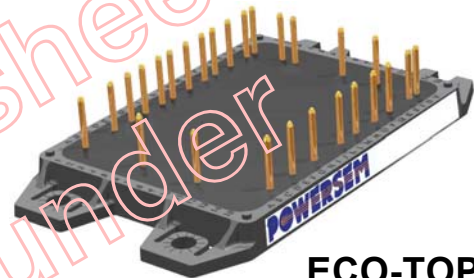


Three Phase Rectifier	Brake Chopper	Three Phase Inverter
$V_{RRM} = 1600 \text{ V}$	$V_{CES} = 600 \text{ V}$	$V_{CES} = 600 \text{ V}$
$I_{FAVM} = 68 \text{ A}$	$I_{C25} = 42.5 \text{ A}$	$I_{C25} = 69 \text{ A}$
$I_{FSM} = 300 \text{ A}$	$V_{CE(sat)} = 2.4 \text{ V}$	$V_{CE(sat)} = 2.3 \text{ V}$



ECO-TOP™ 1

Input Rectifiers

Symbol	Test Conditions	Maximum Ratings
I_{dAV}^*	$T_C = 100 \text{ }^\circ\text{C}$, (per circuit)	68 A
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 $\text{m}\Omega$
R_{thJC}	per diode; DC	1.1 K/W

Features

- 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 hipfast and soft reverse recovery
- Temperature sense included
- Leads suitable for PC board soldering
- UL Release applied

Application: AC motor drives with

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

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

Output Inverter IGBTs

Symbol	Conditions	Maximum Ratings	
V_{CES}	$T_{VJ} = 25^{\circ}\text{C}$ to 150°C	600	V
V_{GES}		± 20	V
I_{C25}	$T_C = 25^{\circ}\text{C}$	69	A
I_{C80}	$T_C = 80^{\circ}\text{C}$	48	A
I_{CM} V_{CEK}	$V_{GE} = \pm 15\text{ V}$; $R_G = 22\ \Omega$; $T_{VJ} = 125^{\circ}\text{C}$ RBSOA, Clamped inductive load; $L = 100\ \mu\text{H}$	100	A
		V_{CES}	
t_{SC} (SCSOA)	$V_{CE} = V_{CES}$; $V_{GE} = \pm 15\text{ V}$; $R_G = 22\ \Omega$; $T_{VJ} = 125^{\circ}\text{C}$ 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.	
$V_{CE(sat)}$	$I_C = 75\text{ A}$; $V_{GE} = 15\text{ V}$; $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$		2.3 2.8	V V	
$V_{GE(th)}$	$I_C = 1\text{ mA}$; $V_{GE} = V_{CE}$	4.5		6.5 V	
I_{CES}	$V_{CE} = V_{CES}$; $V_{GE} = 0\text{ V}$; $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$			0.8 mA 4.4 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, $T_{VJ} = 125^{\circ}\text{C}$ $V_{CE} = 300\text{ V}$; $I_C = 40\text{ A}$ $V_{GE} = 15/0\text{ V}$; $R_G = 22\ \Omega$		50 55 300 30	ns ns ns ns	
			1.8 1.4	mJ mJ	
C_{ies}		$V_{CE} = 25\text{ V}$; $V_{GE} = 0\text{ V}$; $f = 1\text{ MHz}$		2.8	nF
R_{thJC}		(per IGBT)			0.6 KW

Output Inverter Reverse Diodes (FRED)

Symbol	Conditions	Maximum Ratings	
I_{F25}	$T_C = 25^{\circ}\text{C}$	56	A
I_{F80}	$T_C = 80^{\circ}\text{C}$	35	A

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
V_F	$I_F = 40\text{ A}$; $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$		2.32 1.58	V V
I_{RM} t_{rr}	$I_F = 30\text{ A}$; $di_F/dt = 500\text{ A}/\mu\text{s}$; $T_{VJ} = 125^{\circ}\text{C}$ $V_R = 300\text{ V}$; $V_{GE} = 0\text{ V}$		15 70	A ns
R_{thJC}				1.3 KW

Brake Chopper IGBT

Symbol	Conditions	Maximum Ratings	
V_{CES}	$T_{VJ} = 25^{\circ}\text{C}$ to 150°C	600	V
V_{GES}		± 20	V
I_{C25}	$T_C = 25^{\circ}\text{C}$	42.5	A
I_{C80}	$T_C = 80^{\circ}\text{C}$	29	A
I_{CM} V_{CEK}	$V_{GE} = \pm 15\text{ V}$; $R_G = 33\ \Omega$; $T_{VJ} = 125^{\circ}\text{C}$ RBSOA, Clamped inductive load; $L = 100\ \mu\text{H}$	60	A
		V_{CES}	
t_{SC} (SCSOA)	$V_{CE} = V_{CES}$; $V_{GE} = \pm 15\text{ V}$; $R_G = 33\ \Omega$; $T_{VJ} = 125^{\circ}\text{C}$ 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.
$V_{CE(sat)}$	$I_C = 50\text{ A}$; $V_{GE} = 15\text{ V}$; $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$	2.4	2.9	V
		2.9		V
$V_{GE(th)}$	$I_C = 0.7\text{ mA}$; $V_{GE} = V_{CE}$	4.5		6.5 V
I_{CES}	$V_{CE} = V_{CES}$; $V_{GE} = 0\text{ V}$; $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$			0.6 mA
				1.7 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, $T_{VJ} = 125^{\circ}\text{C}$ $V_{CE} = 300\text{ V}$; $I_C = 30\text{ A}$ $V_{GE} = 15/0\text{ V}$; $R_G = 33\ \Omega$		50	ns
			50	ns
			270	ns
			40	ns
			1.4	mJ
		1.0	mJ	
C_{ies}	$V_{CE} = 25\text{ V}$; $V_{GE} = 0\text{ V}$; $f = 1\text{ MHz}$		16	nF
R_{thJC}	(per IGBT)			0.96 K/W

Brake Chopper Diode (FRED)

Symbol	Conditions	Maximum Ratings	
I_{F25}	$T_C = 25^{\circ}\text{C}$	30	A
I_{F80}	$T_C = 80^{\circ}\text{C}$	19	A

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
V_F	$I_F = 30\text{ A}$; $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$	2.57	2.84	V
		1.8		V
I_{RM} t_{rr}	$I_F = 15\text{ A}$; $di_f/dt = 400\text{ A}/\mu\text{s}$; $T_{VJ} = 125^{\circ}\text{C}$ $V_R = 300\text{ V}$; $V_{GE} = 0\text{ V}$	7		A
		50		ns
R_{thJC}				2.3 K/W

Temperature Sensor NTC

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
R_{25}	$T = 25^{\circ}\text{C}$	4.75	5.0	5.25 k Ω
$B_{25/50}$			3375	K

Module

Symbol	Conditions	Maximum Ratings	
T_{VJ}		-40...+125	$^{\circ}\text{C}$
T_{stg}		-40...+125	$^{\circ}\text{C}$
V_{ISOL}	$I_{ISOL} \leq 1 \text{ mA}; 50/60 \text{ Hz}$	2500	V~
M_d	Mounting torque (M5)	3 26	Nm lb.in.
a	Max. allowable acceleration	50	m/s^2

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
d_s	Creepage distance on surface (Pin to heatsink)	11.2		mm
d_A	Strike distance in air (Pin to heatsink)	11.2		mm
Weight		86		g

Package style and outline

Dimensions in mm (1mm = 0.0394")

