Features
- High efficiency dual boost
- Ultra fast switching frequency
- Low Inductance Layout
- 1200V IGBT and 1200V SiC diode
- Antiparallel IGBT protection diode with high current

Target Applications
- Solar inverter

Types
- V23990-P629-L43-PM
- V23990-P629-L43Y-PM

Maximum Ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Condition</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bypass Diode D5, D6 / Boost Sw. Protection Diode D1, D2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repetitive peak reverse voltage</td>
<td>( V_{SSM} )</td>
<td></td>
<td>1600</td>
<td>V</td>
</tr>
<tr>
<td>Mean forward current</td>
<td>( I_{FDM} )</td>
<td>( T_{j} \leq 25 \degree C ) ( T_{j} = 80 \degree C )</td>
<td>38</td>
<td>A</td>
</tr>
<tr>
<td>Surge (non-repetitive) forward current</td>
<td>( I_{FHM} )</td>
<td>( t_{f} = 10 \mu s ) ( T_{j} = 25 \degree C )</td>
<td>220</td>
<td>A</td>
</tr>
<tr>
<td>( I^{2}t )-value</td>
<td>( J^{2}t )</td>
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<td>200</td>
<td>A²s</td>
</tr>
<tr>
<td>Power dissipation</td>
<td>( P_{tot} )</td>
<td>( T_{j} = 80 \degree C ) ( T_{j} = 80 \degree C )</td>
<td>47</td>
<td>W</td>
</tr>
<tr>
<td>Maximum Junction Temperature</td>
<td>( T_{j\text{max}} )</td>
<td></td>
<td>150</td>
<td>°C</td>
</tr>
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</table>

Boost Switch (T1, T2)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Condition</th>
<th>Value</th>
<th>Unit</th>
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</thead>
<tbody>
<tr>
<td>Collector-emitter break down voltage</td>
<td>( V_{CE} )</td>
<td></td>
<td>1200</td>
<td>V</td>
</tr>
<tr>
<td>DC collector current</td>
<td>( I_{C} )</td>
<td>( T_{j} \leq 150 \degree C ) ( V_{CE} = V_{CE} )</td>
<td>65</td>
<td>A</td>
</tr>
<tr>
<td>Repetitive peak collector current</td>
<td>( I_{CEM} )</td>
<td>( T_{j} ) limited by ( T_{j\text{max}} )</td>
<td>150</td>
<td>A</td>
</tr>
<tr>
<td>Turn off safe operating area</td>
<td></td>
<td>( T_{j} \leq 150 \degree C ) ( V_{CE} = V_{CE} )</td>
<td>100</td>
<td>A</td>
</tr>
<tr>
<td>Power dissipation</td>
<td>( P_{tot} )</td>
<td>( T_{j} = 80 \degree C ) ( T_{j} = 80 \degree C )</td>
<td>210</td>
<td>W</td>
</tr>
<tr>
<td>Gate-emitter peak voltage</td>
<td>( V_{GE} )</td>
<td></td>
<td>420</td>
<td>V</td>
</tr>
<tr>
<td>Short circuit ratings</td>
<td>( I_{SC} )</td>
<td>( T_{j} \leq 150 \degree C ) ( V_{CB} = 15V )</td>
<td>10</td>
<td>A</td>
</tr>
<tr>
<td>Maximum Junction Temperature</td>
<td>( T_{j\text{max}} )</td>
<td></td>
<td>175</td>
<td>°C</td>
</tr>
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</table>
Maximum Ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Condition</th>
<th>Value</th>
<th>Unit</th>
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<tbody>
<tr>
<td>Boost Diode (D3,D4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak Repetitive Reverse Voltage</td>
<td>$V_{RRM}$</td>
<td></td>
<td>1200</td>
<td>V</td>
</tr>
<tr>
<td>Mean forward current</td>
<td>$I_{FDM}$</td>
<td>$T_j=T_{max}$, $T_c=80^\circ$C</td>
<td>28</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$T_c=80^\circ$C</td>
<td>34</td>
<td>A</td>
</tr>
<tr>
<td>Surge (non-repetitive) forward current</td>
<td>$I_{FSM}$</td>
<td>$t=10$ms, $T_j=25^\circ$C</td>
<td>138</td>
<td>A</td>
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<td>$t^2$-value</td>
<td>$I_{T}^2$</td>
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<td>95</td>
<td>A$^2$s</td>
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<tr>
<td>Repetitive peak forward current</td>
<td>$I_{PM}$</td>
<td>$T_j$ limited by $T_{max}$</td>
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<td>Power dissipation</td>
<td>$P_{tot}$</td>
<td>$T_j=T_{max}$, $T_c=80^\circ$C</td>
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<td>W</td>
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<tr>
<td></td>
<td></td>
<td>$T_c=80^\circ$C</td>
<td>123</td>
<td>W</td>
</tr>
<tr>
<td>Maximum Junction Temperature</td>
<td>$T_{jmax}$</td>
<td></td>
<td>175</td>
<td>°C</td>
</tr>
</tbody>
</table>

Thermal Properties

| Storage temperature | $T_{stg}$ | | -40...+125 | °C |
| Operation temperature under switching condition | $T_{op}$ | | -40...+$\left(T_{max} - 25\right)$ | °C |

Insulation Properties

| Insulation voltage | $t=2$s, DC voltage | | 4000 | V |
| Creepage distance | | | min 12,7 | mm |
| Clearance | solder pins / Press-fit pins | | 9,55 / 9,57 | mm |
### Characteristic Values

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Conditions</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forward voltage</td>
<td>$V_F$</td>
<td>25</td>
<td>25</td>
<td>0.8</td>
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<tr>
<td>Threshold voltage (for power loss calc. only)</td>
<td>$V_T$</td>
<td>25</td>
<td>25</td>
<td>0.92</td>
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<tr>
<td>Slope resistance (for power loss calc. only)</td>
<td>$r_s$</td>
<td>25</td>
<td>25</td>
<td>0.012</td>
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<tr>
<td>Reverse current</td>
<td>$I_r$</td>
<td>1500</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Thermal resistance junction to sink</td>
<td>$R_{th(j-s)}$</td>
<td>25</td>
<td>125</td>
<td>25</td>
</tr>
<tr>
<td>Thermal resistance junction to sink</td>
<td>$R_{th(j-s)}$</td>
<td>25</td>
<td>125</td>
<td>25</td>
</tr>
<tr>
<td>Thermal resistance junction to sink</td>
<td>$R_{th(j-s)}$</td>
<td>25</td>
<td>125</td>
<td>25</td>
</tr>
<tr>
<td>Integrated Gate resistor</td>
<td>$R_{int}$</td>
<td>25</td>
<td>25</td>
<td>1.43</td>
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<tr>
<td>Gate-emitter leakage current</td>
<td>$I_{leak}$</td>
<td>25</td>
<td>25</td>
<td>17</td>
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<tr>
<td>Gate charge</td>
<td>$Q_g$</td>
<td>15</td>
<td>960</td>
<td>50</td>
</tr>
<tr>
<td>Thermal resistance junction to sink</td>
<td>$R_{th(j-c)}$</td>
<td>25</td>
<td>25</td>
<td>4.05</td>
</tr>
<tr>
<td>Reverse current</td>
<td>$I_r$</td>
<td>15</td>
<td>25</td>
<td>1.36</td>
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</table>

### Boost Switch (T1, T2)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Conditions</th>
<th>Value</th>
<th>Unit</th>
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</thead>
<tbody>
<tr>
<td>Gate-emitter threshold voltage</td>
<td>$V_{th(e)}$</td>
<td>0.05</td>
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<td>Collector-emitter saturation voltage</td>
<td>$V_{ces}$</td>
<td>15</td>
<td>50</td>
<td>25</td>
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<tr>
<td>Collector-emitter cut-off</td>
<td>$V_{CEO}$</td>
<td>0</td>
<td>1200</td>
<td>25</td>
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<tr>
<td>Gate-emitter leakage current</td>
<td>$I_{leak}$</td>
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<td>20</td>
<td>25</td>
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<tr>
<td>Integrated Gate resistor</td>
<td>$R_{int}$</td>
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<td>25</td>
<td>27</td>
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<tr>
<td>Rise time</td>
<td>$t_r$</td>
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<td>125</td>
<td>25</td>
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<td>Turn-off delay time</td>
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<td>Fall time</td>
<td>$t_f$</td>
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<td>25</td>
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<tr>
<td>Turn-on energy loss</td>
<td>$E_{on}$</td>
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<td>125</td>
<td>25</td>
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<tr>
<td>Input capacitance</td>
<td>$C_{in}$</td>
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<td>125</td>
<td>25</td>
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<tr>
<td>Output capacitance</td>
<td>$C_{out}$</td>
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<td>125</td>
<td>25</td>
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<tr>
<td>Reverse transfer capacitance</td>
<td>$C_{rsc}$</td>
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<td>125</td>
<td>25</td>
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<tr>
<td>Gate charge</td>
<td>$Q_g$</td>
<td>15</td>
<td>960</td>
<td>50</td>
</tr>
<tr>
<td>Thermal resistance junction to sink</td>
<td>$R_{th(j-c)}$</td>
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<td>125</td>
<td>25</td>
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<tr>
<td>Reverse current</td>
<td>$I_r$</td>
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<td>25</td>
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### Boost Diode (D3, D4)

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<tr>
<td>Forward voltage</td>
<td>$V_F$</td>
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<td>1.43</td>
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<tr>
<td>Reverse leakage current</td>
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<td>1200</td>
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<td>25</td>
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<tr>
<td>Peak recovery current</td>
<td>$I_{peak}$</td>
<td>15</td>
<td>25</td>
<td>17</td>
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<td>Reverse recovery time</td>
<td>$t_{r}$</td>
<td>25</td>
<td>125</td>
<td>9</td>
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<tr>
<td>Reverse recovery charge</td>
<td>$Q_{rec}$</td>
<td>25</td>
<td>125</td>
<td>0.24</td>
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<tr>
<td>Reverse recovered energy</td>
<td>$E_{rec}$</td>
<td>25</td>
<td>125</td>
<td>0.093</td>
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<tr>
<td>Peak rate of fall of recovery current</td>
<td>$dI/dt$</td>
<td>25</td>
<td>125</td>
<td>670</td>
</tr>
<tr>
<td>Thermal resistance junction to sink</td>
<td>$R_{th(j-c)}$</td>
<td>25</td>
<td>125</td>
<td>1.17</td>
</tr>
<tr>
<td>Reverse current</td>
<td>$I_r$</td>
<td>15</td>
<td>25</td>
<td>1.36</td>
</tr>
<tr>
<td>Parameter</td>
<td>Symbol</td>
<td>Conditions</td>
<td>Value</td>
<td>Unit</td>
</tr>
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<td>---------------------------</td>
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<tr>
<td>Characteristic Values</td>
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</tr>
<tr>
<td>Parameter Symbol</td>
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<td></td>
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</tr>
<tr>
<td>V_{DS} [V] or V_{CE} [V]</td>
<td>V_GS</td>
<td>I_C [A] or I_F [A]</td>
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<td></td>
</tr>
<tr>
<td>V_r [V] or V_{CE} [V]</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T_j [°C]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min</td>
<td>Typ</td>
<td>Max</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Thermistor**

- **Rated resistance**
  - Symbol: \( R \)
  - Value: 25
  - Unit: kΩ
- **Deviation of \( R_{100} \)**
  - Formula: \( R_{100} = 1486 \Omega \)
  - Min: 100
  - Typ: -12
  - Max: 12
  - Unit: %
- **Power dissipation**
  - Symbol: \( P \)
  - Min: 25
  - Typ: 200
  - Max: 500
  - Unit: mW
- **Power dissipation constant**
  - Formula: \( \Delta R/R \)
  - Value: 12
  - Unit: %
- **B-value**
  - Symbol: \( B_{(25/50)} \)
  - Min: 25
  - Typ: 3950
  - Max: 4000
  - Unit: K
- **B-value**
  - Symbol: \( B_{(25/50)} \)
  - Min: 25
  - Typ: 3998
  - Max: 4000
  - Unit: K

**Vincotech NTC Reference**

- Symbol: \( B \)
Boost Switch T1, T2 / Boost Diode D3, D4

**Figure 1** T1, T2
Typical output characteristics
$I_C = f(V_{CE})$

At
$\tau = 250 \mu s$
$T_j = 25 ^{\circ}C$
$V_{CE}$ from 7 V to 17 V in steps of 1 V

**Figure 2** T1, T2
Typical output characteristics
$I_C = f(V_{CE})$

At
$\tau = 250 \mu s$
$T_j = 125 ^{\circ}C$
$V_{CE}$ from 7 V to 17 V in steps of 1 V

**Figure 3** T1, T2
Typical transfer characteristics
$I_C = f(V_{GE})$

At
$\tau = 100 \mu s$
$T_j = 25/125 ^{\circ}C$
$V_{CE} = 10 V$

**Figure 4** D3, D4
Typical diode forward current as a function of forward voltage
$I_F = f(V_F)$

At
$\tau = 250 \mu s$
$T_j = 25/125 ^{\circ}C$
Figure 5
Typical switching energy losses
as a function of collector current
\[ E = f(I_C) \]

With an inductive load at
\[ T_j = \frac{25}{125} \, ^\circ\text{C} \]
\[ V_{CE} = 700 \, \text{V} \]
\[ V_{GE} = 15 \, \text{V} \]
\[ R_{gon} = 4 \, \Omega \]
\[ R_{goff} = 4 \, \Omega \]

Figure 6
Typical switching energy losses
as a function of gate resistor
\[ E = f(R_G) \]

With an inductive load at
\[ T_j = \frac{25}{125} \, ^\circ\text{C} \]
\[ V_{CE} = 700 \, \text{V} \]
\[ V_{GE} = 15 \, \text{V} \]
\[ I_C = 40 \, \text{A} \]

Figure 7
Typical reverse recovery energy loss
as a function of collector current
\[ E_{rec} = f(I_C) \]

With an inductive load at
\[ T_j = \frac{25}{125} \, ^\circ\text{C} \]
\[ V_{CE} = 700 \, \text{V} \]
\[ V_{GE} = 15 \, \text{V} \]
\[ R_{gon} = 4 \, \Omega \]
\[ R_{goff} = 4 \, \Omega \]

Figure 8
Typical reverse recovery energy loss
as a function of gate resistor
\[ E_{rec} = f(R_G) \]

With an inductive load at
\[ T_j = \frac{25}{125} \, ^\circ\text{C} \]
\[ V_{CE} = 700 \, \text{V} \]
\[ V_{GE} = 15 \, \text{V} \]
\[ I_C = 40 \, \text{A} \]
Boost Switch T1,T2 / Boost Diode D3,D4

**Figure 9**
Typical switching times as a function of collector current

\[ t = f(I_C) \]

With an inductive load at
- \( T_j = 126 \, ^\circ\text{C} \)
- \( V_{CE} = 700 \, \text{V} \)
- \( V_{CE} = 15 \, \text{V} \)
- \( R_{gon} = 4 \, \Omega \)
- \( I_C = 40 \, \text{A} \)

**Figure 10**
Typical switching times as a function of gate resistor

\[ t = f(R_g) \]

With an inductive load at
- \( T_j = 126 \, ^\circ\text{C} \)
- \( V_{CE} = 700 \, \text{V} \)
- \( V_{CE} = 15 \, \text{V} \)
- \( I_C = 40 \, \text{A} \)

**Figure 11**
Typical reverse recovery time as a function of collector current

\[ t_{rr} = f(I_C) \]

At
- \( T_j = 25/125 \, ^\circ\text{C} \)
- \( V_{CE} = 700 \, \text{V} \)
- \( V_{CE} = 15 \, \text{V} \)
- \( R_{gon} = 4 \, \Omega \)

**Figure 12**
Typical reverse recovery time as a function of IGBT turn on gate resistor

\[ t_{rr} = f(R_{gon}) \]

At
- \( T_j = 25/125 \, ^\circ\text{C} \)
- \( V_{GE} = 700 \, \text{V} \)
- \( V_{CE} = 15 \, \text{V} \)
Figure 13
Typical reverse recovery charge as a function of collector current
\[ Q_{rr} = f(I_C) \]

At
\[ T_J = 25/125 \, ^\circ C \]
\[ V_{CE} = 700 \, V \]
\[ V_{GE} = 15 \, V \]
\[ R_{gon} = 4 \, \Omega \]

Figure 14
Typical reverse recovery charge as a function of IGBT turn on gate resistor
\[ Q_{rr} = f(R_{gon}) \]

At
\[ T_J = 25/125 \, ^\circ C \]
\[ V_S = 700 \, V \]
\[ I_F = 40 \, A \]
\[ V_{GS} = 15 \, V \]

Figure 15
Typical reverse recovery current as a function of collector current
\[ I_{RRM} = f(I_C) \]

At
\[ T_J = 25/125 \, ^\circ C \]
\[ V_{CE} = 700 \, V \]
\[ V_{GE} = 15 \, V \]
\[ R_{gon} = 4 \, \Omega \]

Figure 16
Typical reverse recovery current as a function of IGBT turn on gate resistor
\[ I_{RRM} = f(R_{gon}) \]

At
\[ T_J = 25/125 \, ^\circ C \]
\[ V_S = 700 \, V \]
\[ I_F = 40 \, A \]
\[ V_{GS} = 15 \, V \]
Typical rate of fall of forward and reverse recovery current as a function of collector current

\[ \frac{dI_0}{dt}, \frac{dI_{rec}}{dt} = f(I_c) \]

\[ \frac{dI_0}{dt}, \frac{dI_{rec}}{dt} = f(R_{gon}) \]

**Figure 17**

**Figure 18**

**Figure 19**

**Figure 20**

IGBT transient thermal impedance as a function of pulse width

\[ Z_{th(j-s)} = f(t_p) \]

\[ Z_{th(j-s)} = f(t_p) \]

**Table:**

<table>
<thead>
<tr>
<th>(D)</th>
<th>(R_{th(j-s)}) (K/W)</th>
<th>(\tau_s) (s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.085</td>
<td>1.272</td>
<td>0.0035</td>
</tr>
<tr>
<td>0.179</td>
<td>0.186</td>
<td>0.0035</td>
</tr>
<tr>
<td>0.314</td>
<td>0.060</td>
<td>0.0035</td>
</tr>
<tr>
<td>0.053</td>
<td>0.005</td>
<td>0.0035</td>
</tr>
<tr>
<td>0.029</td>
<td>0.000</td>
<td>0.0035</td>
</tr>
</tbody>
</table>

**Table:**

<table>
<thead>
<tr>
<th>(D)</th>
<th>(R_{th(j-s)}) (K/W)</th>
<th>(\tau_s) (s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.043</td>
<td>9.803</td>
<td>0.0010</td>
</tr>
<tr>
<td>0.101</td>
<td>0.815</td>
<td>0.0010</td>
</tr>
<tr>
<td>0.383</td>
<td>0.098</td>
<td>0.0010</td>
</tr>
<tr>
<td>0.308</td>
<td>0.026</td>
<td>0.0010</td>
</tr>
<tr>
<td>0.233</td>
<td>0.005</td>
<td>0.0010</td>
</tr>
<tr>
<td>0.098</td>
<td>0.001</td>
<td>0.0010</td>
</tr>
</tbody>
</table>

**Figure 19**

**Figure 20**

IGBT thermal model values

R_{th(j-s)} = 0.66 K/W

R_{th(j-s)} = 0.80 K/W

**Table:**

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<th>(R_{th(j-s)}) (K/W)</th>
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**Table:**

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<td>0.001</td>
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**Figure 19**

**Figure 20**

FWD transient thermal impedance as a function of pulse width

\[ Z_{th(j-s)} = f(t_p) \]

\[ Z_{th(j-s)} = f(t_p) \]

**Table:**

<table>
<thead>
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<th>(\tau_s) (s)</th>
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<td>0.0010</td>
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Boost Switch T1,T2 / Boost Diode D3,D4

At

\[ T_j = \frac{25}{125} \degree C \]

\[ V_{CE} = 700 \, \text{V} \]

\[ V_C = 15 \, \text{V} \]

\[ R_{gon} = 4 \, \Omega \]

**Figure 17**

**Figure 18**

**Figure 19**

**Figure 20**

At

\[ T_j = \frac{25}{125} \degree C \]

\[ V_C = 700 \, \text{V} \]

\[ I_o = 40 \, \text{A} \]

\[ V_o = 15 \, \text{V} \]
Boost Switch T1, T2 / Boost Diode D3, D4

**Figure 21**
Power dissipation as a function of heatsink temperature

\[ P_{tot} = f(T_h) \]

At
\[ T_j = 175 \, ^\circ C \]

**Figure 22**
Collector current as a function of heatsink temperature

\[ I_C = f(T_h) \]

At
\[ T_j = 175 \, ^\circ C \]
\[ V_{GE} = 15 \, V \]

**Figure 23**
Power dissipation as a function of heatsink temperature

\[ P_{tot} = f(T_s) \]

At
\[ T_j = 175 \, ^\circ C \]

**Figure 24**
Forward current as a function of heatsink temperature

\[ I_F = f(T_s) \]

At
\[ T_j = 175 \, ^\circ C \]
Figure 25  
Safe operating area as a function of collector-emitter voltage  
\[ I_C = f(V_{CE}) \]

Figure 26  
Gate voltage vs Gate charge  
\[ V_{GE} = f(Q_g) \]

Figure 27  
Short circuit withstand time as a function of gate-emitter voltage  
\[ t_{sc} = f(V_{GE}) \]

Figure 28  
Typical short circuit collector current as a function of gate-emitter voltage  
\[ I_C = f(V_{CE}) \]

---

At  
\[ D = \text{single pulse} \]  
\[ T_s = 80 \, ^\circ\text{C} \]  
\[ V_{CE} = 15 \, \text{V} \]  
\[ T_j = T_{j\max} \, ^\circ\text{C} \]

---

At  
\[ I_C = 50 \, \text{A} \]  
\[ V_{CE} \leq 600 \, \text{V} \]  
\[ T_j = 25 \, ^\circ\text{C} \]
Boost Switch T1, T2 / Boost Diode D3, D4

Figure 29  
T1, T2

Reverse bias safe operating area

\[ I_C = f(V_{CE}) \]

At

\[ T_v \leq 150 \, ^\circ C \]
\[ I_{C \, \text{MAX}} = 100 \, A \]
\[ V_{CE \, \text{MAX}} = 1200 \, V \]

Boost Switch T1, T2 / Boost Diode D3, D4
Bypass Diode D5,D6 / Boost Sw. Protection Diode D1,D2

**Figure 1**
Typical diode forward current as a function of forward voltage

\[ I_F = f(V_F) \]

**Figure 2**
Diode transient thermal impedance as a function of pulse width

\[ Z_{th(j-s)} = f(t_p) \]

**Figure 3**
Power dissipation as a function of heatsink temperature

\[ P_{tot} = f(T_s) \]

**Figure 4**
Forward current as a function of heatsink temperature

\[ I_F = f(T_s) \]

At

- \( T_j = 25/125 \) °C
- \( t_p = 250 \) µs
- \( D = 0.5 \)
- \( R_{th(j-s)} = 1.49 \) K/W
- \( R_{h(j-s)} = 1.73 \) K/W
- \( T_j = 150 \) °C

---

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01 Dec. 2015 / Revision 5
Figure 1

Typical NTC characteristic as a function of temperature

\[ R(T) = f(T) \]
Switching Definitions Boost

General conditions

\[ T_J = 125 ^\circ C \]
\[ R_{\text{on}} = 4 \Omega \]
\[ R_{\text{off}} = 4 \Omega \]

**Figure 1**  
Turn-off Switching Waveforms & definition of \( t_{\text{doff}} \), \( t_{\text{Eoff}} \)

\( t_{\text{Eoff}} = \) integrating time for \( E_{\text{off}} \)

\( V_{\text{CE}} (0\%) = 0 \) V  
\( V_{\text{CE}} (100\%) = 700 \) V  
\( I_C (100\%) = 40 \) A  
\( t_{\text{doff}} = 0,320 \) \( \mu \)s  
\( t_{\text{Eoff}} = 0,468 \) \( \mu \)s

**Figure 2**  
Turn-on Switching Waveforms & definition of \( t_{\text{don}} \), \( t_{\text{Eon}} \)

\( t_{\text{Eon}} = \) integrating time for \( E_{\text{on}} \)

\( V_{\text{CE}} (0\%) = 0 \) V  
\( V_{\text{CE}} (100\%) = 700 \) V  
\( I_C (100\%) = 40 \) A  
\( t_{\text{don}} = 0,027 \) \( \mu \)s  
\( t_{\text{Eon}} = 0,157 \) \( \mu \)s

**Figure 3**  
Turn-off Switching Waveforms & definition of \( t_f \)

\( V_{\text{CE}} (100\%) = 700 \) V  
\( I_C (100\%) = 40 \) A  
\( t_f = 0,057 \) \( \mu \)s

**Figure 4**  
Turn-on Switching Waveforms & definition of \( t_r \)

\( V_{\text{CE}} (100\%) = 700 \) V  
\( I_C (100\%) = 40 \) A  
\( t_r = 0,017 \) \( \mu \)s
Switching Definitions Boost

**Figure 5**
Turn-off Switching Waveforms & definition of $t_{Eoff}$

- $P_{off}$ (100%) = 28.02 kW
- $E_{off}$ (100%) = 2.43 mJ
- $t_{Eoff} = 0.468$ µs

**Figure 6**
Turn-on Switching Waveforms & definition of $t_{Eon}$

- $P_{on}$ (100%) = 28.02 kW
- $E_{on}$ (100%) = 1.22 mJ
- $t_{Eon} = 0.1567$ µs

**Figure 7**
Turn-off Switching Waveforms & definition of $t_{rr}$

- $V_d$ (100%) = 700 V
- $I_d$ (100%) = 40 A
- $I_{slew}$ (100%) = -15 A
- $t_{rr} = 0.009$ µs
Switching Definitions Boost

**Figure 8**

Turn-on Switching Waveforms & definition of $t_{Qrr}$

($t_{Qrr} = \text{integrating time for } Q_{rr}$)

$I_d (100\%) = 40 \text{ A}$

$Q_{rr} (100\%) = 0.21 \text{ µC}$

$t_{Qrr} = 0.02 \text{ µs}$

**Figure 9**

Turn-on Switching Waveforms & definition of $t_{Erec}$

($t_{Erec} = \text{integrating time for } E_{rec}$)

$P_{rec} (100\%) = 28.02 \text{ kW}$

$E_{rec} (100\%) = 0.07 \text{ mJ}$

$t_{Erec} = 0.02 \text{ µs}$
## Ordering Code and Marking - Outline - Pinout

### Pin table

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<th>Pin</th>
<th>X</th>
<th>Y</th>
<th>Function</th>
<th>Pin</th>
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<th>Y</th>
<th>Function</th>
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### Outline

The center of package is the pin 1.
Dimensions of coordinates is given without tolerance.

### Pinout

![Pinout Diagram]

### Identification

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<tr>
<th>ID</th>
<th>Component</th>
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<th>Current</th>
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