Tyco Electronics

V23990-P767-A-PM
taget datasheet

flow PIM 2 — 1200V/35A

Features

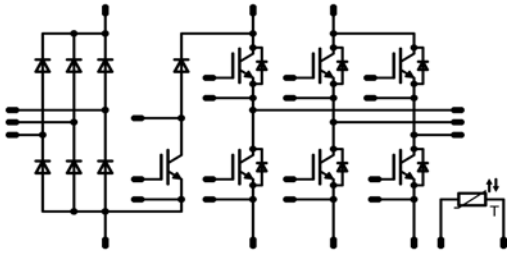
- 3~rectifier,BRC,Inverter, NTC
- Very Compact housing, easy to route
- IGBT4/ EmCon4 technology for low saturation losses and improved EMC behavior

flowPIM2 housing

Target Applications

- Motor Drives
- Power Generation

Schematic



Types

- V23990-P767-A-PM

Maximum Ratings

Parameter	Symbol	Condition		Value	Unit
Input Rectifier Diode					
Repetitive peak reverse voltage	V_{RRM}			1600	V
Forward current per diode	I_{FAV}	DC current	T_h=80°C T_c=80°C	40	A
Surge forward current	I_{FSM}	t_p=10ms	T_j=25°C	400	A
I^2t-value	I^2t			800	A2s
Power dissipation per Diode	P_{tot}	T_j=$T_j$max	T_h=80°C T_c=80°C	58	W
Maximum junction temperature	$T_j$max			150	°C
Transistor Inverter					
Collector-emitter break down voltage	V_{CE}			1200	V
DC collector current	I_C	T_j=$T_j$max	T_h=80°C T_c=80°C	39	A
Repetitive peak collector current	I_{cpuls}	tp limited by $T_j$max		105	A
Power dissipation per IGBT	P_{tot}	T_j=$T_j$max	T_h=80°C T_c=80°C	112	W
Gate-emitter peak voltage	V_{GE}			±20	V
Short circuit ratings*	t_{SC} V_{CC}	Tj≤150°C VCC		10 800	µs V
Maximum junction temperature	$T_j$max			175	°C

* It is recommended to not exceed 1000 short circuit situations in the lifetime of the module and to allow at least 1s between short circuits

Maximum Ratings

Parameter	Symbol	Condition		Value	Unit
Diode Inverter					
Peak Repetitive Reverse Voltage	V_{RRM}			1200	V
DC forward current	I_F	$T_j=T_j max$	T_h=80°C T_c=80°C	40	A
Repetitive peak forward current	I_{FRM}	tp limited by $T_j max$		70	A
Power dissipation per Diode	P_{tot}	$T_j=T_j max$	T_h=80°C T_c=80°C	83	W
Maximum junction temperature	$T_j max$			175	°C
Transistor BRC					
Collector-emitter break down voltage	V_{CE}			1200	V
DC collector current	I_C	$T_j=T_j max$	T_h=80°C T_c=80°C	34	A
Repetitive peak collector current	I_{cpuls}	tp limited by $T_j max$	T_h=80°C	75	A
Power dissipation per IGBT	P_{tot}	$T_j=T_j max$	T_h=80°C T_c=80°C	109	W
Gate-emitter peak voltage	V_{GE}			±20	V
Short circuit ratings*	t_{SC} V_{CC}	Tj≤150°C VCC		10 800	µs V
Maximum junction temperature	$T_j max$			175	°C
BRC inverse diode					
Peak Repetitive Reverse Voltage	V_{RRM}			1200	V
DC forward current	I_F	$T_j=T_j max$	T_h=80°C T_c=80°C	40	A
Repetitive peak forward current	I_{FRM}	tp limited by $T_j max$	T_h=80°C	400	A
Power dissipation per Diode	P_{tot}	$T_j=T_j max$	T_h=80°C T_c=80°C	37	W
Maximum junction temperature	$T_j max$			175	°C

* It is recommended to not exceed 1000 short circuit situations in the lifetime of the module and to allow at least 1s between short circuits

Maximum Ratings

Parameter	Symbol	Condition		Value	Unit
Diode BRC					
Peak Repetitive Reverse Voltage	V_{RRM}			1200	V
DC forward current	I_F	$T_j=T_j$max	T_h=80°C T_c=80°C	30	A
Repetitive peak forward current	I_{FRM}	tp limited by $T_j$max	T_h=80°C	50	A
Power dissipation per Diode	P_{tot}	$T_j=T_j$max	T_h=80°C T_c=80°C	62	W
Maximum junction temperature	$T_j$max			175	°C
Thermal properties					
Storage temperature	T_{stg}			-40…+125	°C
Operation temperature	T_{op}			-40…+150	°C
Insulation properties					
Insulation voltage	V_{is}	t=1min		4000	Vdc
Creepage distance				min 12,7	mm
Clearance				min 12,7	mm

Characteristic Values

Parameter	Symbol	Conditions					Value			Unit
			V_{GE}(V) or V_{GS}(V)	V_r(V) or V_{CE}(V) or V_{DS}(V)	I_C(A) or I_F(A) or I_D(A)	T(°C)	Min	Typ	Max	
Input Rectifier Bridge										
Forward voltage	V_F				25	Tj=25°C Tj=125°C		1 0,9	1,21 1,1	V
Threshold voltage (for power loss calc. only)	V_{to}					Tj=25°C Tj=125°C			 0,83	V
Slope resistance (for power loss calc. only)	r_t					Tj=25°C Tj=125°C			 0,0066	Ohm
Reverse leakage current	I_r			1600		Tj=25°C Tj=145°C			0,05 1,1	mA
Thermal resistance chip to heatsink per chip	R_{thJH}	Thermal grease thickness≤50um λ = 0,61 W/mK						1,20		K/W
Thermal resistance chip to case per chip	R_{thJC}									
Transistor Inverter										
Gate emitter threshold voltage	$V_{GE(th)}$	VCE=VGE			0,0012	Tj=25°C Tj=125°C	5	5,8	6,5	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		35	Tj=25°C Tj=125°C	1,6	1,85	2,1	V
Collector-emitter cut-off	I_{CES}		0	1200		Tj=25°C Tj=125°C			0,005	mA
Gate-emitter leakage current	I_{GES}		20	0		Tj=25°C Tj=125°C			120	nA
Integrated Gate resistor	R_{gint}							-		Ohm
Turn-on delay time	$t_{d(on)}$	Rg=tbd Ω				Tj=25°C Tj=125°C		tbd		ns
Rise time	t_r					Tj=25°C Tj=125°C		tbd		ns
Turn-off delay time	$t_{d(off)}$					Tj=25°C Tj=125°C		tbd		ns
Fall time	t_f					Tj=25°C Tj=125°C		tbd		ns
Turn-on energy loss per pulse	E_{on}					Tj=25°C Tj=125°C		tbd		mWs
Turn-off energy loss per pulse	E_{off}					Tj=25°C Tj=125°C		tbd		mWs
Input capacitance	C_{ies}	f=1MHz	0	25		Tj=25°C		1,95		nF
Output capacitance	C_{oss}							0,155		nF
Reverse transfer capacitance	C_{rss}							0,115		nF
Gate charge	Q_{Gate}		±15			Tj=25°C		tbd		nC
Thermal resistance chip to heatsink per chip	R_{thJH}	Thermal grease thickness≤50um λ = 0,61 W/mK						0,77		K/W
Thermal resistance chip to case per chip	R_{thJC}									K/W
Diode Inverter										
Diode forward voltage	V_F				35	Tj=25°C Tj=125°C	1,35	1,7	2,05	V
Reverse leakage current	I_{rm}					Tj=25°C Tj=125°C			7,7	mA
Peak reverse recovery current	I_{RRM}	tbd				Tj=25°C Tj=125°C		tbd		A
Reverse recovery time	t_{rr}					Tj=25°C Tj=125°C		tbd		ns
Reverse recovery charge	Q_{rr}					Tj=25°C Tj=125°C		tbd		mC
Peak rate of fall of reverse recovery current	di(rec)max /dt							tbd		A/ms
Reverse recovery energy	Erec					Tj=25°C Tj=125°C		tbd		mWs
Thermal resistance chip to heatsink per chip	R_{thJH}	Thermal grease thickness≤50um λ = 0,61 W/mK						1,07		K/W
Thermal resistance chip to case per chip	R_{thJC}									K/W

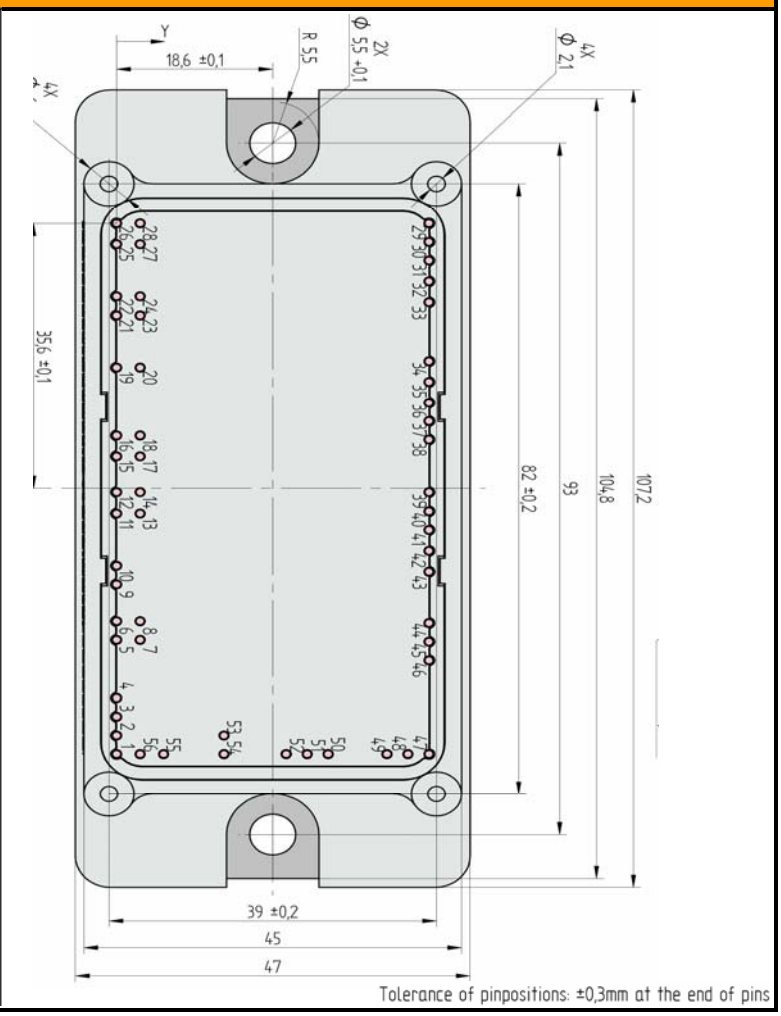
Characteristic Values

Parameter	Symbol	Conditions					Value			Unit
			V_{GE}(V) or V_{GS}(V)	V_r(V) or V_{CE}(V) or V_{DS}(V)	I_C(A) or I_F(A) or I_D(A)	T(°C)	Min	Typ	Max	
Transistor BRC										
Gate emitter threshold voltage	$V_{GE(th)}$	VCE=VGE			0,00085	Tj=25°C Tj=125°C	5	5,8	6,5	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		25	Tj=25°C Tj=125°C	1,6	1,85	2,1	V
Collector-emitter cut-off	I_{CES}		0	1200		Tj=25°C Tj=125°C			0,0024	mA
Gate-emitter leakage current	I_{GES}		20	0		Tj=25°C Tj=125°C			120	nA
Integrated Gate resistor	R_{gint}							-		Ohm
Turn-on delay time	$t_{d(on)}$	R=tbdΩ				Tj=25°C Tj=125°C		tbd		ns
Rise time	t_r					Tj=25°C Tj=125°C		tbd		ns
Turn-off delay time	$t_{d(off)}$					Tj=25°C Tj=125°C		tbd		ns
Fall time	t_f					Tj=25°C Tj=125°C		tbd		ns
Turn-on energy loss per pulse	E_{on}					Tj=25°C Tj=125°C		tbd		mWs
Turn-off energy loss per pulse	E_{off}					Tj=25°C Tj=125°C		tbd		mWs
Input capacitance	C_{ies}	f=1MHz	0	25		Tj=25°C		1,43		nF
Output capacitance	C_{oss}							0,115		nF
Reverse transfer capacitance	C_{rss}							0,085		nF
Gate charge	Q_{Gate}		15			Tj=25°C		tbd		nC
Thermal resistance chip to heatsink per chip	R_{thJH}	Thermal grease thickness≤50um λ = 0,61 W/mK						0,87		K/W
Thermal resistance chip to case per chip	R_{thJC}									K/W
BRC inverse diode										
Diode forward voltage	V_F				10	Tj=25°C Tj=125°C		tbd tbd		V
Reverse leakage current	I_r			600		Tj=25°C Tj=125°C		tbd		uA
Thermal resistance chip to heatsink per chip	R_{thJH}	Thermal foil thickness=76um Kunze foil KU-ALF5						1,87		K/W
Thermal resistance chip to case per chip	R_{thJC}									K/W
Diode BRC										
Diode forward voltage	V_F				25	Tj=25°C Tj=125°C	1,35	1,7	2,05	V
Reverse leakage current	I_r									mA
Peak reverse recovery current	I_{RRM}	Rgon=tbd Ω Rgon=tbd Ω				Tj=25°C Tj=125°C		tbd tbd		A
Reverse recovery time	t_{rr}					Tj=25°C Tj=125°C		tbd tbd		ns
Reverse recovered charge	Q_{rr}					Tj=25°C Tj=125°C		tbd tbd		mC
Peak rate of fall of reverse recovery current	di(rec)max /dt							tbd		A/ms
Reverse recovery energy	E_{rec}					Tj=25°C Tj=125°C		tbd tbd		mWs
Thermal resistance chip to heatsink per chip	R_{thJH}	Thermal foil thickness=76um						1,53		K/W
Thermal resistance chip to case per chip	R_{thJC}									K/W
NTC Thermistor										
Rated resistance	R_{25}	Tol. ±5%				Tj=25°C	20,9	22	23,1	kOhm
Deviation of R100	$D_{R/R}$	R100=1503Ω				Tc=100°C		2,9		%/K
Power dissipation given Epcos-Type	P					Tj=25°C		210		mW
B-value	$B_{(25/100)}$	Tol. ±3%				Tj=25°C		3980		K

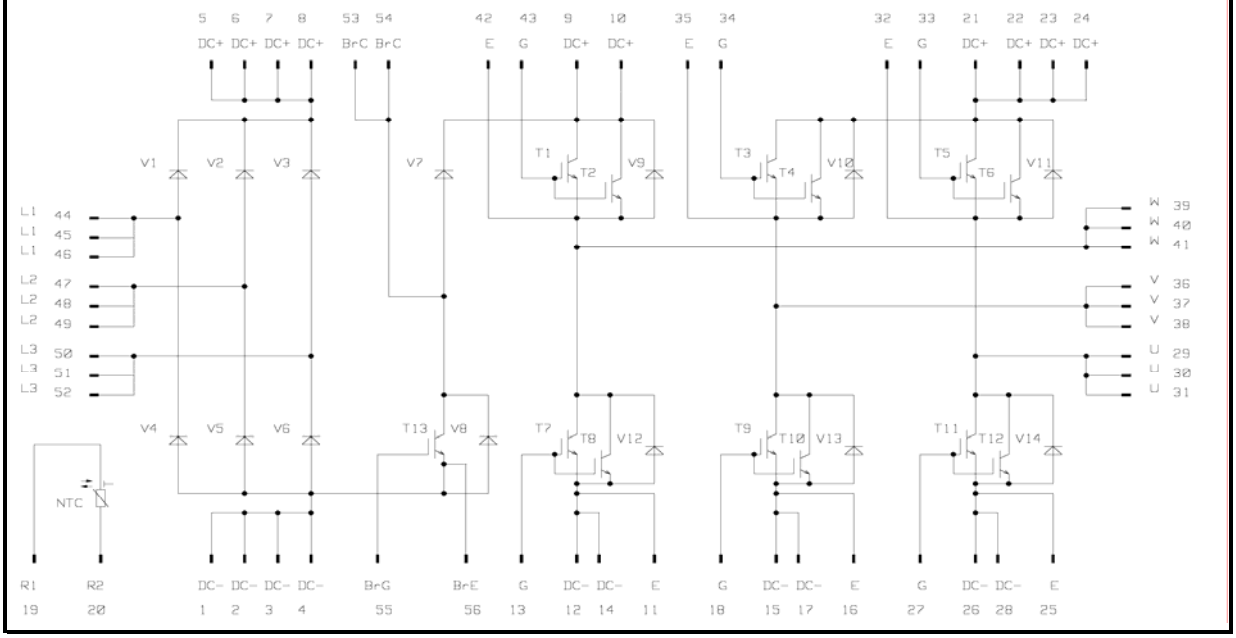
Package Outline and Pinout

Outline

Pin table				Pin table			
Pin		X	Y	Pin		X	Y
1	DC -	71,2	0	29	U	0	37,2
2	DC -	68,7	0	30	U	2,5	37,2
3	DC -	66,2	0	31	U	5	37,2
4	DC -	63,7	0	32	E	7,8	37,2
5	DC +	55,95	0	33	G	10,6	37,2
6	DC +	53,45	0	34	G	18,45	37,2
7	DC +	55,95	2,8	35	E	21,25	37,2
8	DC +	53,45	2,8	36	V	24,05	37,2
9	DC +	48,4	0	37	V	26,55	37,2
10	DC +	45,9	0	38	V	29,05	37,2
11	E	38,9	0	39	W	36,1	37,2
12	DC -	36,1	0	40	W	38,6	37,2
13	G	38,9	2,8	41	W	41,1	37,2
14	DC -	36,1	2,8	42	E	43,9	37,2
15	DC -	31,3	0	43	G	46,7	37,2
16	E	28,5	0	44	L1	53,7	37,2
17	DC -	31,3	2,8	45	L1	56,2	37,2
18	G	28,5	2,8	46	L1	58,7	37,2
19	R2	19,3	0	47	L2	71,2	37,2
20	R1	19,3	2,8	48	L2	71,2	34,7
21	DC +	12,3	0	49	L2	71,2	32,2
22	DC +	9,8	0	50	L3	71,2	25,2
23	DC +	12,3	2,8	51	L3	71,2	22,7
24	DC +	9,8	2,8	52	L3	71,2	20,2
25	E	2,8	0	53	BrC	68,7	12,8
26	DC -	0	0	54	BrC	71,2	12,8
27	G	2,8	2,8	55	BrG	71,2	5,6
28	DC -	0	2,8	56	BrE	71,2	2,8



Pinout



PRODUCT STATUS DEFINITIONS

Datasheet Status	Product Status	Definition
Target	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice. The data contained is exclusively intended for technically trained staff.
Preliminary	First Production	This datasheet contains preliminary data, and supplementary data may be published at a later date. Tyco Electronics reserves the right to make changes at any time without notice in order to improve design. The data contained is exclusively intended for technically trained staff.
Final	Full Production	This datasheet contains final specifications. Tyco Electronics reserves the right to make changes at any time without notice in order to improve design. The data contained is exclusively intended for technically trained staff.

DISCLAIMER

Tyco Electronics reserves the right to make changes without further notice to any products herein to improve reliability, function or design. Tyco Electronics does not assume any liability arising out of the application or use of any product or circuit described herein; neither does it convey any license under its patent rights, nor the rights of others.

LIFE SUPPORT POLICY

Tyco Electronics products are not authorised for use as critical components in life support devices or systems without the express written approval of Tyco Electronics.

As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in labelling can be reasonably expected to result in significant injury to the user.

2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.