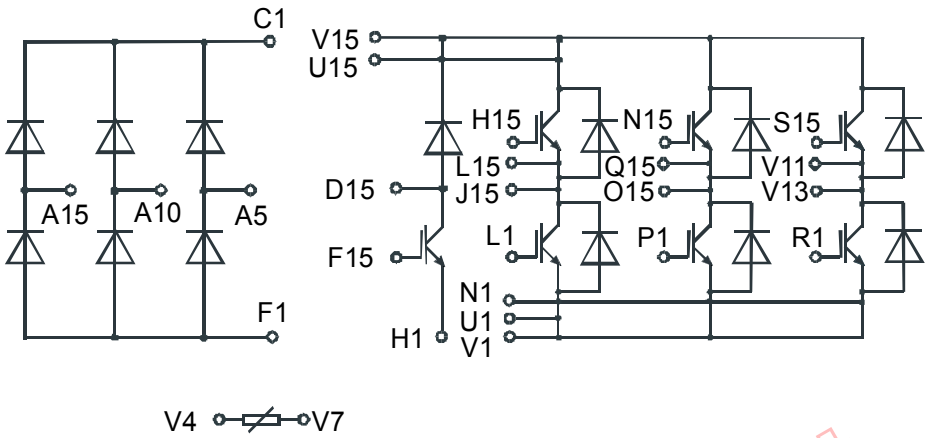
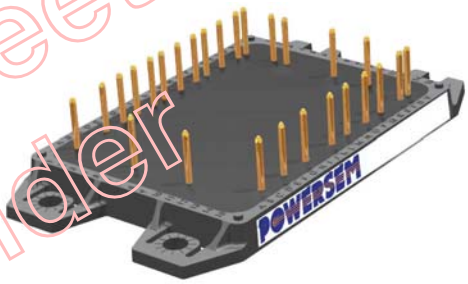
Converter - Brake - Inverter Module

PSIPM 35/12

Preliminary Data Sheet



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



ECO-TOP™ 1

Input Rectifiers

Symbol	Test Conditions	Maximum Ratings	
I^*_{dAV}	T_C = 100 °C, (per circuit)	68	A
I_{FSM}	T_{VJ} = 25°C; t = 10 ms; sin 50 Hz	300	A
V_{RRM}		1600	V

Symbol	Test Conditions		Characteristic Value	
I_R	$V_R = V_{RRM}$, $T_{VJ} = T_{VJM}$	≤	3	mA
	$V_R = V_{RRM}$, T_{VJ} = 25°C	≤	0.5	mA
V_F	I_F = 55 A, T_{VJ} = 25 °C	≤	1.46	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.

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 hiperfast 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

POWERSEM GmbH, Walpersdorfer Str. 53
D - 91126 Schwabach
Phone: 09122 - 9764 - 0 FAX: 09122 - 9764 - 20

Output Inverter IGBTs

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

Symbol	Conditions	Characteristic Values (T_{VJ} = 25°C, unless otherwise specified) min.	typ.	max.	
$V_{CE(sat)}$	I_C = 50 A; V_{GE} = 15 V; T_{VJ} = 25°C		3.1	3.7	V
	T_{VJ} = 125°C		3.5		V
$V_{GE(th)}$	I_C = 1 mA; V_{GE} = V_{CE}	4.5		6.5	V
I_{CES}	V_{CE} = V_{CES}; V_{GE} = 0 V; T_{VJ} = 25°C			1.1	mA
	T_{VJ} = 125°C			4.2	mA
I_{GES}	V_{CE} = 0 V; V_{GE} = ± 20 V			180	nA
$t_{d(on)}$	Inductive load, T_{VJ} = 125°C		100		ns
t_r	V_{CE} = 600 V; I_C = 30 A		70		ns
$t_{d(off)}$	V_{GE} = 15/0 V; R_G = 47 Ω		500		ns
t_f			70		ns
E_{on}			4.6		mJ
E_{off}			3.4		mJ
C_{ies}	V_{CE} = 25 V; V_{GE} = 0 V; f = 1 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°C	49	A
I_{F80}	T_C = 80°C	31	A

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

POWERSEM GmbH, Walpersdorfer Str. 53
D - 91126 Schwabach
Phone: 09122 - 9764 - 0 FAX: 09122 - 9764 - 20

Brake Chopper IGBT

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

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

Brake Chopper Diode (FRED)

Symbol	Conditions	Maximum Ratings	
I_{F25}	T_C = 25°C	26	A
I_{F80}	T_C = 80°C	17	A

Symbol	Conditions	Characteristic Values min.	typ.	max.	
V_F	I_F = 17.5 A; T_{VJ} = 25°C		2.48	2.79	V
	T_{VJ} = 125°C		1.84		V
I_{RM}	I_F = 15 A; di_F/dt = 400 A/µs; T_{VJ} = 125°C		16		A
t_{rr}	V_R = 600 V; V_{GE} = 0 V		130		ns
R_{thJC}				2.3	K/W

POWERSEM GmbH, Walpersdorfer Str. 53
D - 91126 Schwabach
Phone: 09122 - 9764 - 0 FAX: 09122 - 9764 - 20

Temperature Sensor NTC

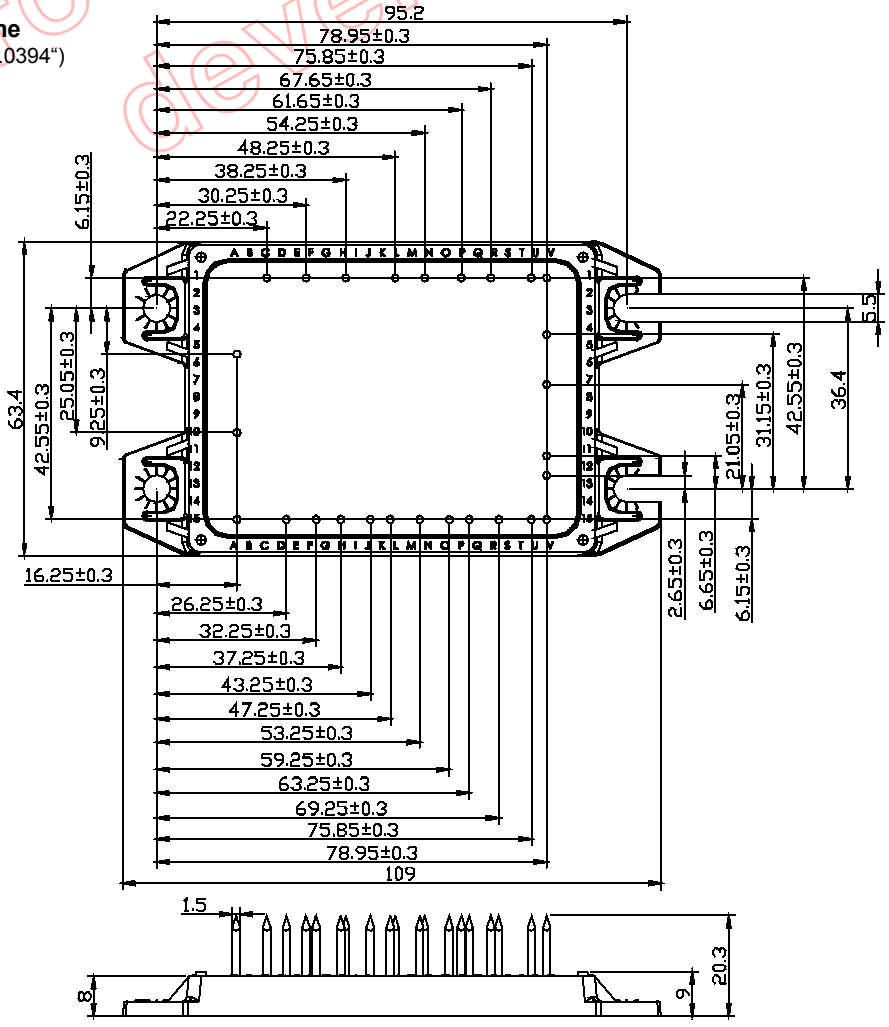
Symbol	Conditions	Characteristic Values min.	typ.	max.	
R_{25}	T = 25°C	4.75	5.0	5.25	kΩ
$B_{25/50}$			3375		K

Module

Symbol	Conditions	Maximum Ratings	
T_{VJ}		-40...+125	°C
T_{stg}		-40...+125	°C
V_{ISOL}	I_{ISOL} ≤ 1 mA; 50/60 Hz	2500	V~
M_d	Mounting torque (M5)	3	Nm
		26	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")



POWERSEM GmbH, Walpersdorfer Str. 53
D - 91126 Schwabach
Phone: 09122 - 9764 - 0 FAX: 09122 - 9764 - 20