



## Features

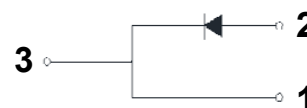
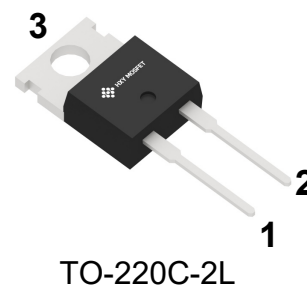
- 650-Volt Schottky Rectifier
- Zero Reverse Recovery Current
- Zero Forward Recovery Voltage
- High-Frequency Operation
- Temperature-Independent Switching Behavior
- Extremely Fast Switching
- Positive Temperature Coefficient on  $V_F$

## 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
- Power Factor Correction
- Motor Drives



| Part Number | Package    | Qty(PCS) |
|-------------|------------|----------|
| STPSC406D   | TO-220C-2L | 50       |

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

| Symbol         | Parameter                                  | Value            | Unit                 | Test Conditions                                                              |
|----------------|--------------------------------------------|------------------|----------------------|------------------------------------------------------------------------------|
| $V_{RRM}$      | Repetitive Peak Reverse Voltage            | 650              | V                    |                                                                              |
| $V_{RSM}$      | Surge Peak Reverse Voltage                 | 650              | V                    |                                                                              |
| $I_F$          | Continuous Forward Current                 | 11.4<br>5.3<br>4 | A                    | $T_C=25^\circ\text{C}$<br>$T_C=135^\circ\text{C}$<br>$T_C=150^\circ\text{C}$ |
| $I_{FRM}$      | Repetitive Peak Forward Surge Current      | 16               | A                    | $T_C=25^\circ\text{C}$ , $t_p = 10$ ms, Half Sine Wave                       |
| $I_{FSM}$      | Non-Repetitive Peak Forward Surge Current  | 32               | A                    | $T_C=25^\circ\text{C}$ , $t_p = 10$ ms, Half Sine Wave                       |
| $P_{tot}$      | Power Dissipation                          | 47<br>20         | W                    | $T_C=25^\circ\text{C}$<br>$T_C=110^\circ\text{C}$                            |
| $T_J, T_{stg}$ | Operating Junction and Storage Temperature | -55 to<br>+175   | $^\circ\text{C}$     |                                                                              |
|                | TO-220 Mounting Torque                     | 1                | Nm                   | M3 Screw                                                                     |
| $\int i^2 dt$  | $i^2 dt$ value                             | 5.12             | $\text{A}^2\text{s}$ | $T_C=25^\circ\text{C}$ , $t_p = 10$ ms, Half Sine Wave                       |



## Electrical Characteristics

| Symbol   | Parameter                 | Min. | Typ.                | Max.       | Unit          | Test Conditions                                                                                                                                                                                                    |
|----------|---------------------------|------|---------------------|------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $V_{DC}$ | DC Blocking Voltage       | 650  |                     |            | V             |                                                                                                                                                                                                                    |
| $V_F$    | Forward Voltage           |      | 1.53<br>1.94        | 1.7<br>2.5 | V             | $I_F = 4\text{ A}$ $T_J = 25^\circ\text{C}$<br>$I_F = 4\text{ A}$ $T_J = 175^\circ\text{C}$                                                                                                                        |
| $I_R$    | Reverse Current           |      | 0.09<br>0.79        | 50<br>100  | $\mu\text{A}$ | $V_R = 650\text{ V}$ $T_J = 25^\circ\text{C}$<br>$V_R = 650\text{ V}$ $T_J = 175^\circ\text{C}$                                                                                                                    |
| $Q_C$    | Total Capacitive Charge   |      | 10                  |            | nC            | $V_R = 400\text{ V}$ $T_J = 25^\circ\text{C}$                                                                                                                                                                      |
| C        | Total Capacitance         |      | 184<br>19.2<br>18.8 |            | pF            | $V_R = 0\text{ V}$ , $T_J = 25^\circ\text{C}$ , $f = 1\text{ MHz}$<br>$V_R = 200\text{ V}$ , $T_J = 25^\circ\text{C}$ , $f = 1\text{ MHz}$<br>$V_R = 400\text{ V}$ , $T_J = 25^\circ\text{C}$ , $f = 1\text{ MHz}$ |
| $E_C$    | Capacitance Stored Energy |      | 2                   |            | $\mu\text{J}$ | $V_R = 400\text{ V}$                                                                                                                                                                                               |

## Thermal Characteristics

| Symbol          | Parameter                                | Typ. | Unit               |
|-----------------|------------------------------------------|------|--------------------|
| $R_{\theta JC}$ | Thermal Resistance from Junction to Case | 3.2  | $^\circ\text{C/W}$ |

## Typical Performance

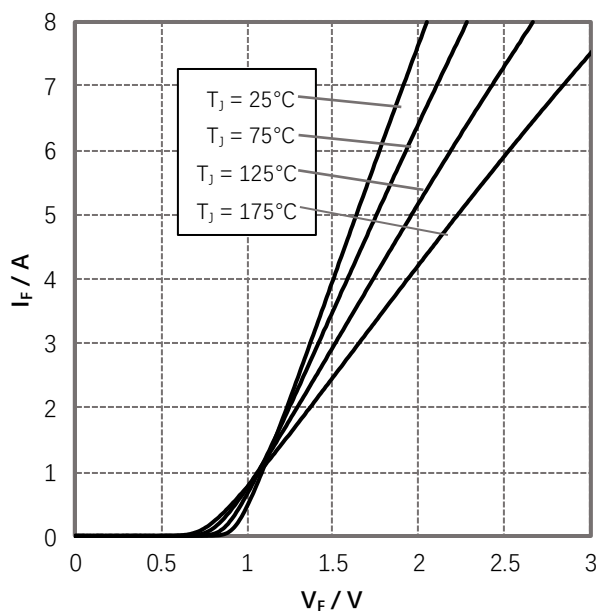


Figure 1. Forward Characteristics

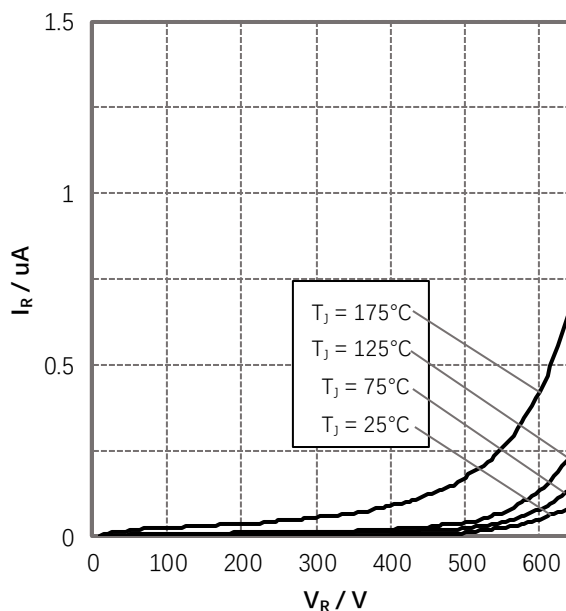


Figure 2. Reverse Characteristics

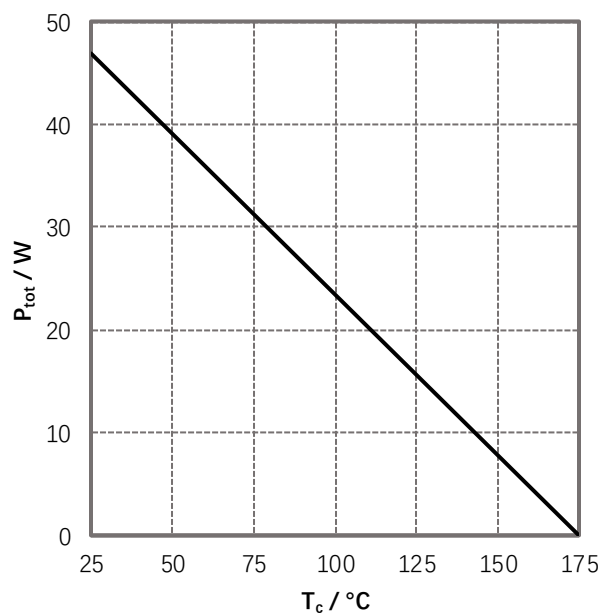


Figure 3. Power Derating

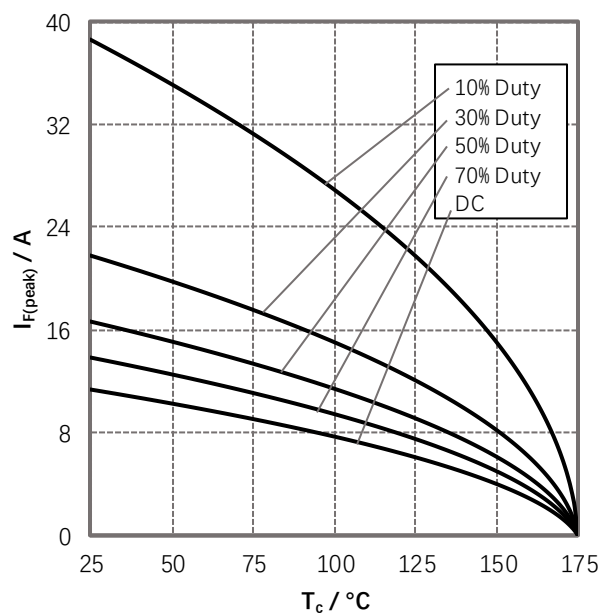


Figure 4. Current Derating

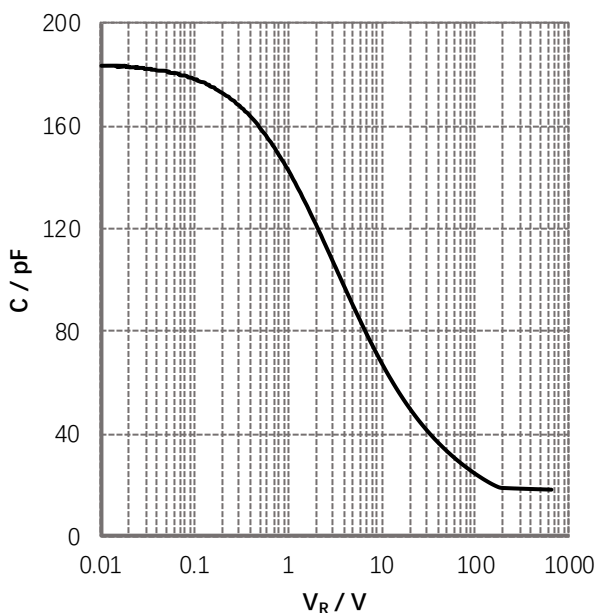


Figure 5. Capacitance vs. Reverse Voltage

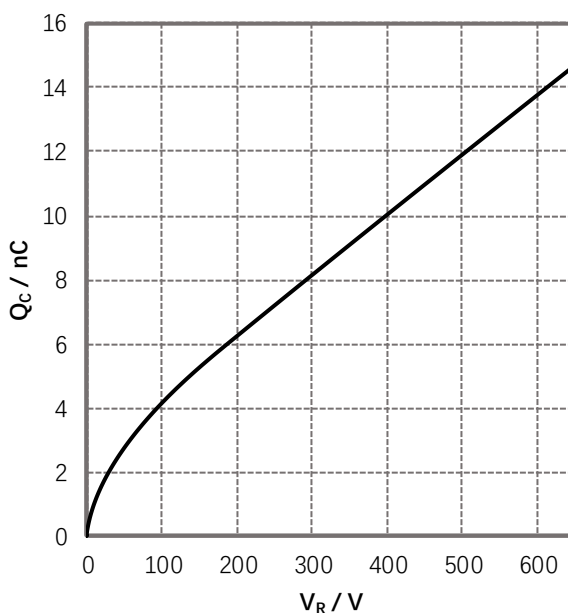


Figure 6. Total Capacitance Charge vs. Reverse Voltage

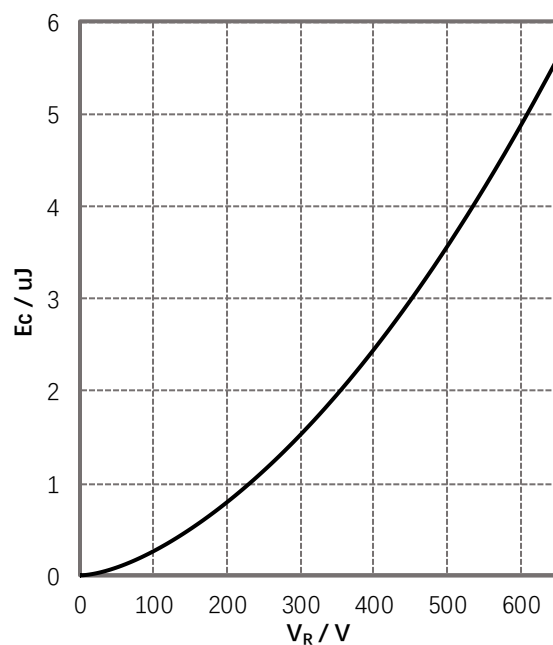


Figure 7. Capacitance Stored Energy

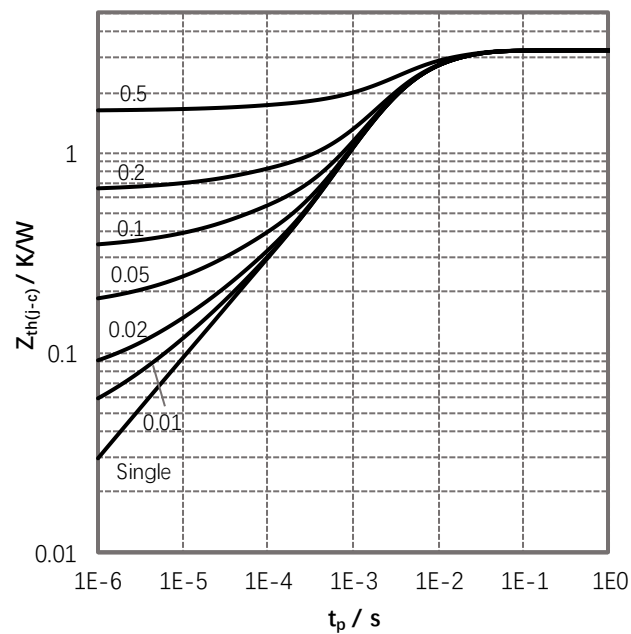
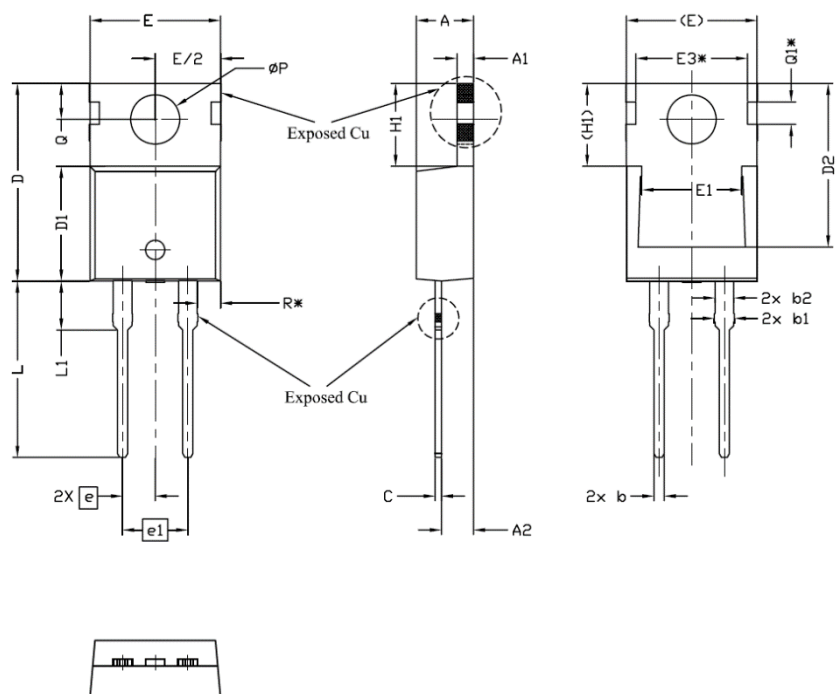


Figure 8. Transient Thermal Impedance

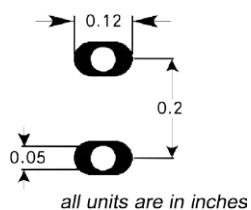
## Package Information

### TO-220C-2L



| SYMBOL | DIMENSIONS |       |       | NOTES |
|--------|------------|-------|-------|-------|
|        | MIN.       | NOM.  | MAX.  |       |
| A      | 4.24       | 4.44  | 4.64  |       |
| A1     | 1.15       | 1.27  | 1.40  |       |
| A2     | 2.30       | 2.48  | 2.70  |       |
| b      | 0.70       | 0.80  | 0.90  |       |
| b1     | 1.20       | 1.55  | 1.75  |       |
| b2     | 1.20       | 1.45  | 1.70  |       |
| c      | 0.40       | 0.50  | 0.60  |       |
| D      | 14.70      | 15.37 | 16.00 | 4     |
| D1     | 8.82       | 8.92  | 9.02  |       |
| D2     | 12.43      | 12.73 | 12.83 | 5     |
| E      | 9.96       | 10.16 | 10.36 | 4,5   |
| E1     | 6.86       | 7.77  | 8.89  | 5     |
| E3*    | 8.70REF.   |       |       |       |
| e      | 2.54BSC    |       |       |       |
| e1     | 5.08BSC    |       |       |       |
| H1     | 6.30       | 6.45  | 6.60  | 5,6   |
| L      | 13.47      | 13.72 | 13.97 |       |
| L1     | 3.60       | 3.80  | 4.00  |       |
| ØP     | 3.75       | 3.84  | 3.93  |       |
| Q      | 2.60       | 2.80  | 3.00  |       |
| Q1*    | 1.73REF.   |       |       |       |
| R*     | 1.82REF.   |       |       |       |

## Recommended Solder Pad Layout



TO-220C-2L



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