

FAST RECOVERY DIODES

Power Modules in B-package

Features

- Fast recovery time characteristics
- Electrically isolated base plate
- Standard JEDEC package
- Simplified mechanical designs, rapid assembly
- High surge capability
- Large creepage distances
- UL E78996 approved
- 3500 V_{RMS} isolating voltage

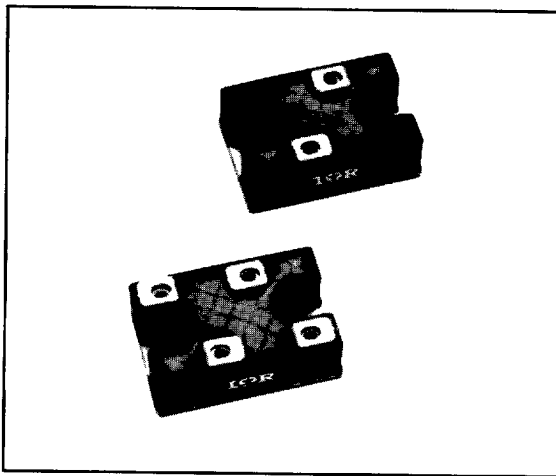
40A

Description

The B40HFL./B40H2S.. Series use fast recovery power diodes in two basic configurations. The semiconductors are electrically isolated from the metal base, allowing common heatsinks and compact assemblies to be built. Application includes power supplies, battery chargers, welders, motor controls and general industrial current rectification. These modules are intended for those applications where fast recovery characteristics are required.

Major Ratings and Characteristics

Parameters	B40HFL/B40H2L	Units
$I_{F(AV)}$	40	A
@T _C	50	°C
I_{FSM} 50Hz	480	A
60Hz	500	A
I^2t 50Hz	1130	A ² s
60Hz	1030	A ² s
V _{RRM} range	100 to 1000	V
t _{rr} range	200 to 1000	ns
T _J	-40 to 125	°C



ELECTRICAL SPECIFICATIONS

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Voltage Ratings

Type number	Voltage Code	t_{rr} Code	V_{RRM} , maximum repetitive peak reverse voltage V	V_{RSM} , maximum non-repetitive peak reverse voltage V	I_{RRM} @ 25°C. μA
B40HFL B40H2L	10	S02, S05, S10	100	150	100
	20	S02, S05, S10	200	300	100
	40	S02, S05, S10	400	500	100
	60	S02, S05, S10	600	700	100
	80	S05, S10	800	900	100
	100	S05, S10	1000	1100	100

Forward Conduction

Parameter		B40HFL/B40H2L	Units			
$I_{F(AV)}$	Max. average forward current @ Case temperature	40	A	180° conduction, half sine wave		
		50	°C			
$I_{F(RMS)}$	Max. RMS forward current	63	A			
I_{FSM}	Max. peak, one-cycle forward, non-repetitive surge current	480	A	t = 10ms	No voltage	Sinusoidal half wave, Initial $T_J = T_{J,max}$
		500	A	t = 8.3ms	reapplied	
		400	A	t = 10ms	100% V_{RRM}	
		420	A	t = 8.3ms	reapplied	
I^2t	Maximum I^2t for fusing	1130	A ² s	t = 10ms	No voltage	Sinusoidal half wave, Initial $T_J = T_{J,max}$
		1030	A ² s	t = 8.3ms	reapplied	
		800	A ² s	t = 10ms	100% V_{RRM}	
		730	A ² s	t = 8.3ms	reapplied	
I^2/t	Maximum I^2/t for fusing	11300	A ² /s	t = 0.1 to 10ms, no voltage reapplied		
$V_{F(TO)1}$	Low level value of threshold voltage	0.97	V	$(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$		
$V_{F(TO)2}$	High level value of threshold voltage	1.35	V	$(\pi \times I_{F(AV)} < I < 20 \times \pi \times I_{F(AV)})$		
r_{f1}	Low level value of forward slope resistance	4.85	mΩ	$(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$		
r_{f2}	High level value of forward slope resistance	2.34	mΩ	$(\pi \times I_{F(AV)} < I < 20 \times \pi \times I_{F(AV)})$		
V_{FM}	Max. forward voltage drop	1.55	V	$I_{FM} = \pi \times I_{F(AV)}$, $T_J = 25^\circ\text{C}$, 180° conduction Av. power = $V_{F(TO)} \times I_{F(AV)} + r_f \times (I_{F(RMS)})^2$		

Blocking

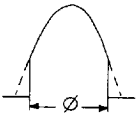
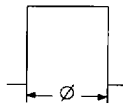
I_{RRM} Max. peak reverse leakage current	5	mA	$T_J = 125^\circ\text{C}$
V_{INS} RMS isolation voltage	3500	V	50Hz, circuit to base, all terminals shorted; t = 1s

Thermal and Mechanical Specifications

T_J Max. junction operating temperature	-40 to 125	°C		
T_{stg} Max. storage temperature range	-40 to 125	°C		
R_{thJC} Max. internal thermal resistance junction to case	1.2	K/W	B40HFL	Per module, DC operation
	0.60	K/W	B40H2L	Per module, DC operation
R_{thc-s} Thermal resistance, case to heatsink	0.10	K/W	Mounting surface flat, smooth and greased Per module/ Per junction	
T Mounting torque Device to heatsink Terminals	2	Nm	M4 mounting screws Non-lubricated threads	
	0.8	Nm	M3 screws terminals; Non-lubricated threads	
wt Approximate weight	40	g (oz)		
Case style	"B" Type		See outline table	

ΔR Conduction (per Junction) INTERNATIONAL RECTIFIER 65E D

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

Conduction angle		B40HFL	B40H2L	Units
	180°	0.058	0.058	K/W
	120°	0.072	0.072	K/W
	90°	0.095	0.095	K/W
	60°	0.141	0.141	K/W
	30°	0.238	0.238	K/W
	180°	0.046	0.046	K/W
	120°	0.080	0.080	K/W
	90°	0.106	0.106	K/W
	60°	0.148	0.148	K/W
	30°	0.240	0.240	K/W

Reverse Recovery Characteristics

Parameter	B40HFL/B40H2L			Units	Conditions
	S02	S05	S10		
t_{rr} Maximum reverse recovery time	70	110	270	ns	$T_J = 25^\circ\text{C}$, $-di_F/dt = 100\text{A}/\mu\text{s}$ $I_F = 1\text{A}$
	200	500	1000	ns	$T_J = 25^\circ\text{C}$, $-di_F/dt = 25\text{A}/\mu\text{s}$ $I_{FM} = 125\text{A}$ (*)
Q_{rr} Maximum reverse recovered charge	0.2	0.4	1.35	μC	$T_J = 25^\circ\text{C}$, $-di_F/dt = 100\text{A}/\mu\text{s}$ $I_F = 1\text{A}$
	0.9	3.3	12.7	μC	$T_J = 25^\circ\text{C}$, $-di_F/dt = 25\text{A}/\mu\text{s}$ $I_{FM} = 125\text{A}$ (*)

(*) Tested on LEM 300A Diodometer Tester

Ordering Information Table

Device Code				
B	40	HFL	100	S10
①	②	③	④	⑤
1	- Module type - Current code - Circuit configuration (See table on the right) - Voltage code (See Voltage Ratings Table) - t_{rr} code (See Reverse Recovery Characteristics Table)			

Circuit Configuration Table

B..HFL	B..H2L	
		

Outlines Table

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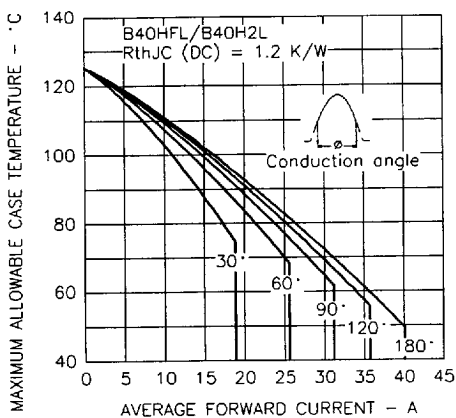
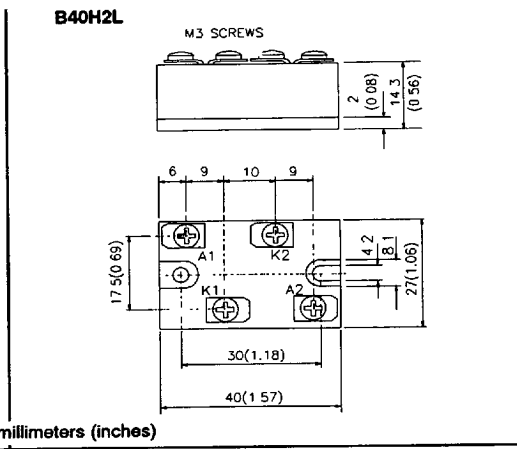
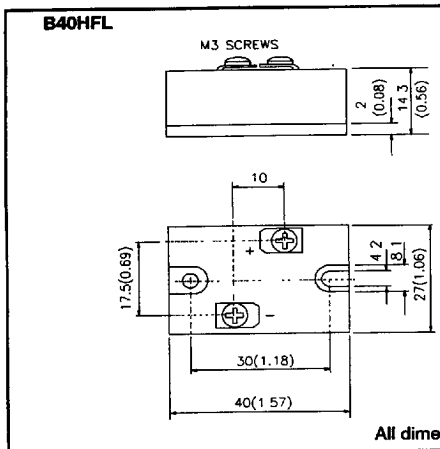


Fig. 1 - Current Ratings Characteristics

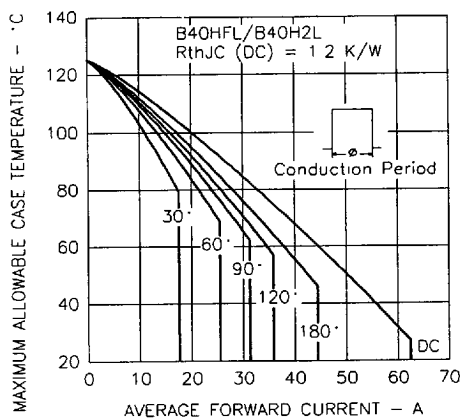


Fig. 2 - Current Ratings Characteristics

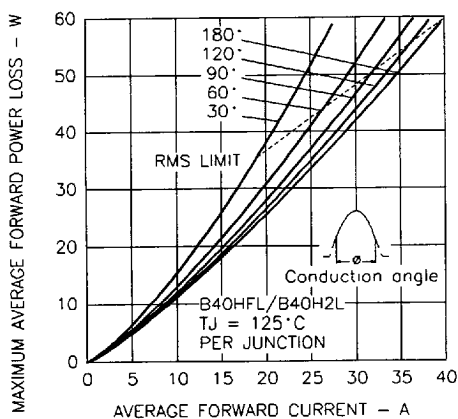


Fig. 3 - Forward Power Loss Characteristics

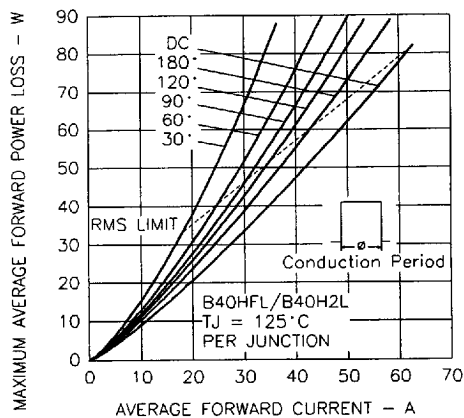


Fig. 4 - Forward Power Loss Characteristics

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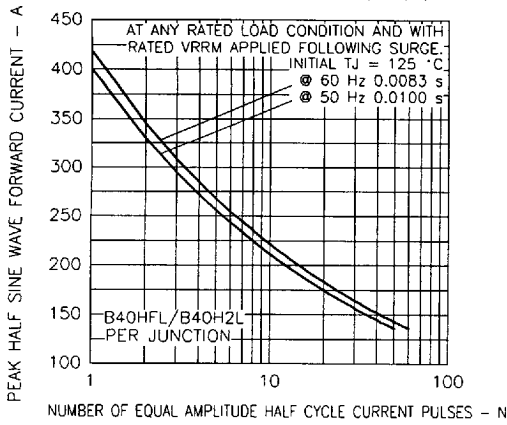


Fig. 5 - Maximum Non-Repetitive Surge Current

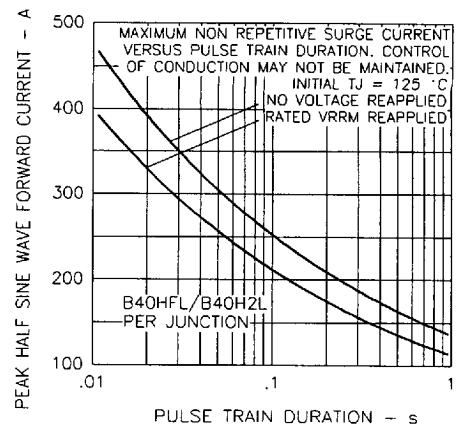


Fig. 6 - Maximum Non-Repetitive Surge Current

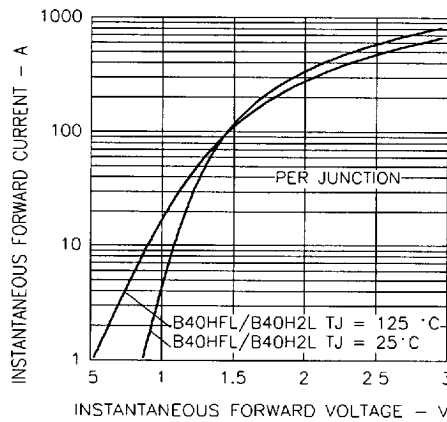


Fig. 7 - Forward Voltage Drop Characteristics

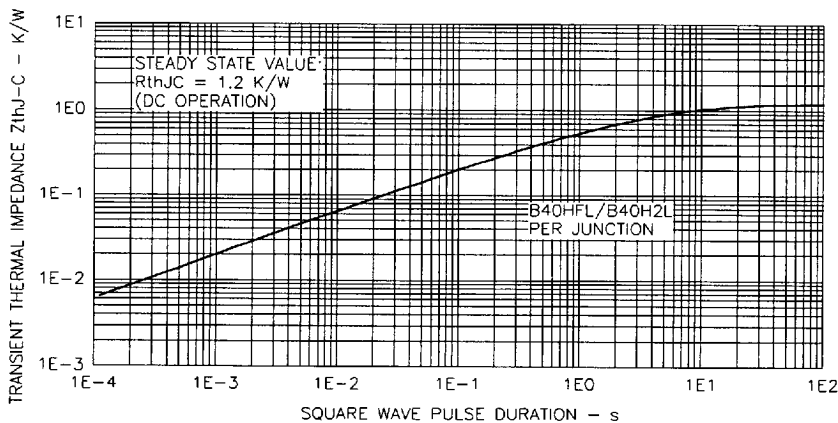


Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

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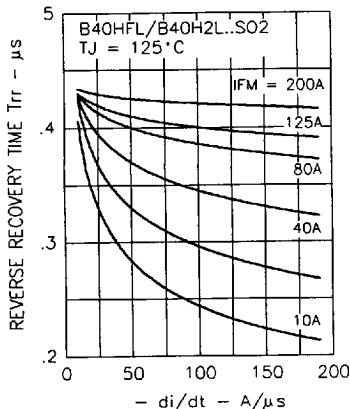


Fig. 9 - Recovery Time Characteristics

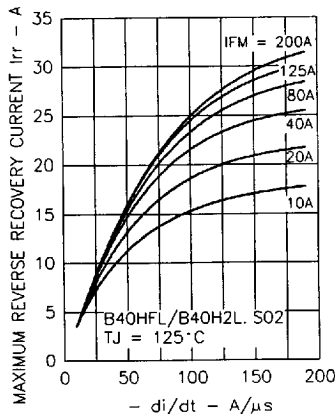


Fig. 10 - Recovery Current Characteristics

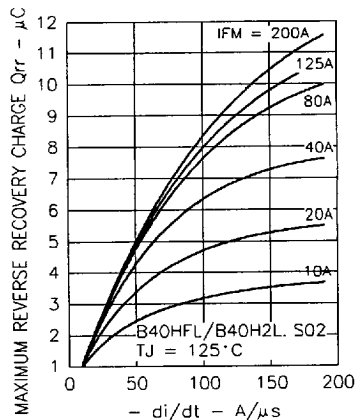


Fig. 11 - Recovery Charge Characteristics

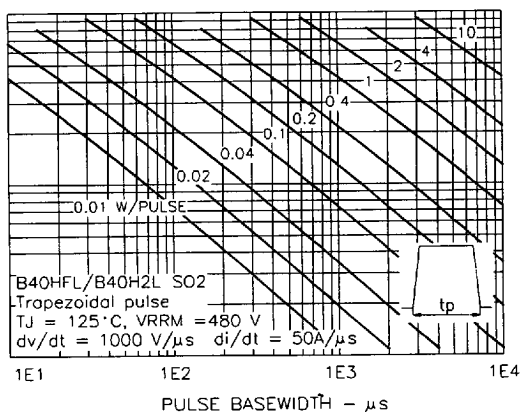
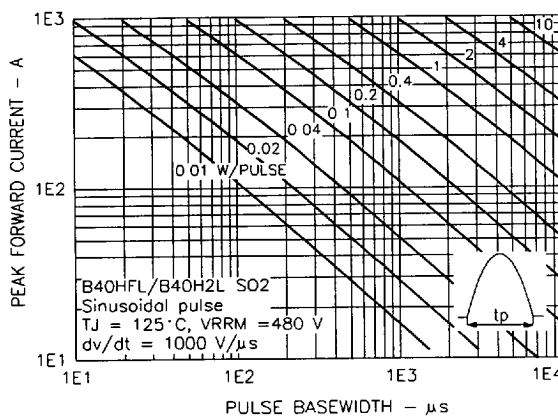


Fig. 12 - Maximum Total Energy Loss Per Pulse Characteristics

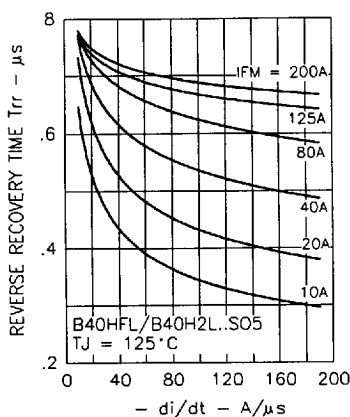


Fig. 13 - Recovery Time Characteristics

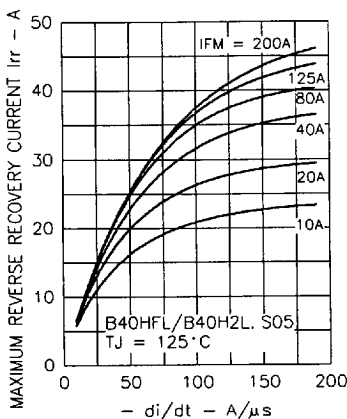


Fig. 14 - Recovery Current Characteristics

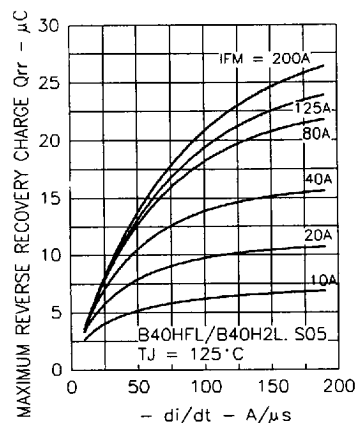


Fig. 15 - Recovery Charge Characteristics

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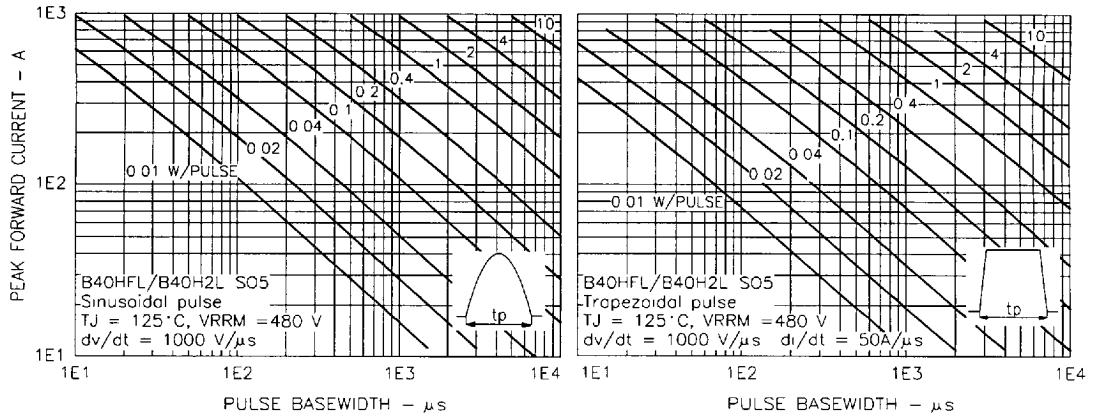


Fig. 16 - Maximum Total Energy Loss Per Pulse Characteristics

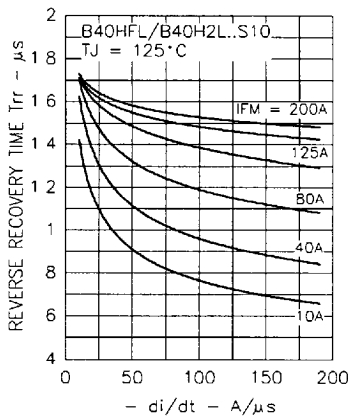


Fig. 17 - Recovery Time Characteristics

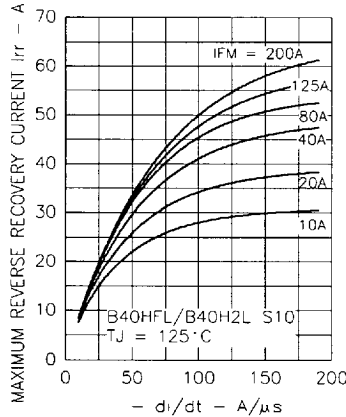


Fig. 18 - Recovery Current Characteristics

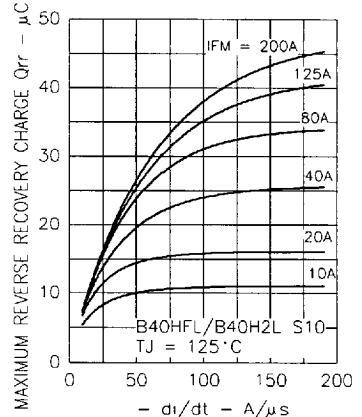


Fig. 19 - Recovery Charge Characteristics

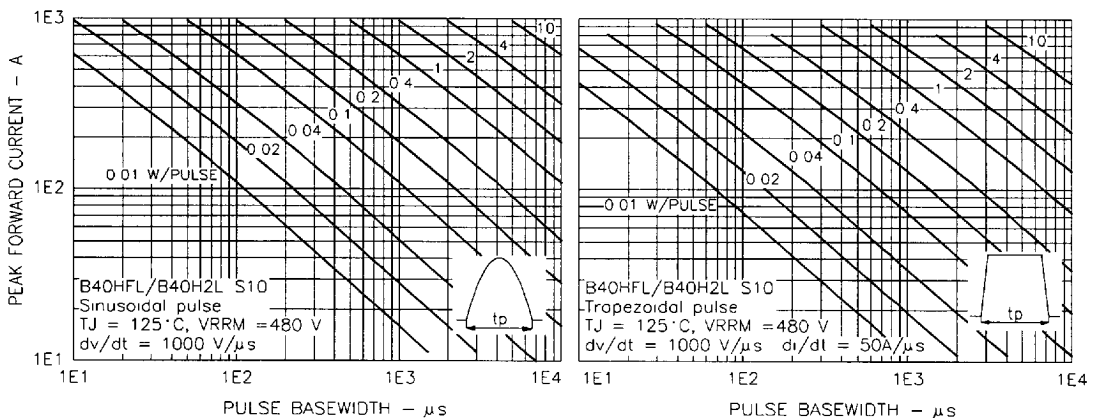


Fig. 20 - Maximum Total Energy Loss Per Pulse Characteristics