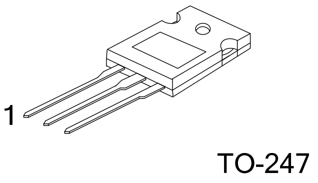
**UTC UNISONIC TECHNOLOGIES CO., LTD**

# UTG25N120LSS2

***Insulated Gate Bipolar Transistor***

## 1200V TRENCH GATE FIELD-STOP IGBT



## ■ DESCRIPTION

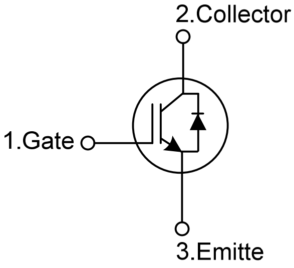
The UTC **UTG25N120LSS2** is an Trench Field-Stop Insulated Gate Bipolar Transistor. it uses UTC's advanced technology to provide customers with high switching speed, low saturation voltage and low switching loss, etc.

The UTC **UTG25N120LSS2** is suitable for the resonant or soft switching applications.

## ■ FEATURES

* High switching speed
* High avalanche ruggedness
* Low saturation voltage: $V_{CE(SAT).Typ.}$=1.71V @ $I_C$=25A, $V_{GE}$=15V ($T_C$ =25°C)

## ■ SYMBOL



## ■ ORDERING INFORMATION

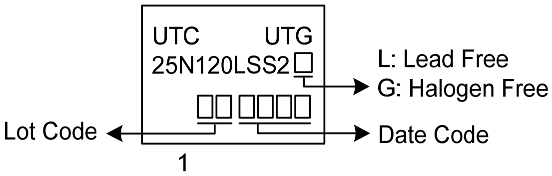
| Ordering Number | | Package | Pin Assignment | | | Packing |
|---|---|---|---|---|---|---|
| Lead Free | Halogen Free | | 1 | 2 | 3 | |
| UTG25N120LSS2L-T47-T | UTG25N120LSS2G-T47-T | TO-247 | G | C | E | Tube |

Note: Pin Assignment: G: Gate C: Collector E: Emitter

UTG25N120LSS2G-T47-T

| | |
|---|---|
| (1)Packing Type | (1) T: Tube |
| (2)Package Type | (2) T47: TO-247 |
| (3)Green Package | (3) G: Halogen Free and Lead Free, L: Lead Free |

## ■ MARKING



## ■ ABSOLUTE MAXIMUM RATINGS ($T_A$=25°C, unless otherwise noted)

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|---|---|---|---|---|
| Collector-Emitter Voltage | | $V_{CES}$ | 1200 | V |
| Gate-Emitter Voltage | | $V_{GES}$ | ±20 | V |
| Transient Gate-emitter voltage ($t_p$ < 5 ms) | | | ±25 | V |
| Continuous Collector Current | $T_C$=25°C | $I_C$ | 50 | A |
| | $T_C$=100°C | | 25 | A |
| Collector Current Pulsed (Note 1) | | $I_{CM}$ | 100 | A |
| Diode Forward Current | $T_C$=25°C | $I_F$ | 50 | A |
| | $T_C$=100°C | | 25 | A |
| Short Circuit Withstand Time<br>$V_{GE}$ = 15V, $V_{CC} \leq$ 200V<br>Allowed number of short circuits < 1000<br>Time between short circuits: ≥1.0s<br>$T_{VJ}$= 25°C | | $t_{SC}$ | 3 | μs |
| Power Dissipation ($T_C$=25°C) | | $P_D$ | 260 | W |
| Operating Junction Temperature | | $T_J$ | -40 ~ +150 | °C |
| Storage Temperature Range | | $T_{STG}$ | -55 ~ +150 | °C |

Notes: 1. Absolute maximum ratings are stress ratings only and functional device operation is not implied. Absolute maximum ratings are those values beyond which the device could be permanently damaged.
2. Pulse width limited by maximum junction temperature.

## ■ THERMAL DATA

| PARAMETER | SYMBOL | RATING | UNIT |
|---|---|---|---|
| Junction to Case | $\theta_{JC}$ | 0.48 | °C/W |

■ ELECTRICAL CHARACTERISTICS ($T_C$=25°C, unless otherwise noted)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| Collector-Emitter Breakdown Voltage | $BV_{CES}$ | | 1200 | | | V |
| Collector Cut-Off Current | $I_{CES}$ | $V_{CE}$=1200V, $V_{GE}$=0V | | | 5 | µA |
| G-E Leakage Current | $I_{GES}$ | $V_{CE}$=0V, $V_{GE}$=±20V | | | ±400 | nA |
| **On Characteristics** | | | | | | |
| Gate to Emitter Threshold Voltage | $V_{GE(TH)}$ | $I_C$=250µA, $V_{CE}$=$V_{GE}$ | 3.5 | | 6.5 | V |
| Collector to Emitter Saturation Voltage | $V_{CE(SAT)}$ | $I_C$=25A, $V_{GE}$=15V, $T_C$=25°C | | 1.71 | 2.2 | V |
| | | $T_C$=125°C | | 2.1 | | V |
| **Dynamic Characteristics** | | | | | | |
| Input Capacitance | $C_{IES}$ | $V_{CE}$=25V, $V_{GE}$=0V, f=1MHz | | 1400 | | pF |
| Output Capacitance | $C_{OES}$ | | | 104 | | pF |
| Reverse Transfer Capacitance | $C_{RES}$ | | | 57 | | pF |
| **Switching Characteristics** | | | | | | |
| Total Gate Charge | $Q_G$ | $V_{CE}$=520V, $I_C$=25A, $V_{GE}$=15V | | 120 | | nC |
| Gate-Emitter Charge | $Q_{GE}$ | | | 15 | | nC |
| Gate-Collector Charge | $Q_{GC}$ | | | 74 | | nC |
| Turn-On Delay Time | $t_{DON)}$ | $V_{CC}$=400V, $I_C$=25A, $R_G$=5Ω,<br>$V_{GE}$=0~15V, L=500uH | | 13 | | ns |
| Rise Time | $t_R$ | | | 25 | | ns |
| Turn-Off Delay Time | $t_{DOFF)}$ | | | 124 | | ns |
| Fall Time | $t_F$ | | | 269 | | ns |
| Turn-On Switching Loss | $E_{ON}$ | | | 1.69 | | mJ |
| Turn-Off Switching Loss | $E_{OFF}$ | | | 2.03 | | mJ |
| **SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS** | | | | | | |
| Forward Voltage Drop | $V_F$ | $I_F$=25A | | | 3.2 | V |
| Reverse Recovery Time | $t_{rr}$ | $I_F$=25A, dI/dt=100A/µS, $V_{CC}$=400V | | 54 | | ns |
| Reverse Recovery Charge | $Q_{rr}$ | | | 1145 | | nC |

## ■ TEST CIRCUIT AND WAVEFORMS

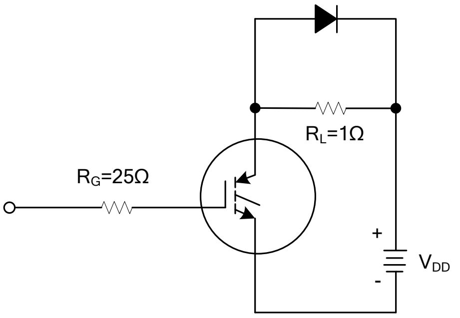


Fig 1. INDUCTIVE SWITCHING TEST CIRCUIT

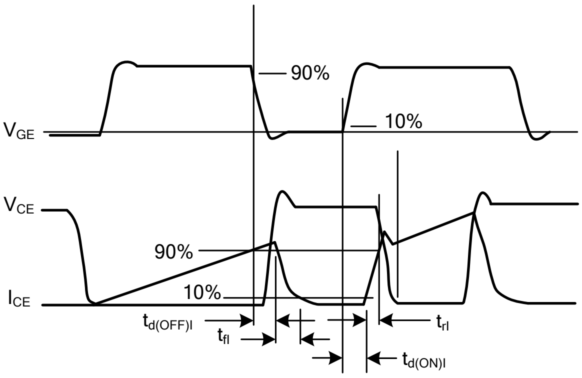


Fig 2. SWITCHING TEST WAVEFORMS