

# XD6506

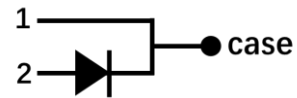
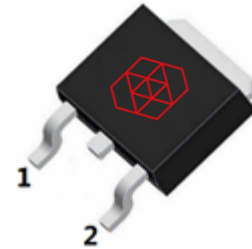
## 650V 6A SiC Schottky Barrier Diode in TO-252 Package

Datasheet version: 1.0 Preliminary

### Features

| $BV_{dss}$ | $I_f$ (135°C) | $I_f$ (155°C) | $Q_c$ |
|------------|---------------|---------------|-------|
| 650 V      | 9A            | 6 A           | 17 nC |

- No reverse recovery
- High speed switching
- Low switching losses
- Positive temperature coefficient



### Applications

- Switching Power Supplies
- Adapters, Quick Chargers
- Power Factor Corrections
- Motor Drives

### Description

- These devices are 650 SiC Schottky Barrier Diodes (SBD) with zero reverse recovery that allows systems to operate at higher switching frequencies. Lower heat dissipation requirements and higher system efficiency can be achieved in this compact TO-252 package.

## Device Characteristics

| Static Parameters  |                      |                           |   | Test data |         |     |      |
|--------------------|----------------------|---------------------------|---|-----------|---------|-----|------|
|                    | Sym.                 | Parameters                | Conditions                                  | Min       | Typical | Max | Unit |
| 1                  | V <sub>DC</sub>      | DC Blocking Voltage       | I <sub>R</sub> =100 μA                      | 650       |         |     | V    |
| 2                  | V <sub>F</sub>       | Forward Voltage           | I <sub>F</sub> =4A, T <sub>j</sub> =25°C    |           | 1.4     | 1.7 | V    |
|                    |                      |                           | I <sub>F</sub> =4A, T <sub>j</sub> =175°C   |           | 1.8     | 2.5 |      |
| 3                  | I <sub>R</sub>       | Reverse Current           | V <sub>R</sub> =650V, T <sub>j</sub> =25°C  |           | 3       | 20  | μA   |
|                    |                      |                           | V <sub>R</sub> =650V, T <sub>j</sub> =175°C |           | 20      | 120 |      |
| 4                  | C                    | Total Capacitance         | V <sub>R</sub> =0V, f=1MHz                  |           | 310     |     | pF   |
|                    |                      |                           | V <sub>R</sub> =200V, f=1MHz                |           | 33      |     |      |
|                    |                      |                           | V <sub>R</sub> =400V, f=1MHz                |           | 28.1    |     |      |
| 5                  | Q <sub>C</sub>       | Total capacitive charge   | V <sub>R</sub> =400V                        |           | 17      |     | nC   |
| 6                  | E <sub>C</sub>       | Capacitance Stored Energy | V <sub>R</sub> =400V                        |           | 2.6     |     | μJ   |
| Thermal Parameters |                      |                           |   | Test data |         |     |      |
|                    | Sym.                 | Parameters                | Conditions                                  | Min       | Typical | Max | Unit |
| 1                  | R <sub>th(j-c)</sub> | Thermal resistance        |   |           | 2.5     |     | °C/w |

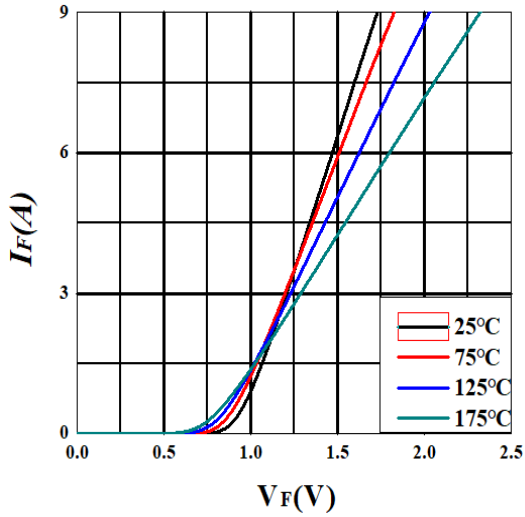
## Absolute Max. Ratings

|   | Symbols                 | Parameters                             | Test Conditions   | Value      | Unit             |
|---|-------------------------|--|---|------------|------------------|
| 1 | V <sub>RR-max</sub>     | Reverse Voltage (Repetitive Peak)      | T <sub>C</sub> =25°C  | 650        | V                |
| 2 | V <sub>RS-max</sub>     | Reverse Voltage (Surge Peak)           | T <sub>C</sub> =25°C  | 650        | V                |
| 3 | V <sub>dc-max</sub>     | Reverse Voltage (DC)                   | T <sub>C</sub> =25°C  | 650        | A                |
| 4 | I <sub>F-max</sub>      | Continuous Forward Current             | T <sub>C</sub> =25°C  | 18         | A                |
|   |                         |  | T <sub>C</sub> =135°C   | 9          |                  |
|   |                         |  | T <sub>C</sub> =155°C   | 6          |                  |
| 5 | I <sub>FS-max</sub>     | Non-repetitive Forward Current (Surge) | T <sub>C</sub> =25°C<br>t <sub>p</sub> =10ms<br>Half Sine Pulse | 55         | A                |
| 6 | P <sub>total-max</sub>  | Total Power Dissipation                | T <sub>C</sub> =25°C  | 79         | W                |
| 7 | ∫ i <sup>2</sup> dt-max | i <sup>2</sup> t value                 | T <sub>C</sub> =25°C<br>t <sub>p</sub> =10ms                    | 14.5       | A <sup>2</sup> s |
| 8 | T <sub>O-max</sub>      | Operation Temperature                  |   | -55 to 175 | °C               |
| 9 | T <sub>S-storage</sub>  | Storage temperature                    |   | -55 to 175 | °C               |

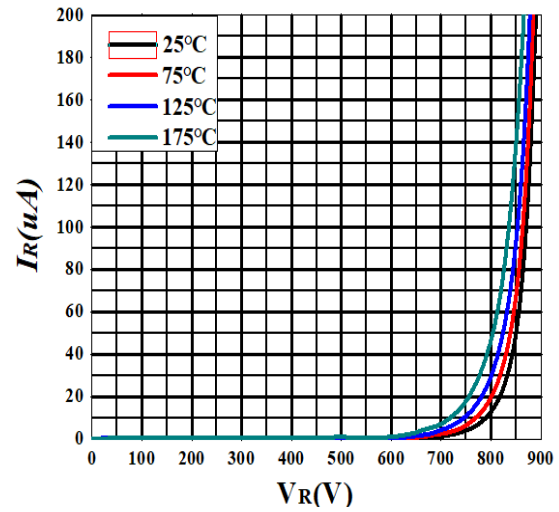
## Ordering

| Order Code | Package Type | Packaging Method | Qty  |
|------------|--------------|------------------|------|
| XD6506     | TO-252-2L    | Tape and Reel    | 3000 |

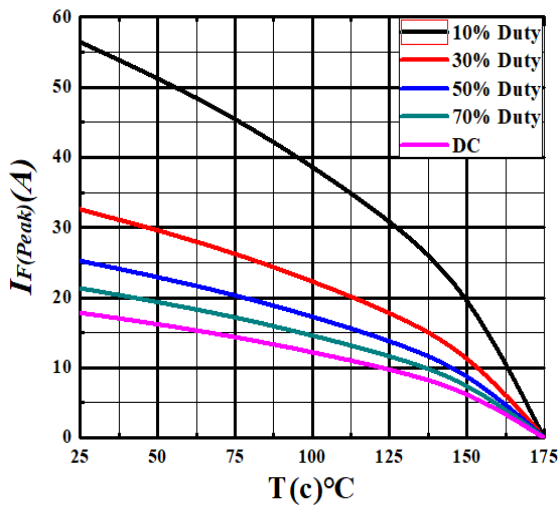
## Electrical Performance



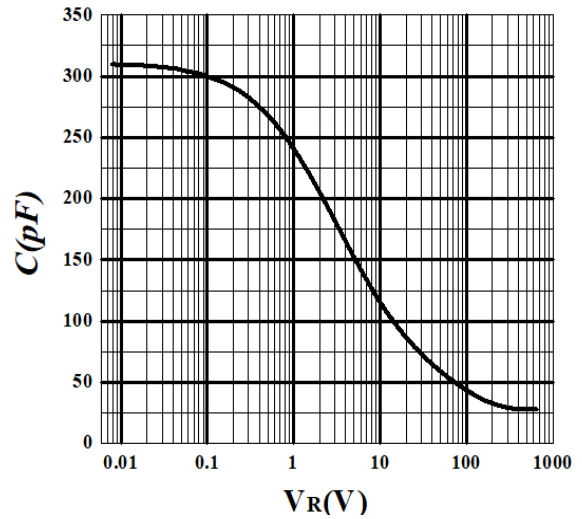
Forward Characteristics



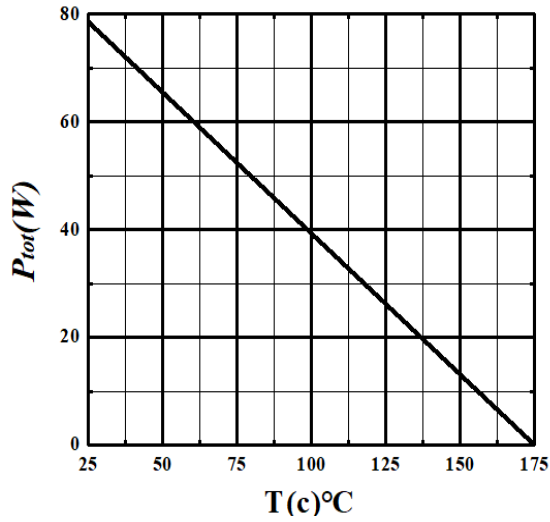
Reverse Characteristics



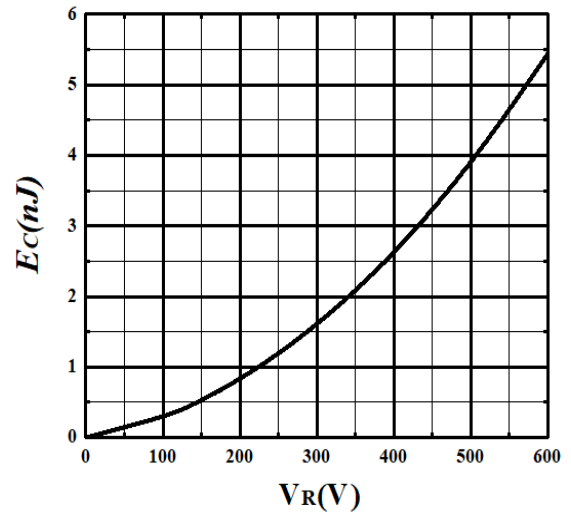
Current Derating



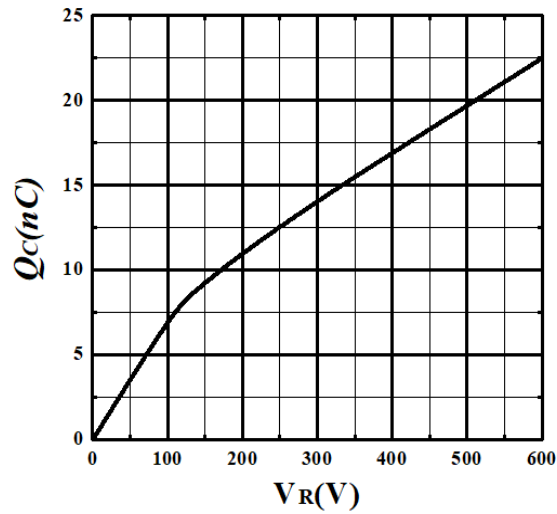
Capacitance vs.  $V_R$



Power Derating

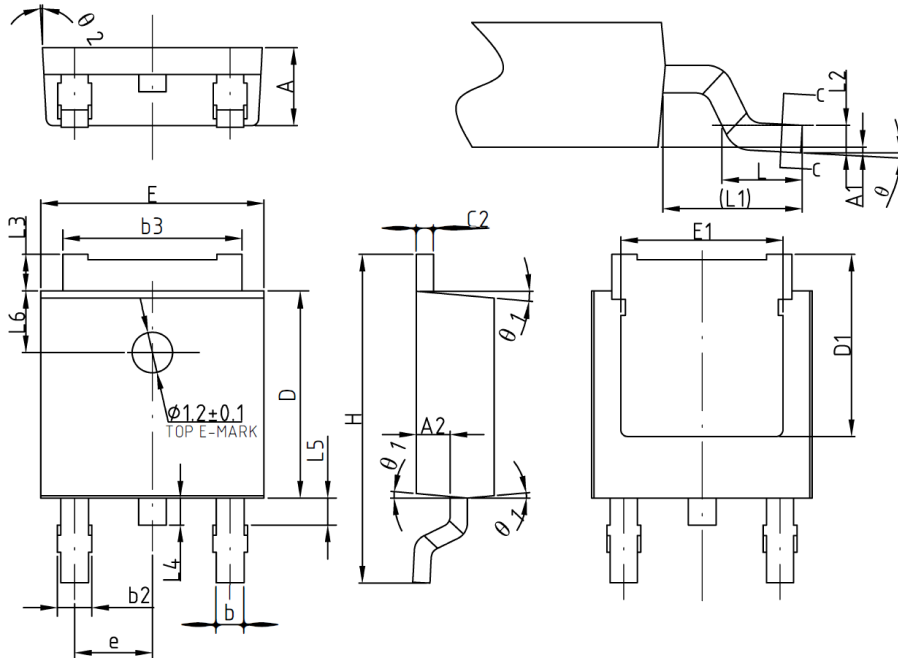


Capacitance Stored Energy



Total Capacitance Charge vs.  $V_R$

# Package Information



COMMON DIMENSIONS  
(UNITS OF MEASURE=MILLIMETER)

| SYMBOL | MIN     | NOM   | MAX   |
|--------|---------|-------|-------|
| A      | 2.20    | 2.30  | 2.38  |
| A1     | 0       | —     | 0.10  |
| A2     | 0.90    | 1.00  | 1.10  |
| b      | 0.77    | —     | 0.89  |
| b1     | 0.76    | 0.81  | 0.86  |
| b2     | 0.77    | —     | 1.10  |
| b3     | 5.23    | 5.33  | 5.43  |
| c      | 0.47    | —     | 0.60  |
| c1     | 0.46    | 0.51  | 0.56  |
| c2     | 0.47    | —     | 0.60  |
| D      | 6.00    | 6.10  | 6.20  |
| D1     | 5.25    | —     | —     |
| E      | 6.50    | 6.60  | 6.70  |
| E1     | 4.70    | —     | —     |
| e      | 2.28BSC |       |       |
| H      | 9.80    | 10.10 | 10.40 |
| L      | 1.40    | 1.50  | 1.70  |
| L1     | 2.90REF |       |       |
| L2     | 0.51BSC |       |       |
| L3     | 0.90    | —     | 1.25  |
| L4     | 0.60    | 0.80  | 1.00  |
| L5     | 0.90    | —     | 1.50  |
| L6     | 1.80REF |       |       |
| 0      | 0°      | —     | 8°    |
| 0 1    | 3°      | 5°    | 7°    |
| 0 2    | 1°      | 3°    | 5°    |