

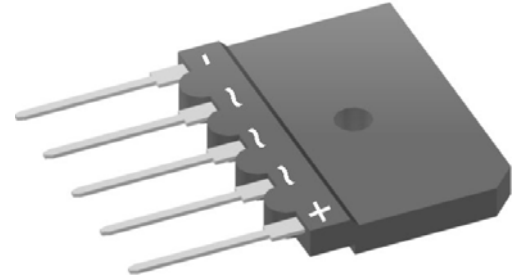
# Standard Rectifier

<b>3~ Rectifier</b>	
$V_{RRM}$	= 1200 V
$I_{DAV}$	= 40 A
$I_{FSM}$	= 370 A

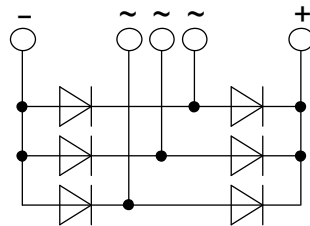
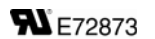
## 3~ Rectifier Bridge

Part number

**GUO40-12NO1**



Backside: isolated



### Features / Advantages:

- Low forward voltage drop
- Planar passivated chips
- Easy to mount with one screw
- Space and weight savings

### Applications:

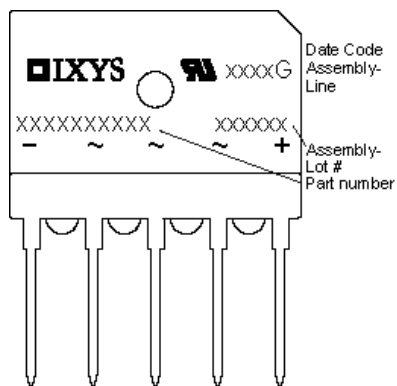
- Supplies for DC power equipment
- Input rectifiers for PWM inverter
- Battery DC power supplies
- Field supply for DC motors

### Package: GUPP

- Isolation Voltage: 2500 V~
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Soldering pins for PCB mounting
- Base plate: Plastic overmolded tab
- Reduced weight

Rectifier				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
$V_{RSM}$	max. non-repetitive reverse blocking voltage					1300	V
$V_{RRM}$	max. repetitive reverse blocking voltage					1200	V
$I_R$	reverse current	$V_R = 1200$ V	$T_{VJ} = 25^\circ\text{C}$			40	$\mu\text{A}$
		$V_R = 1200$ V	$T_{VJ} = 150^\circ\text{C}$			1.5	mA
$V_F$	forward voltage drop	$I_F = 10$ A	$T_{VJ} = 25^\circ\text{C}$			1.06	V
		$I_F = 30$ A				1.28	V
		$I_F = 10$ A	$T_{VJ} = 150^\circ\text{C}$			0.92	V
		$I_F = 30$ A				1.23	V
$I_{DAV}$	bridge output current	$T_C = 90^\circ\text{C}$ rectangular	$T_{VJ} = 175^\circ\text{C}$ $d = \frac{1}{3}$			40	A
$V_{FO}$	threshold voltage	} for power loss calculation only				0.74	V
$r_F$	slope resistance					16.3	m $\Omega$
$R_{thJC}$	thermal resistance junction to case					4.3	K/W
$R_{thCH}$	thermal resistance case to heatsink				0.50		K/W
$P_{tot}$	total power dissipation			$T_C = 25^\circ\text{C}$		35	W
$I_{FSM}$	max. forward surge current	$t = 10$ ms; (50 Hz), sine	$T_{VJ} = 45^\circ\text{C}$			370	A
		$t = 8,3$ ms; (60 Hz), sine	$V_R = 0$ V			400	A
		$t = 10$ ms; (50 Hz), sine	$T_{VJ} = 150^\circ\text{C}$			315	A
		$t = 8,3$ ms; (60 Hz), sine	$V_R = 0$ V			340	A
$I^2t$	value for fusing	$t = 10$ ms; (50 Hz), sine	$T_{VJ} = 45^\circ\text{C}$			685	A <sup>2</sup> s
		$t = 8,3$ ms; (60 Hz), sine	$V_R = 0$ V			665	A <sup>2</sup> s
		$t = 10$ ms; (50 Hz), sine	$T_{VJ} = 150^\circ\text{C}$			495	A <sup>2</sup> s
		$t = 8,3$ ms; (60 Hz), sine	$V_R = 0$ V			480	A <sup>2</sup> s
$C_J$	junction capacitance	$V_R = 400$ V; $f = 1$ MHz	$T_{VJ} = 25^\circ\text{C}$		10		pF

Package GUPP		Ratings				
Symbol	Definition	Conditions	min.	typ.	max.	Unit
$I_{RMS}$	RMS current	per terminal			70	A
$T_{VJ}$	virtual junction temperature		-40		175	°C
$T_{op}$	operation temperature		-40		150	°C
$T_{stg}$	storage temperature		-40		150	°C
<b>Weight</b>				8.5		g
$M_D$	mounting torque		0.8		1.2	Nm
$F_C$	mounting force with clip		20		120	N
$d_{Spp/App}$	creepage distance on surface   striking distance through air	terminal to terminal	6.7	5.4		mm
$d_{Spb/Apb}$		terminal to backside	10.0	8.0		mm
$V_{ISOL}$	isolation voltage	t = 1 second		2500		V
		t = 1 minute	50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA	2080		V
$R_{thJA}$	thermal resistance junction to ambient			50		K/W



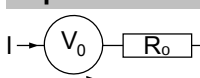
Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	GUO40-12NO1	GUO40-12NO1	Tube	14	514892

Similar Part	Package	Voltage class
DNA40U2200GU	GUPP	2200
DMA40U1800GU	GUPP	1800
GUO40-16NO1	GUPP	1600
GUO40-08NO1	GUPP	800

### Equivalent Circuits for Simulation

\* on die level

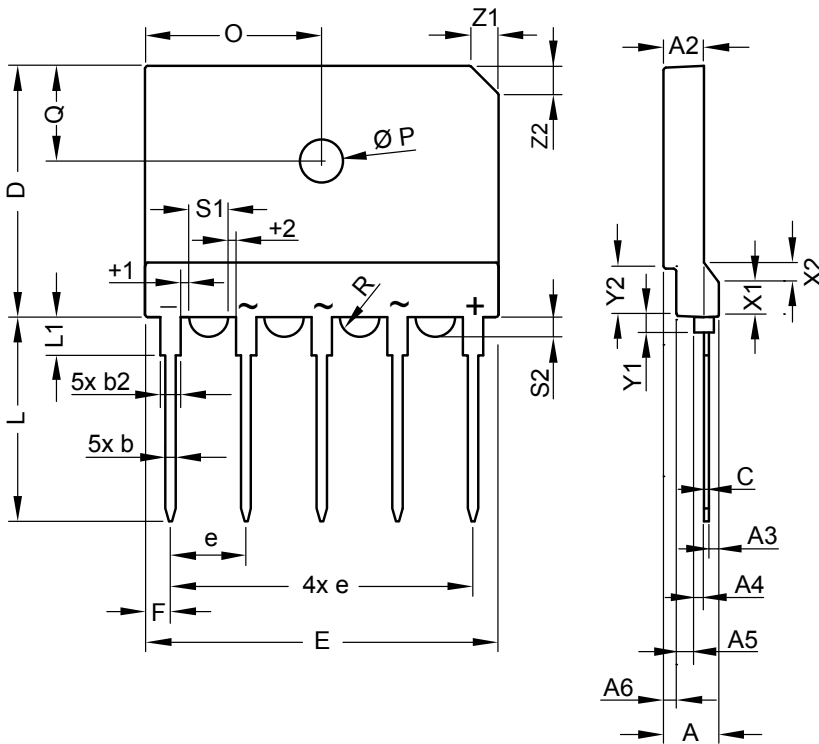
$T_{VJ} = 175^\circ\text{C}$



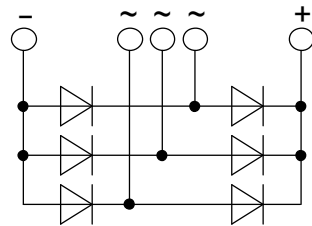
Rectifier

$V_{0\ max}$	threshold voltage	0.74	V
$R_{0\ max}$	slope resistance *	13.7	mΩ

## Outlines GUPF



Dim.	Millimeter			Inches		
	min	typ.	max	min	typ.	max
A	5.40	5.50	5.60	0.213	0.217	0.221
A2	3.90	4.00	4.10	0.154	0.158	0.162
A3	0.95	1.00	1.10	0.037	0.039	0.043
A4	0.95	1.00	1.05	0.037	0.039	0.041
A5	1.60	1.70	1.80	0.063	0.067	0.071
A6	1.25	1.30	1.35	0.049	0.051	0.053
b	0.95	1.00	1.05	0.037	0.039	0.041
b2	1.95	2.00	2.05	0.077	0.079	0.081
C	0.45	0.50	0.55	0.018	0.020	0.022
D	24.80	25.00	25.20	0.977	0.985	0.993
E	34.70	35.00	35.30	1.367	1.379	1.391
e	BSC 7.50			BSC 0.296		
F	2.40	2.50	2.60	0.095	0.099	0.102
L	20.30	20.40	20.50	0.800	0.804	0.808
L1	3.70	3.75	3.80	0.146	0.148	0.150
O	17.40	17.50	17.60	0.686	0.690	0.693
ØP	4.10	4.20	4.30	0.162	0.165	0.169
Q	9.20	9.30	9.40	0.362	0.366	0.370
Ø/2R		1.77			0.070	
s1	3.45	3.50	3.55	0.136	0.138	0.140
s2	1.45	1.50	1.55	0.057	0.059	0.061
t1	0.95	1.00	1.05	0.037	0.039	0.041
t2	0.95	1.00	1.05	0.037	0.039	0.041
x1	3.20	3.30	3.40	0.126	0.130	0.134
x2	1.90	2.00	2.10	0.075	0.079	0.083
y1	1.60	1.65	1.70	0.063	0.065	0.067
y2	4.65	4.70	4.75	0.183	0.185	0.187
z1	2.80	2.90	3.00	0.110	0.114	0.118



## Rectifier

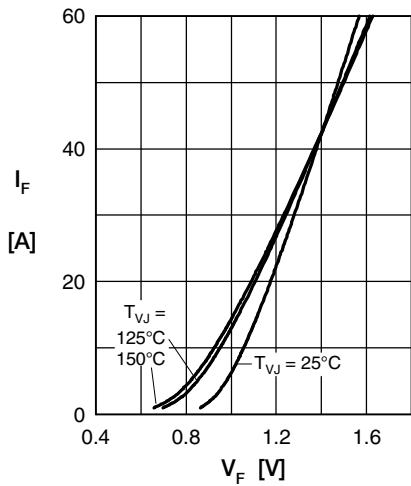


Fig. 1 Forward current vs. voltage drop per diode

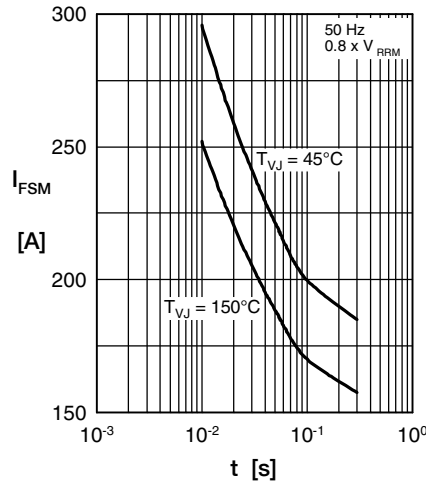


Fig. 2 Surge overload current vs. time per diode

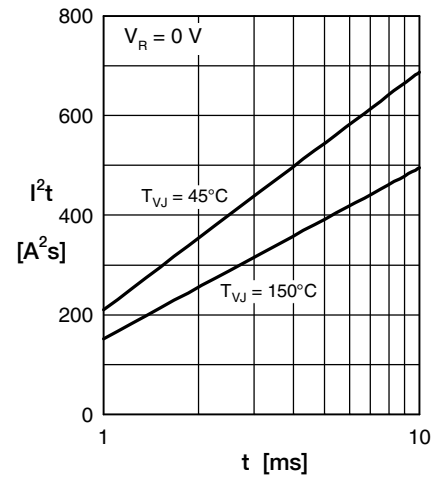


Fig. 3  $I^2t$  vs. time per diode

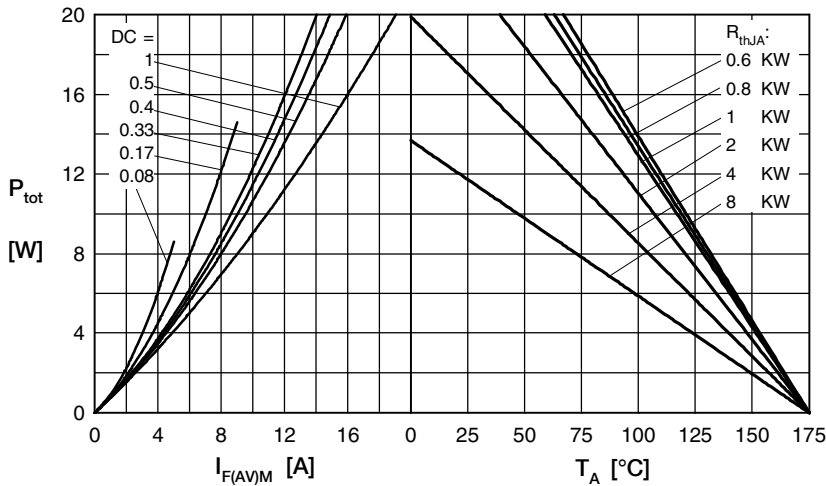


Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

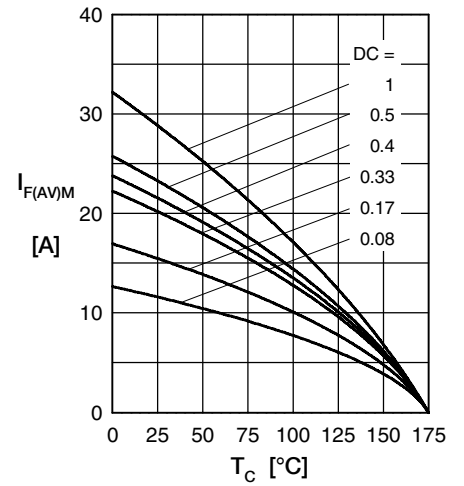


Fig. 5 Max. forward current vs. case temperature per diode

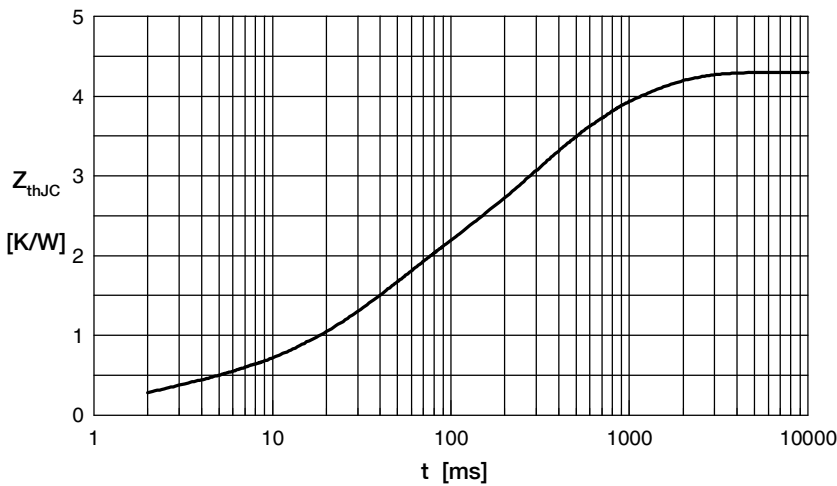


Fig. 6 Transient thermal impedance junction to case vs. time per diode

Constants for  $Z_{thJC}$  calculation:

i	$R_{th}$ (K/W)	$t_i$ (s)
1	0.302	0.002
2	1.252	0.032
3	1.582	0.227
4	1.164	0.820