

GEM_099, _107, _115 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 circuits 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 control, electrolysis, UPS, etc.

Maximum Ratings

Parameters	Part number					Conditions	Units
	GEM_099	GEM_107	GEM_115				
I _{T(AV)}	990	1070	1150			180° cond, half sine T _a = 40 °C	A
I _{T(RMS)}	1554	1680	1806			180° cond, half sine T _a = 40 °C	A
I _{TSM}	50	60	57			50 Hz, T _j = T _{jmax} V _R = 0 V	kA
I _{TSM}	52.8	63.3	60.1			60 Hz, T _j = T _{jmax} V _R = 0 V	kA
I ² t	12500	18000	16245			50 Hz, T _j = T _{jmax} V _R = 0 V	kA ² s
I ² t	11375	16380	14783			60 Hz, T _j = T _{jmax} V _R = 0 V	kA ² s
V _{DRM} /V _{RRM}	2800	2200	1800			T _j = T _{jmax}	V
T _{jmax}	125	125	125				°C

Part Number	V code	VDRM VRRM max repetitive reverse and off-state blocking voltage [V]	IDRM IRRM @ Tjmax [mA]	VL(RMS) maximum suggested RMS line voltage [V]
GEM_115	12	1200	200	400
	16	1600	200	500
	18	2200	200	550
GEM_107	22	2200	200	700
GEM_099	28	2800	200	800

On-State Characteristics

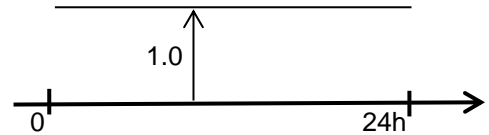
Parameters	GEM_099	GEM_107	GEM_115			Conditions	Units
V _{T(TO)} Threshold voltage	0.9	0.9	0.81			T _j = T _{jmax}	V
r _T On-state slope resistance	0.13	0.09	0.08			T _j = T _{jmax}	mΩ
I _H Holding current, max	300	300	300			T _j = 25°C	mA
I _L Latching current, typ	1500	1000	1500			T _j = 25°C	mA
P _{MAX} Max power losses	2411	2446	2411			T _A = 40°C	W

Triggering Characteristics

Parameters	GEM_099	GEM_107	GEM_115			Conditions	Units
V _{GT} Gate trigger voltage	3	3.5	3			T _j = 25°C, V _D = 5V	V
I _{GT} Gate trigger current	300	350	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	5	2	5				W
I _{FGM} Peak gate current	10	10	10				A
V _{FGM} Peak gate voltage (forward)	25	30	25				V
V _{RGM} Peak gate voltage (reverse)	5	5	5				V

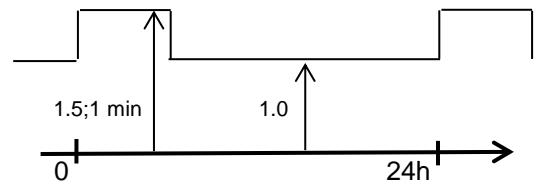
Switching Characteristics

Parameters	GEM_099	GEM_107	GEM_115			Conditions	Units
di/dt Critical rate of rise of on-state current	200	200	200			T _j = T _{jmax}	A/μs
dV/dt Critical rate of rise of off-state voltage	1000	1000	1000			T _j = T _{jmax}	V/μs
t _q Turn-off time, typ	500	500	500			T _j =T _{jmax} , I _T =1000A di/dt=-20A/μs V _R =50V dV/dt=20V/μs	μs



Maximum IEC class 1 currents for typical circuit type

Circuit Type	GEM_099	GEM_107	GEM_115			Conditions	Units
AC switch	2212	2390	2569			T _A = 40 °C delay angle = 0°	A
Center tap	1980	2140	2300			T _A = 40 °C delay angle = 0°	A
Two pulse bridge	1980	2140	2300			T _A = 40 °C delay angle = 0°	A
Six pulse bridge	2835	3100	3310			T _A = 40 °C delay angle = 0°	A
Double star with I.P. transf.	5695	6220	6645			T _A = 40 °C delay angle = 0°	A



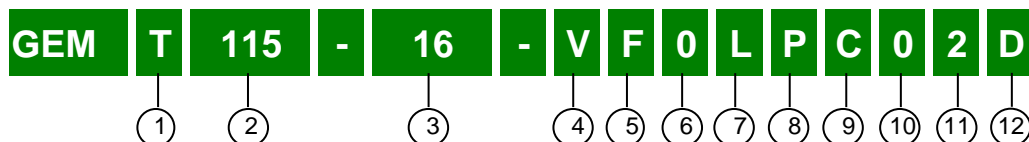
Maximum IEC class 2 currents for typical circuit type

Circuit Type	GEM_099	GEM_107	GEM_115			Conditions	Units
AC switch	1830	1985	2125			T _A = 40 °C delay angle = 0°	A
Center tap	1650	1790	1915			T _A = 40 °C delay angle = 0°	A
Two pulse bridge	1650	1790	1915			T _A = 40 °C delay angle = 0°	A
Six pulse bridge	2365	2585	2760			T _A = 40 °C delay angle = 0°	A
Double star with I.P. transf.	4750	5180	5535			T _A = 40 °C delay angle = 0°	A

Thermal and mechanical characteristics

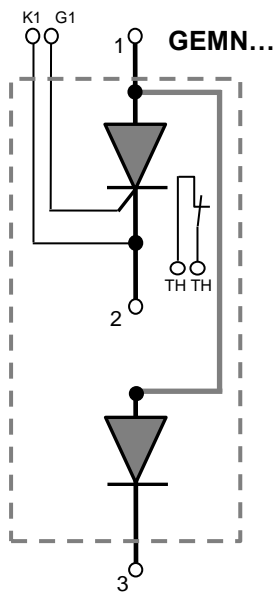
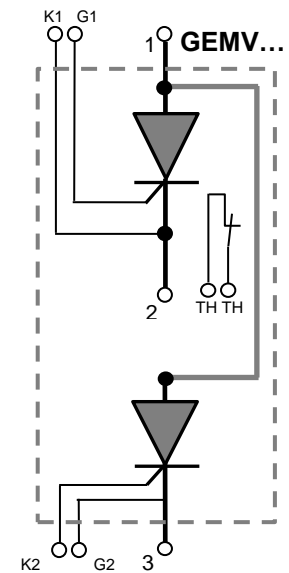
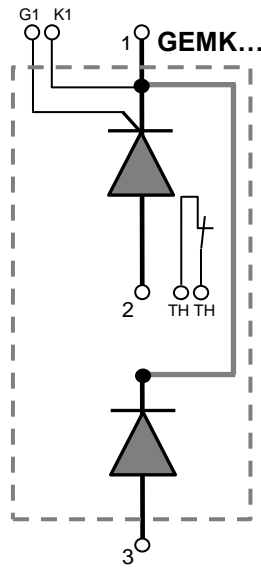
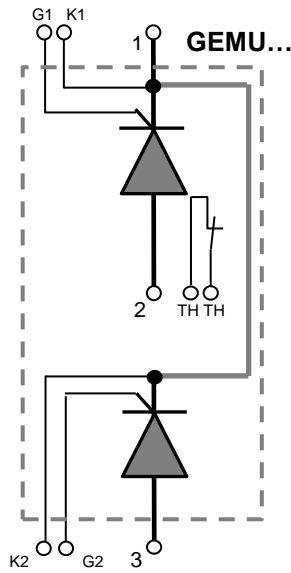
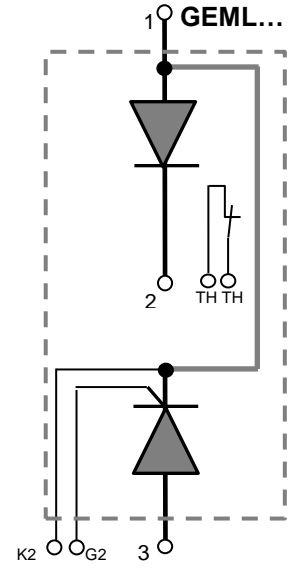
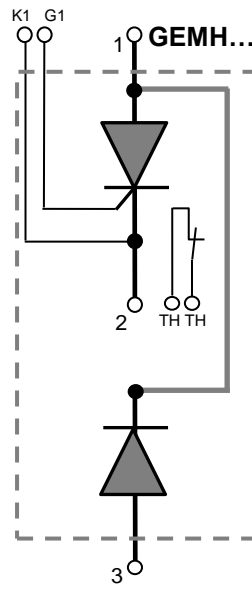
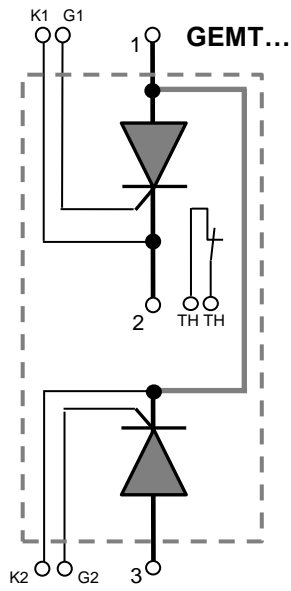
Parameters	GEM_099	GEM_107	GEM_115			Conditions	Units
T _{jmax} Max operating junction temperature	125	125	125				°C
T _{stg} Storage temperature	-40 +70	-40 +70	-40 +70				°C
R _{thJA} Thermal resistance (junction to ambient)	0.071	0.070	0.071			Air velocity = 5 m/s	°C/W
F Mounting torque - GEM to panel (+/- 10%) Mounting torque - busbar to GEM (+/- 10%)	7	7	7			M6 mounting screw	N·m
	14	14	14			M8 mounting screw	N·m
m Mass, typ	30	30	30			module complete with cooling fan	kg
Overall dimensions	<p>500 230 290 170 (*)</p> <p>(*) without fuses</p>						mm

PART-NUMBERING SYSTEM



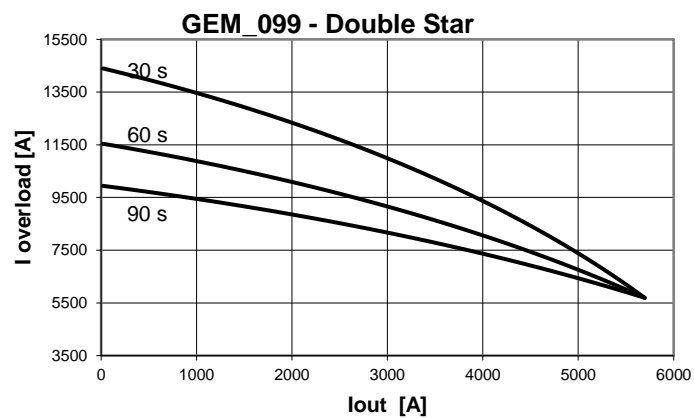
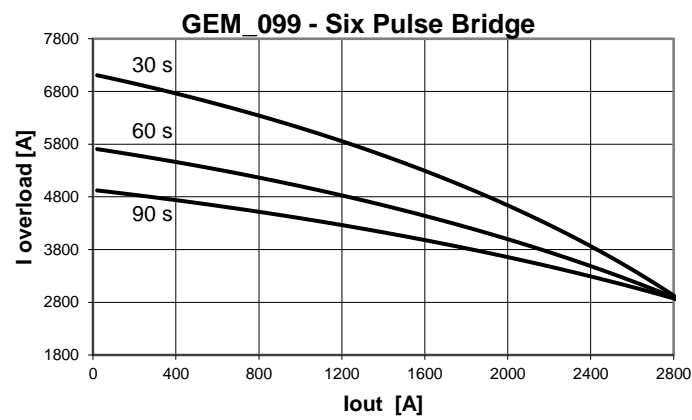
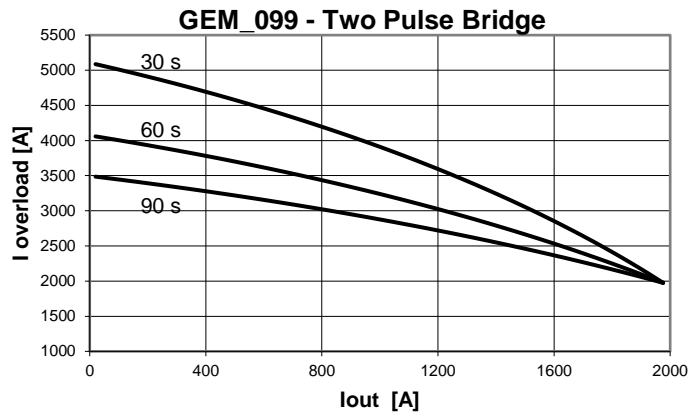
- ① Circuit configuration
- ② GEM average current / 10
- ③ GEM blocking voltage / 100
- ④ 0 = No fan - V = With 230 VRMS fan - W = With 115 VRMS fan
- ⑤ 0 = No fuse - F = with fuse for non-regenerative bridges - R = with fuse for regenerative bridges
- ⑥ 0 = No standard busbar available for this module; 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.

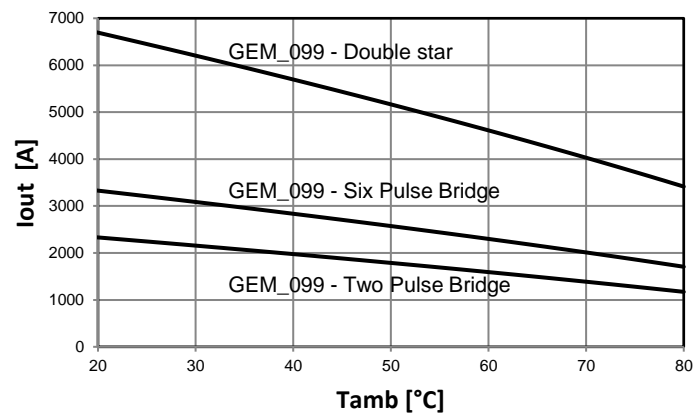


In the interest of product improvement Green Power Solutions reserves the right to change any specification given in this data sheet without notice.

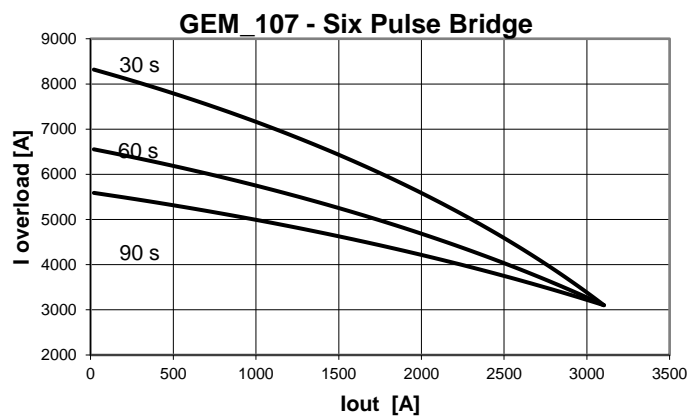
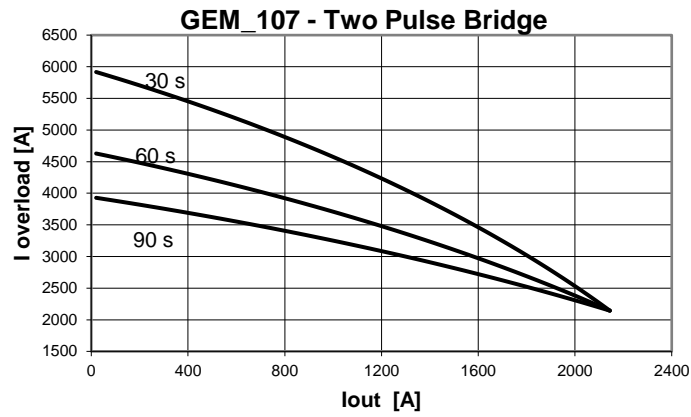
Overload capability at different overload time - Tamb = 40 °C



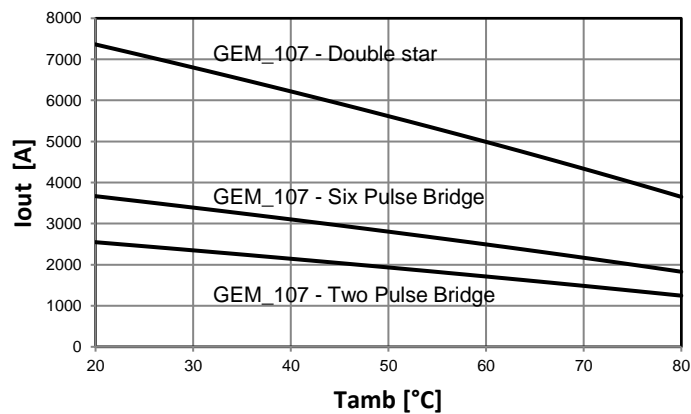
Max output vs Tamb



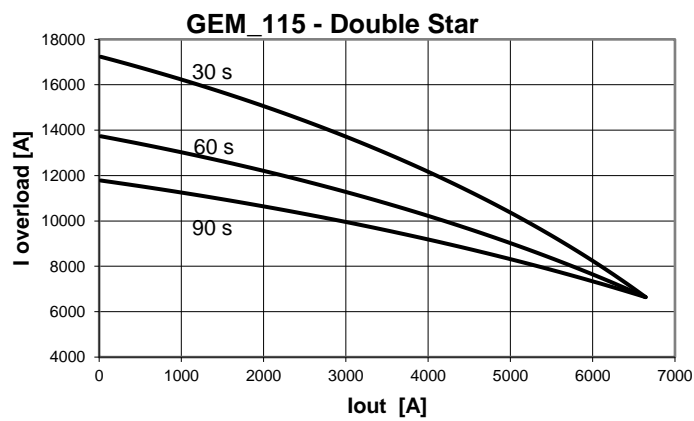
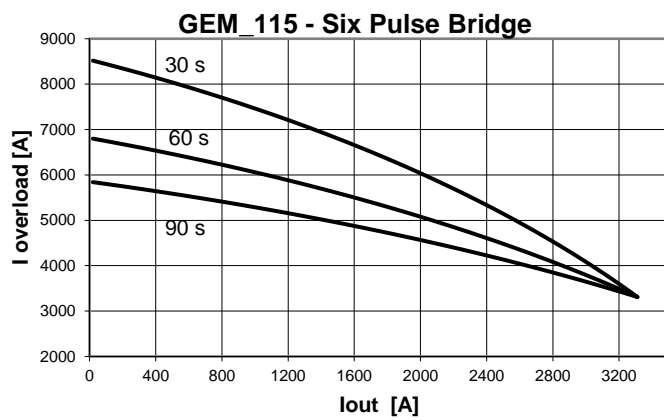
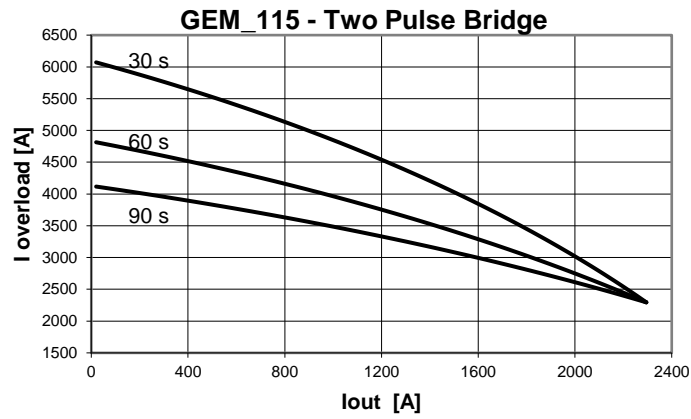
Overload capability at different overload time - Tamb = 40 °C



Max output vs Tamb



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



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