

GH_007,....,_013 HEXA SCR MODULES

Green Power Easy Module

- ▶ Extremely high power density
- ▶ 3000 V_{RMS} insulation voltage
- ▶ Line voltage range up to 500 V_{RMS}
- ▶ Natural convection cooling
- ▶ High reliability
- ▶ Modularity
- ▶ Fully customizable
- ▶ Broad range of accessories
- ▶ Cost effective solution



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
- optimised snubber circuits
- pulse transformer modules
- ducted heat flow.

Maximum ratings of single thyristor

Part number Parameters	GH_011	GH_007	GH_013	GH_009	Conditions	Units
	$I_{T(AV)}$	110	75	130		
$I_{T(RMS)}$	173	118	204	141	Natural convection	A
I_{TSM}	7	6	13	9	50 Hz, $T_j = T_{jmax}$, $V_R = 0\text{ V}$	kA
I_{TSM}	7.4	6.3	13.7	9.5	60 Hz, $T_j = T_{jmax}$, $V_R = 0\text{ V}$	kA
I^2t	245	180	845	405	50 Hz, $T_j = T_{jmax}$, $V_R = 0\text{ V}$	kA ² s
I^2t	223	164	769	369	60 Hz, $T_j = T_{jmax}$, $V_R = 0\text{ V}$	kA ² s
V_{DRM}/V_{RRM}	400	1600	400	1600	$T_j = T_{jmax}$	V
T_{jmax}	150	125	150	125		°C

Part Number	V code	V _{DRM} V _{RRM} max repetitive reverse and off-state blocking voltage [V]	I _{DRM} I _{RRM} @ T _{jmax} [mA]	V _{L(RMS)} maximum suggested RMS line voltage [V]
GH_011	04	400	50	115
GH_007	16	1600	50	500
GH_013	04	400	100	115
GH_009	16	1600	50	500

On-State Characteristics

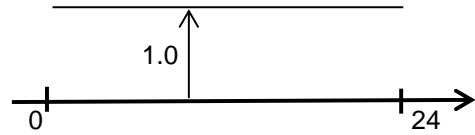
Parameters	GH_011	GH_007	GH_013	GH_009		Conditions	Units
V _{T(TO)} Threshold voltage	0.9	1.0	0.9	0.9		T _j = T _{jmax}	V
r _T On-state slope resistance	0.50	0.80	0.24	0.65		T _j = T _{jmax}	mΩ
I _H Holding current, max	600	600	600	600		T _j = 25 °C	mA
I _L Latching current, typ	300	1000	1000	1000		T _j = 25 °C	mA
P _{MAX} Max power losses	667	528	743	570		T _A = 40 °C	W

Triggering Characteristics

Parameters	GH_011	GH_007	GH_013	GH_009		Conditions	Units
V _{GT} Gate trigger voltage	3	3.5	2.5	3		T _j = 25°C, V _D = 5V	V
I _{GT} Gate trigger current	150	150	190	200		T _j = 25°C, V _D = 5V	mA
P _{GM} Peak gate power dissipation	10	10	10	10		Pulse width 1 ms	W
P _{G(AV)} Average gate power dissipation	2	2	2	2			W
I _{FGM} Peak gate current	3	3	3	3			A
V _{FGM} Peak gate voltage (forward)	20	20	20	20			V
V _{RGM} Peak gate voltage (reverse)	5	5	5	5			V

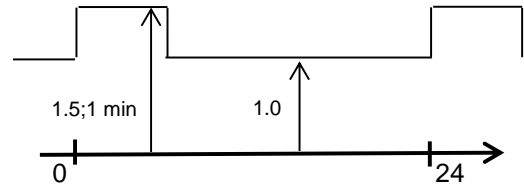
Switching Characteristics

Parameters	GH_011	GH_007	GH_013	GH_009		Conditions	Units
di/dt Critical rate of rise of on-state current	200	200	200	200		T _j = T _{jmax}	A/μs
dV/dt Critical rate of rise of off-state voltage	500	500	500	500		T _j = T _{jmax}	V/μs
t _q Turn-off time, typ	200	200	200	200		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

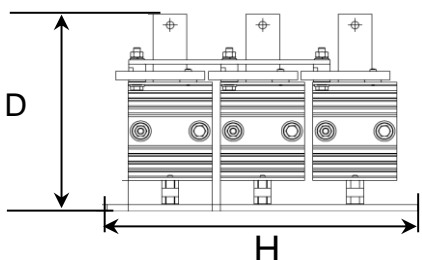
Circuit Type	GH_011	GH_007	GH_013	GH_009		Conditions	Units
Three Phase AC switch	241	160	280	190		$T_A = 45\text{ }^\circ\text{C}$ delay angle = 0°	A
Six pulse bridge	315	215	370	250		$T_A = 45\text{ }^\circ\text{C}$ delay angle = 0°	A
Double star with I.P. transf.	630	430	740	500		$T_A = 45\text{ }^\circ\text{C}$ delay angle = 0°	A



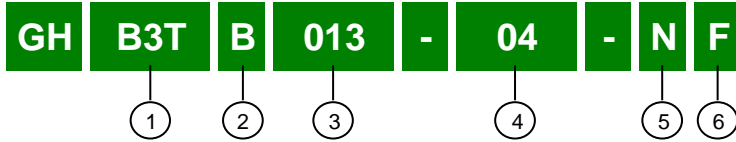
Maximum IEC class 2 currents for typical circuit type

Circuit Type	GH_011	GH_007	GH_013	GH_009		Conditions	Units
Three Phase AC switch	193	133	233	158			A
Six pulse bridge	252	173	307	206			A
Double star with I.P. transf.	509	347	608	416			A

Thermal and mechanical characteristics

Parameters	GH_011	GH_007	GH_013	GH_009		Conditions	Units
T_{jmax} Max operating junction temperature	150	125	150	125			$^\circ\text{C}$
T_{stg} Storage temperature	-40 +70	-40 +70	-40 +70	-40 +70			$^\circ\text{C}$
R_{thJA} Thermal resistance (junction to ambient)	0.990	0.966	0.888	0.895		Natural convection	$^\circ\text{C/W}$
F Mounting torque - GEM to panel (+/- 10%)	7	7	7	7		M6 mounting screw	N·m
	14	14	14	14		M8 mounting screw	N·m
m Mass, typ						with FAPC options	kg
Overall dimensions							
D Depth	243						mm
H Height	370					mm	
W Width	131					mm	

PART-NUMBERING SYSTEM



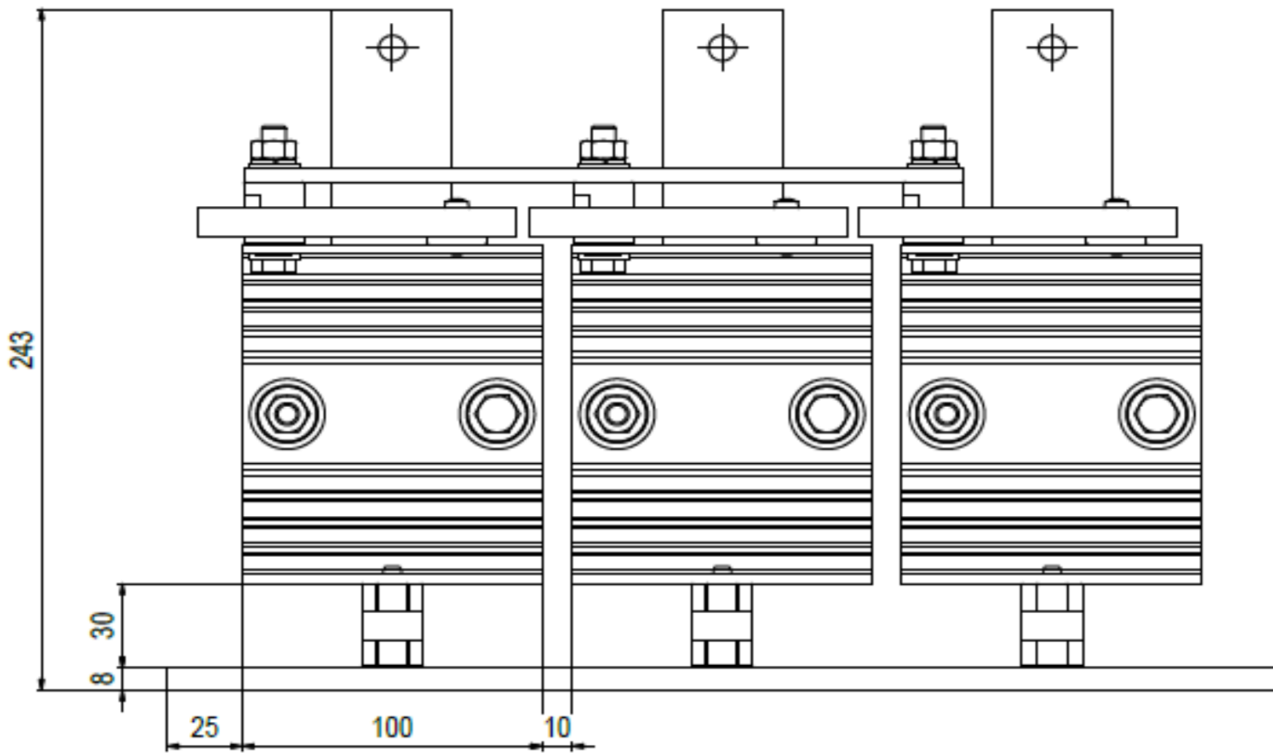
- ① Circuit configuration - see table below (*)
- ② 0 = No standard busbar B = bridge configuration - D = double star configuration
- ③ Average current / 10
- ④ Blocking voltage / 100
- ⑤ N = natural convection
- ⑥ 0 = No fuse - F = Individual fuse - R = individual fuse suitable for regen bridge - L = line fuse

(*) Circuit configuration table	
GB3T	six pulse bridge fully controlled
GB3H	six pulse bridge half controlled - SCR high side
GB3L	six pulse bridge half controlled - SCR low side
GDST	double star converter fully controlled - common cathode
GDSX	double star converter fully controlled - common anode
GW3C	three phase AC-switch

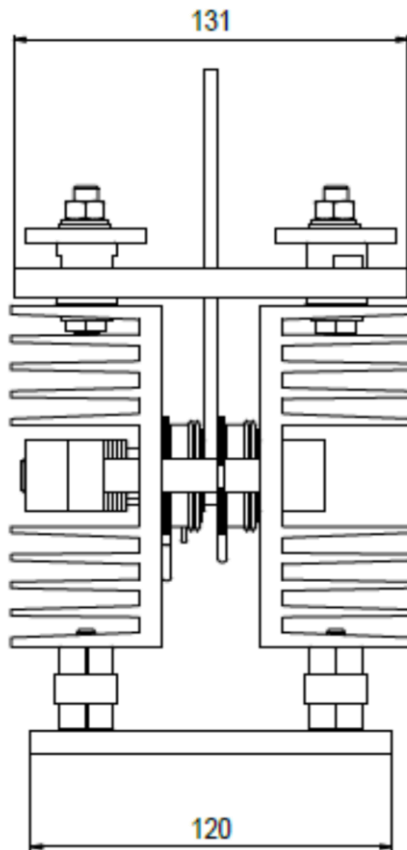
GEM modules are not covered by the Low Voltage Directive (LVD) 2014/35/EU because, according to LVD Guidelines, they are components "the safety of which can only, to a very large extent, be assessed taking into account how they are incorporated and for which a risk assessment cannot be undertaken".

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

SIDE VIEW

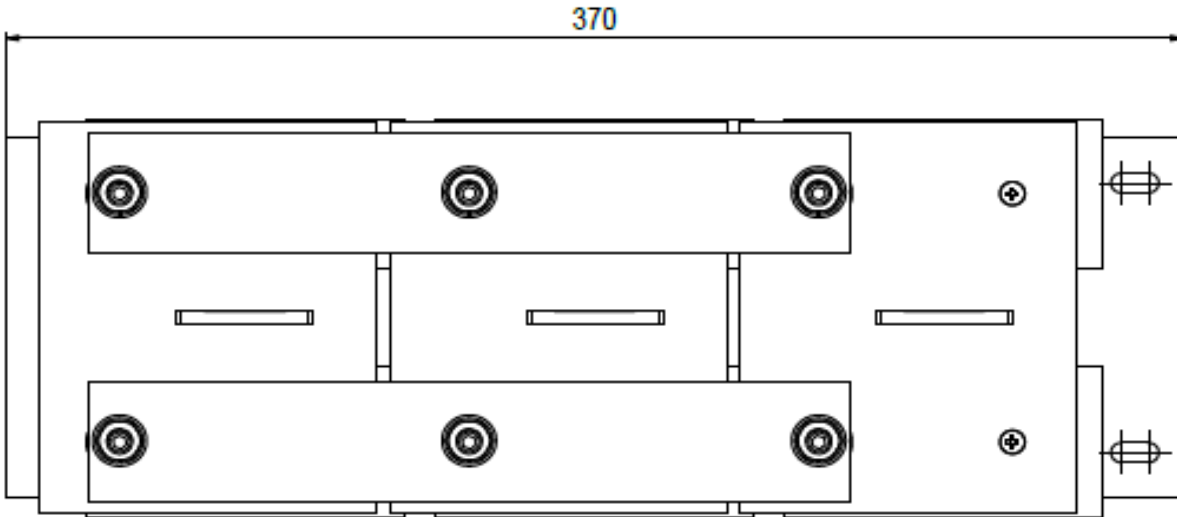


FRONT VIEW

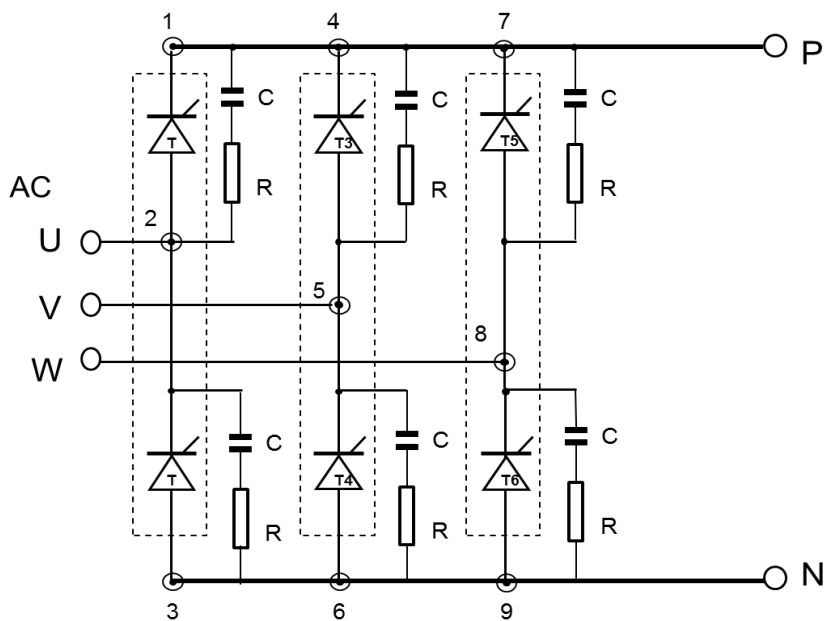


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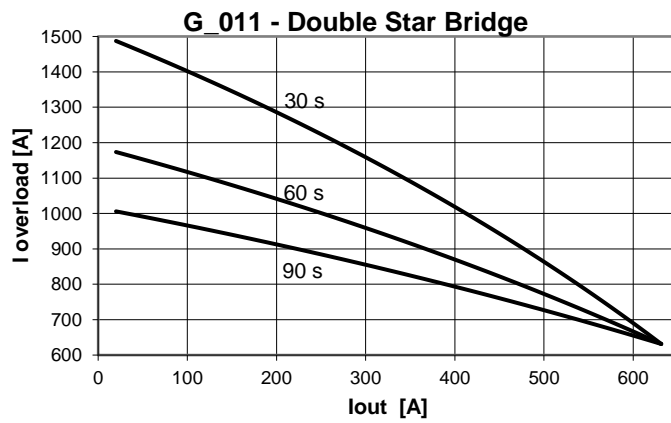
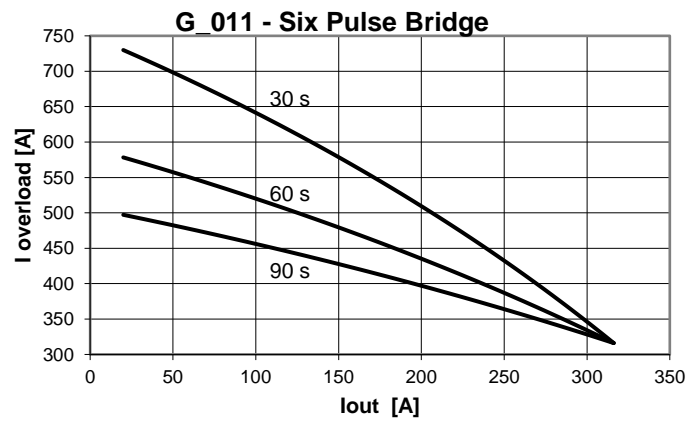
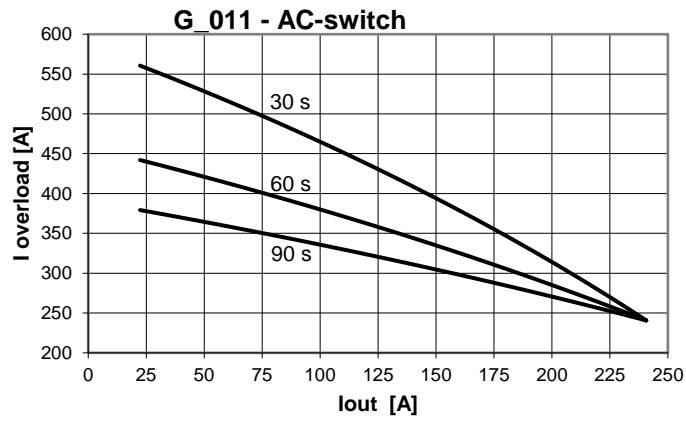
TOP VIEW



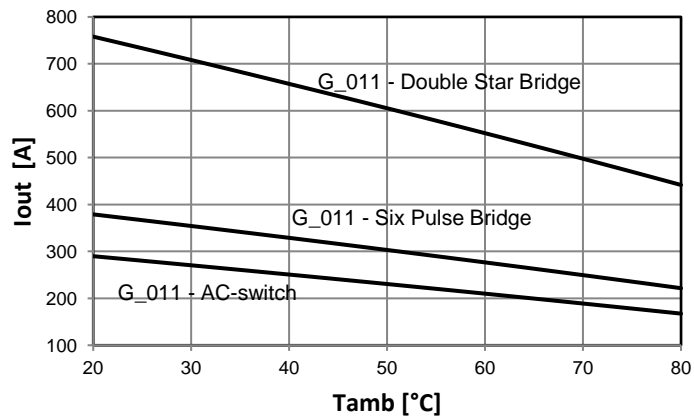
GB3T Six pulse bridge fully controlled circuit



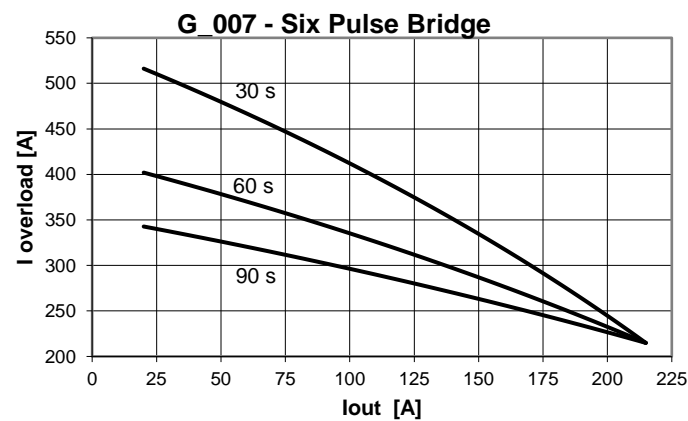
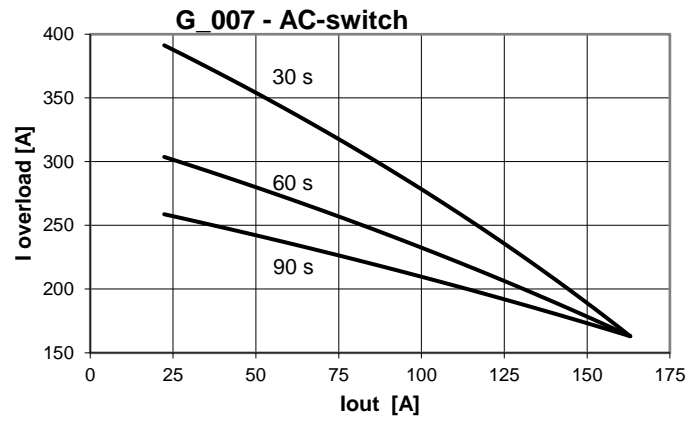
Overload capability at different overload time - Tamb = 45 °C



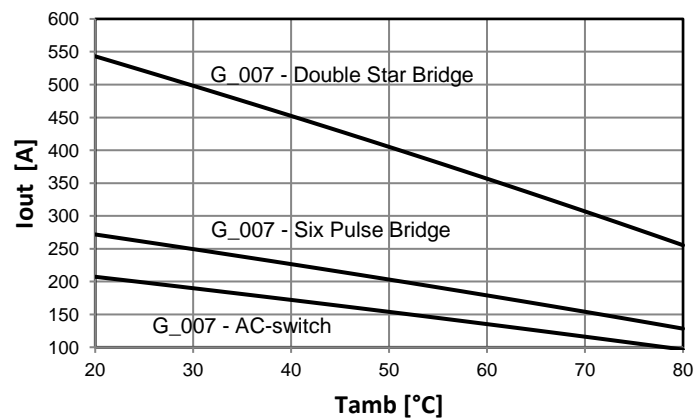
Max output vs Tamb



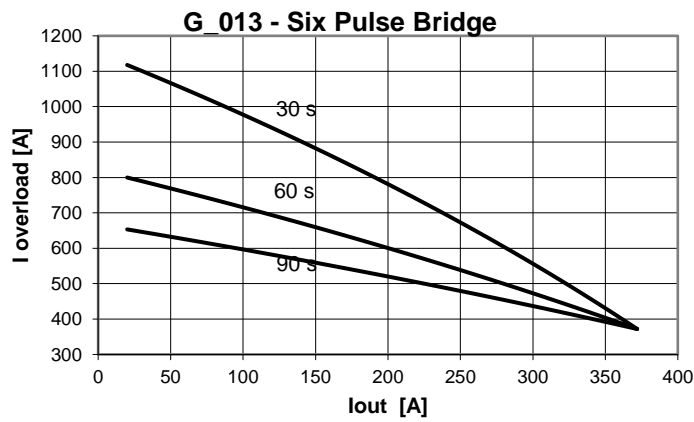
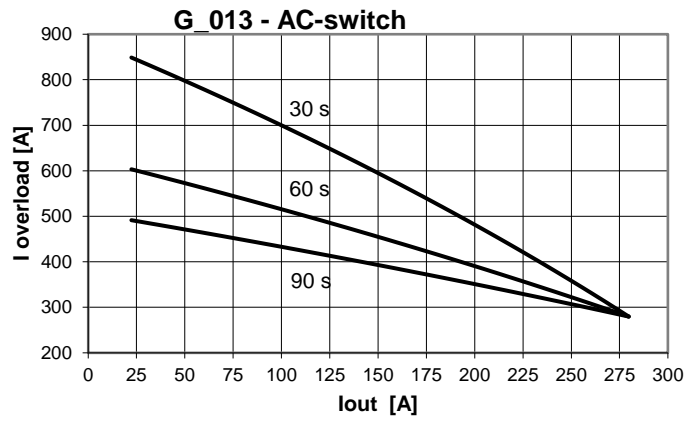
Overload capability at different overload time - Tamb = 45 °C



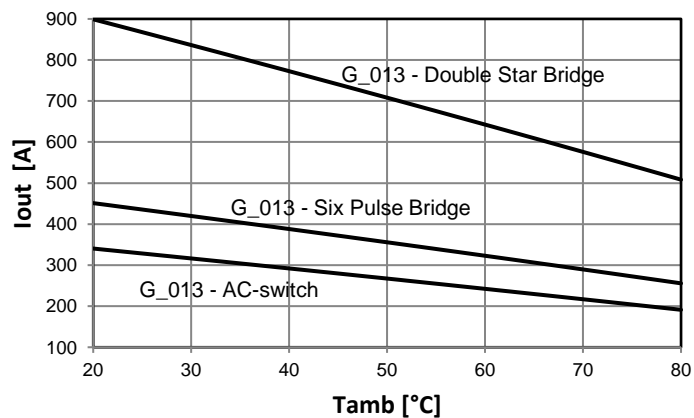
Max output vs Tamb



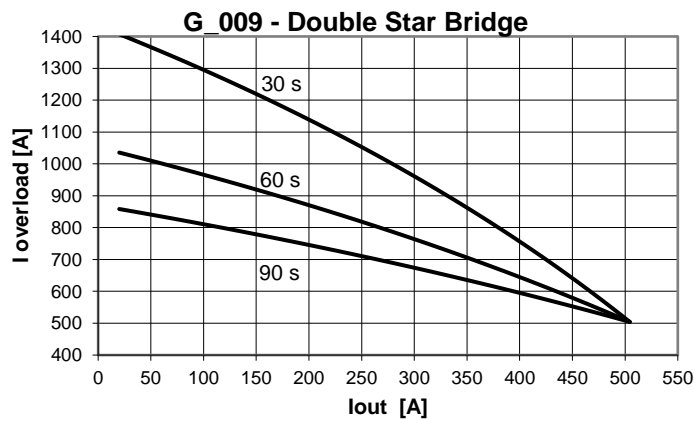
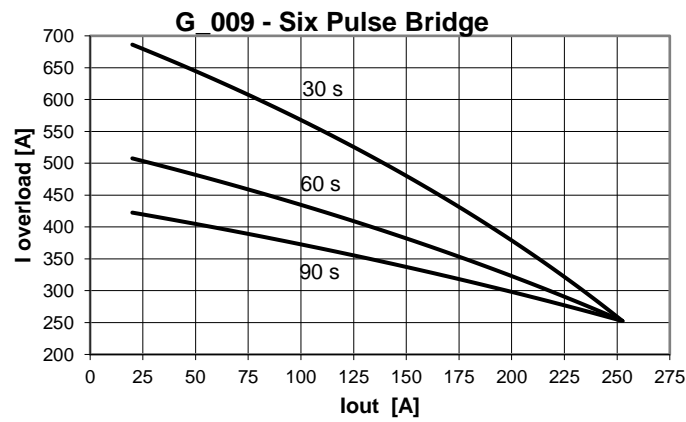
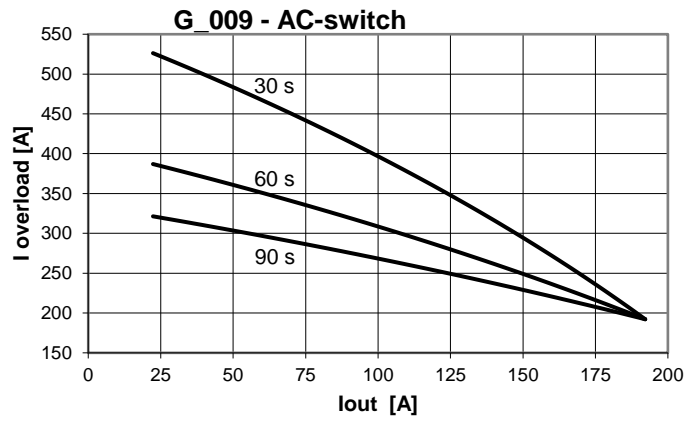
Overload capability at different overload time - Tamb = 45 °C



Max output vs Tamb



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Max output vs Tamb

