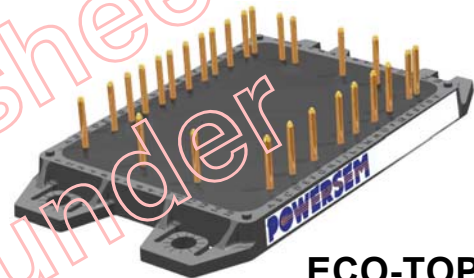


V4 V7

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 $\text{K/W}$

### 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 $150^{\circ}\text{C}$	600	V
$V_{GES}$		$\pm 20$	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	$\mu\text{s}$
$P_{tot}$	$T_C = 25^{\circ}\text{C}$	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
		2.8		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		ns
		55		ns
		300		ns
		30		ns
		1.8		mJ
		1.4		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	K/W

### 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	2.59	V
		1.58		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		A
		70		ns
$R_{thJC}$			1.3	K/W

### Brake Chopper IGBT

Symbol	Conditions	Maximum Ratings	
$V_{CES}$	$T_{VJ} = 25^{\circ}\text{C}$ to $150^{\circ}\text{C}$	600	V
$V_{GES}$		$\pm 20$	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	$\mu\text{s}$
$P_{tot}$	$T_C = 25^{\circ}\text{C}$	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 $\Omega$
$B_{25/50}$			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	$\text{m/s}^2$

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")

