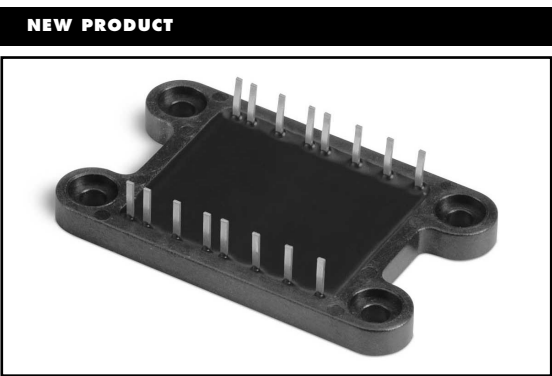


# MODEL 7721 SERIES

## H Bridge Power Module

Drives DC motors, transformers and other loads. Paralleled ultrafast diodes included. Standard applications are off-line DC motor control and power conversion.



### MODELS/RANGE

7721-1A

22A 500V IGBTs with 8A 600V ultrafast diodes

7721-2A

32A 600V IGBTs with 25A 600V hyperfast diodes

### FEATURES AND BENEFITS

- Saves significant space and assembly time
  - Modern design reduces heatsink cost
  - Low cost
  - Thin package (.200) easily fits between PCB and heatsink
  - Internal temperature sensing for fastest possible response
  - Replaces 8 each TO-220 or TO-247 discrete power semiconductors
  - Custom designs accept any IGBTs or FETs up to size 5 with parallel diodes
  - Custom module versions available for specific applications
- Example: 3 phase motor drives & rectifier bridges, power servo amplifiers, solenoid drivers, solid state relays, audio amplifiers, and high-power DC/DC converters.

Specifications subject to change without notice.

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**ELECTRICAL CHARACTERISTICS (7721-1A)**

Parameter	Symbol	Conditions <sup>1</sup>	Min.	Typ.	Max.	Units
<b>Q1-Q4 IGBT</b>						
Continuous Collector Current	$I_C$	$T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$			40 22	A A
Pulsed Collector Current	$I_{CM}$				80	A
Reverse Avalanche Energy	$E_{AVR}$				15	mJ
Collector Leakage Current	$I_{CES}$	$V_{GE} = 0V, V_{CE} = 500V$			250	$\mu\text{A}$
Saturation Voltage	$V_{CE(ON)}$	$I_C = 22A, V_{GE} = 15V$ $I_C = 40A, V_{GE} = 15V$		2.4 2.8	3.0	V V
Gate Threshold Voltage	$V_{GE(TH)}$	$V_{CE} = V_{GE}, I_C = 250\mu\text{A}$	3.0		5.5	V
Gate Leakage Current	$I_{GES}$	$V_{GE} = \pm 20V$			$\pm 100$	nA
Total Gate Charge (turn on)	$Q_g$	$I_C = 22A, V_{CC} = 400V, V_{GE} = 15V$		55	83	nC
Gate Emitter Charge (turn on)	$Q_{ge}$	$I_C = 22A, V_{CC} = 400V, V_{GE} = 15V$		11	17	nC
Gate Collector Charge (turn on)	$Q_{gc}$	$I_C = 22A, V_{CC} = 400V, V_{GE} = 15V$		19	29	nC
Turn Off Delay Time	$t_{d(off)}$	$I_C = 22A, V_{CC} = 400V, V_{GE} = 15V, R_G = 10\Omega$ w/tail		100	150	ns
Fall Time	$t_f$	$I_C = 22A, V_{CC} = 400V, V_{GE} = 15V, R_G = 10\Omega$ w/tail		56	100	ns
Total Switching Loss	$E_{ts}$	$I_C = 22A, V_{CC} = 400V, V_{GE} = 15V, R_G = 10\Omega$ w/tail		.55	.70	mJ
Input Capacitance	$C_{ies}$	$V_{GE} = 0V, V_{CC} = 30V, f = 1\text{MHz}$		1400		pF
Output Capacitance	$C_{oes}$	$V_{GE} = 0V, V_{CC} = 30V, f = 1\text{MHz}$		250		pF
Reverse Transfer Capacitance	$C_{res}$	$V_{GE} = 0V, V_{CC} = 30V, f = 1\text{MHz}$		42		pF
Junction Temperature	$T_J$				150	$^\circ\text{C}$
Thermal Resistance	$R_{thjc}$				.94	$^\circ\text{C/W}$
<b>D1-D4 Fred Diodes</b>						
Reverse Leakage Current	$I_R$	$V_R = 600V$ $V_R = .8 \times 600V, T_J = 125^\circ\text{C}$			20 1.5	$\mu\text{A}$ mA
Forward Voltage	$V_F$	$I_F = 8A$ $I_F = 8A, T_J = 150^\circ\text{C}$			1.5 1.3	V V
Reverse Recovery Time	$t_{rr}$	$I_F = 1A, -di/dt = 50A/\mu\text{s}, V_R = 30V$		35	50	ns
Junction Temperature	$T_J$				150	$^\circ\text{C}$
Thermal Resistance	$R_{thjc}$				3.1	$^\circ\text{C/W}$
<b>TH1 NTC Thermistor</b>						
Resistance	$R_{25}$	$I = 1\text{mA}$	22.5	25	27.5	K $\Omega$
Resistance Ratio	$R_T/R_{25}$	$t = 80^\circ\text{C}$ $t = 90^\circ\text{C}$ $t = 100^\circ\text{C}$ $t = 110^\circ\text{C}$		.126 .0916 .0679 .0511		
Dissipation Constant	$P_D$			1.0		mW/ $^\circ\text{C}$
Thermal Time Constant	$t$				10	sec

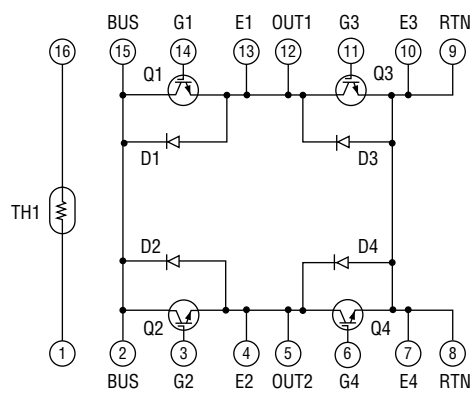
1 - TCase = 25°C unless otherwise specified.

**ELECTRICAL CHARACTERISTICS (7721-2A)**

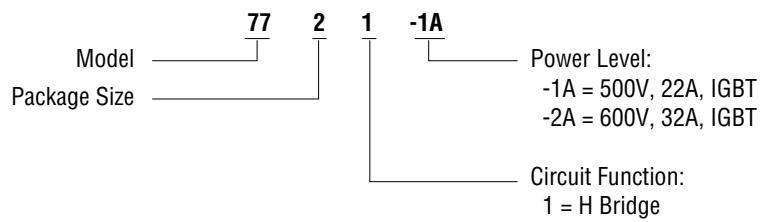
Parameter	Symbol	Conditions <sup>1</sup>	Min.	Typ.	Max.	Units
<b>Q1-Q4 IGBT</b>						
Continuous Collector Current	$I_C$	$T_C = 25^\circ\text{C}$ $T_C = 90^\circ\text{C}$			60 32	A A
Pulsed Collector Current	$I_{CM}$				120	A
Collector Leakage Current	$I_{CES}$	$V_{GE} = 0\text{V}, I_C = .8 \times 600\text{V}$ $V_{GE} = 0\text{V}, V_{CE} = .8 \times 600\text{V}, T_J = 125^\circ\text{C}$			200 1	$\mu\text{A}$ mA
Saturation Voltage	$V_{CE(ON)}$	$I_C = 32\text{A}, V_{GE} = 15\text{V}$			2.5	V
Gate Threshold Voltage	$V_{GE(TH)}$	$V_{CE} = V_{GE}, I_C = 250\mu\text{A}$	2.5		5.0	V
Gate Leakage Current	$I_{GES}$	$V_{GE} = \pm 20\text{V}$			$\pm 100$	nA
Total Gate Charge (turn on)	$Q_g$	$I_C = 32\text{A}, V_{CC} = 300\text{V}, V_{GE} = 15\text{V}$		125	150	nC
Gate Emitter Charge (turn on)	$Q_{ge}$	$I_C = 32\text{A}, V_{CC} = 300\text{V}, V_{GE} = 15\text{V}$		23	35	nC
Gate Collector Charge (turn on)	$Q_{gc}$	$I_C = 32\text{A}, V_{CC} = 300\text{V}, V_{GE} = 15\text{V}$		50	75	nC
Turn Off Delay Time	$t_{d(off)}$	$I_C = 32\text{A}, V_{CC} = 400\text{V}, V_{GE} = 15\text{V}, R_G = 4.7\Omega$		100	200	ns
Fall Time	$t_f$	$I_C = 32\text{A}, V_{CC} = 400\text{V}, V_{GE} = 15\text{V}, R_G = 4.7\Omega$		80	150	ns
Total Switching Loss	$E_{ts}$	$I_C = 32\text{A}, V_{CC} = 400\text{V}, V_{GE} = 15\text{V}, R_G = 4.7\Omega$		.8	1.6	mJ
Input Capacitance	$C_{ies}$	$V_{GE} = 0\text{V}, V_{CC} = 25\text{V}, f = 1\text{MHz}$		2500		pF
Output Capacitance	$C_{oes}$	$V_{GE} = 0\text{V}, V_{CC} = 25\text{V}, f = 1\text{MHz}$		230		pF
Reverse Transfer Capacitance	$C_{res}$	$V_{GE} = 0\text{V}, V_{CC} = 25\text{V}, f = 1\text{MHz}$		70		pF
Junction Temperature	$T_J$				150	$^\circ\text{C}$
Thermal Resistance	$R_{thjc}$				.60	$^\circ\text{C/W}$
<b>D1-D4 Fred Diodes</b>						
Reverse Leakage Current	$I_R$	$V_R = 600\text{V}$ $V_R = .600\text{V}, T_J = 150^\circ\text{C}$		1 .3	500 1.5	$\mu\text{A}$ mA
Forward Voltage	$V_F$	$I_F = 25\text{A}$ $I_F = 25\text{A}, T_J = 150^\circ\text{C}$		1.5 1.3	2.8 2.5	V V
Reverse Recovery Time	$t_{rr}$	$I_F = 1\text{A}, -di/dt = 100\text{A}/\mu\text{s}$		30	40	ns
Junction Temperature	$T_j$				175	$^\circ\text{C}$
Thermal Resistance	$R_{thjc}$				1.2	$^\circ\text{C/W}$
<b>TH1 NTC Thermistor</b>						
Resistance	$R_{25}$	$I = 1\text{mA}$	22.5	25	27.5	K $\Omega$
Resistance Ratio	$R_T/R_{25}$	$t = 80^\circ\text{C}$ $t = 90^\circ\text{C}$ $t = 100^\circ\text{C}$ $t = 110^\circ\text{C}$		.126 .0916 .0679 .0511		
Dissipation Constant	$P_D$			1.0		mW/ $^\circ\text{C}$
Thermal Time Constant	$t$				10	sec

1 - TCase = 25°C unless otherwise specified.

## SCHEMATIC



## ORDERING INFORMATION



**OUTLINE DIMENSIONS (Inch)**

