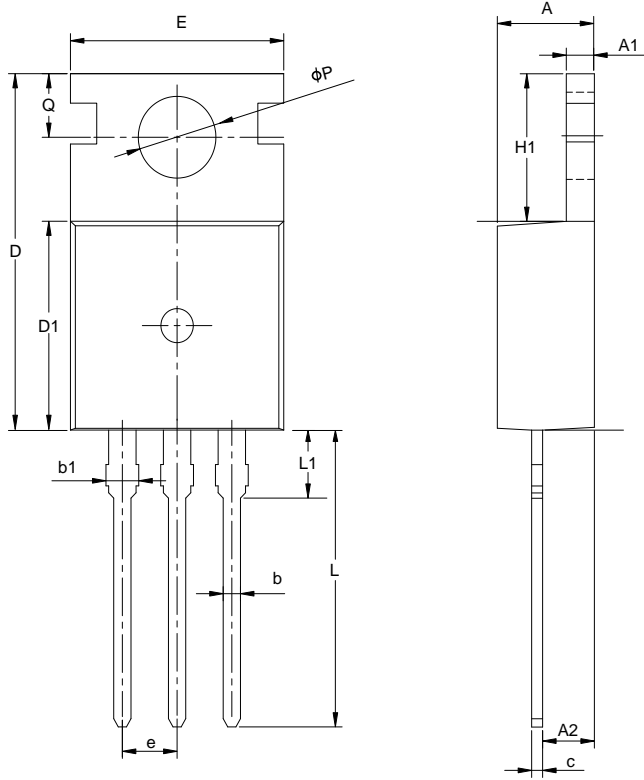


## TYPICAL CHARACTERISTICS CURVE (CONTINUED)



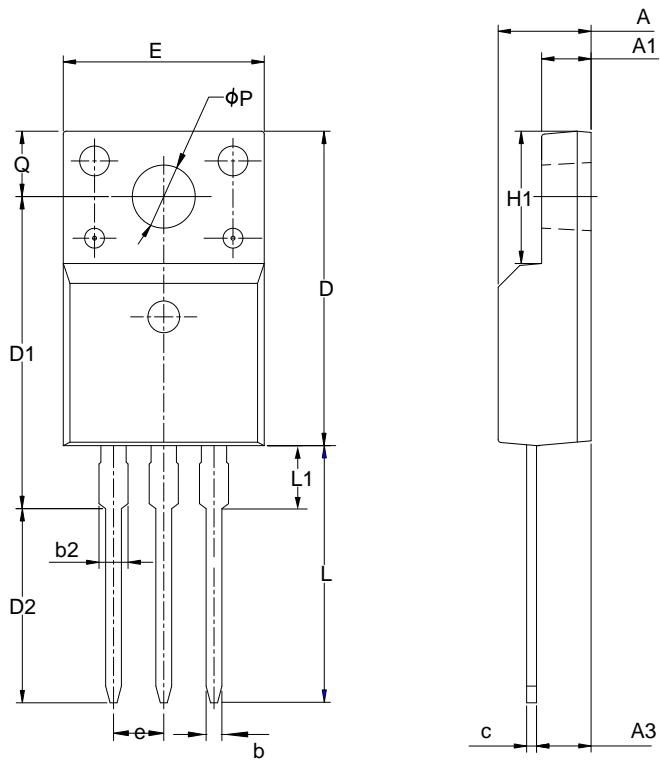
**PACKAGE OUTLINE**

**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  |
| $\phi P$ | 3.40       | 3.70  | 3.90  |
| Q        | 2.60       | —     | 3.20  |

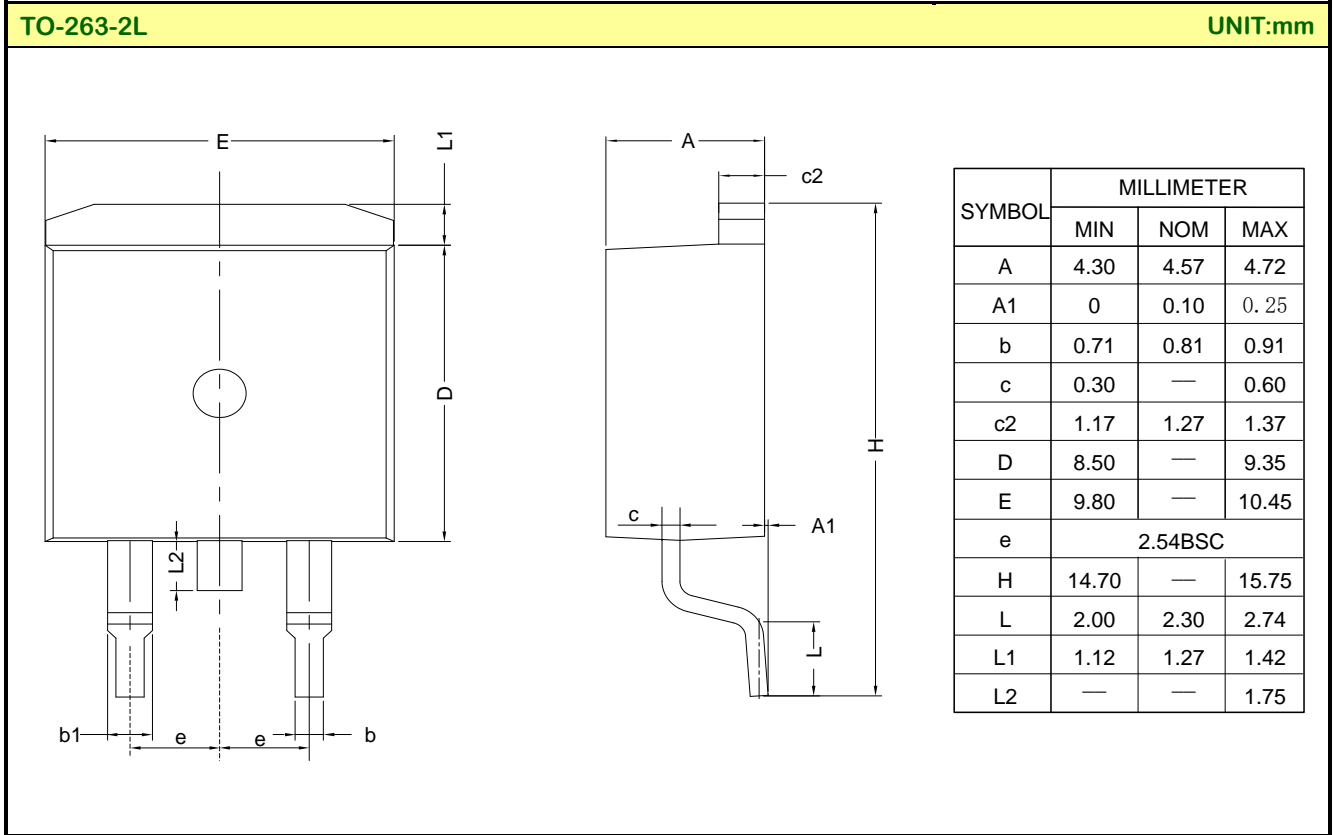
**TO-220F-3L UNIT: mm**



| 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  |
| $\phi P$ | 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>

---

Part No.: SGT15T60SD1T/F/S Document Type: Datasheet  
Copyright: HANGZHOU SILAN MICROELECTRONICS CO.,LTD Website: <http://www.silan.com.cn>

---

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
- 
-