



UG1N120

Preliminary

Insulated Gate Bipolar Transistor

**5.3A, 1200V NPT SERIES
N-CHANNEL IGBT**

■ DESCRIPTION

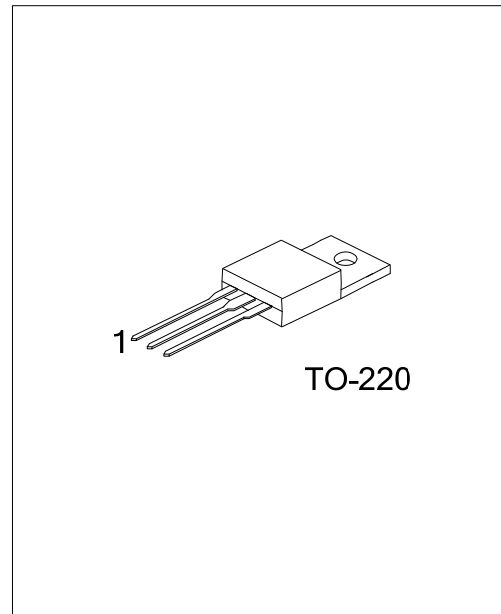
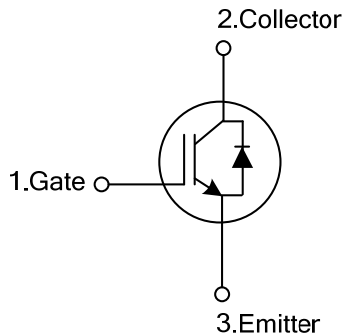
The UTC **UG1N120** is a NPT series N-Channel IGBT, it uses UTC's advanced technology to provide the customers with a minimum on-state resistance, etc.

The UTC **UG1N120** is suitable for AC and DC motor controls, power supplies, and drivers for solenoids, relays and contactors, etc.

■ FEATURES

- * Low conduction loss
- * Short circuit rating

■ SYMBOL



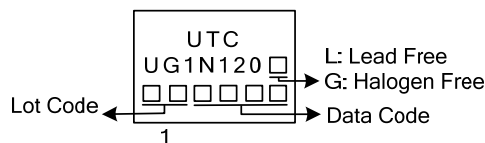
■ ORDERING INFORMATION

| Ordering Number | | Package | Pin Assignment | | | Packing |
|-----------------|----------------|---------|----------------|---|---|---------|
| Lead Free | Halogen Free | | 1 | 2 | 3 | |
| UG1N120L-TA3-T | UG1N120G-TA3-T | TO-220 | G | C | E | Tube |

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

| | |
|---|--|
| <p>UG1N120L-TA3-T</p> <p>(1)Packing Type (2)Package Type (3)Green Package</p> | <p>(1) T: Tube (2) TA3: TO-220 (3) L: Lead Free, G: Halogen Free and Lead Free</p> |
|---|--|

■ MARKING



■ ABSOLUTE MAXIMUM RATING ($T_C=25^\circ\text{C}$, unless otherwise specified)

| PARAMETER | SYMBOL | RATINGS | UNIT | |
|--|------------|-------------------------|---------------------|---|
| Collector to Emitter Voltage | BV_{CES} | 1200 | V | |
| Gate to Emitter Voltage Continuous | V_{GES} | ± 20 | V | |
| Gate to Emitter Voltage Pulsed | V_{GEM} | ± 30 | V | |
| Collector Current Continuous | I_C | $T_C=25^\circ\text{C}$ | 5.3 | A |
| | | $T_C=110^\circ\text{C}$ | 2.7 | A |
| Collector Current Pulsed (Note 1) | I_{CM} | 6 | A | |
| Power Dissipation Total at $T_C=25^\circ\text{C}$ | P_D | 60 | W | |
| Power Dissipation Derating $T_C>25^\circ\text{C}$ | | 0.476 | W/ $^\circ\text{C}$ | |
| Forward Voltage Avalanche Energy (Note 2) | E_{AV} | 10 | mJ | |
| Short Circuit Withstand Time (Note 3) at $V_{GE}=15\text{V}$ | t_{SC} | 8 | μs | |
| Short Circuit Withstand Time (Note 3) at $V_{GE}=12\text{V}$ | t_{SC} | 13 | μs | |
| Operating Junction Temperature Range | T_J | -55~+150 | $^\circ\text{C}$ | |
| Storage Temperature Range | T_{STG} | -55~+150 | $^\circ\text{C}$ | |

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Pulse width limited by maximum junction temperature.

3. $I_{CE}=7\text{A}$, $L=400\mu\text{H}$, $V_{GE}=15\text{V}$, $T_J=25^\circ\text{C}$.

4. $V_{CE(PK)}=840\text{V}$, $T_J=125^\circ\text{C}$, $R_G=82\Omega$.

■ THERMAL CHARACTERISTICS

| PARAMETER | SYMBOL | RATINGS | UNIT |
|------------------|---------------|---------|---------------------------|
| Junction to Case | θ_{JC} | 2.1 | $^\circ\text{C}/\text{W}$ |

■ ELECTRICAL CHARACTERISTICS ($T_C=25^\circ\text{C}$, unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---------------|--|-------------------------|-----|-----------|---------------|
| Collector to Emitter Breakdown Voltage | BV_{CES} | $I_C=250\mu\text{A}$, $V_{GE}=0\text{V}$ | 1200 | | | V |
| Emitter to Collector Breakdown Voltage | BV_{ECS} | $I_C=10\text{mA}$, $V_{GE}=0\text{V}$ | 15 | | | V |
| Collector to Emitter Leakage Current | I_{CES} | $V_{CE}=1200\text{V}$ | $T_C=25^\circ\text{C}$ | | 250 | μA |
| | | | $T_C=125^\circ\text{C}$ | | 20 | μA |
| | | | $T_C=150^\circ\text{C}$ | | 1.0 | mA |
| Collector to Emitter Saturation Voltage | $V_{CE(SAT)}$ | $I_C=1.0\text{A}$, $V_{GE}=15\text{V}$ | $T_C=25^\circ\text{C}$ | 2.5 | 2.9 | V |
| | | | $T_C=150^\circ\text{C}$ | 3.8 | 4.3 | V |
| Gate to Emitter Threshold Voltage | $V_{GE(TH)}$ | $I_C=50\mu\text{A}$, $V_{CE}=V_{GE}$ | 6.0 | 7.1 | | V |
| Gate to Emitter Leakage Current | I_{GES} | $V_{GE}=\pm 20\text{V}$ | | | ± 250 | nA |
| Switching SOA | SSOA | $T_J=150^\circ\text{C}$, $R_G=82\Omega$, $V_{GE}=15\text{V}$, $L=2\text{mH}$, $V_{CE(PK)}=1200\text{V}$ | 6 | | | A |
| Gate to Emitter Plateau Voltage | V_{GEP} | $I_C=1.0\text{A}$, $V_{CE}=600\text{V}$ | | 9.2 | | V |
| On-State Gate Charge | $Q_{G(ON)}$ | $I_C=1.0\text{A}$, $V_{CE}=600\text{V}$ | $V_{GE}=15\text{V}$ | 14 | 20 | nC |
| | | | $V_{GE}=20\text{V}$ | 15 | 21 | nC |
| Current Turn-On Delay Time | $t_{d(ON)I}$ | IGBT and Diode at $T_J=25^\circ\text{C}$ $I_{CE}=1.0\text{A}$, $V_{CE}=30\text{V}$, $V_{GE}=15\text{V}$, $R_G=82\Omega$ | | 200 | | ns |
| Current Rise Time | t_{rl} | | | 470 | | ns |
| Current Turn-Off Delay Time | $t_{d(OFF)I}$ | | | 118 | | ns |
| Current Fall Time | t_{fl} | | | 200 | | ns |

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