10 Base-T Multiport Module with Enhanced Common Mode Attenuation

PCA ELECTRONICS INC.

EPA2188B
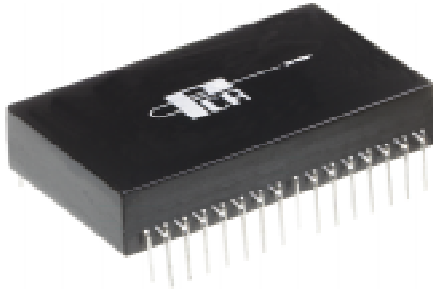
- • Optimized for RIC Chips •
- • Robust construction allows for severe solder processes •
- • Low Crosstalk enhances network reliability •
- • Complies with or exceeds IEEE 802.3, 10 Base-T Requirements •

Electrical Parameters @ 25° C

Cut-off Frequency (MHz)		Insertion Loss (dB Max.)		Return Loss (dB Min.)		Attenuation (dB Min.)								Common Mode Rejection (dB Min.)						Crosstalk (dB Min.)	
		1-10 MHz		5-10 MHz		@ 20 MHz		@ 25 MHz		@ 30 MHz		@ 40 MHz		@ 50 MHz		@ 100 MHz		@ 200 MHz		@ 1-10 MHz	
Xmit	Rcv	Xmit	Rcv	Xmit	Rcv	Xmit	Rcv	Xmit	Rcv	Xmit	Rcv	Xmit	Rcv	Xmit	Rcv	Xmit	Rcv	Xmit	Rcv	Xmit	Rcv
17	17	-1	-1	-15	-15	-7	-6	-19	-14	-30	-20	-35	-31	-30	-30	-25	-25	---	---	-30	-30

- • **Isolation** : meets or exceeds 802.3 IEEE Requirements • **Characteristic Filter Impedance** : 100 Ω •
- • Referenced to the Output Level Fundamental Frequency •

Schematic
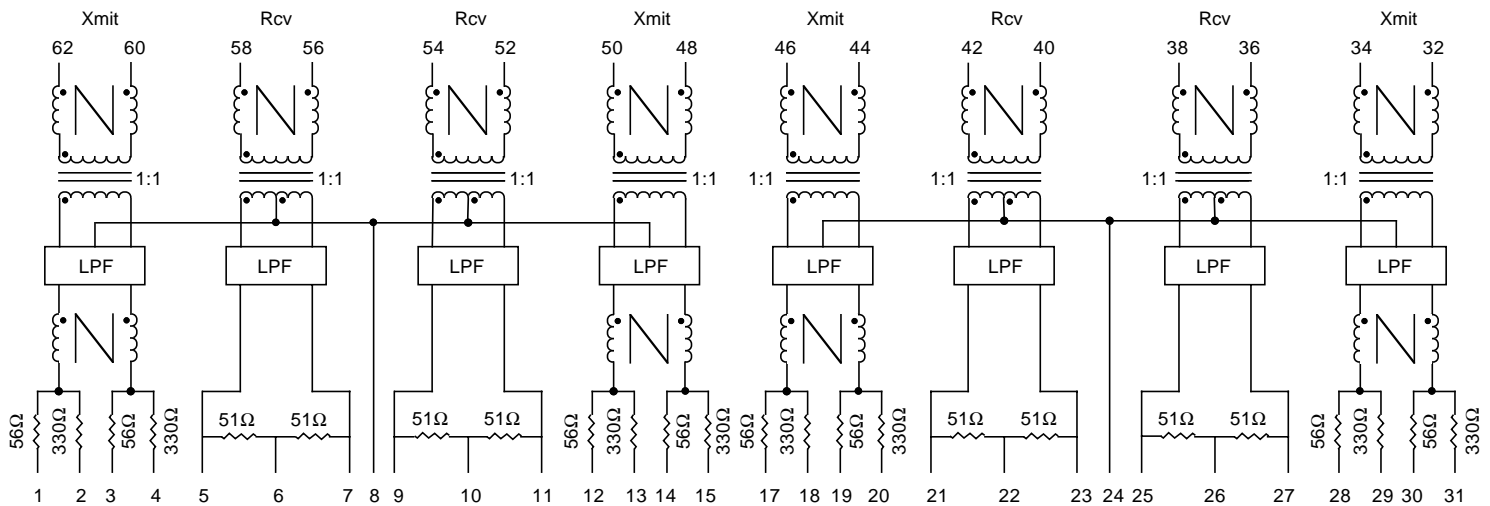
Package
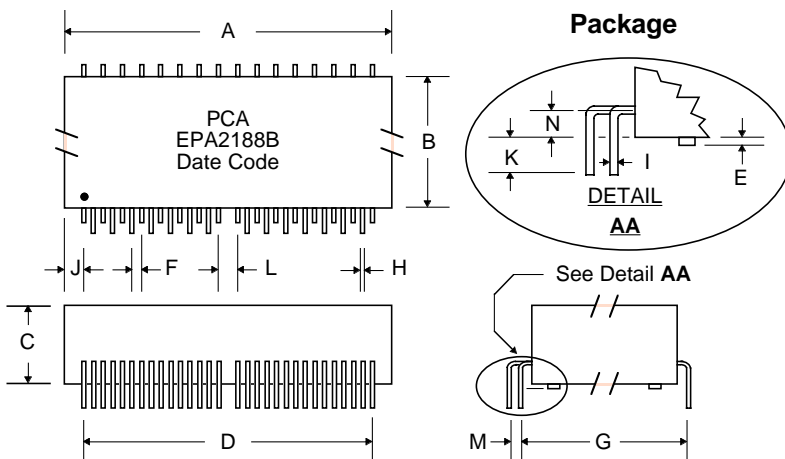
Dimensions

	(Inches)			(Millimeters)		
Dim.	Min.	Max.		Min.	Max.	
A	1.680	1.700		42.67	43.18	
B	1.015	1.025		25.78	26.04	
C	.380	.400		9.65	10.16	
D	1.49	1.51		37.85	38.35	
E	.010	.Typ.		.254	.Typ.	
F	.05 0	Typ.	34 Plcs	1.27	Typ.	34 Plcs
G	1.090	1.110		27.69	28.19	
H	.016	.020		.406	.508	
I	.008	.012		.203	.305	
J	.095	Typ.		2.41	Typ.	
K	.125	.150		3.18	3.81	
L	100	Typ.	17 Plcs	2.54	Typ.	17 Plcs
M	.075	Typ.		1.905	Typ.	
N	.100	.120		2.54	3.05	

The circuit below is a guideline for interconnecting PCA's EPA2188B with National chips as a reference controller. Further details of system design, such as chip pin-out, etc. can be obtained from the specific chip manufacturer.

Typical insertion loss of the isolation transformer/filter is 0.7dB. This parameter covers the entire spectrum of the encoded signals in 10 Base-T protocols. However, the predistortion resistor network introduces some loss which has to be taken into account in determining how well your design meets the Standard Template requirements. Additionally, note that NSC suggest using lower values for the resistors to provide more optimum amplitude control as would be required when driving lon cables or of varied quality unknown to the designer. Both values are shown here for your convenience. Users are encouraged to verify which network best suits their needs with the chip manufacturer before choosing one or the other.
For the first case, a quick calculation of the effective Thevenin's termination impedance for the filter follows: $1/R(termination) = 95\ \Omega$.
In the second case, one gets about the same values assuming $R_{ACT} \approx 7\Omega$. Thus, when measuring the return loss of these parts on the bench, it is necessary to provide a shunting resistor of approximatively 5Ω representing the four 5Ω output signal sources.

Note that some systems have auto polarity detection and some do not. If not, be certain to follow the proper polarity.
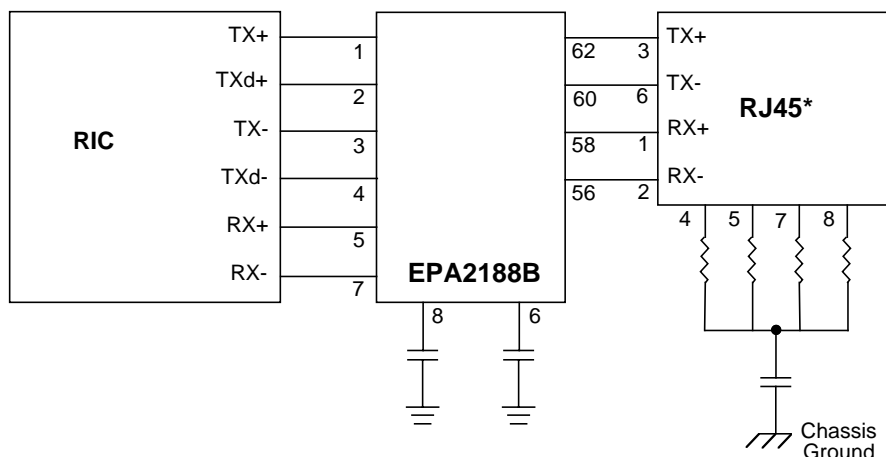
It is recommended that system designers ground the chip side center taps via a low voltage capacitor. Taking the cable side center taps to chassis via capacitors, is not recommended, as this will add cost without containing EMI. This may worsen EMI, specifically if the primary "common mode termination" is pulled to ground as shown.

The phantom resistors shown around the RJ45 connector have been known to suppress unwanted radiation that unused wires pick up from the immediate environment. Their placement and use are to be considered carefully before a design is finalized.

It is recommended that there be a neat separation of ground planes in the layout. It is generally accepted practice to limit the plane off at least 0.08 inches away from the chip side pins of EPA2188B. There need not be any ground plane beyond this point.

For best results, PCB designer should design the outgoing traces preferably to be 50Ω, balanced and well coupled to achieve minimum radiation from these traces.

Typical Application Circuit for UTP (Only one port shown)

Notes : * Pin-outs shown are for multiport, DCE configurations : e.g. Hubs, Repeaters

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