SCS240KE2
SiC Schottky Barrier Diode

### Absolute maximum ratings (Tj = 25°C)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reverse voltage (repetitive peak)</td>
<td>V_{RM}</td>
<td>1200</td>
<td>V</td>
</tr>
<tr>
<td>Reverse voltage (DC)</td>
<td>V_{R}</td>
<td>1200</td>
<td>V</td>
</tr>
<tr>
<td>Continuous forward current(^7)</td>
<td>I_{F}</td>
<td>20/40(^*1)</td>
<td>A</td>
</tr>
<tr>
<td>Surge no repetitive forward current(^7)</td>
<td>I_{FSM}</td>
<td>83/160(^*2)</td>
<td>A</td>
</tr>
<tr>
<td>Repetitive peak forward current(^7)</td>
<td>I_{FRM}</td>
<td>77/150(^*5)</td>
<td>A</td>
</tr>
<tr>
<td>Total power dissipation(^7)</td>
<td>P_{D}</td>
<td>210/420(^*6)</td>
<td>W</td>
</tr>
<tr>
<td>Junction temperature</td>
<td>T_j</td>
<td>175</td>
<td>°C</td>
</tr>
<tr>
<td>Range of storage temperature</td>
<td>T_{Stg}</td>
<td>-55 to +175</td>
<td>°C</td>
</tr>
</tbody>
</table>

\(^*1\) Tc=134°C/Tc=134°C  \(^*2\) PW=8.3ms sinusoidal, Tj=25°C  \(^*3\) PW=10\(\mu\)s square, Tj=25°C
\(^*4\) PW=8.3ms sinusoidal, Tj=150°C  \(^*5\) Tc=100°C, Tj=150°C, Duty cycle=10%
\(^*6\) Tc=25°C  \(^*7\) Per leg / Both legs

### Features
1) Shorter recovery time
2) Reduced temperature dependence
3) High-speed switching possible

### Construction
Silicon carbide epitaxial planer type

### Outline
TO-247

### Inner circuit

### Packaging specifications

<table>
<thead>
<tr>
<th>Type</th>
<th>Packaging</th>
<th>Tube</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reel size (mm)</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Tape width (mm)</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Basic ordering unit (pcs)</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Taping code</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>Marking</td>
<td>SCS240KE2</td>
</tr>
</tbody>
</table>
### Electrical characteristics \((T_j = 25^\circ C)\) (Per leg)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Conditions</th>
<th>Values</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC blocking voltage</td>
<td>( V_{DC} )</td>
<td>( I_R = 0.4 \text{mA} )</td>
<td>1200</td>
<td>-</td>
</tr>
<tr>
<td>Forward voltage</td>
<td>( V_F )</td>
<td>( I_F = 20 \text{A}, T_j = 25^\circ C )</td>
<td>-</td>
<td>1.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( I_F = 20 \text{A}, T_j = 150^\circ C )</td>
<td>-</td>
<td>1.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( I_F = 20 \text{A}, T_j = 175^\circ C )</td>
<td>-</td>
<td>1.9</td>
</tr>
<tr>
<td>Reverse current</td>
<td>( I_R )</td>
<td>( V_R = 1200 \text{V}, T_j = 25^\circ C )</td>
<td>-</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( V_R = 1200 \text{V}, T_j = 150^\circ C )</td>
<td>-</td>
<td>160</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( V_R = 1200 \text{V}, T_j = 175^\circ C )</td>
<td>-</td>
<td>260</td>
</tr>
<tr>
<td>Total capacitance</td>
<td>( C )</td>
<td>( V_R = 1 \text{V}, f = 1 \text{MHz} )</td>
<td>-</td>
<td>1060</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( V_R = 800 \text{V}, f = 1 \text{MHz} )</td>
<td>-</td>
<td>85</td>
</tr>
<tr>
<td>Total capacitive charge</td>
<td>( Q_c )</td>
<td>( V_R = 800 \text{V}, \frac{di}{dt} = 500 \text{A/s} )</td>
<td>-</td>
<td>66</td>
</tr>
<tr>
<td>Switching time</td>
<td>( t_c )</td>
<td>( V_R = 800 \text{V}, \frac{di}{dt} = 500 \text{A/s} )</td>
<td>-</td>
<td>18</td>
</tr>
</tbody>
</table>

### Thermal characteristics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Conditions</th>
<th>Values</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal resistance</td>
<td>( R_{th(j-c)} )</td>
<td>Per Leg</td>
<td>-</td>
<td>0.56</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Both Legs</td>
<td>-</td>
<td>0.28</td>
</tr>
</tbody>
</table>
Electrical characteristic curves

**Fig. 1** $V_F - I_F$ Characteristics (Per leg)

- Forward Current: $I_F$ [A]
- Forward Voltage: $V_F$ [V]
- **Ta** = 175°C
- **Ta** = 125°C
- **Ta** = 75°C
- **Ta** = 25°C
- **Ta** = -25°C

**Fig. 2** $V_F - I_F$ Characteristics (Per leg)

- Forward Current: $I_F$ [A]
- Forward Voltage: $V_F$ [V]
- **Ta** = 75°C
- **Ta** = 25°C
- **Ta** = -25°C
- **Ta** = 175°C
- **Ta** = 125°C

**Fig. 3** $V_R - I_R$ Characteristics (Per leg)

- Reverse Current: $I_R$ [μA]
- Reverse Voltage: $V_R$ [V]
- **Ta** = 175°C
- **Ta** = 125°C
- **Ta** = 75°C
- **Ta** = 25°C
- **Ta** = -25°C

**Fig. 4** $V_R - Ct$ Characteristics (Per leg)

- Capacitance Between Terminals: $C_t$ [pF]
- Reverse Voltage: $V_R$ [V]
- **Ta** = 25°C
- $f$ = 1MHz

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**Note:**
- The data is valid for different temperatures: Ta = 125°C, Ta = 75°C, Ta = -25°C, Ta = 25°C, Ta = 175°C.
- The graphs show various characteristics under pulsed conditions.
Electrical characteristic curves

Fig. 5 Thermal Resistance vs. Pulse Width (Per leg)
Thermal Resistance: $R_{th(j-c)}$ [ºC/W]
Pulse Width: $P_w$ [s]

Ta=25ºC
Single Pulse

Fig. 6 Power Dissipation (Per leg)
Power Dissipation [W]
Case Temperature: $T_c$ [ºC]

Fig. 7 Derating Curve $I_p-T_c$ (Per leg)
Peak Forward Current: $I_p$ [A]
Case Temperature: $T_c$ [ºC]

Fig. 8 Io-Pf Characteristics (Per leg)
Average Rectified Forward Current: $I_o$ [A]

Peak Forward Current: $I_p$ [A]
Duty=0.1
Duty=0.2
Duty=0.5
Duty=0.8
D.C.

Power Dissipation: [W]
Duty=0.2
Duty=0.5
Duty=0.1
Duty=0.8
D.C.
Dimensions (Unit: mm)

TO-247
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