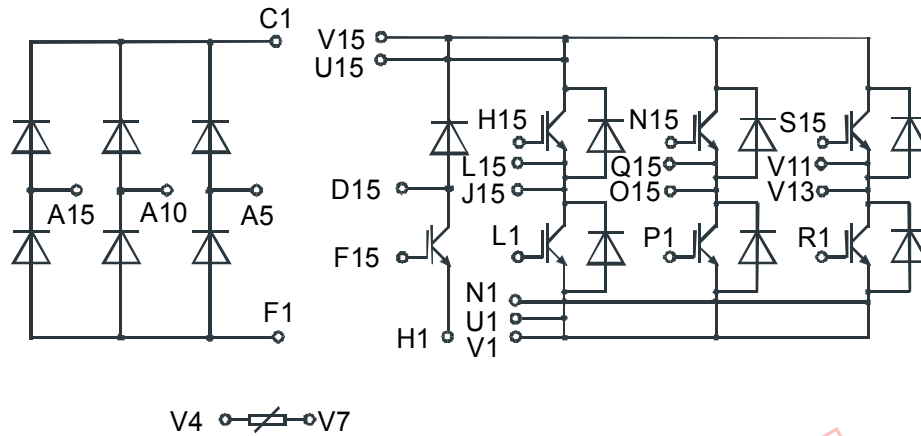
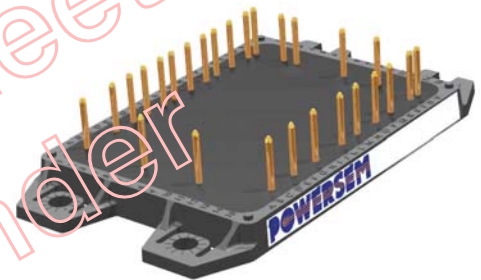


Preliminary Data Sheet



| Three Phase Rectifier | Brake Chopper | Three Phase Inverter |
|---------------------------|------------------------------|------------------------------|
| $V_{RRM} = 1600\text{ V}$ | $V_{CES} = 1200\text{ V}$ | $V_{CES} = 1200\text{ V}$ |
| $I_{FAVM} = 68\text{ A}$ | $I_{C25} = 30\text{ A}$ | $I_{C25} = 49\text{ A}$ |
| $I_{FSM} = 300\text{ A}$ | $V_{CE(sat)} = 2.6\text{ V}$ | $V_{CE(sat)} = 3.1\text{ V}$ |



ECO-TOP™ 1

Input Rectifiers

| Symbol | Test Conditions | Maximum Ratings | Features |
|-------------|--|-----------------|---|
| I_{dAV}^* | $T_C = 100\text{ }^\circ\text{C}$, (per circuit) | 68 A | <ul style="list-style-type: none"> Package with DCB ceramic base plate High level of integration - only one power semiconductor module required for the whole drive Planar glass passivated chips NPT IGBT technology with low saturation voltage, low switching losses, high RBSOA and short circuit ruggedness Epitaxial free wheeling diodes with hipersfast and soft reverse recovery Temperature sense included Leads suitable for PC board soldering UL Release applied |
| I_{FSM} | $T_{VJ} = 25\text{ }^\circ\text{C}$; $t = 10\text{ ms}$; sin 50 Hz | 300 A | |
| V_{RRM} | | 1600 V | |

| Symbol | Test Conditions | Characteristic Value |
|------------|---|----------------------|
| I_R | $V_R = V_{RRM}$, $T_{VJ} = T_{VJM}$ | $\leq 3\text{ mA}$ |
| | $V_R = V_{RRM}$, $T_{VJ} = 25\text{ }^\circ\text{C}$ | $\leq 0.5\text{ mA}$ |
| V_F | $I_F = 55\text{ A}$, $T_{VJ} = 25\text{ }^\circ\text{C}$ | $\leq 1.46\text{ V}$ |
| V_{TO} | For power-loss calculations only | 0.8 V |
| r_T | | 13 mΩ |
| R_{thJC} | per diode; DC | 1.1 K/W |

Caution: These Devices are sensitive to electrostatic discharge. Users should observe proper ESD handling precautions.

Application: AC motor drives with

- Input from single or three phase grid
- Three phase synchronous or asynchronous motor
- Electric braking operations

Output Inverter IGBTs

| Symbol | Conditions | Maximum Ratings | |
|-----------------------|---|-----------------|---------------|
| V_{CES} | $T_{VJ} = 25^{\circ}\text{C}$ to 150°C | 1200 | V |
| V_{GES} | | ± 20 | V |
| I_{C25} | $T_C = 25^{\circ}\text{C}$ | 49 | A |
| I_{C80} | $T_C = 80^{\circ}\text{C}$ | 33 | A |
| I_{CM} V_{CEK} | $V_{GE} = \pm 15\text{ V}$; $R_G = 47\ \Omega$; $T_{VJ} = 125^{\circ}\text{C}$ RBSOA, Clamped inductive load; $L = 100\ \mu\text{H}$ | 50 | A |
| | | V_{CES} | |
| t_{SC} (SCSOA) | $V_{CE} = V_{CES}$; $V_{GE} = \pm 15\text{ V}$; $R_G = 47\ \Omega$; $T_{VJ} = 125^{\circ}\text{C}$ non-repetitive | 10 | μs |
| P_{tot} | $T_C = 25^{\circ}\text{C}$ | 208 | W |

| Symbol | Conditions | Characteristic Values ($T_{VJ} = 25^{\circ}\text{C}$, unless otherwise specified) | | |
|--|--|--|------|---------|
| | | min. | typ. | max. |
| $V_{CE(sat)}$ | $I_C = 50\text{ A}$; $V_{GE} = 15\text{ V}$; $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$ | 3.1 | 3.7 | V |
| | | 3.5 | | V |
| $V_{GE(th)}$ | $I_C = 1\text{ mA}$; $V_{GE} = V_{CE}$ | 4.5 | | 6.5 V |
| I_{CES} | $V_{CE} = V_{CES}$; $V_{GE} = 0\text{ V}$; $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$ | | 1.1 | mA |
| | | | 4.2 | mA |
| I_{GES} | $V_{CE} = 0\text{ V}$; $V_{GE} = \pm 20\text{ V}$ | | 180 | nA |
| $t_{d(on)}$ t_r $t_{d(off)}$ t_f E_{on} E_{off} | Inductive load, $T_{VJ} = 125^{\circ}\text{C}$ $V_{CE} = 600\text{ V}$; $I_C = 30\text{ A}$ $V_{GE} = 15/0\text{ V}$; $R_G = 47\ \Omega$ | 100 | | ns |
| | | 70 | | ns |
| | | 500 | | ns |
| | | 70 | | ns |
| | | 4.6 | | mJ |
| | | 3.4 | | mJ |
| C_{ies} | $V_{CE} = 25\text{ V}$; $V_{GE} = 0\text{ V}$; $f = 1\text{ MHz}$ | 1.65 | | nF |
| R_{thJC} | (per IGBT) | | | 0.6 K/W |

Output Inverter Reverse Diodes (FRED)

| Symbol | Conditions | Maximum Ratings | |
|-----------|----------------------------|-----------------|---|
| I_{F25} | $T_C = 25^{\circ}\text{C}$ | 49 | A |
| I_{F80} | $T_C = 80^{\circ}\text{C}$ | 31 | A |

| Symbol | Conditions | Characteristic Values | | |
|----------------------|---|-----------------------|------|---------|
| | | min. | typ. | max. |
| V_F | $I_F = 30\text{ A}$; $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$ | 2.4 | 2.7 | V |
| | | 1.77 | | V |
| I_{RM} t_{rr} | $I_F = 30\text{ A}$; $di_F/dt = 500\text{ A}/\mu\text{s}$; $T_{VJ} = 125^{\circ}\text{C}$ $V_R = 600\text{ V}$; $V_{GE} = 0\text{ V}$ | 27 | | A |
| | | 150 | | ns |
| R_{thJC} | | | | 1.3 K/W |

Brake Chopper IGBT

| Symbol | Conditions | Maximum Ratings | |
|-----------------------|---|-----------------|---------------|
| V_{CES} | $T_{VJ} = 25^{\circ}\text{C}$ to 150°C | 1200 | V |
| V_{GES} | | ± 20 | V |
| I_{C25} | $T_C = 25^{\circ}\text{C}$ | 30 | A |
| I_{C80} | $T_C = 80^{\circ}\text{C}$ | 21 | A |
| I_{CM} V_{CEK} | $V_{GE} = \pm 15\text{ V}$; $R_G = 82\ \Omega$; $T_{VJ} = 125^{\circ}\text{C}$ RBSOA, Clamped inductive load; $L = 100\ \mu\text{H}$ | 35 | A |
| | | V_{CES} | |
| t_{SC} (SCSOA) | $V_{CE} = V_{CES}$; $V_{GE} = \pm 15\text{ V}$; $R_G = 82\ \Omega$; $T_{VJ} = 125^{\circ}\text{C}$ non-repetitive | 10 | μs |
| P_{tot} | $T_C = 25^{\circ}\text{C}$ | 130 | W |

| Symbol | Conditions | Characteristic Values | | | | |
|--|--|--|------|------|------|-----|
| | | $(T_{VJ} = 25^{\circ}\text{C}$, unless otherwise specified) | | | | |
| | | min. | typ. | max. | | |
| $V_{CE(sat)}$ | $I_C = 25\text{ A}$; $V_{GE} = 15\text{ V}$; $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$ | | 2.6 | 3.3 | V | |
| | | | | 2.9 | V | |
| $V_{GE(th)}$ | $I_C = 0.6\text{ mA}$; $V_{GE} = V_{CE}$ | 4.5 | | 6.5 | V | |
| I_{CES} | $V_{CE} = V_{CES}$; $V_{GE} = 0\text{ V}$; $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$ | | | 0.9 | mA | |
| | | | | 3.7 | mA | |
| I_{GES} | $V_{CE} = 0\text{ V}$; $V_{GE} = \pm 20\text{ V}$ | | | 100 | nA | |
| $t_{d(on)}$ t_r $t_{d(off)}$ t_f E_{on} E_{off} | Inductive load, $T_{VJ} = 125^{\circ}\text{C}$ $V_{CE} = 600\text{ V}$; $I_C = 17.5\text{ A}$ $V_{GE} = 15/0\text{ V}$; $R_G = 82\ \Omega$ | | 100 | | ns | |
| | | | 75 | | ns | |
| | | | 500 | | ns | |
| | | | 70 | | ns | |
| | | | 2.7 | | mJ | |
| | 2.1 | | mJ | | | |
| C_{ies} | $V_{CE} = 25\text{ V}$; $V_{GE} = 0\text{ V}$; $f = 1\text{ MHz}$ | | 1 | | nF | |
| R_{thJC} | (per IGBT) | | | | 0.96 | K/W |

Brake Chopper Diode (FRED)

| Symbol | Conditions | Maximum Ratings | |
|-----------|----------------------------|-----------------|---|
| I_{F25} | $T_C = 25^{\circ}\text{C}$ | 26 | A |
| I_{F80} | $T_C = 80^{\circ}\text{C}$ | 17 | A |

| Symbol | Conditions | Characteristic Values | | | | |
|------------|---|-----------------------|------|------|-----|-----|
| | | min. | typ. | max. | | |
| V_F | $I_F = 17.5\text{ A}$; $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$ | | 2.48 | 2.79 | V | |
| | | | | 1.84 | V | |
| I_{RM} | $I_F = 15\text{ A}$; $di_F/dt = 400\text{ A}/\mu\text{s}$; $T_{VJ} = 125^{\circ}\text{C}$ $V_R = 600\text{ V}$; $V_{GE} = 0\text{ V}$ | | 16 | | A | |
| t_{tr} | | | 130 | | ns | |
| R_{thJC} | | | | | 2.3 | K/W |

