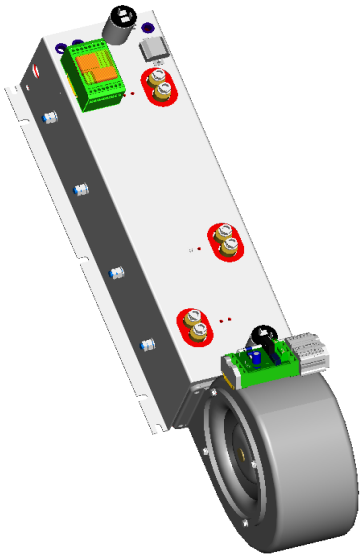
Green Power Solutions Srl
Web: www.gpsemi.it e-mail: info@gpsemi.it
Phone: +39-011-988 2251
Fax: +39-011-988 1358
http://gpsemi.it/pdf/GEM20_066_084.pdf



GEM_066, _076, _084 FAMILY

Green Power Easy Module ®

- ► Electrically insulated metal frame
- ► 3000 V_{RMS} insulation voltage
- ► Line voltage range up to 800 V_{RMS}
- ► High reliability
- ► Modularity
- ► Broad choice of circuit configurations
- ► Fully customizable
- ► Broad range of accessories
- ► Cost effective solution
- ► Suitable for heavy duty applications

Description

This new family of high power modules brings to the high power applications the same compactness, ease of use and scalability of the lower power semiconductor modules. In addition to these typical features (i.e. standard dimensions, electrical insulation, various circuit types, etc.) the new Green Power Easy Module (GEM) family includes many features aimed to simplify their adoption allowing the end users to focus on their core business. These features include:

• embedded air cooling system (heatsink and fan)
• optimised snubber circuits
• pulse transformer modules
• ducted heat flow.

The GEM family can be used for most of the converter cicuits like single and three phase bridges, AC-switches, motor brakes, double wye rectifiers, current source inverters, etc.. Their application range covers all low and high line voltage applications (up to 800 V_{RMS}) such as: electroplating, motor drive, induction heating, welding, temperature co\ntrol, electrolysis, UPS, etc.

Maximum Ratings

Part number / Parameters		GEM_066	GEM_076	GEM_084		Conditions	Units
$I_{T(AV)}$		660	760	840		180° cond, half sine Ta = 40 °C	A
$I_{T(RMS)}$		1036	1193	1319		180° cond, half sine Ta = 40 °C	A
I_{TSM}		29	30	32		50 Hz, Tj = Tjmax V_R = 0 V	kA
I_{TSM}		30.6	31.7	33.8		60 Hz, Tj = Tjmax V_R = 0 V	kA
I^2t		4205	4500	5120		50 Hz, Tj = Tjmax V_R = 0 V	kA^2s
I^2t		3827	4095	4659		60 Hz, Tj = Tjmax V_R = 0 V	kA^2s
V_{DRM}/V_{RRM}		2800	2200	1600		Tj = Tjmax	V
Tjmax		125	125	125			°C

Part Number	V code	V_{DRM} V_{RRM} max repetitive reverse and off-state blocking voltage [V]	I_{DRM} I_{RRM} @ Tjmax [mA]	$V_{L(RMS)}$ maximum suggested RMS line voltage [V]
GEM_084	12	1200	70	400
	16	1600	70	500
GEM_076	22	2200	75	700
GEM_066	28	2800	75	800

On-State Characteristics

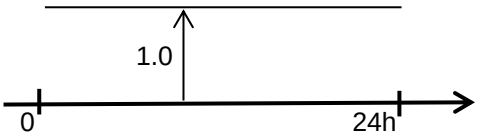
	Parameters		GEM_066	GEM_076	GEM_084		Conditions	Units
$V_{T(TO)}$	Threshold voltage		1.04	0.82	0.80		Tj = Tjmax	V
r_T	On-state slope resistance		0.283	0.230	0.178		Tj = Tjmax	mΩ
I_H	Holding current, max		300	300	300		Tj = 25°C	mA
I_L	Latching current, typ		700	700	700		Tj = 25°C	mA
P_{MAX}	Max power losses		1980	1960	1980		T_A = 40°C	W

Triggering Characteristics

	Parameters		GEM_066	GEM_076	GEM_084		Conditions	Units
V_{GT}	Gate trigger voltage		3.5	3.5	2.5		T_j = 25°C, V_D = 5V	V
I_{GT}	Gate trigger current		300	300	300		T_j = 25°C, V_D = 5V	mA
P_{GM}	Peak gate power dissipation		150	150	150		Pulse width 1 ms	W
$P_{G(AV)}$	Average gate power dissipation		2	2	2			W
I_{FGM}	Peak gate current		10	10	10			A
V_{FGM}	Peak gate voltage (forward)		30	30	10			V
V_{RGM}	Peak gate voltage (reverse)		5	5	12			V

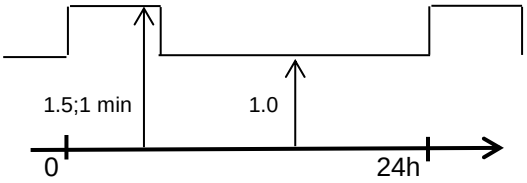
Switching Characteristics

	Parameters		GEM_066	GEM_076	GEM_084		Conditions	Units
di/dt	Critical rate of rise of on-state current		200	200	200		Tj = Tjmax	A/µs
dV/dt	Critical rate of rise of off-state voltage		1000	1000	1000		Tj = Tjmax	V/µs
t_q	Turn-off time, typ		200	200	200		Tj=Tjmax, IT=1000A di/dt=-20A/µs VR=50V dV/dt=20V/µs	µs



Maximum IEC class 1 currents for typical circuit type

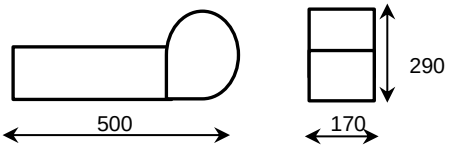
Circuit Type		GEM_066	GEM_076	GEM_084		Conditions	Units
AC switch		1468	1698	1880		T_A = 40 °C delay angle = 0°	A
Center tap		1314	1520	1683		T_A = 40 °C delay angle = 0°	A
Two pulse bridge		1314	1520	1683		T_A = 40 °C delay angle = 0°	A
Six pulse bridge		1872	2130	2396		T_A = 40 °C delay angle = 0°	A
Double star with I.P. transf.		3770	4320	4823		T_A = 40 °C delay angle = 0°	A



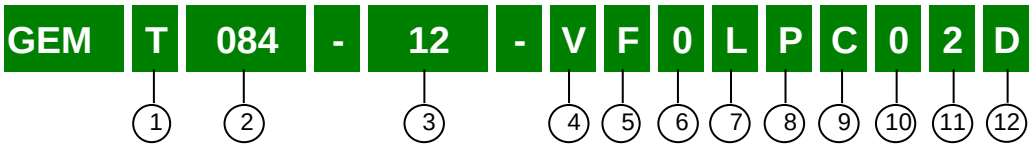
Maximum IEC class 2 currents for typical circuit type

Circuit Type		GEM_066	GEM_076	GEM_084		Conditions	Units
AC switch		1140	1285	1490		T_A = 40 °C delay angle = 0°	A
Center tap		1025	1170	1360		T_A = 40 °C delay angle = 0°	A
Two pulse bridge		1025	1170	1360		T_A = 40 °C delay angle = 0°	A
Six pulse bridge		1440	1625	1950		T_A = 40 °C delay angle = 0°	A
Double star with I.P. transf.		2915	3295	3900		T_A = 40 °C delay angle = 0°	A

Thermal and mechanical characteristics

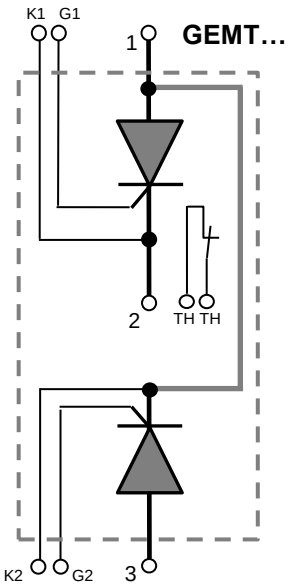
Parameters			GEM_066	GEM_076	GEM_084		Conditions	Units
T_{jmax}	Max operating junction temperature		125	125	125			°C
T_{stg}	Storage temperature		-40 +70	-40 +70	-40 +70			°C
R_{thJA}	Thermal resistance (junction to ambient)		0.086	0.089	0.086		DC operation	°C/W
F	Mounting torque - GEM to panel (+/- 10%)		7	7	7		M6 mounting screw	N·m
	Mounting torque - busbar to GEM (+/- 10%)		14	14	14		M8 mounting screw	N·m
m	Mass, typ		22	22	22		with FAPC options	kg
	Overall dimensions							mm

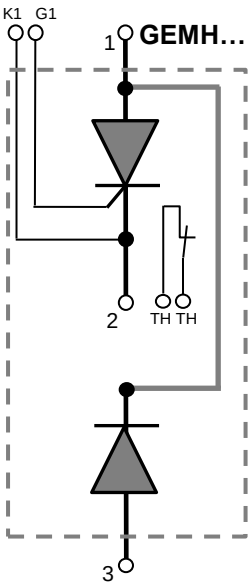
PART-NUMBERING SYSTEM

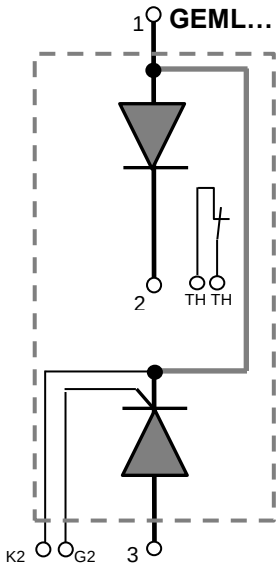


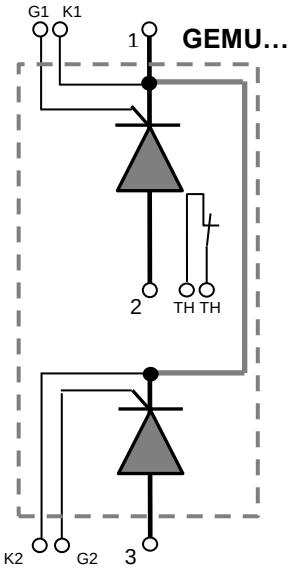
(1) Circuit configuration
(2) GEM average current / 10
(3) GEM blocking voltage / 100
(4) 0 = No fan - V = With 230 V_{RMS} fan - W = With 115 V_{RMS} fan
(5) 0 = No fuse - F = With fuse protetction
(6) 0 = No standard busbar available for this module; please contact factory in case of specific need
(7) 0 = No anti-parallel busbar - L = Anti-parallel busbar
(8) 0 = No pulse transformer - P = With pulse transformer *
(9) 0 = No fan loss detection module - C = With fan loss detection module
(10) 0 = No SCR fault detection module - S = SCR fault detection module (for AC-switch circuits)
(11) 0 = No snubber - 1 = One snubber - 2 = Two snubbers
(12) 0 = No fan-on-demand thermo-switch - D = Fan-on-demand thermo-switch (trip point 50 °C)

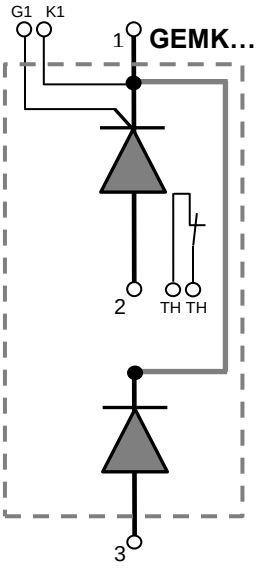
* Pulse transformer GT001 (dual) or GT002 (single) depending on the circuit configuration.
For pulse transformer characteristics see their specific datasheets.

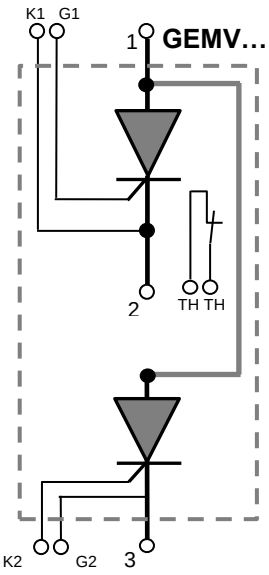


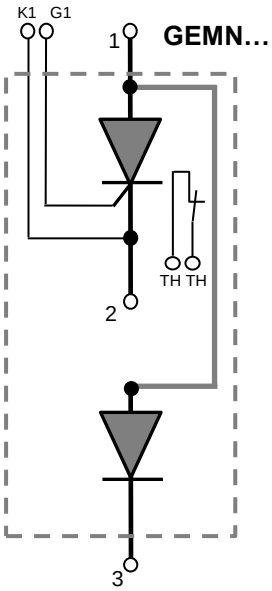




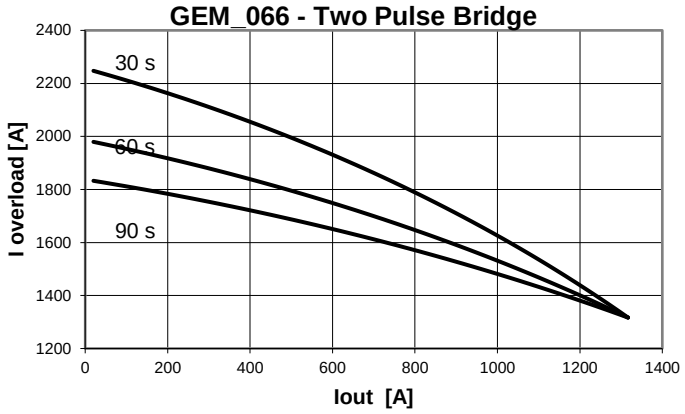


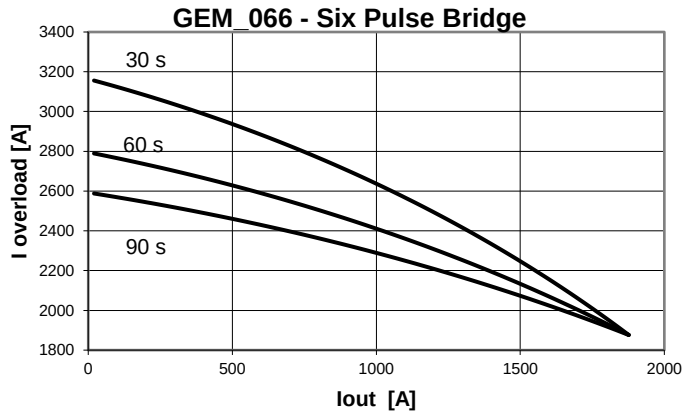


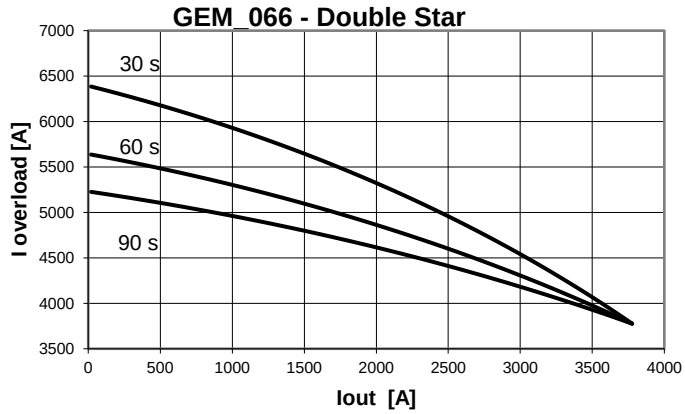




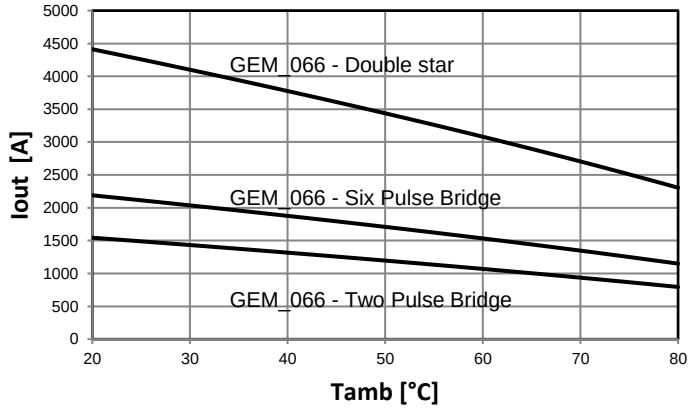
Overload capability at different overload time - Tamb = 40 °C



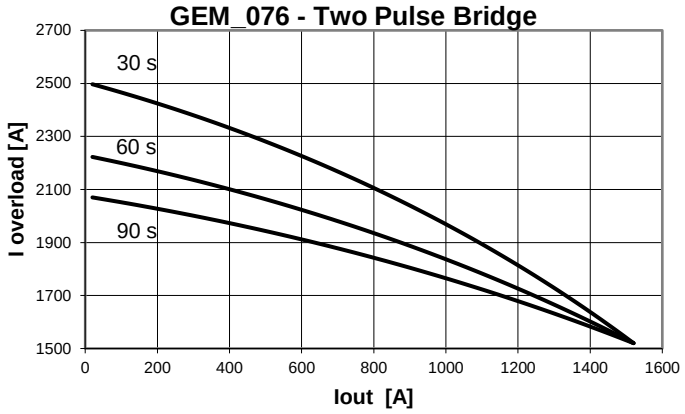


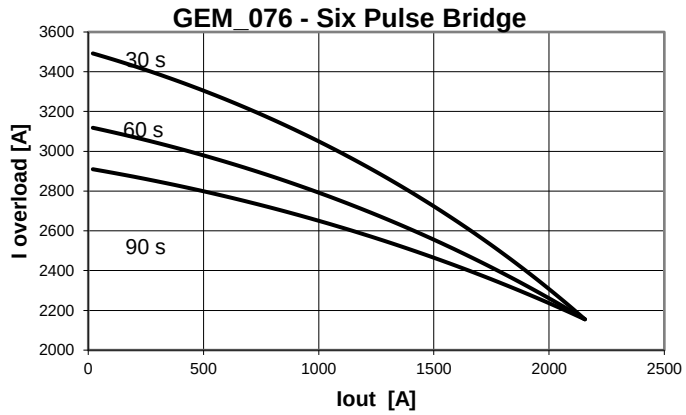


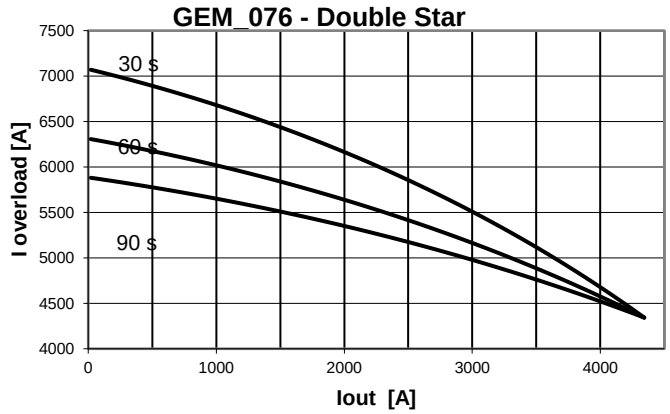
Max output vs Tamb



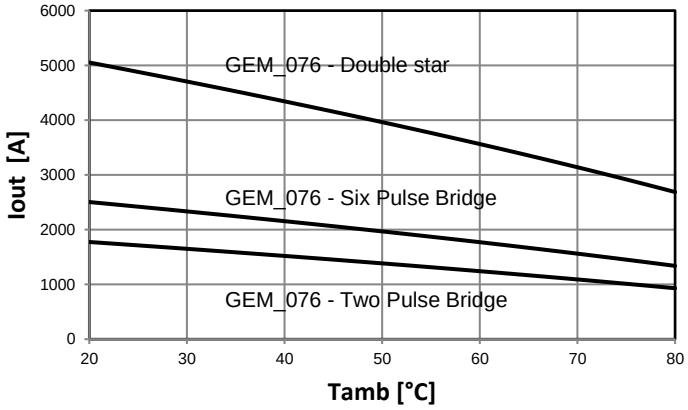
Overload capability at different overload time - Tamb = 40 °C



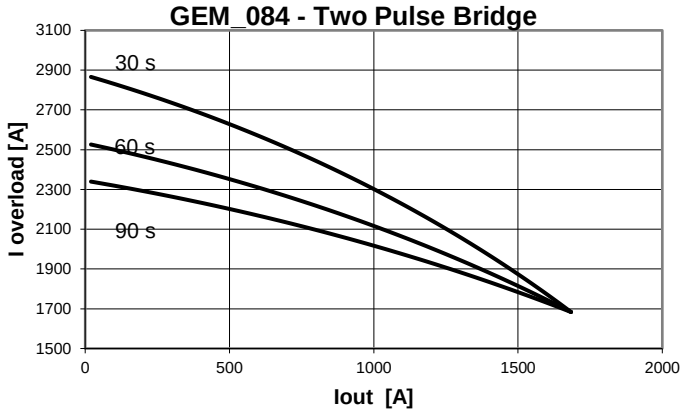


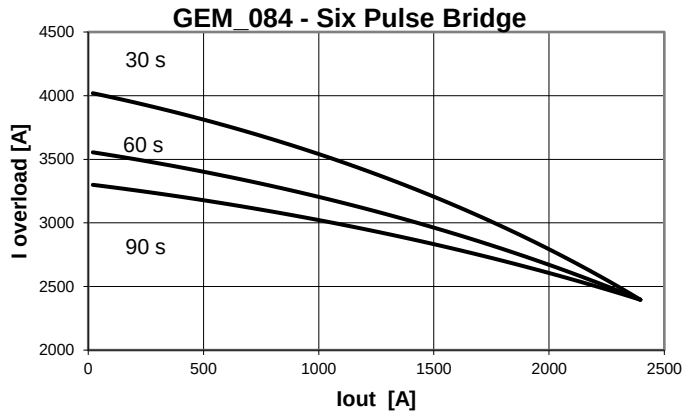


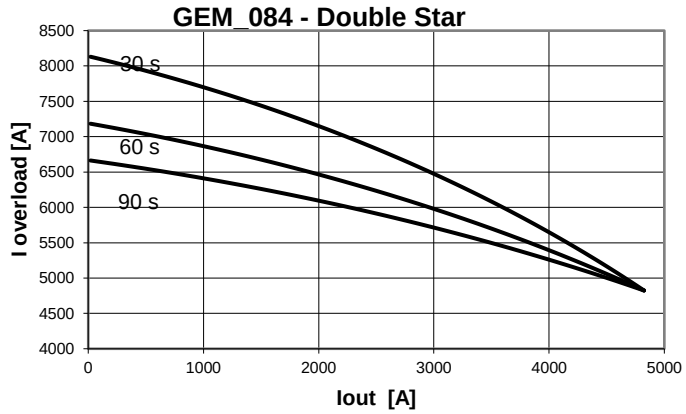
Max output vs Tamb



Overload capability at different overload time - Tamb = 40 °C







Max output vs Tamb