

GEM_151, _168, _213

>>> Preliminary <<< 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_213	GEM_168	GEM_151		
I _{T(AV)}	2133	1687	1513	180° cond, half sine T _a = 40 °C	A
I _{T(RMS)}	3349	2649	2375	180° cond, half sine T _a = 40 °C	A
I _{TSM}	65	60	50	50 Hz, T _j = T _{jmax} V _R = 0 V	kA
I _{TSM}	68.6	63.3	52.8	60 Hz, T _j = T _{jmax} V _R = 0 V	kA
I ² t	21125	18000	12500	50 Hz, T _j = T _{jmax} V _R = 0 V	kA ² s
I ² t	19224	16380	11375	60 Hz, T _j = T _{jmax} V _R = 0 V	kA ² s
V _{DRM} /V _{RRM}	800	2200	2800	T _j = T _{jmax}	V
T _{jmax}	140	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_213	10	1000	200	230
GEM_168	22	2200	200	700
GEM_151	28	2800	200	800

On-State Characteristics

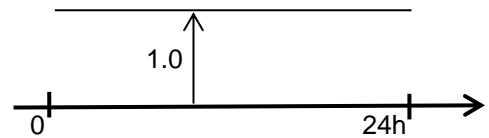
Parameters	GEM_213	GEM_168	GEM_151			Conditions	Units
V _{T(TO)} Threshold voltage	0.83	0.90	0.90			T _j = T _{jmax}	V
r _T On-state slope resistance	0.062	0.090	0.130			T _j = T _{jmax}	mΩ
I _H Holding current, max	300	300	300			T _j = 25°C	mA
I _L Latching current, typ	1500	1000	1500			T _j = 25°C	mA
P _{MAX} Max power losses	5076	4315	4208			T _A = 40°C	W

Triggering Characteristics

Parameters	GEM_213	GEM_168	GEM_151			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)	30	30	30				V
V _{RGM} Peak gate voltage (reverse)	5	5	5				V

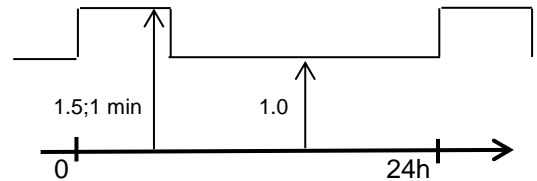
Switching Characteristics

Parameters	GEM_213	GEM_168	GEM_151			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_213	GEM_168	GEM_151			Conditions	Units
AC switch	4735	3745	3359			T _A = 40 °C delay angle = 0°	A
Center tap	4266	3374	3026			T _A = 40 °C delay angle = 0°	A
Two pulse bridge	4266	3374	3026			T _A = 40 °C delay angle = 0°	A
Six pulse bridge	6103	4817	4286			T _A = 40 °C delay angle = 0°	A
Double star with I.P. transf.	12270	9688	8683			T _A = 40 °C delay angle = 0°	A



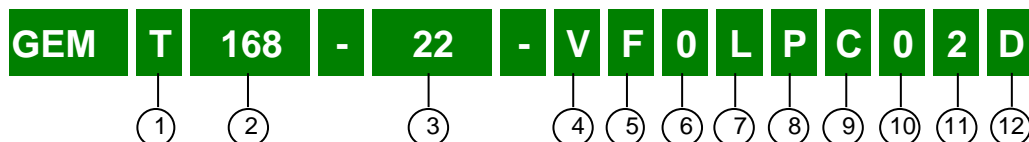
Maximum IEC class 2 currents for typical circuit type

Circuit Type	GEM_213	GEM_168	GEM_151			Conditions	Units
AC switch						T _A = 40 °C delay angle = 0°	A
Center tap						T _A = 40 °C delay angle = 0°	A
Two pulse bridge						T _A = 40 °C delay angle = 0°	A
Six pulse bridge						T _A = 40 °C delay angle = 0°	A
Double star with I.P. transf.						T _A = 40 °C delay angle = 0°	A

Thermal and mechanical characteristics

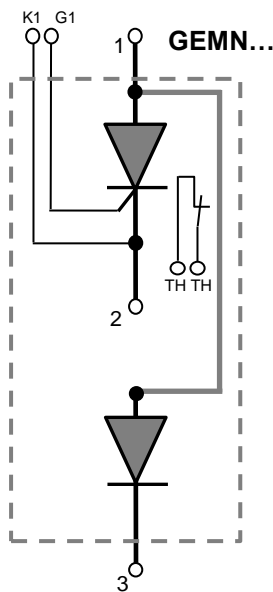
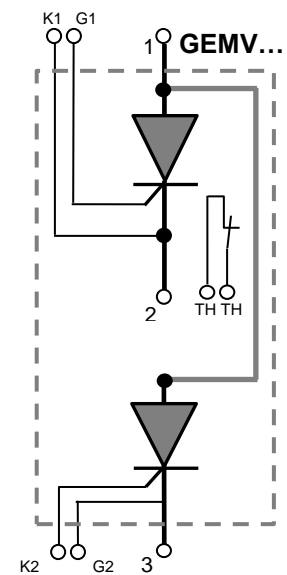
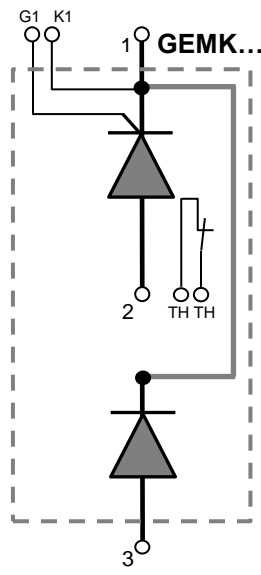
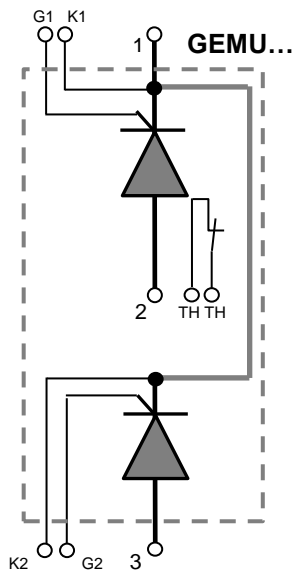
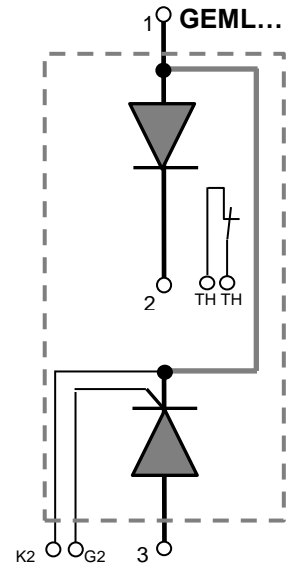
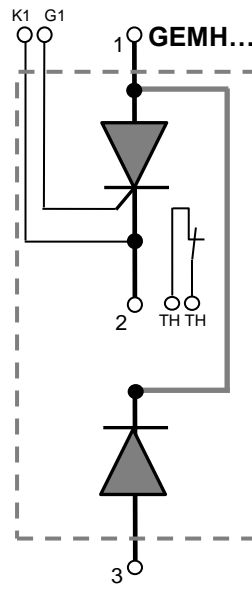
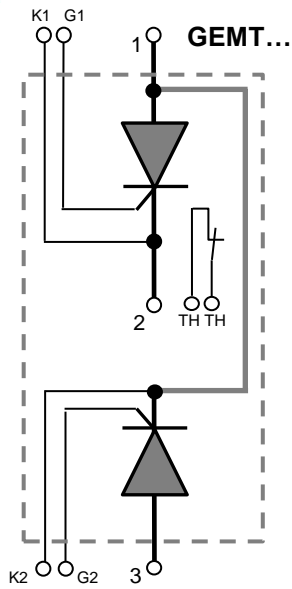
Parameters	GEM_213	GEM_168	GEM_151			Conditions	Units
T _{jmax} Max operating junction temperature	140	125	125				°C
T _{stg} Storage temperature	-40 +70	-40 +70	-40 +70				°C
R _{thJA} Thermal resistance (junction to ambient)	0.040	0.039	0.040			Air velocity = 5 m/s	°C/W
F Mounting torque - GEM to panel (+/- 10%)	7	7	7			M6 mounting screw	N·m
	14	14	14			M8 mounting screw	N·m
m Mass, typ	50	50	50			module complete with cooling fan	kg
Overall dimensions	<p>690 309 270 300 (*)</p> <p>(*) without fuses and snubber capacitor</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.

Mechanical Drawings

dimensions in mm

