



## General Description

This product family offers state of the art performance. It is designed for high frequency applications where high efficiency and high reliability are required.

## Features

- Low conduction loss due to low  $V_F$
- Extremely low switching loss by tiny  $Q_c$
- Highly rugged due to better surge current
- Industrial standard quality and reliability

## Applications

- UPS
- Power Inverter
- High performance SMPS
- Power factor correction



TO-220-2L  
Package



| Ordering Part Number | Package   | Marking    |
|----------------------|-----------|------------|
| HC3D04065A           | TO-220-2L | HC3D04065A |





**Maximum Ratings** (at  $T_j = 25^\circ\text{C}$ , unless otherwise specified)

| Parameter  | Symbol       | Value        | Unit                 |
|--|--------------|--------------|----------------------|
| Repetitive Peak Reverse Voltage  | $V_{RRM}$    | 650          | V                    |
| Surge Peak Reverse Voltage   | $V_{RSM}$    | 650          | V                    |
| DC Peak Reverse Voltage  | $V_R$        | 650          | V                    |
| Continuous Forward Current<br>$T_c = 25^\circ\text{C}$<br>$T_c = 135^\circ\text{C}$<br>$T_c = 160^\circ\text{C}$   | $I_F$        | 14<br>8<br>4 | A                    |
| Repetitive Peak Forward Surge Current<br>$T_c = 25^\circ\text{C}, t_p=10\text{ms}, \text{Half Sine Pulse}$<br>$T_c = 110^\circ\text{C}, t_p=10\text{ms}, \text{Half Sine Pulse}$ | $I_{FRM}$    | 23<br>15     | A                    |
| Non-Repetitive Forward Surge Current<br>$T_c = 25^\circ\text{C}, t_p=10\text{ms}, \text{Half Sine Pulse}$<br>$T_c = 110^\circ\text{C}, t_p=10\text{ms}, \text{Half Sine Pulse}$  | $I_{FSM}$    | 36<br>28     | A                    |
| $i^2dt$ value<br>$T_c = 25^\circ\text{C}, t_p=10\text{ms}, \text{Half Sine Pulse}$<br>$T_c = 110^\circ\text{C}, t_p=10\text{ms}, \text{Half Sine Pulse}$                         | $\int i^2dt$ | 6.5<br>3.9   | $\text{A}^2\text{s}$ |
| Power dissipation<br>$T_c = 25^\circ\text{C}$<br>$T_c = 110^\circ\text{C}$   | $P_{tot}$    | 60<br>26     | W                    |
| Operating junction Range   | $T_j$        | -55 to +175  | $^\circ\text{C}$     |
| Storage temperature Range  | $T_{stg}$    | -55 to +150  | $^\circ\text{C}$     |

**Thermal Resistance**

| Parameter                            | Symbol     | Value | Unit                      |
|--------------------------------------|------------|-------|---------------------------|
| Thermal resistance, junction – case. | $R_{thJC}$ | 2.50  | $^\circ\text{C}/\text{W}$ |



**Electrical Characteristic** (at  $T_j = 25^\circ\text{C}$ , unless otherwise specified)

| Parameter               | Symbol | Value |      |      | Unit          | Test Condition   |
|-------------------------|--------|-------|------|------|---------------|--|
|                         |        | min.  | typ. | max. |               |  |
| Forward Voltage         | $V_F$  | -     | 1.3  | 1.5  | V             | $I_F=4\text{A}$<br>$T_j=25^\circ\text{C}$                              |
|                         |        | -     | 1.5  | -    |               | $T_j=175^\circ\text{C}$  |
| Reverse Current         | $I_R$  | -     | 10   | 50   | $\mu\text{A}$ | $V_R=650\text{V}$<br>$T_j=25^\circ\text{C}$                            |
|                         |        | -     | 40   | 150  |               | $T_j=175^\circ\text{C}$  |
| Total Capacitive Charge | $Q_C$  | -     | 10.6 | -    | nC            | $V_R=400\text{V}, T_j=25^\circ\text{C}$<br>$Q_C = \int_0^{V_R} C(V)dV$ |
| Total Capacitance       | C      | -     | 203  | -    | pF            | $T_j=25^\circ\text{C}, f=1\text{MHz}$<br>$V_R=0\text{V}$               |
|                         |        | -     | 21   | -    |               | $V_R=200\text{V}$  |
|                         |        | -     | 16   | -    |               | $V_R=400\text{V}$  |

**Characteristics Curve:**

Fig 1: Forward Characteristics

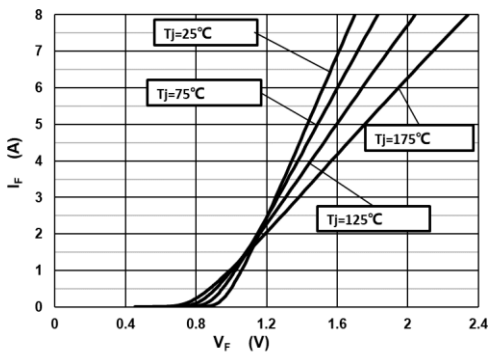


Fig 2: Reverse Characteristics

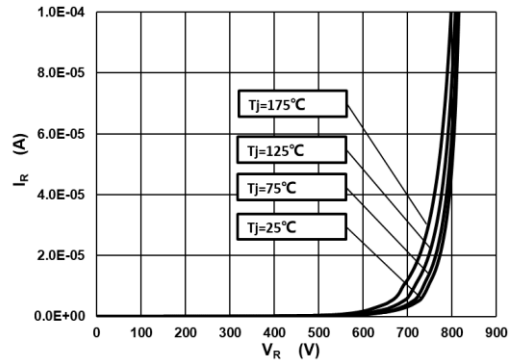


Fig 3: Current Derating

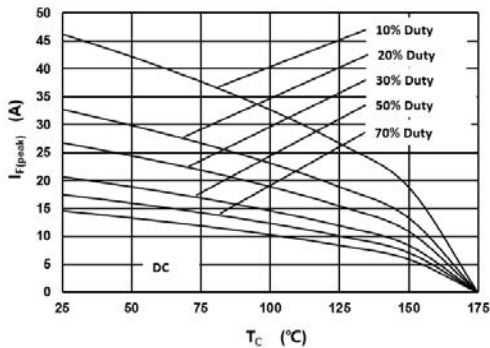


Fig 4: Power Derating

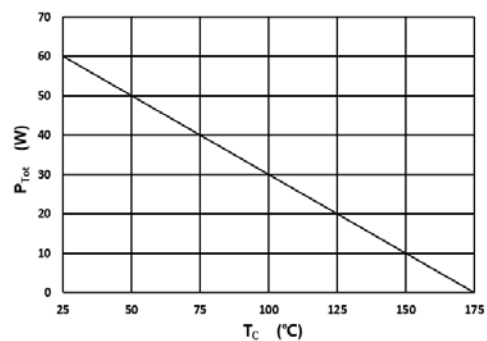




Fig 5: Capacitance vs. Reverse Voltage

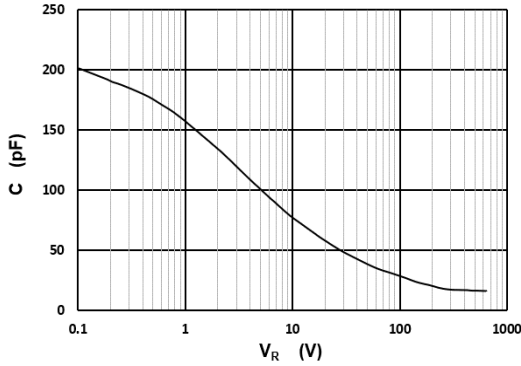


Fig 6: Reverse Charge vs. Reverse Voltage

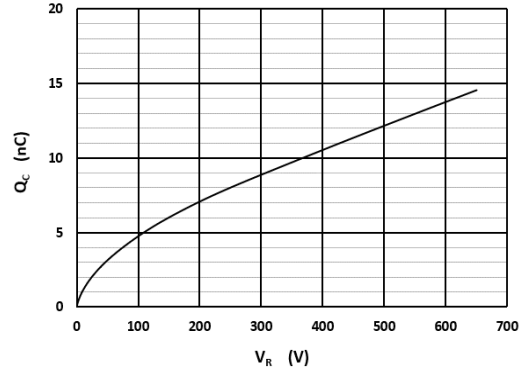


Fig 7: Typical Capacitance Stored Energy

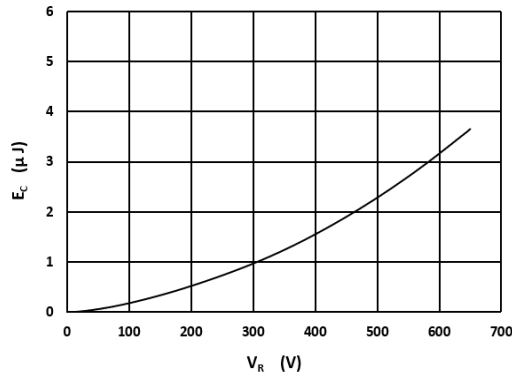
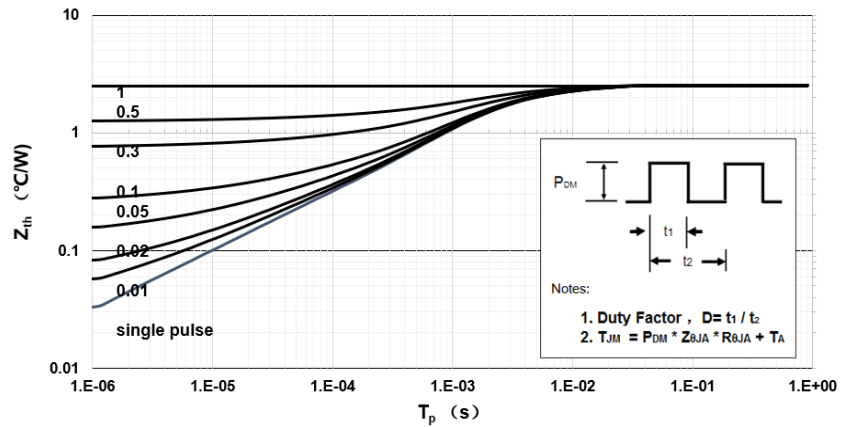


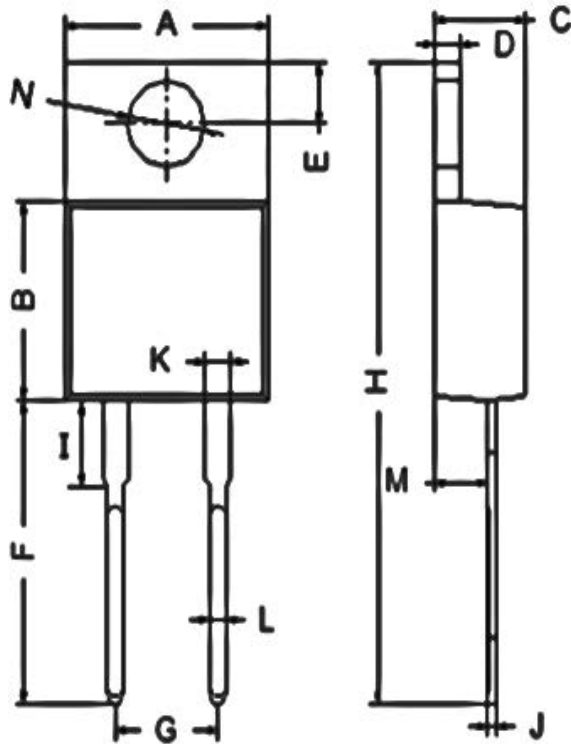
Fig 8: Transient Thermal Impandance





### Package Dimensions

Package TO-220-2L



| POS. | Millimeters |       |
|------|-------------|-------|
|      | Min.        | Max.  |
| A    | 9.80        | 10.30 |
| B    | 8.60        | 9.20  |
| C    | 4.37        | 4.77  |
| D    | 1.07        | 1.47  |
| E    | 2.64        | 2.84  |
| F    | 13.14       | 14.20 |
| G    | 4.98        | 5.18  |
| H    | 28.03       | 29.06 |
| I    | 3.50        | 4.00  |
| J    | 0.28        | 0.48  |
| K    | 1.22        | 1.32  |
| L    | 0.71        | 0.91  |
| M    | 2.40        | 2.90  |
| N    | 3.76        | 3.96  |



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