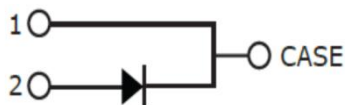


TO-220-2



### Package Pin Definitions

- Pin1- Cathode
- Pin2- Anode

| Part Number | Marking  | Package  |
|-------------|----------|----------|
| XCH20065NAS | 20065NAS | TO-220-2 |

$$V_{RRM} = 650 \text{ V}$$

$$I_F(T_C=155^\circ\text{C}) = 20\text{A}$$

$$V_F(T_J=25^\circ\text{C}) = 1.3\text{V}$$

### Features

- Low reverse current
- Good surge current capability
- Low capacitive charge
- No reverse recovery current
- Halogen free, RoHs compliant

### Benefits

- System efficiency improvement over Si diodes
- Higher switching frequency
- Increased power density
- Essentially no switching losses

### Applications

- Switch mode power supplies (SMPS)
- Uninterruptible power supplies
- On Board Charger
- UPS

### Maximum Ratings ( $T_C=25^\circ\text{C}$ unless otherwise specified)

| Symbol        | Parameter                            | Test conditions                                                                                                               | Value          | Unit             |
|---------------|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|----------------|------------------|
| $V_{RRM}$     | Repetitive peak reverse voltage      |                                                                                                                               | 650            | V                |
| $V_{RSM}$     | Non-repetitive peak reverse voltage  |                                                                                                                               | 650            | V                |
| $I_F$         | Continuous forward current           | $T_C=25^\circ\text{C}$<br>$T_C=135^\circ\text{C}$<br>$T_C=155^\circ\text{C}$                                                  | 58<br>30<br>20 | A                |
| $I_{FRM}$     | Repetitive forward surge current     | $T_C=25^\circ\text{C}$ , $t_p=10\text{ms}$ , Half Sine Pulse<br>$T_C=110^\circ\text{C}$ , $t_p=10\text{ms}$ , Half Sine Pulse | 90<br>54       | A                |
| $I_{FSM}$     | Non-Repetitive forward surge current | $T_C=25^\circ\text{C}$ , $t_p=10\text{ms}$ , Half Sine Pulse<br>$T_C=110^\circ\text{C}$ , $t_p=10\text{ms}$ , Half Sine Pulse | 160<br>140     | A                |
| $\int i^2 dt$ | $i^2t$ value                         | $T_C=25^\circ\text{C}$ , $t_p=10\text{ms}$ , Half Sine Pulse<br>$T_C=110^\circ\text{C}$ , $t_p=10\text{ms}$ , Half Sine Pulse | 128<br>98      | A <sup>2</sup> S |
| $P_{tot}$     | Power dissipation                    | $T_C=25^\circ\text{C}$<br>$T_C=110^\circ\text{C}$                                                                             | 136<br>59      | W                |
| $T_J$         | Operating junction temperature       |                                                                                                                               | -55~175        | °C               |
| $T_{stg}$     | Storage temperature                  |                                                                                                                               | -55~150        | °C               |

### Thermal Characteristics

| Symbol       | Parameter                                | Value |      |      | Unit |
|--------------|------------------------------------------|-------|------|------|------|
|              |                                          | Min.  | Typ. | Max. |      |
| $R_{th(jc)}$ | Thermal resistance from junction to case |       | 1.10 |      | °C/W |

### Electrical Characteristics ( $T_j=25^{\circ}\text{C}$ unless otherwise specified)

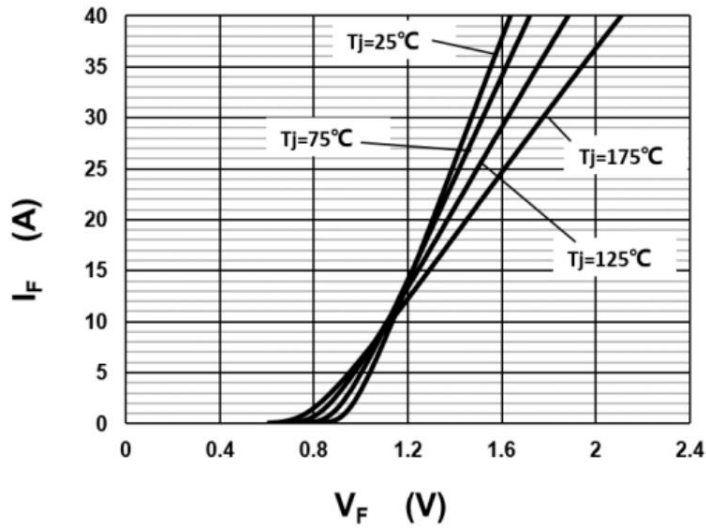
#### Static Characteristics

| Symbol   | Parameter             | Test conditions                                                                         | Value |            |           | Unit          |
|----------|-----------------------|-----------------------------------------------------------------------------------------|-------|------------|-----------|---------------|
|          |                       |                                                                                         | Min.  | Typ.       | Max.      |               |
| $V_{DC}$ | DC blocking voltage   | $T_j=25^{\circ}\text{C}$                                                                | 650   |            |           | V             |
| $V_F$    | Diode forward voltage | $I_F=20\text{A } T_j=25^{\circ}\text{C}$<br>$I_F=20\text{A } T_j=175^{\circ}\text{C}$   |       | 1.3<br>1.5 | 1.5       | V             |
| $I_R$    | Reverse current       | $V_R=650\text{V } T_j=25^{\circ}\text{C}$<br>$V_R=650\text{V } T_j=175^{\circ}\text{C}$ |       | 10<br>40   | 80<br>200 | $\mu\text{A}$ |

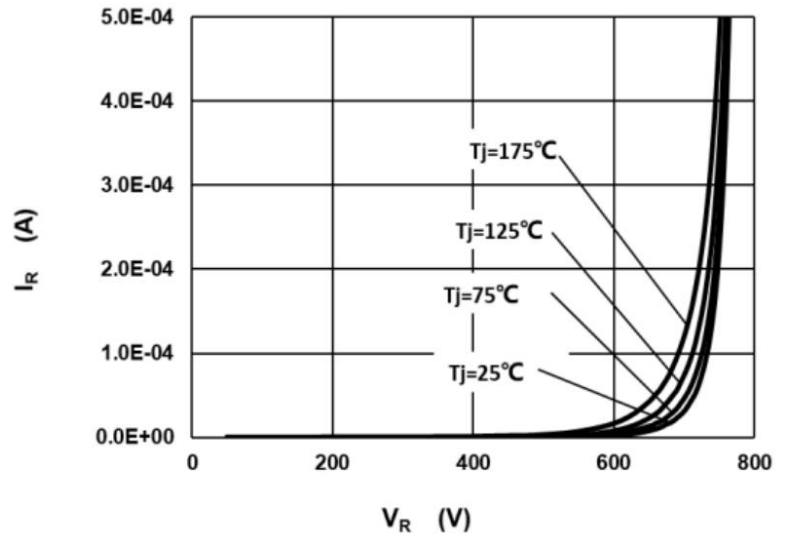
### AC Characteristics ( $T_j=25^{\circ}\text{C}$ unless otherwise specified)

| Symbol | Parameter               | Test conditions                                                                                        | Value |                   |      | Unit |
|--------|-------------------------|--------------------------------------------------------------------------------------------------------|-------|-------------------|------|------|
|        |                         |                                                                                                        | Min.  | Typ.              | Max. |      |
| $Q_C$  | Total capacitive charge | $V_R=400\text{V } T_j=25^{\circ}\text{C}$<br>$Q_C = \int_0^{V_R} C(V) dV$                              |       | 62                |      | nC   |
| $C$    | Total capacitance       | $V_R=0\text{V } f=1\text{MHz}$<br>$V_R=200\text{V } f=1\text{MHz}$<br>$V_R=400\text{V } f=1\text{MHz}$ |       | 1176<br>119<br>98 |      | pF   |

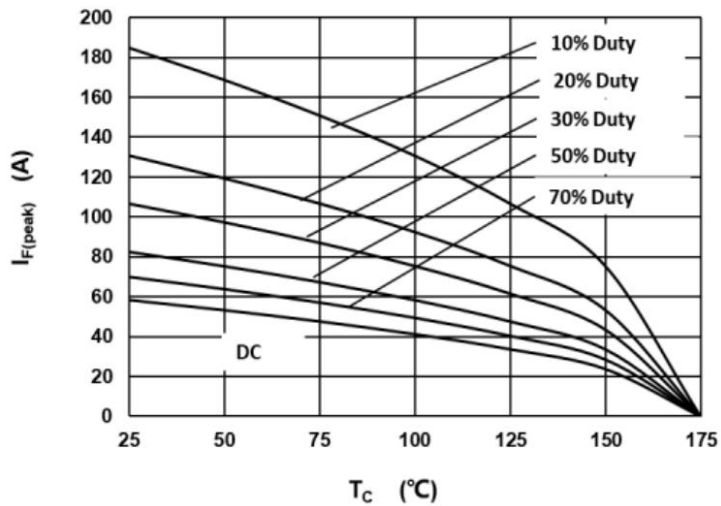
**Typical Performance**



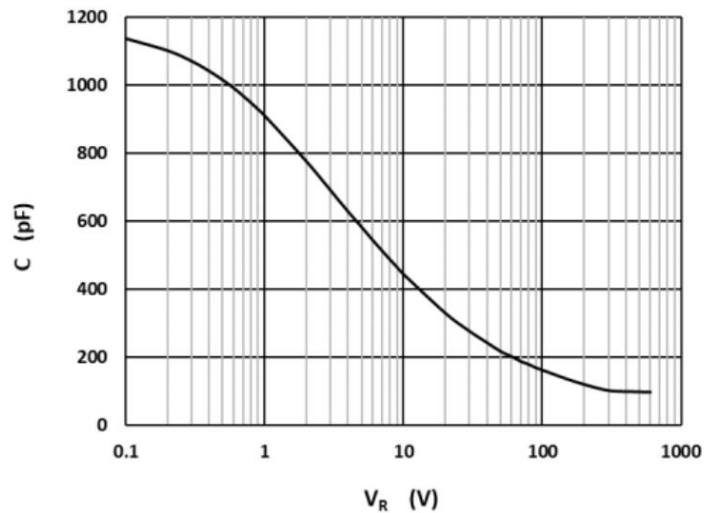
**Figure 1. Typical forward characteristics**



**Figure 2. Typical reverse current as function of reverse voltage**

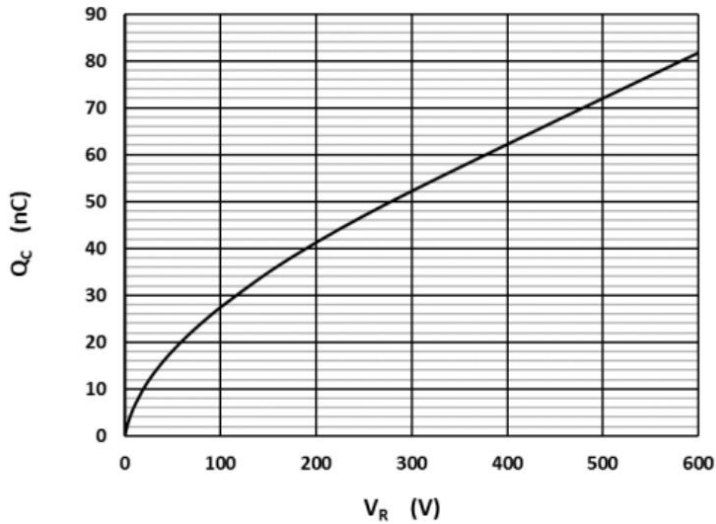


**Figure 3. Diode forward current as function of temperature, D=duty cycle**

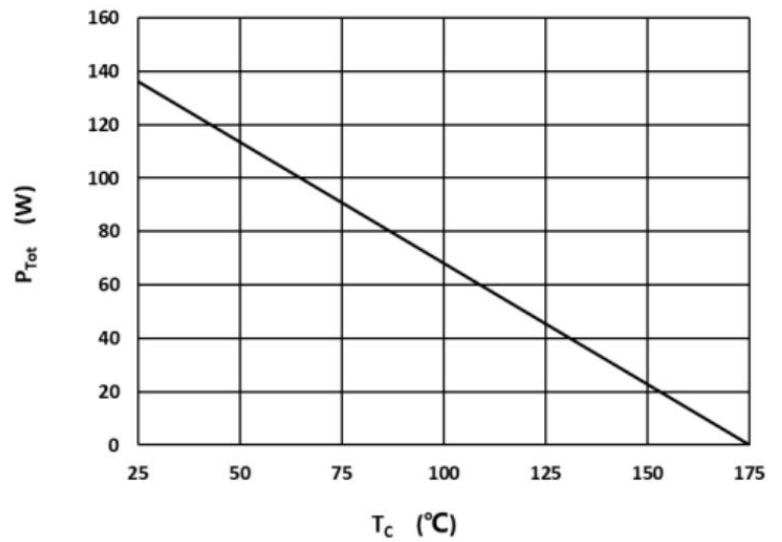


**Figure 4. Typical capacitance as function of reverse voltage,  $C=f(V_R)$ ;  $T_J=25^\circ\text{C}$**

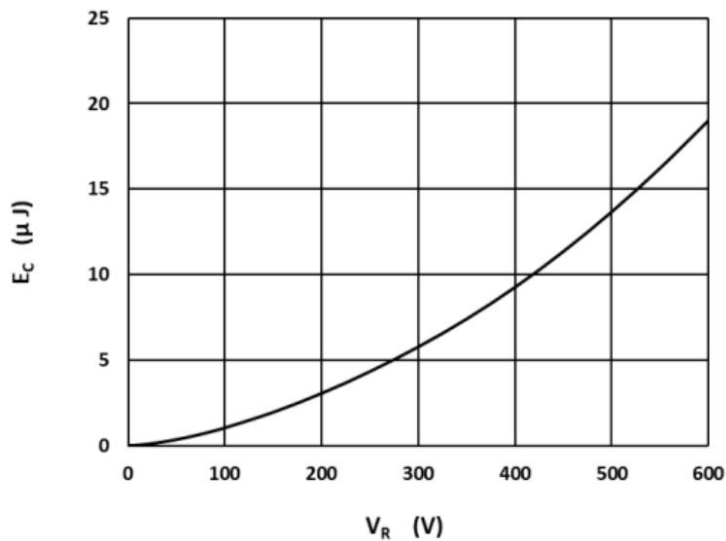
**Typical Performance**



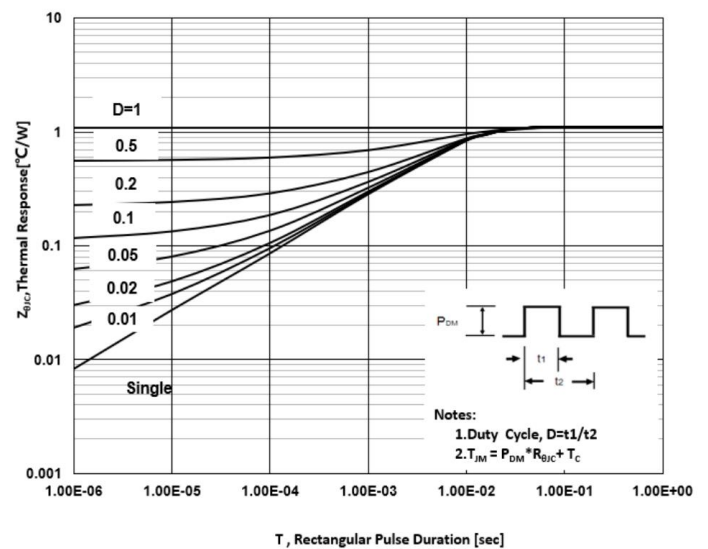
**Figure 5. Typical reverse charge as function of reverse voltage**



**Figure 6. Power dissipation as function of case temperature**

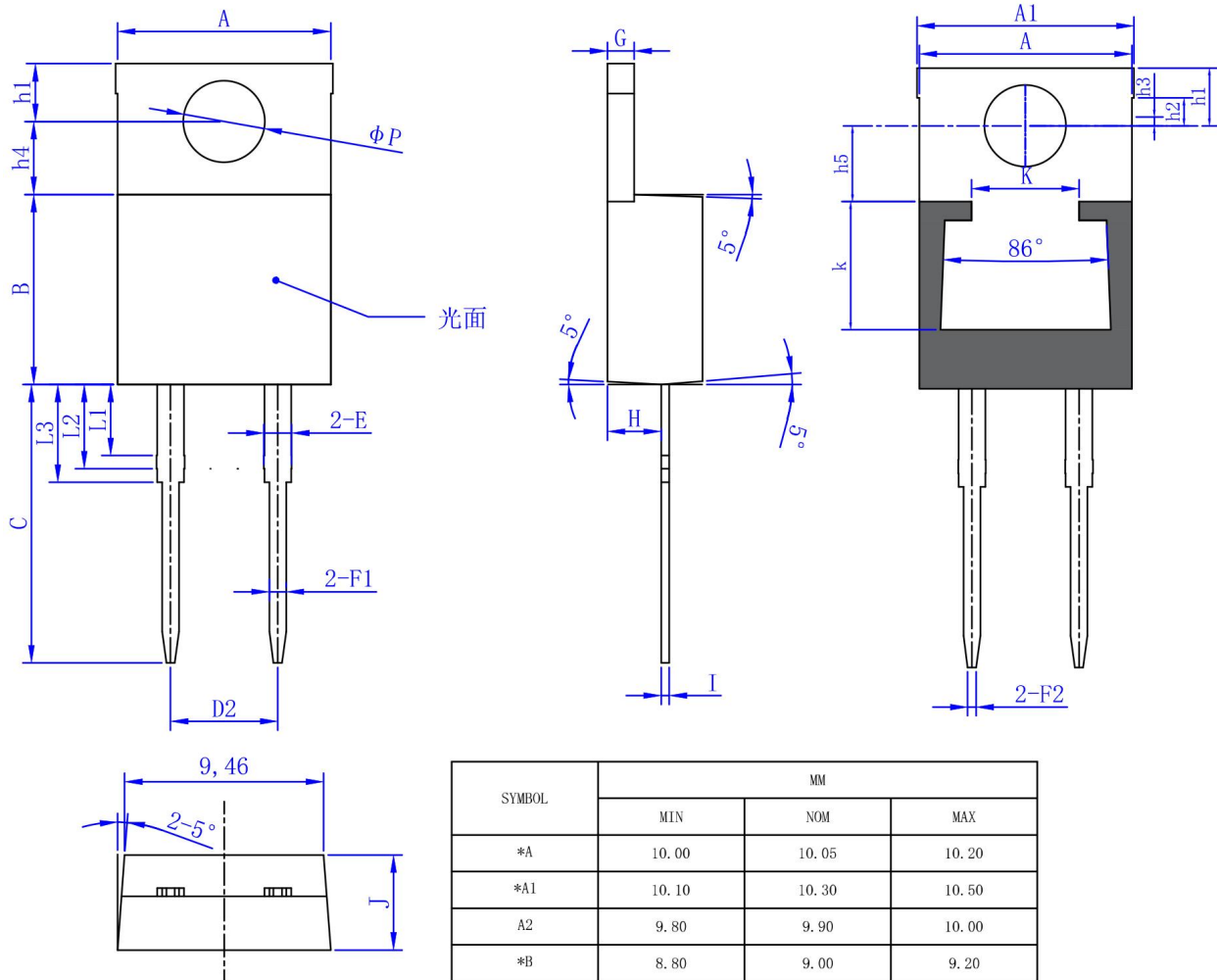


**Figure 7. Capacitance stored energy**



**Figure 8. Max. transient thermal impedance**

Package Dimensions



| SYMBOL | MM    |         |       |
|--------|-------|---------|-------|
|        | MIN   | NOM     | MAX   |
| *A     | 10.00 | 10.05   | 10.20 |
| *A1    | 10.10 | 10.30   | 10.50 |
| A2     | 9.80  | 9.90    | 10.00 |
| *B     | 8.80  | 9.00    | 9.20  |
| *C     | 12.80 | 13.10   | 13.40 |
| *D2    |       | 5.08BSC |       |
| E      | 1.27  | 1.32    | 1.40  |
| *F1    | 0.75  | 0.80    | 0.85  |
| *G     | 1.26  | 1.27    | 1.28  |
| *H     | 2.40  | 2.55    | 2.70  |
| h1     | 2.70  | 2.74    | 2.80  |
| h2     | 1.27  | 1.32    | 1.37  |
| h3     | 0.40  | 0.42    | 0.45  |
| *h4    | 3.40  | 3.45    | 3.50  |
| h5     | 3.60  | 3.63    | 3.65  |
| *I     | 0.35  | 0.38    | 0.45  |
| *J     | 4.45  | 4.50    | 4.60  |
| *K     | 4.90  | 5.00    | 5.10  |
| *k     | 6.00  | 6.03    | 6.05  |
| L1     | 3.30  | 3.40    | 3.50  |
| L2     | 3.90  | 4.00    | 4.10  |
| *L3    | 4.50  | 4.60    | 4.70  |
| *φP    | 3.75  | 3.80    | 3.90  |

带\*为检验尺寸, C之尺寸参考原则必须满足有“尖脚”