

SERIES B40A

BACK TO BACK SCRs

Power Modules

Features

- Glass passivated junctions for greater reliability
- Electrically isolated base plate (3500V RMS)
- Available up to 1200 V_{RRM}, V_{DRM}
- High surge capability
- Large creepage distances
- Simplified mechanical designs, rapid assembly
- B-package case style
- UL E 78996 approved

40A

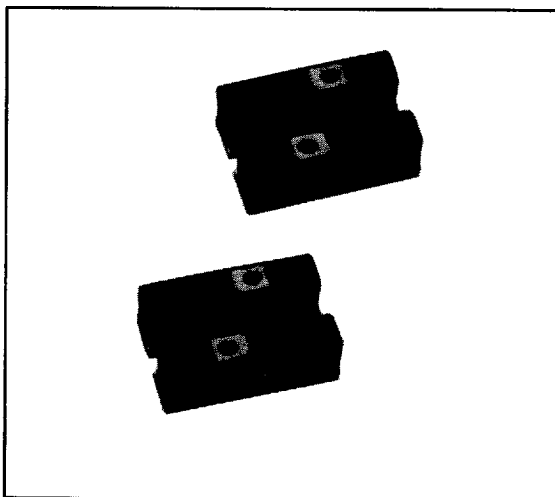
Description

The B40A.. series of B-modules consist of power SCR/SCR configured in a single package. With their isolating base plate, mechanical designs are greatly simplified giving advantages of cost reduction and reduced size.

Applications include power supplies, control circuits, light dimmers and battery chargers.

Major Ratings and Characteristics

Parameters	B40A	Units
$I_{T(RMS)}$	40	A
@ T_C	97	°C
50Hz	390	A
I_{TSM} 60Hz	410	A
50Hz	770	A ² s
I^2_t 60Hz	700	A ² s
$I^2\sqrt{t}$	7700	A ² √s
V _{RRM} range	100 to 1200	V
T _J	-40 to 125	°C



ELECTRICAL SPECIFICATIONS

Voltage Ratings

Part number	Voltage Code	I_{RRM}, I_{DRM} max peak reverse and off-state leakage current at $V_{RRM}, V_{DRM}, T_J = 125^\circ\text{C}$, gate open circuit mA	V_{RRM}, V_{DRM} maximum repetitive peak reverse and off-state voltage gate open circuit V	V_{RSM} maximum non-repetitive peak reverse voltage V
B40A	10	20	100	150
	20	20	200	300
	40	20	400	500
	60	20	600	700
	80	20	800	900
	100	20	1000	1100
	120	20	1200	1300

On-state Conduction

Parameter	Value	Units	Conditions
$I_{T(RMS)}$ Max. RMS on-state current	40	A	@ $T_C = 97^\circ\text{C}$
I_{TSM} Maximum peak one half cycle non repetitive surge current	390	A	10ms No voltage Sinusoidal half Wave
	410	A	8.3ms reappplied Initial $T_J = 125^\circ\text{C}$
	330	A	10ms 100% V_{RRM} Sinusoidal half Wave
	345	A	8.3ms reappplied Initial $T_J = 125^\circ\text{C}$
I^2t Maximum I^2t for fusing	770	A^2s	10ms No voltage Initial $T_J = 125^\circ\text{C}$
	700	A^2s	8.3ms reappplied
	545	A^2s	10ms 100% V_{RRM}
	490	A^2s	8.3ms reappplied Initial $T_J = 125^\circ\text{C}$
I^2/t Maximum I^2/t for fusing (1)	7700	A^2/s	t=0 to 10ms, no voltage reappplied, Initial $T_J = 125^\circ\text{C}$
V_{TM} Maximum peak on-state voltage	1.60	V	$T_J = 25^\circ\text{C}, I_{TM} = I_{T(AV)} \times \pi, t_p = 400 \mu\text{s}, 180^\circ$ conduction
$V_{T(To)}$ Max. value of threshold voltage	0.90	V	Low level (3) $T_J = T_J \text{ max (2)}$
	1.15	V	High level (4)
r_t Max. value of on-state slope resistance	12.5	m Ω	Low level (3) $T_J = T_J \text{ max (2)}$
	9.7	m Ω	High level (4)
I_H Maximum holding current	100	mA	$T_J = 25^\circ\text{C}$ anode supply=6V, resistive load, gate open, Initial $I_T = 1\text{A}$
I_L Maximum latching current	200	mA	$T_J = 25^\circ\text{C}$ anode supply=6V, resistive load
di/dt Maximum rate of rise of off-state voltage			
	$V_{DRM} \leq 600\text{V}$	200	$\text{A}/\mu\text{s}$ $T_J = 125^\circ\text{C}$, from $0.67 V_{DRM}$
	$V_{DRM} = 800\text{V}$	180	$\text{A}/\mu\text{s}$ $I_{TM} = \pi \times I_{T(AV)} \cdot I_g = 500\text{mA}$
	$V_{DRM} = 1000\text{V}$	160	$\text{A}/\mu\text{s}$ $t_r < 0.5 \mu\text{s}, t_p > 6 \mu\text{s}$
	$V_{DRM} \geq 1100\text{V}$	150	$\text{A}/\mu\text{s}$

(1) I^2t for time $t_x = I^2/t \times \sqrt{t_x}$ (2) Average power = $V_{T(To)} \times I_{T(AV)} + r_t \times (I_{T(RMS)})^2$ (3) $16.7\% \times \pi \times I_{T(AV)} < I < \pi \times I_{T(AV)}$ (4) $\pi \times I_{T(AV)} < I < 20 \times \pi \times I_{T(AV)}$

Triggering INTERNATIONAL RECTIFIER B5E D

Parameter	B40A	Units	Conditions
P_{GM} Maximum peak gate power	8.0	W	
$P_{G(AV)}$ Maximum average gate power	2.0	W	
$+I_{GM}$ Maximum peak gate current	1.5	A	
$-V_{GM}$ Maximum peak negative gate voltage	10	V	
V_{GT} Maximum required DC gate current to trigger	3.0	V	$T_J = -65^\circ\text{C}$
	2.0	V	$T_J = 25^\circ\text{C}$
	1.0	V	$T_J = 125^\circ\text{C}$
I_{GT} Maximum required DC gate current to trigger	90	mA	$T_J = -65^\circ\text{C}$
	60	mA	$T_J = 25^\circ\text{C}$
	35	mA	$T_J = 125^\circ\text{C}$
V_{GD} Maximum gate voltage that will not trigger	0.2	V	@ $T_J = 125^\circ\text{C}$, rated V_{DRM} applied
I_{GD} Maximum gate current that will not trigger	2.0	mA	@ $T_J = 125^\circ\text{C}$, rated V_{DRM} applied

Switching

t_{gd} Typical turn-on time	0.9	μs	$T_J = 25^\circ\text{C}$
t_{rr} Typical reverse recovery time	4	μs	$T_J = 125^\circ\text{C}$ (5)
t_q Typical turn-off time	110	μs	$T_J = 125^\circ\text{C}$ (6)

Blocking

dv/dt Minimum critical rate-of-rise of off-state voltage	100	V/ μs	$T_J = 125^\circ\text{C}$, Linear to 100% rated V_{DRM}
	300	V/ μs	$T_J = 125^\circ\text{C}$, Linear to 67% rated V_{DRM}
I_{RRM} Maximum peak reverse leakage and off-state at V_{RRM} , V_{DRM}	20	mA	$T_J = 125^\circ\text{C}$, gate open circuit
I_{RM} Max. peak reverse leakage current	100	μA	$T_J = 25^\circ\text{C}$
V_{INS} RMS isolation voltage	3500	V	50Hz, circuit to base, all terminals shorted $T_J = 25^\circ\text{C}$, $t = 1\text{ s}$

Thermal and Mechanical Specifications

T_J Junction temperature range	-40 to 125	$^\circ\text{C}$	
T_{stg} Storage temperature range	-40 to 125	$^\circ\text{C}$	
$R_{\theta JC}$ Maximum thermal resistance, junction to case	1.05	K/W	Per junction - DC operation
$R_{\theta C-S}$ Max. thermal resistance case to heatsink	0.10/0.20	K/W	Mounting surface smooth flat and greased Per module/Per junction
T Mounting torque $\pm 10\%$	Module to heatsink	2	Nm M4 mounting screws Non-lubricated threads (7)
	Module Terminals	0.8	Nm M3 screw terminals; Non-lubricated threads
wt Approximate weight	40	g	
Case style	"B" Type		See outline table

(5) $I_{TM} = \text{rated } I_{T(AV)}$ for at least 200 μs , $di_{R/dt} = 10\text{ A}/\mu\text{s}$

(6) $I_{TM} = \text{rated } I_{T(AV)}$ for at least 200 μs . Min. V_R during turn-off = 100V, reapplied $dv/dt = 20\text{ V}/\mu\text{s}$ linear to 0.80 V_{DRM} - Gate bias 0V, 100 Ω

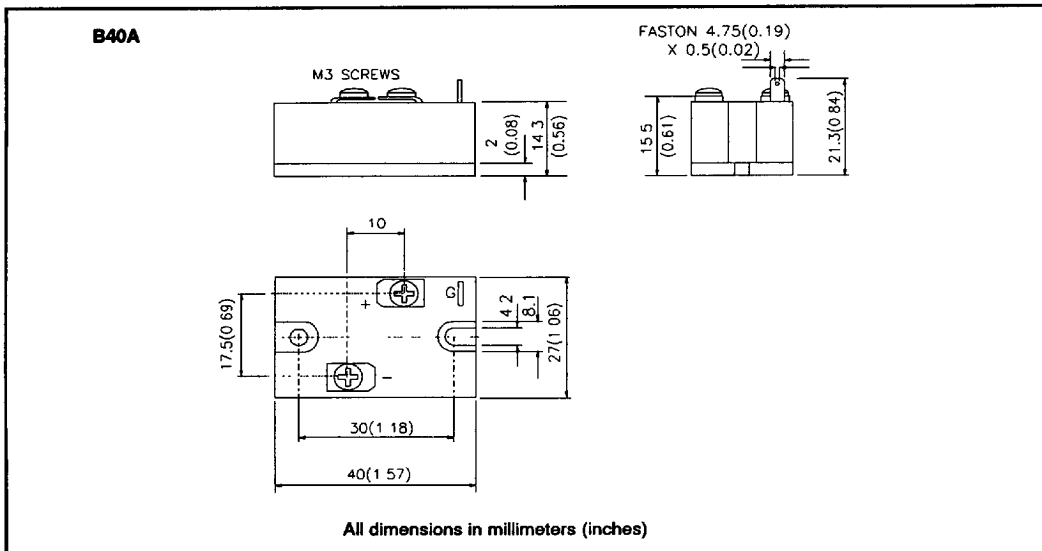
(7) A mounting compound is recommended and the torque should be rechecked after a period of about 3 hours to allow for the spread of the compound

ΔR Conduction (per Junction)

(The following table shows the increment of thermal resistance R_{thJC} when devices operate at different conduction angles than DC)

Conduction angle	Sinusoidal	Rectangular	Units
180°	0.25	0.18	K/W
120°	0.30	0.30	K/W
90°	0.38	0.41	K/W
60°	0.55	0.58	K/W
30°	0.95	0.96	K/W

Outlines Table



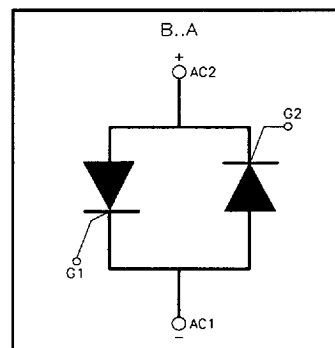
Ordering Information Table

Device Code

B	40	A	120	K	L
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- ① ② ③ ④ ⑤ ⑥
- 1 - Module type
 - 2 - Current rating: 40 RMS
 - 3 - Circuit configuration **
 - 4 - Voltage code (See Voltage Ratings Table)
 - 5 - dv/dt code:
No letter = 300V/ μ s
D = 500V/ μ s
K = 1000V/ μ s
 - 6 - Terminal type:
No letter = Screw terminal
L = Fast on

Circuit configuration **



INTERNATIONAL RECTIFIER

65E D

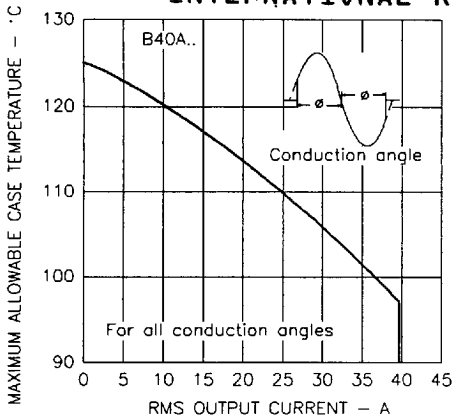


Fig. 1 - Current Ratings Characteristics

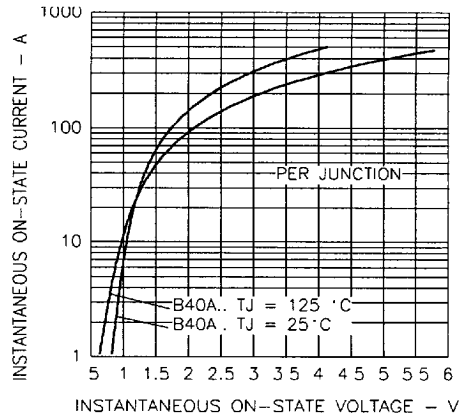


Fig. 2 - On-state Voltage Drop Characteristics

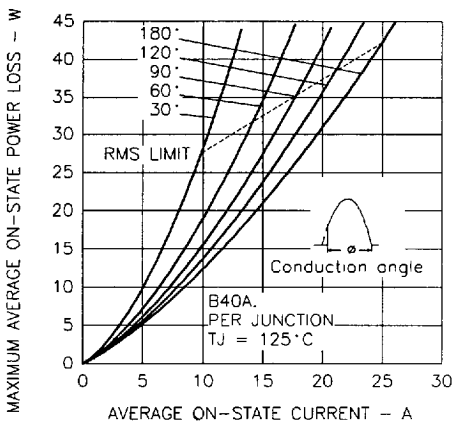


Fig. 3 - On-state Power Loss Characteristics

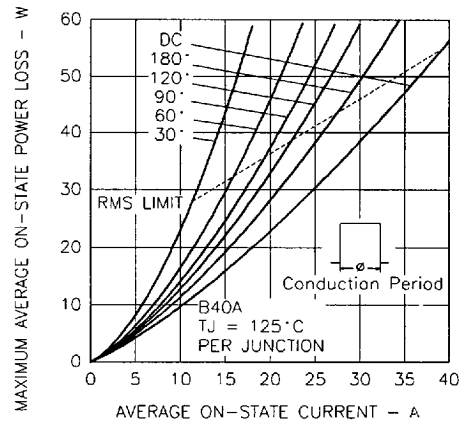


Fig. 4 - On-state Power Loss Characteristics

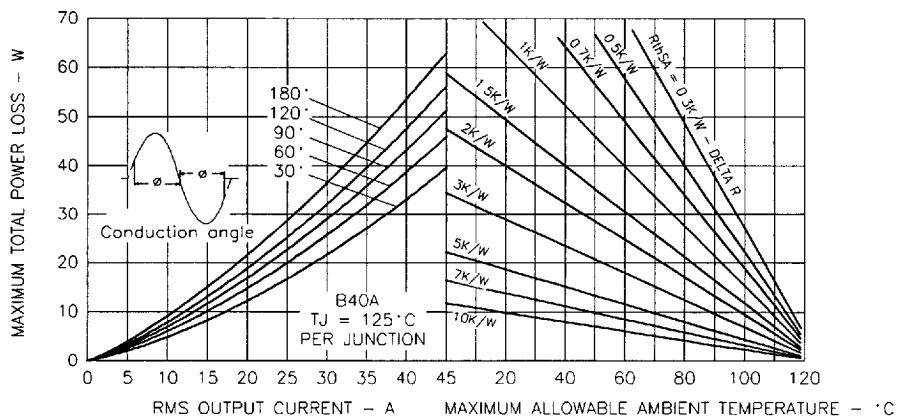


Fig. 5 - On-state Power Loss Characteristics

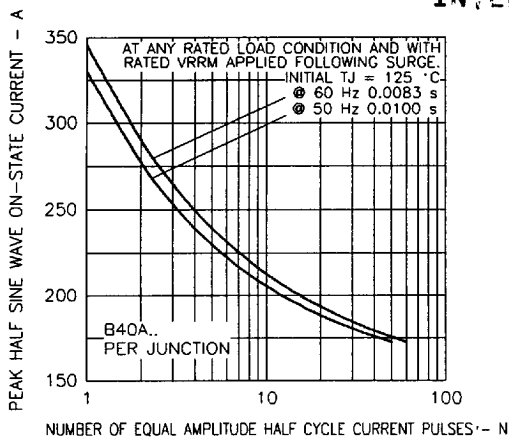


Fig. 6 - Maximum Non-Repetitive Surge Current

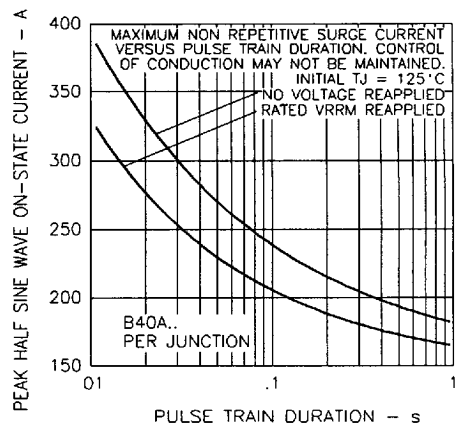


Fig. 7 - Maximum Non-Repetitive Surge Current

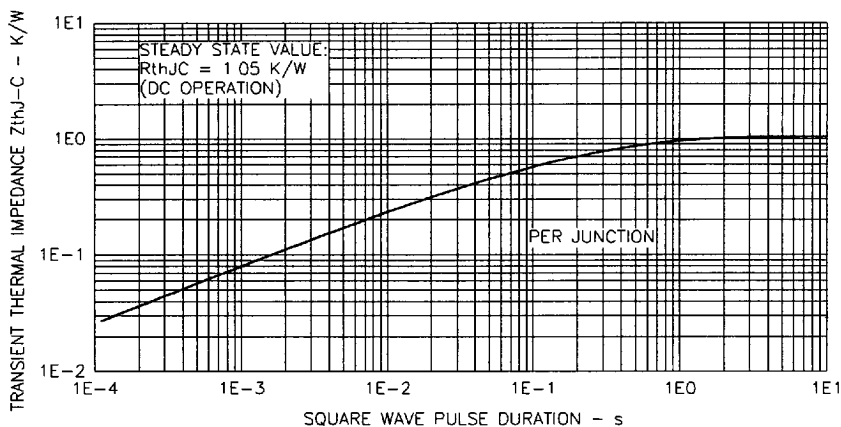
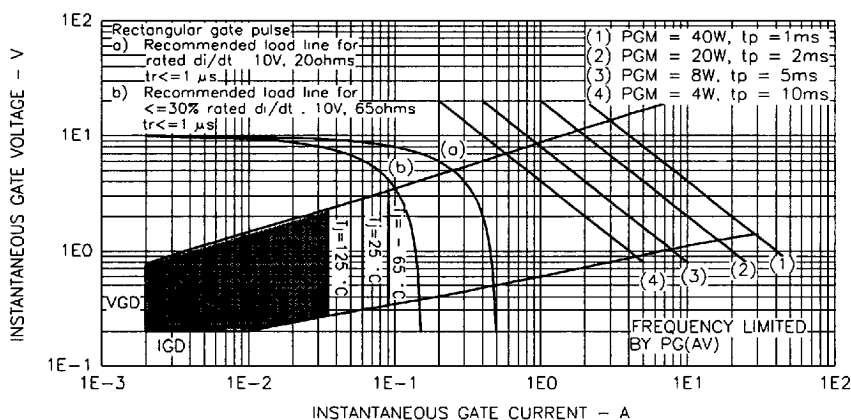
Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

Fig. 9 - Gate Characteristics