

### 1200V, 10A COMMON CATHODE SILICON CARBIDE SiC SCHOTTKY DIODE

#### FEATURES

- ▲ High Surge Current Capability SiC Schottky (MPS)
- ▲ Maximum Operating Junction Temperature over 175°C
- ▲ Zero Reverse and Forward Recovery
- ▲ Fast and Temperature-independent Switching
- ▲ Positive Temperature Coefficient on  $V_F$

#### ADVANTAGES AND BENEFITS

- ▲ Extremely Low Standby and Switching Power Losses
- ▲ Higher Efficiency than when using Si Diodes
- ▲ High Frequency Operation
- ▲ Very Low Heat Sink Requirements
- ▲ Paralleling of Devices Without Thermal Runaway

#### DESCRIPTION

KE12DJ10D is a high performance 1200V, Dual 5A Common Cathode Silicon Carbide (SiC) Schottky with enhanced surge current capabilities (MPS), able to operate at high frequencies and temperatures in excess 175°C. SiC Schottky diodes offer zero reverse and forward recovery, making them ideal for high frequency and high efficiency applications, with minimum heat sinking requirements.

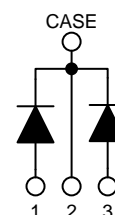
#### APPLICATIONS

- ▲ Rectification, Voltage Blocking, Boost and Free Wheeling
- ▲ Switching Mode Power Supplies (SMPS)
- ▲ Battery chargers (EV, OBC, computers)
- ▲ Power Factor Correction (PFC)
- ▲ Uninterruptible Power Supplies (UPS)
- ▲ Wind Turbine and Solar Inverters
- ▲ Motor Drives
- ▲ High Voltage Multipliers
- ▲ Induction Heating
- ▲ Snubbers

#### KEY PERFORMANCE

| Parameter | Value     |
|-----------|-----------|
| $V_{RRM}$ | 1200V     |
| $I_F$     | 5 / 10A   |
| $Q_C$     | 38 / 76nC |

#### DIE OUTLINE



#### QUICK ORDERING INFORMATION

| Part Number  | Package   | Marking   |
|--------------|-----------|-----------|
| KE12DJ10DT47 | TO-247-3L | KE12DJ10D |

Other packages and packaging configurations available and also possible upon request.

#### ABSOLUTE MAXIMUM RATINGS

Unless otherwise stated, specification applies for  $T_C=25^\circ\text{C}$ .

| Parameter                                 | Symbol    | Values            | Unit             | Note/Test Condition  |
|---|-----------|-------------------|------------------|--|
| DC Blocking Voltage                       | $V_R$     | 1200              | V                |  |
| Repetitive Peak Reverse Voltage           | $V_{RRM}$ | 1200              | V                | $T_J=25^\circ\text{C}$   |
| Surge Peak Reverse Voltage                | $V_{RSM}$ | 1200              | V                |  |
| Continuous Forward Current                | $I_F$     | 12 / 24<br>5 / 10 | A                | $T_C=125^\circ\text{C}$ , $R_{\theta JC}\leq 0.8 / 0.4^\circ\text{C/W}$<br>$T_C=163^\circ\text{C}$ , $R_{\theta JC}\leq 0.8 / 0.4^\circ\text{C/W}$ |
| Repetitive Peak Forward Surge Current     | $I_{FRM}$ | 35 / 70           | A                | $T_C=25^\circ\text{C}$ , $t_p=10\text{ms}$ half sinewave   |
| Non-repetitive Peak Forward Surge Current | $I_{FSM}$ | 70 / 140          | A                | $T_C=25^\circ\text{C}$ , $t_p=10\text{ms}$ , pulse   |
| Power Dissipation                         |           |                   |                  |  |
| Operating Temperature Range               | $T_J$     | -55 to +175       | $^\circ\text{C}$ |  |
| Storage Temperature Range                 | $T_{STG}$ | -55 to +175       | $^\circ\text{C}$ |  |

**ELECTRICAL CHARACTERISTICS**

Unless otherwise stated, specification applies for  $-55^{\circ}\text{C} < T < 175^{\circ}\text{C}$ .

| Parameter               | Symbol | Values                          |            | Unit          | Note/Test Condition  |   |
|-------------------------|--------|---------------------------------|------------|---------------|--|---|
|                         |        | Typ                             | Max        |               |  |   |
| Forward Voltage         | $V_F$  | 1.45<br>2.05                    | 1.8<br>2.5 | V             | $T_J=25^{\circ}\text{C}$<br>$T_J=175^{\circ}\text{C}$                | $I_F=5\text{A} / 10\text{A}$            |
| Reverse Current         | $I_R$  | 2<br>47                         | 150        | $\mu\text{A}$ | $T_J=25^{\circ}\text{C}$<br>$T_J=175^{\circ}\text{C}$                | $V_R=1200\text{V}$                      |
| Total Capacitive Charge | $Q_C$  | 38 / 76                         |            | nC            | $V_R=1200\text{V}, I_F=5\text{A}$<br>$di/dt=200\text{A}/\mu\text{s}$ | $T_J=25^{\circ}\text{C}$                |
| Total Capacitance       | C      | 440 / 880<br>44 / 88<br>33 / 66 |            | pF            | $V_R=1\text{V}$<br>$V_R=400\text{V}$<br>$V_R=800\text{V}$            | $f=1\text{MHz}, T_J=25^{\circ}\text{C}$ |

**THERMAL CHARACTERISTICS**

| Parameter                        | Symbol      | Values    |           | Unit                        | Note/Test Condition |
|----------------------------------|-------------|-----------|-----------|-----------------------------|---------------------|
|                                  |             | Typ       | Max       |                             |                     |
| Junction-case Thermal Resistance | $R_{TH-JC}$ | 0.6 / 0.3 | 0.8 / 0.4 | $^{\circ}\text{C}/\text{W}$ |                     |

**TYPICAL PERFORMANCE (Per Leg)**

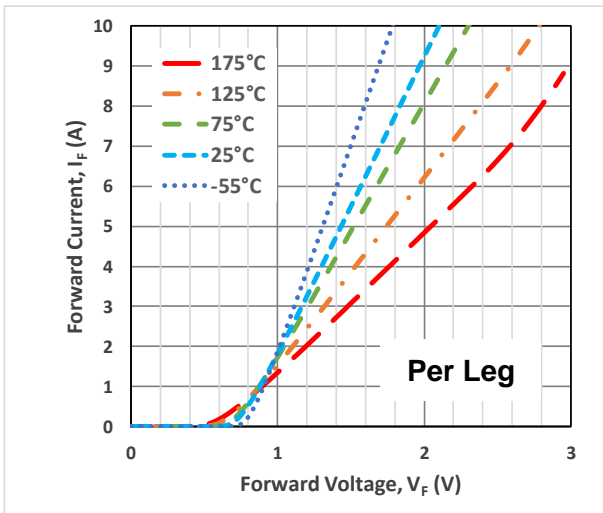


Fig 1. Typical Forward I-V characteristics vs  $T_J$ .

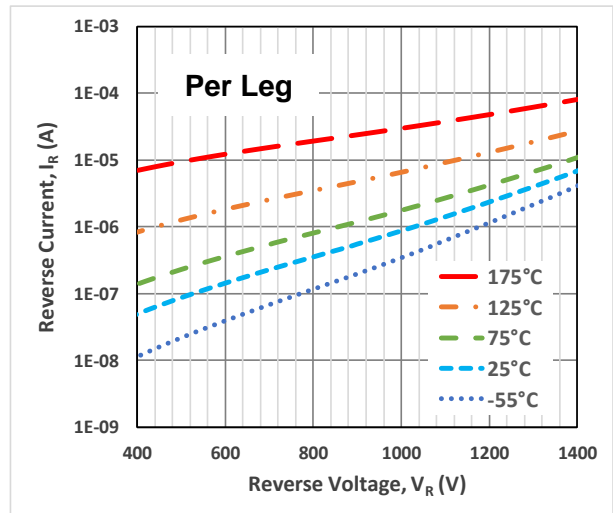


Fig 2. Typical Reverse I-V characteristics vs  $T_J$ .

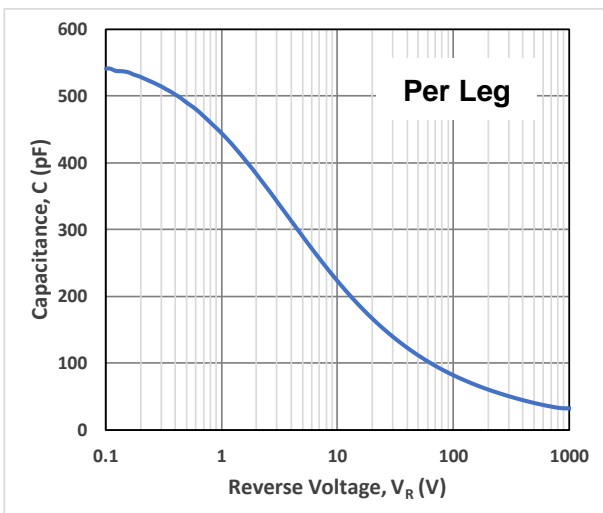


Fig 3. Diode Capacitance C(pF) versus reverse voltage.

## DETAILED ORDERING INFORMATION

|  |  |  |  |  |  |
|--|--|--|--|--|--|
| <b>K</b><br>↓<br>Source<br>K = CALY Technologies | <b>E</b><br>↓<br>Temperature range:<br>E = -55°C to +175°C | <b>12</b><br>↓<br>Rated Voltage:<br>12 = 1200V | <b>DJ</b><br>↓<br>Device / Type<br>DJC = Diode / JBS (MPS) | <b>10D</b><br>↓<br>Rated Current:<br>10D = Dual 5A (10A) | <b>T47</b><br>↓<br>Package:<br>T47 = TO-247-3L |
|--|--|--|--|--|--|

| Part Number  | Temperature Range | Package   | Pin Count | Marking   |
|--------------|-------------------|-----------|-----------|-----------|
| KE12DJ10DT47 | -55°C to +175°C   | TO-247-3L | 3         | KE12DJ10D |

Other packages, packaging configurations and finishing materials possible upon request. MOQ may apply.

## PACKAGE OUTLINES

### TO247-3

| Ref. | Dimensions  |       |           |       |
|------|-------------|-------|-----------|-------|
|      | Millimeters |       | Inches    |       |
|      | Min.        | Max.  | Min.      | Max.  |
| A    | 4.83        | 5.21  | 0.190     | 0.205 |
| A1   | 2.29        | 2.54  | 0.090     | 0.100 |
| A2   | 1.91        | 2.16  | 0.075     | 0.085 |
| b    | 1.07        | 1.32  | 0.042     | 0.052 |
| b1   | 1.88        | 2.13  | 0.074     | 0.084 |
| b2   | 2.92        | 3.20  | 0.115     | 0.126 |
| c    | 0.51        | 0.66  | 0.020     | 0.026 |
| D    | 20.80       | 20.90 | 0.819     | 0.823 |
| D1   | 16.56       | 17.83 | 0.652     | 0.702 |
| D2   | 0.51        | 1.35  | 0.020     | 0.053 |
| E    | 15.49       | 16.26 | 0.610     | 0.640 |
| e    | 5.44 BSC    |       | 0.214 BSC |       |
| E1   | 13.46       | 14.02 | 0.530     | 0.552 |
| E2   | 4.27        | 4.52  | 0.168     | 0.178 |
| E3   | 1.40        | 1.65  | 0.055     | 0.065 |
| L    | 19.30       | 19.81 | 0.760     | 0.780 |
| L1   | 4.14        | 4.39  | 0.163     | 0.173 |
| Φ P  | 3.51        | 3.56  | 0.138     | 0.140 |
| Φ P1 | 7.06        | 7.32  | 0.278     | 0.288 |
| Q    | 5.46        | 5.64  | 0.215     | 0.225 |
| S    | 6.15 BSC    |       | 0.242 BSC |       |

M3 Screw: 1Nm (8.8lbf-in)

### Unique Lot Assembly Code

|    |  |
|----|--|
| YY | Last two digits of assembly year (e.g. 16 = 2016). |
| WW | Assembly week (01 to 52).                          |
| M  | Assembly location code.                            |
| NN | Assembly lot code (01 to 99).                      |

## REVISION HISTORY

| Revision | Date        | Description   |
|----------|-------------|---------------|
| 1A       | 2018-Dec-12 | First release |

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