## Features

- 600-Volt Schottky Rectifier
- Zero Reverse Recovery Current
- Zero Forward Recovery Voltage
- High-Frequency Operation
- Temperature-Independent Switching Behavior
- Extremely Fast Switching
- Positive Temperature Coefficient on $V_F$

## Benefits

- Replace Bipolar with Unipolar Rectifiers
- Essentially No Switching Losses
- Higher Efficiency
- Reduction of Heat Sink Requirements
- Parallel Devices Without Thermal Runaway

## Applications

- Switch Mode Power Supplies (SMPS)
- Boost diodes in PFC or DC/DC stages
- Free Wheeling Diodes in Inverter stages
- AC/DC converters

| $V_{RRM}$ | = | 600 V |
|---|---|---|
| $I_F$ ($T_C$=135°C) = | | 5 A |
| $Q_c$ | = | 7.6 nC |

RoHS compliant | lead-free

TO-220-2

## Package

PIN 1 ○———
PIN 2 ○———▷|——— ○ CASE

| Part Number | Package | Marking |
|---|---|---|
| GC3D03060A | TO-220-2 | GC3D03060 |

## Maximum Ratings ($T_C$ = 25 °C unless otherwise specified)

| Symbol | Parameter | Value | Unit | Test Conditions | Note |
|---|---|---|---|---|---|
| $V_{RRM}$ | Repetitive Peak Reverse Voltage | 600 | V | | |
| $V_{RSM}$ | Surge Peak Reverse Voltage | 600 | V | | |
| $V_{DC}$ | DC Blocking Voltage | 600 | V | | |
| $I_F$ | Continuous Forward Current | 11<br>5<br>3 | A | $T_C$=25°C<br>$T_C$=135°C<br>$T_C$=158°C | Fig. 3 |
| $I_{FRM}$ | Repetitive Peak Forward Surge Current | 18<br>13.5 | A | $T_C$=25°C, $t_p$=10 mS, Half Sine Wave D=0.3<br>$T_C$=110°C, $t_p$=10 mS, Half Sine Wave D=0.3 | |
| $I_{FSM}$ | Non-Repetitive Peak Forward Surge Current | 26<br>23 | A | $T_C$=25°C, $t_p$=10 mS, Half Sine Wave D=0.3<br>$T_C$=110°C, $t_p$=10 mS, Half Sine Wave D=0.3 | |
| $I_{FSM}$ | Non-Repetitive Peak Forward Surge Current | 100 | A | $T_C$=25°C, $t_p$=10 µS, Pulse | |
| $P_{tot}$ | Power Dissipation | 47<br>20 | W | $T_C$=25°C<br>$T_C$=110°C | Fig. 4 |
| dV/dt | Diode dV/dt ruggedness | 200 | V/ns | $V_R$=0-600V | |
| $T_J$ , $T_{stg}$ | Operating Junction and Storage Temperature | -55 to +175 | °C | | |
| | TO-220 Mounting Torque | 1<br>8.8 | Nm<br>lbf-in | M3 Screw<br>6-32 Screw | |

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## Electrical Characteristics

| Symbol | Parameter | Typ. | Max. | Unit | Test Conditions | Note |
|---|---|---|---|---|---|---|
| $V_F$ | Forward Voltage | 1.5<br>1.8 | 1.7<br>2.4 | V | $I_F$ = 3 A  $T_J$=25°C<br>$I_F$ = 3 A  $T_J$=175°C | Fig. 1 |
| $I_R$ | Reverse Current | 4<br>8 | 20<br>80 | µA | $V_R$ = 600 V  $T_J$=25°C<br>$V_R$ = 600 V  $T_J$=175°C | Fig. 2 |
| $Q_C$ | Total Capacitive Charge | 7.6 | | nC | $V_R$ = 400 V, $I_F$ = 3A<br>d$i$/d$t$ = 500 A/µS<br>$T_J$ = 25°C | Fig. 5 |
| C | Total Capacitance | 166<br>14<br>11 | | pF | $V_R$ = 0 V, $T_J$ = 25°C, f = 1 MHz<br>$V_R$ = 200 V, $T_J$ = 25°C, f = 1 MHz<br>$V_R$ = 400 V, $T_J$ = 25°C, f = 1 MHz | Fig. 6 |
| $E_C$ | Capacitance Stored Energy | 1.1 | | µJ | $V_R$ = 400 V | Fig. 7 |

Note: This is a majority carrier diode, so there is no reverse recovery charge.

## Thermal Characteristics

| Symbol | Parameter | Typ. | Unit | Note |
|---|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance from Junction to Case | 3.2 | °C/W | Fig. 8 |

## Typical Performance
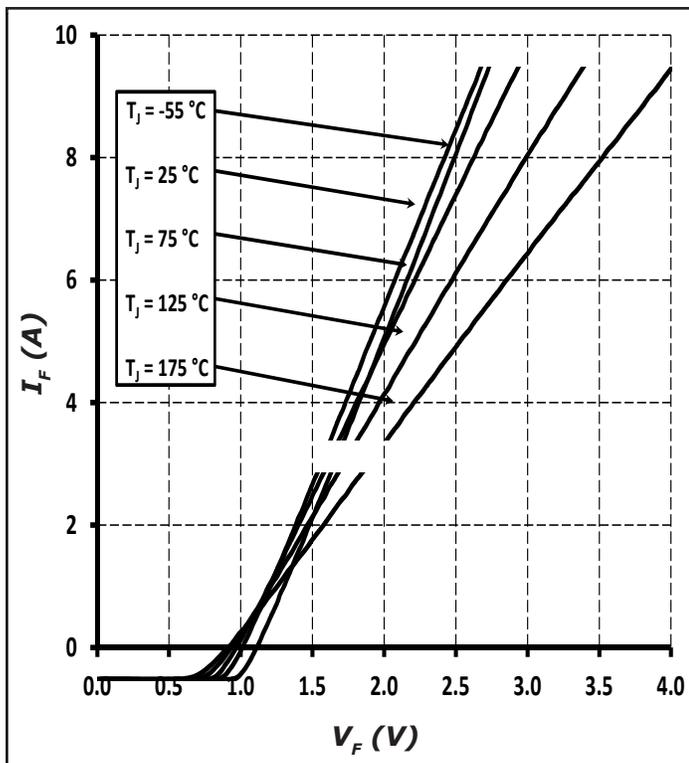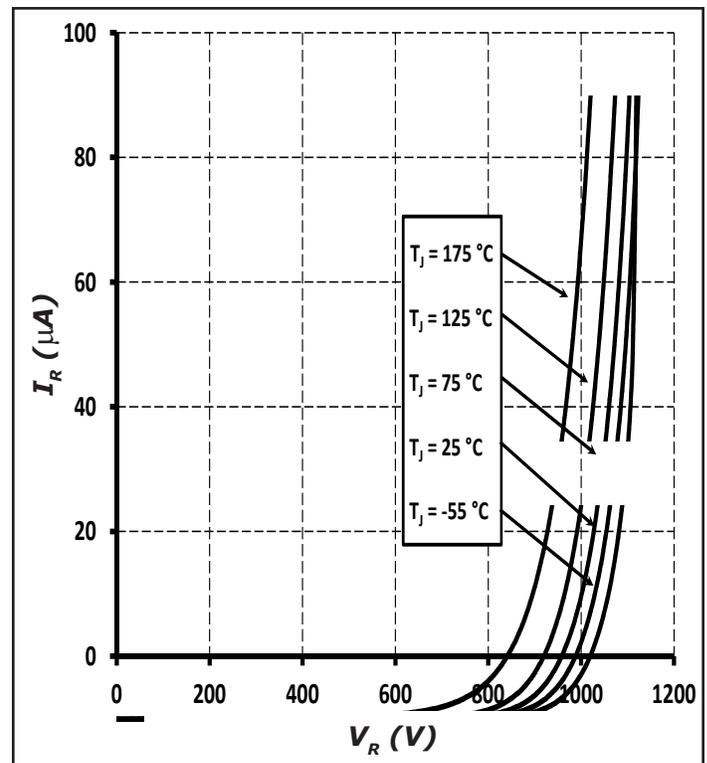


Figure 1. Forward Characteristics



Figure 2. Reverse Characteristics

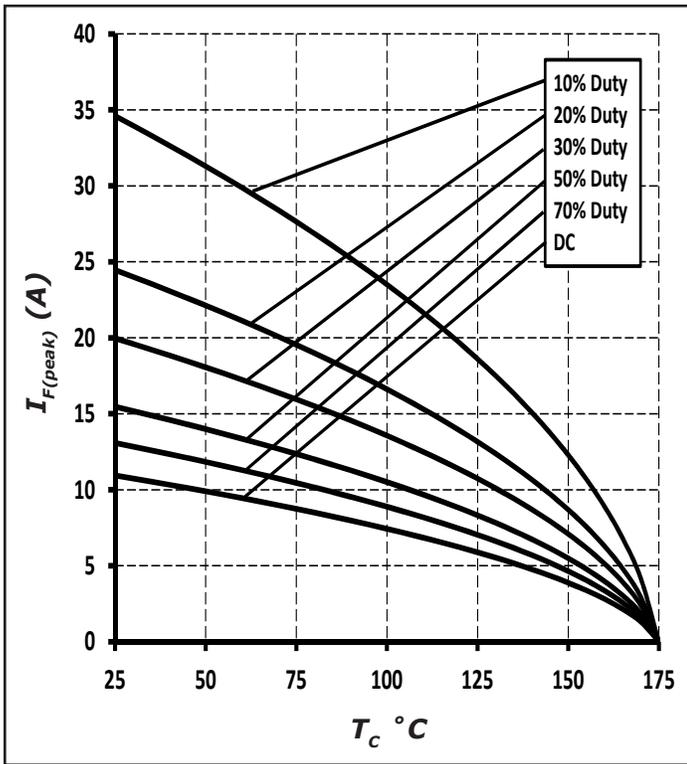Wuxi Gwok Semiconductor Co.,Ltd
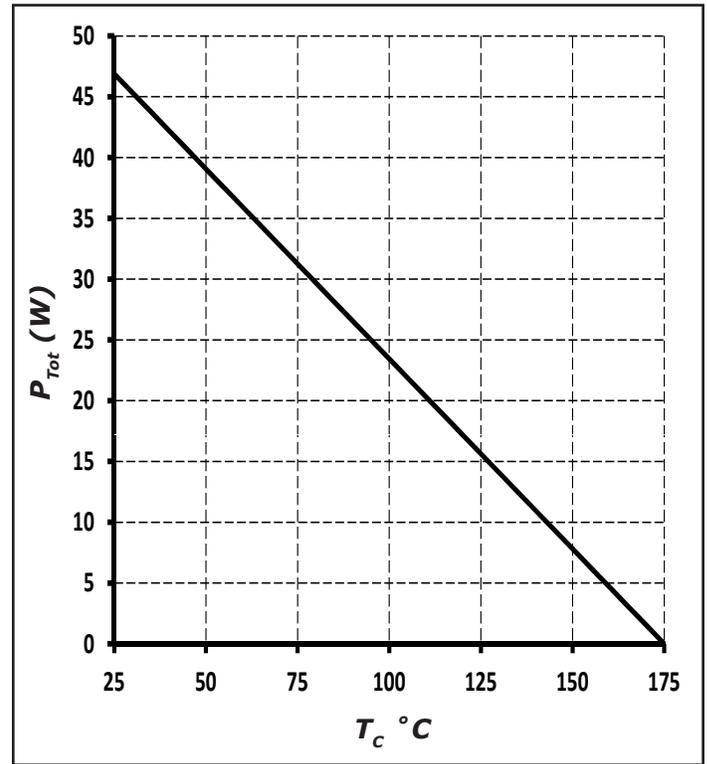
**Typical Performance**



Figure 3. Current Derating



Figure 4. Power Derating
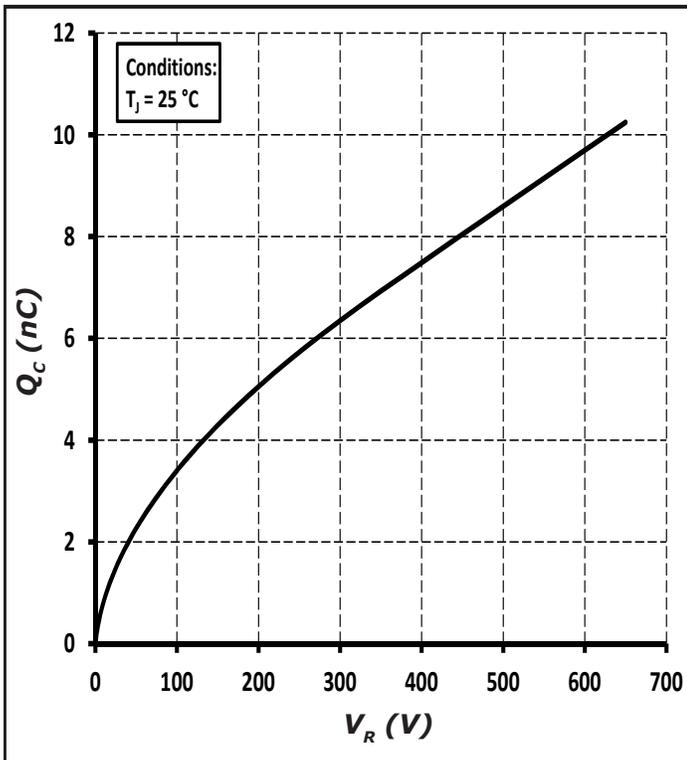


Figure 5. Total Capacitance Charge vs. Reverse Voltage
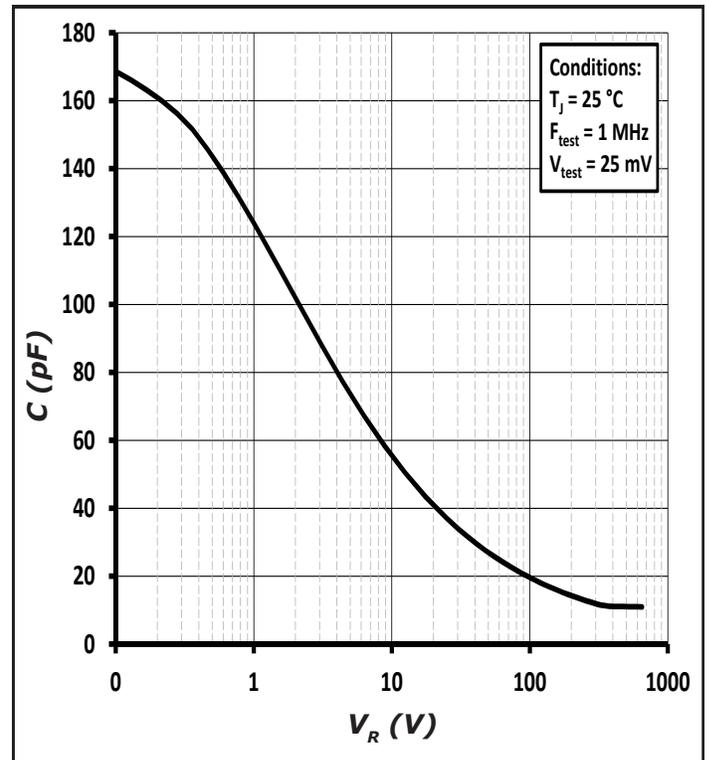


Figure 6. Capacitance vs. Reverse Voltage

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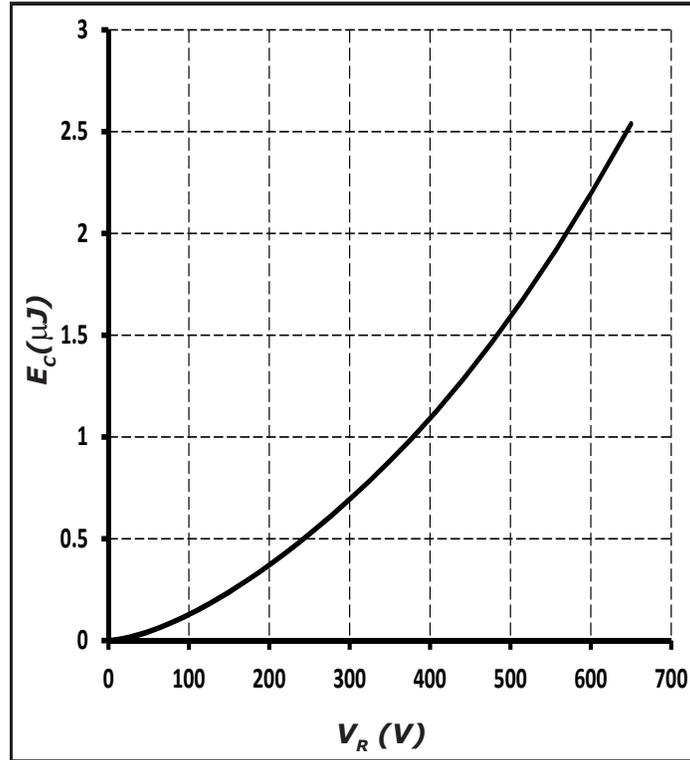
## Typical Performance



Figure 7. Capacitance Stored Energy
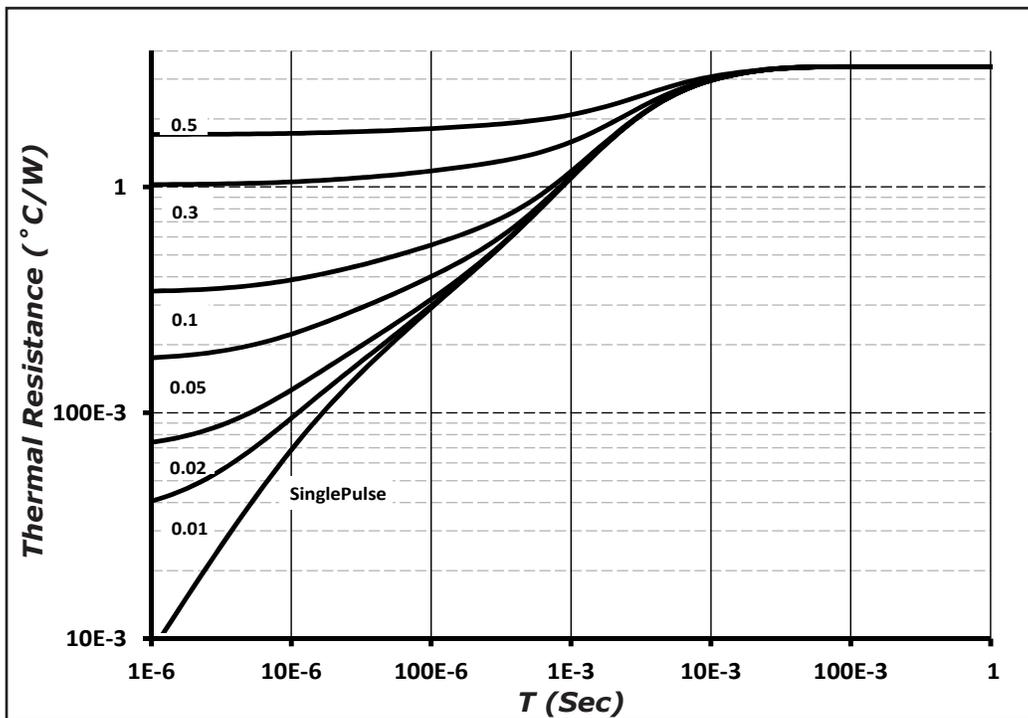


Figure 8. Transient Thermal Impedance

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## Package Dimensions

Package TO-220-2
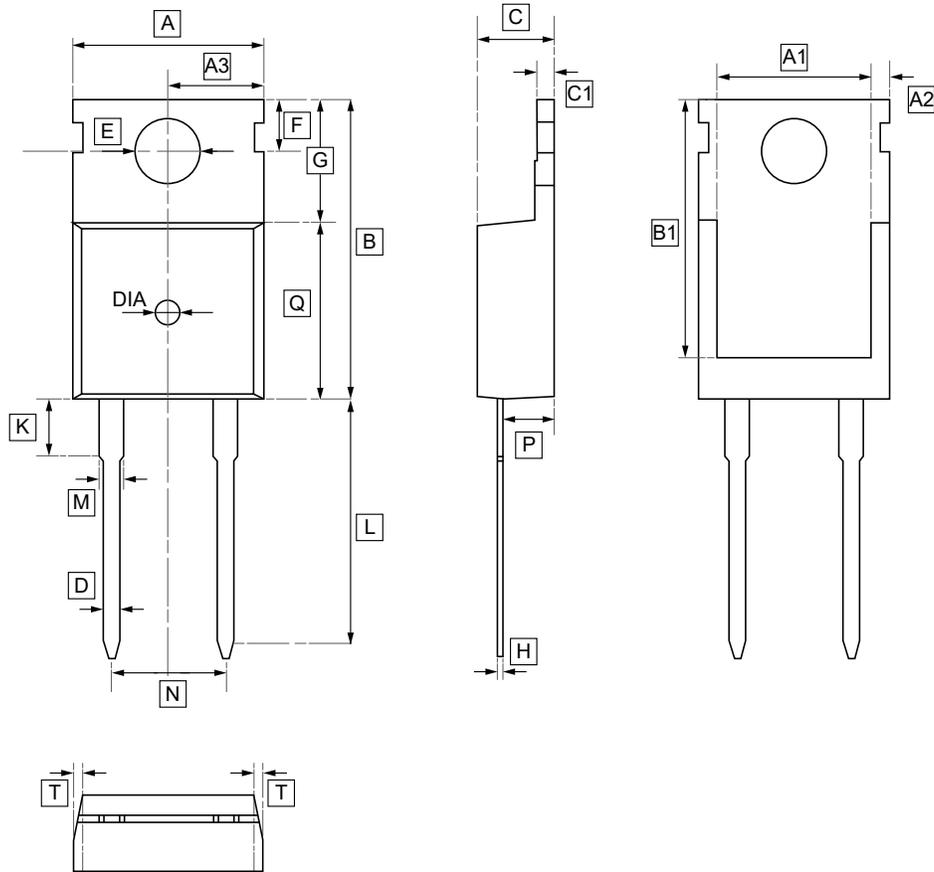


### DIMENSIONS (mm are the original dimensions)

| Symbol | A | A1 | A2 | A3 | B | B1 | C | C1 | D | E | F | G |
|--------|------|------|------|-----|------|------|------|------|-----|-----|------|-----|
| Min | 9.7 | 8.44 | 1.05 | 4.8 | 15.4 | 12.9 | 4.28 | 1.1 | 0.6 | 3.4 | 2.65 | 5.2 |
| Max | 10.3 | 8.84 | 1.25 | 5.2 | 16.2 | 13.5 | 4.68 | 1.5 | 1.0 | 3.8 | 3.25 | 5.8 |

| Symbol | H | K | L | L1 | M | N | P | Q | T | DIA |
|--------|-----|-----|------|-----|------|------|-----|-----|--------|------------|
| Min | 0.4 | 2.9 | 12.8 | 2.7 | 1.15 | 4.98 | 2.1 | 8.7 | W:0.35 | ⊙1.5 |
| Max | 0.6 | 3.3 | 13.6 | 3.3 | 1.35 | 5.18 | 2.7 | 9.3 | | (deep 0.2) |

## Diode Model

0.12

0.2

0.05

*all units are in inches*
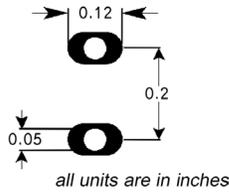
TO-220-2

| Part Number | Package |
|---|---|
| GC3D03060A | TO-220-2 |

PIN 1 ○

PIN 2 ○

○ CASE

## Diode Model
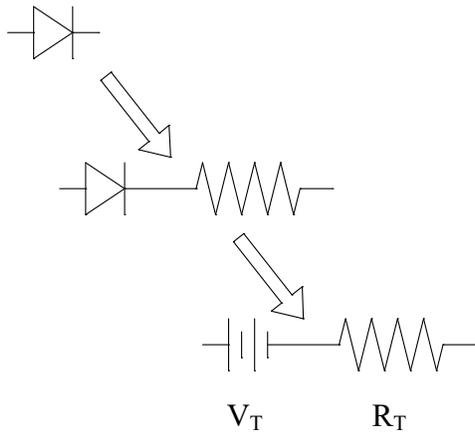
$$Vf_T = V_T + If * R_T$$

$$V_T = 0.96 + (T_J * -1.1 * 10^{-3})$$
$$R_T = 0.145 + (T_J * 9.5 * 10^{-4})$$

Note: $T_j$ = Diode Junction Temperature In Degrees Celsius, valid from 25°C to 175°C

$V_T$        $R_T$