

flowPIM 1 3rd gen
1200V/25A
Features

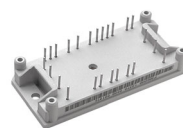
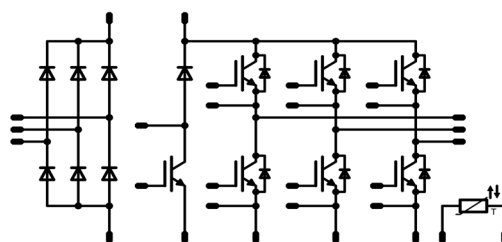
- 3~ rectifier, BRC, Inverter, NTC
- Very compact housing, easy to route
- IGBT4 / EmCon4 technology for low saturation losses and improved EMC behaviour

Target Applications

- Motor Drives
- Power Generation

Types

- V23990-P589-A41-PM

flowPIM1 housing

Schematic


Maximum Ratings

 $T_j = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Condition	Value	Unit
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Input Rectifier Diode

Repetitive peak reverse voltage	V_{RRM}		1600	V
Forward current per diode	I_{FAV}	DC current $T_h = 80^\circ\text{C}$	33	A
Surge forward current	I_{FSM}	$t_p = 10\text{ms}$ $T_j = 25^\circ\text{C}$	250	A
I^2t -value	I^2t		310	A^2s
Power dissipation per Diode	P_{tot}	$T_j = T_{jmax}$ $T_h = 80^\circ\text{C}$	38	W
Maximum Junction Temperature	T_{jmax}		150	$^\circ\text{C}$

Inverter Transistor

Collector-emitter break down voltage	V_{CE}		1200	V
DC collector current	I_C	$T_j = T_{jmax}$ $T_h = 80^\circ\text{C}$	27	A
Repetitive peak collector current	I_{Cpulse}	t_p limited by T_{jmax} $T_h = 80^\circ\text{C}$	75	A
Power dissipation per IGBT	P_{tot}	$T_j = T_{jmax}$ $T_h = 80^\circ\text{C}$	72	W
Gate-emitter peak voltage	V_{GE}		± 20	V
Short circuit ratings	t_{SC} V_{CC}	$T_j \leq 150^\circ\text{C}$ $V_{GE} = 15\text{V}$	10 800	μs V
Maximum Junction Temperature	T_{jmax}		175	$^\circ\text{C}$

Maximum Ratings

 $T_j=25^{\circ}\text{C}$, unless otherwise specified

Parameter	Symbol	Condition	Value	Unit
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Inverter Diode

Peak Repetitive Reverse Voltage	V_{RRM}	$T_j=25^{\circ}\text{C}$	1200	V
DC forward current	I_F	$T_j=T_{jmax}$ $T_h=80^{\circ}\text{C}$	27	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax} $T_h=80^{\circ}\text{C}$	50	A
Power dissipation per Diode	P_{tot}	$T_j=T_{jmax}$ $T_h=80^{\circ}\text{C}$	51	W
Maximum Junction Temperature	T_{jmax}		175	$^{\circ}\text{C}$

BRC Transistor

Collector-emitter break down voltage	V_{CE}		1200	V
DC collector current	I_C	$T_j=T_{jmax}$ $T_h=80^{\circ}\text{C}$	20	A
Repetitive peak collector current	I_{Cpuls}	$t_p=1\text{ms}$ $T_h=80^{\circ}\text{C}$	45	A
Power dissipation per IGBT	P_{tot}	$T_j=T_{jmax}$ $T_h=80^{\circ}\text{C}$	64	W
Gate-emitter peak voltage	V_{GE}		± 20	V
Short circuit ratings	t_{SC} V_{CC}	$T_j \leq 150^{\circ}\text{C}$ $V_{GE}=15\text{V}$	10 800	μs V
Maximum Junction Temperature	T_{jmax}		175	$^{\circ}\text{C}$

BRC Diode

Peak Repetitive Reverse Voltage	V_{RRM}	$T_j=25^{\circ}\text{C}$	1200	V
DC forward current	I_F	$T_j=T_{jmax}$ $T_h=80^{\circ}\text{C}$	16	A
Repetitive peak forward current	I_{FRM}	$t_p=1\text{ms}$ $T_h=80^{\circ}\text{C}$	20	A
Power dissipation per Diode	P_{tot}	$T_j=T_{jmax}$ $T_h=80^{\circ}\text{C}$	39	W
Maximum Junction Temperature	T_{jmax}		175	$^{\circ}\text{C}$

Thermal properties

Storage temperature	T_{stg}		$-40 \dots +125$	$^{\circ}\text{C}$
Operation temperature under switching condition	T_{op}		$-40 \dots +T_{jmax}-25$	$^{\circ}\text{C}$

Insulation properties

Insulation voltage	V_{is}	$t=1\text{min}$	4000	V_{DC}
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 _o [A]	T _j	Min	Typ	Max	
Input Rectifier Diode										
Forward voltage	V _F				50	T _j =25°C T _j =125°C	0.8	1.31 1.32	1.6	V
Threshold voltage (for power loss calc. only)	V _{Io}					T _j =25°C T _j =125°C		0.93 0.83		V
Slope resistance (for power loss calc. only)	r _t					T _j =25°C T _j =125°C		0.008 0.01		Ω
Reverse current	I _r			1500		T _j =25°C T _j =150°C		2	0.02	mA
Thermal resistance chip to heatsink per chip	R _{thJH}	Thermal grease thickness≤50μm λ=0.61W/mK						1.78		K/W
Thermal resistance chip to case per chip	R _{thJC}						n.A.			
Transistor Inverter										
Gate emitter threshold voltage	V _{GE(th)}	VCE=VGE			0.00085	T _j =25°C T _j =150°C	5	5.8	6.5	V
Collector-emitter saturation voltage	V _{CE(sat)}		15		25	T _j =25°C T _j =150°C		1.87 2.32	2.2	V
Collector-emitter cut-off current incl. Diode	I _{CES}		0	1200		T _j =25°C T _j =150°C			0.25	mA
Gate-emitter leakage current	I _{GES}		20	0		T _j =25°C T _j =150°C			200	nA
Integrated Gate resistor	R _{gint}							none		Ω
Turn-on delay time	t _{d(on)}	Rgoff=32Ohm Rgon=32Ohm	±15	600	25	T _j =25°C T _j =150°C		127		ns
Rise time	t _r					T _j =25°C T _j =150°C		32		
Turn-off delay time	t _{d(off)}					T _j =25°C T _j =150°C		286		
Fall time	t _f					T _j =25°C T _j =150°C		118		
Turn-on energy loss per pulse	E _{on}					T _j =25°C T _j =150°C		3		mWs
Turn-off energy loss per pulse	E _{off}	T _j =25°C T _j =150°C		2.16						
Input capacitance	C _{ies}	f=1MHz	0	25		T _j =25°C		1.43		nF
Output capacitance	C _{oss}							0.115		
Reverse transfer capacitance	C _{rss}							0.085		
Gate charge	Q _{Gate}		±15	600	25	T _j =25°C T _j =150°C		120		nC
Thermal resistance chip to heatsink per chip	R _{thJH}	Thermal grease thickness≤50μm λ=0.61W/mK						1.31		K/W
Thermal resistance chip to case per chip	R _{thJC}						n.A.			
Diode Inverter										
Diode forward voltage	V _F				25	T _j =25°C T _j =150°C		1.93 1.91	2.2	V
Reverse leakage current	I _R			1200		T _j =25°C T _j =150°C			10	μA
Peak reverse recovery current	I _{RRM}	Rgoff=32Ohm Rgon=32Ohm	±15	600	25	T _j =25°C T _j =150°C		21.68		A
Reverse recovery time	t _{rr}					T _j =25°C T _j =150°C		588		ns
Reverse recovered charge	Q _{rr}					T _j =25°C T _j =150°C		4.94		μC
Peak rate of fall of recovery current	di(rec)max /dt					T _j =25°C T _j =150°C		48		A/μs
Reverse recovered energy	E _{rec}					T _j =25°C T _j =150°C		1.97		mWs
Thermal resistance chip to heatsink per chip	R _{thJH}	Thermal grease thickness≤50μm λ=0.61W/mK						1.85		K/W
Thermal resistance chip to case per chip	R _{thJC}									

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 _b [A]	T _j	Min	Typ	Max	
Transistor BRC										
Gate emitter threshold voltage	V _{GE(th)}	VCE=VGE			0.0005	Tj=25°C Tj=150°C	5	5.8	6.5	V
Collector-emitter saturation voltage	V _{CE(sat)}		30		15	Tj=25°C Tj=150°C	1.6	1.84 1.77	2.3	V
Collector-emitter cut-off	I _{CES}		0	1200		Tj=25°C Tj=150°C			0.005	mA
Gate-emitter leakage current	I _{GES}		20	0		Tj=25°C Tj=150°C			200	nA
Integrated Gate resistor	R _{gint}							0		Ω
Turn-on delay time	t _{d(on)}	Rgon=320hm Rgoff=320hm	±15	600	15	Tj=25°C Tj=150°C		tbd		ns
Rise time	t _r					Tj=25°C Tj=150°C		tbd		
Turn-off delay time	t _{d(off)}					Tj=25°C Tj=150°C		tbd		
Fall time	t _f					Tj=25°C Tj=150°C		tbd		
Turn-on energy loss per pulse	E _{on}					Tj=25°C Tj=150°C		tbd		mWs
Turn-off energy loss per pulse	E _{off}	Tj=25°C Tj=150°C		tbd						
Input capacitance	C _{ies}	f=1MHz	0	25		Tj=25°C		0.9		pF
Output capacitance	C _{oss}							0.08		
Reverse transfer capacitance	C _{rss}							0.055		
Gate charge	Q _{gate}		±15	600	15	Tj=25°C Tj=150°C		tbd		nC
Thermal resistance chip to heatsink per chip	R _{thJH}	Thermal grease thickness≤50μm λ=0.61W/mK						1.47		K/W
Thermal resistance chip to case per chip	R _{thJC}									
Diode BRC										
Diode forward voltage	V _F				10	Tj=25°C Tj=150°C		1.17 0.95	2.2	V
Reverse leakage current	I _r			1200		Tj=25°C Tj=150°C			5	μA
Peak reverse recovery current	I _{RRM}	Rgon=320hm Rgoff=320hm		600	15	Tj=25°C Tj=150°C		tbd		A
Reverse recovery time	t _{rr}					Tj=25°C Tj=150°C		tbd		ns
Reverse recovered charge	Q _{rr}					Tj=25°C Tj=150°C		tbd		μC
Peak rate of fall of recovery current	di(rec)max /dt					Tj=25°C Tj=150°C		tbd		A/μs
Reverse recovery energy	E _{rec}					Tj=25°C Tj=150°C		tbd		mWs
Thermal resistance chip to heatsink per chip	R _{thJH}	Thermal grease thickness≤50μm λ=0.61W/mK						2.43		K/W
Thermal resistance chip to case per chip	R _{thJC}									
Thermistor										
Rated resistance	R					Tj=25°C Tj=125°C	20.9	22 0.75	23.1	kΩ
Operating current	I					Tj=25°C			0.3	mA
Power dissipation	P					Tj=25°C		200		mW
B-value	B _(25/50)	Tol. ±3%				Tj=25°C		3950		K

Outline

[illegible]

Pin table		
Pin	X	Y
29	52,55	25
30	52,55	16,9
31	52,55	8,6
32	52,55	2,8

PRODUCT STATUS DEFINITIONS

Datasheet Status	Product Status	Definition
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