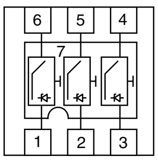
3-Channel EMI-Filter with ESD-Protection



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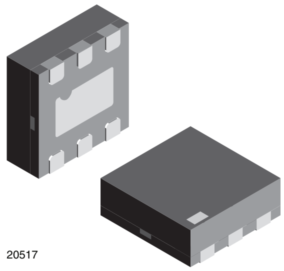
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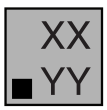
MARKING (example only)



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Dot = pin 1 marking
YY = type code (see table below)
XX = date code

FEATURES

- Ultra compact LLP75-7L package
- 3-channel EMI-filter and ESD-protection
- Low leakage current
- Line resistance R_S = 30 Ω
- Typical cut off frequency f_{3dB} = 100 MHz
- ESD-protection acc. IEC 61000-4-2
  ± 30 kV contact discharge
  ± 30 kV air discharge
- e4 - precious metal (e.g. Ag, Au, NiPd, NiPdAu) (no Sn)
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC

Pb-free
e4
RoHS COMPLIANT
GREEN (5-2008)**

ORDERING INFORMATION

DEVICE NAME	ORDERING CODE	TAPED UNITS PER REEL (8 mm TAPE ON 7" REEL)	MINIMUM ORDER QUANTITY
VEMI353A-HAF	VEMI353A-HAF-G-08	3000	15 000

PACKAGE DATA

DEVICE NAME	PACKAGE NAME	TYPE CODE	WEIGHT	MOLDING COMPOUND FLAMMABILITY RATING	MOISTURE SENSITIVITY LEVEL	SOLDERING CONDITIONS
VEMI353A-HAF	LLP75-7L	9D	4.2 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	260 °C/10 s at terminals

ABSOLUTE MAXIMUM RATINGS

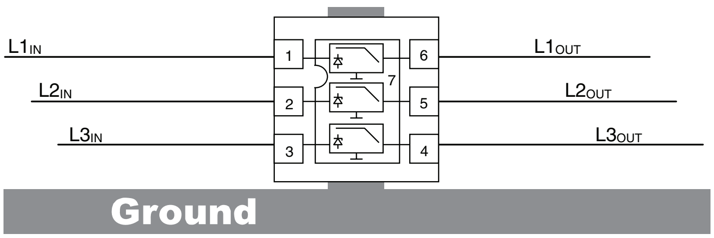
PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Peak pulse current	All I/O pin to pin 7; acc. IEC 61000-4-5; t_p = 8/20 µs; single shot	I_{PPM}	4	A
ESD immunity	Contact discharge acc. IEC61000-4-2; 10 pulses	V_{ESD}	± 30	kV
	Air discharge acc. IEC61000-4-2; 10 pulses		± 30	
Operating temperature	Junction temperature	T_J	- 40 to + 125	°C
Storage temperature		T_{STG}	- 55 to + 150	°C

** Please see document “Vishay Material Category Policy”: www.vishay.com/doc?99902

For technical questions, contact: EMIFilter@vishay.com

APPLICATION NOTE

With the VEMI353A-HAF 3 different signal or data lines can be filtered and clamped to ground. Due to the different clamping levels in forward and reverse direction the clamping behavior is Bidirectional and Asymmetric (BiAs).



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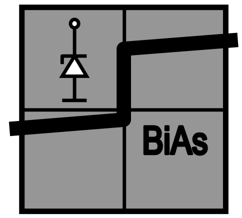

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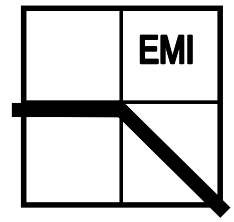

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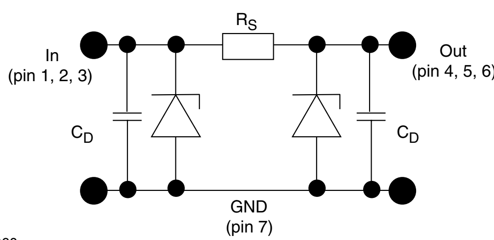
The 3 independent EMI-filter are placed between

pin 1 and pin 6
pin 2 and pin 5, and
pin 3 and pin 4.

They all are connected to a common ground pin 7 on the backside of the package. Each filter is symmetrical so that all ports (pin 1 to 6) can be used as input or output.

The circuit diagram of one EMI-filter-channel shows two identical Z-diodes at the input to ground and the output to ground. These Z-diodes are characterized by the breakthrough voltage level (V_{BR}) and the diode capacitance (C_D). Below the breakthrough voltage level the Z-diodes can be considered as capacitors. Together with these capacitors and the line resistance R_S between input and output the device works as a low pass filter. Low frequency signals ($f < f_{3dB}$) pass the filter while high frequency signals ($f > f_{3dB}$) will be shorted to ground through the diode capacitances C_D.



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Each filter is symmetrical so that both ports can be used as input or output.

ELECTRICAL CHARACTERISTICS VEMI353A-HAF (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITIONS/REMARKS**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Protection paths	Number of channels which can be protected	$N_{channel}$	-	-	3	channel
Reverse stand off voltage	at I_R = 1 μA each input to pin 2	V_{RWM}	5	-	-	V
Reverse current	at V_R = 5 V each input to pin 2	I_R	-	-	1	μA
Reverse break down voltage	Each input to pin 2 at I_R = 1 mA	V_{BR}	6	-	-	V
Pos. clamping voltage	at I_{PP} = 1 A applied at the input, measured at the output; acc. IEC 61000-4-5	V_{C-out}	-	-	7.8	V
	at I_{PP} = I_{PPM} = 4 A applied at the input, measured at the output; acc. IEC 61000-4-5	V_{C-out}	-	-	8	V
Neg. clamping voltage	at I_{PP} = - 1 A applied at the input, measured at the output; acc. IEC 61000-4-5	V_{C-out}	- 1	-	-	V
	at I_{PP} = I_{PPM} = - 4 A applied at the input, measured at the output; acc. IEC 61000-4-5	V_{C-out}	- 1.2	-	-	V
Input capacitance	at V_R = 0 V; f = 1 MHz	C_{IN}	-	60	-	pF
	at V_R = 2.5 V; f = 1 MHz	C_{IN}	-	37	-	pF
ESD-clamping voltage	at ± 30 kV ESD-pulse acc. IEC 61000-4-2	V_{CESD}	-	7.5	-	V
Line resistance	Measured between input and output; I_S = 10 mA	R_S	27	30	35	Ω
Cut-off frequency	V_{IN} = 0 V; measured in a 50 Ω system	f_{3dB}	-	100	-	MHz

TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

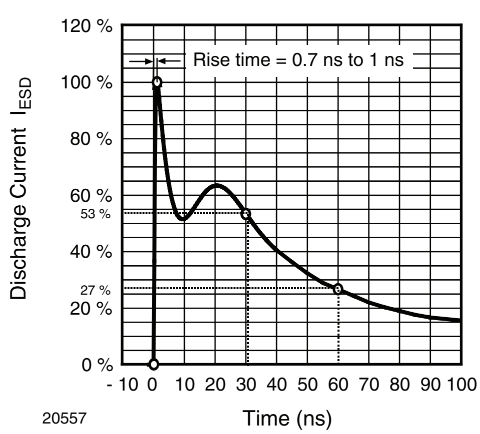


Fig. 1 - ESD Discharge Current Wave Form acc. IEC 61000-4-2 (330 Ω/150 pF)

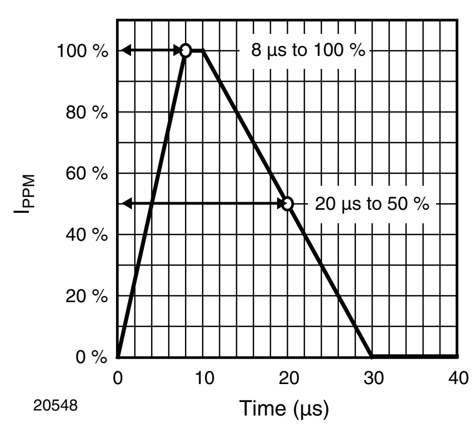


Fig. 2 - 8/20 μs Peak Pulse Current Wave Form acc. IEC 61000-4-5

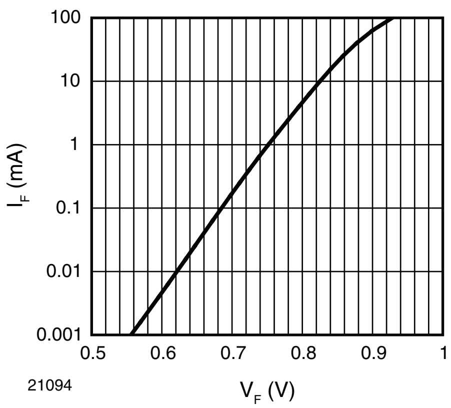


Fig. 3 - Typical Forward Current I_F vs. Forward Voltage V_F

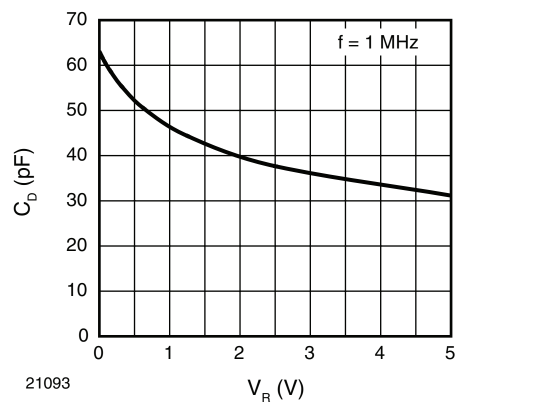


Fig. 6 - Typical Capacitance C_D vs. Reverse Voltage V_R

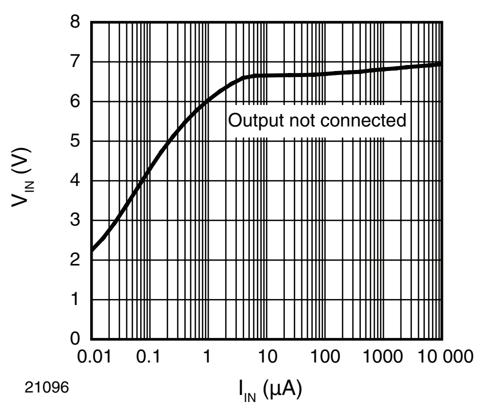


Fig. 4 - Typical Input Voltage V_{IN} vs. Input Current I_{IN}

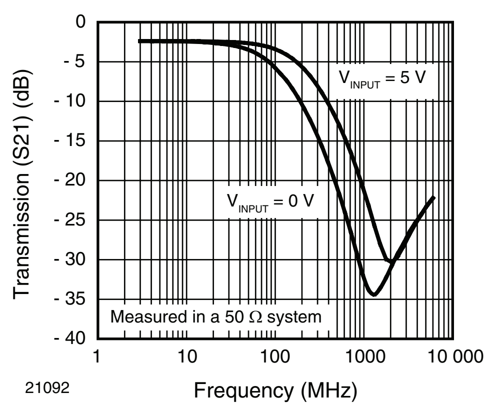


Fig. 7 - Typical Small Signal Transmission (S21) at Z_O = 50 Ω

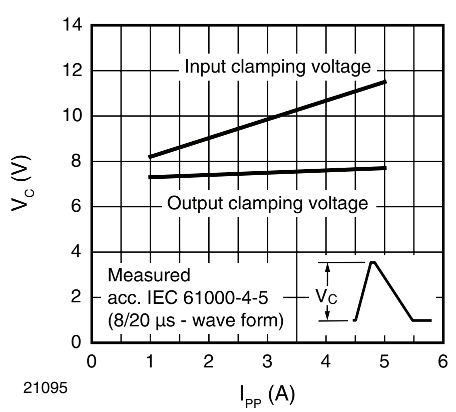
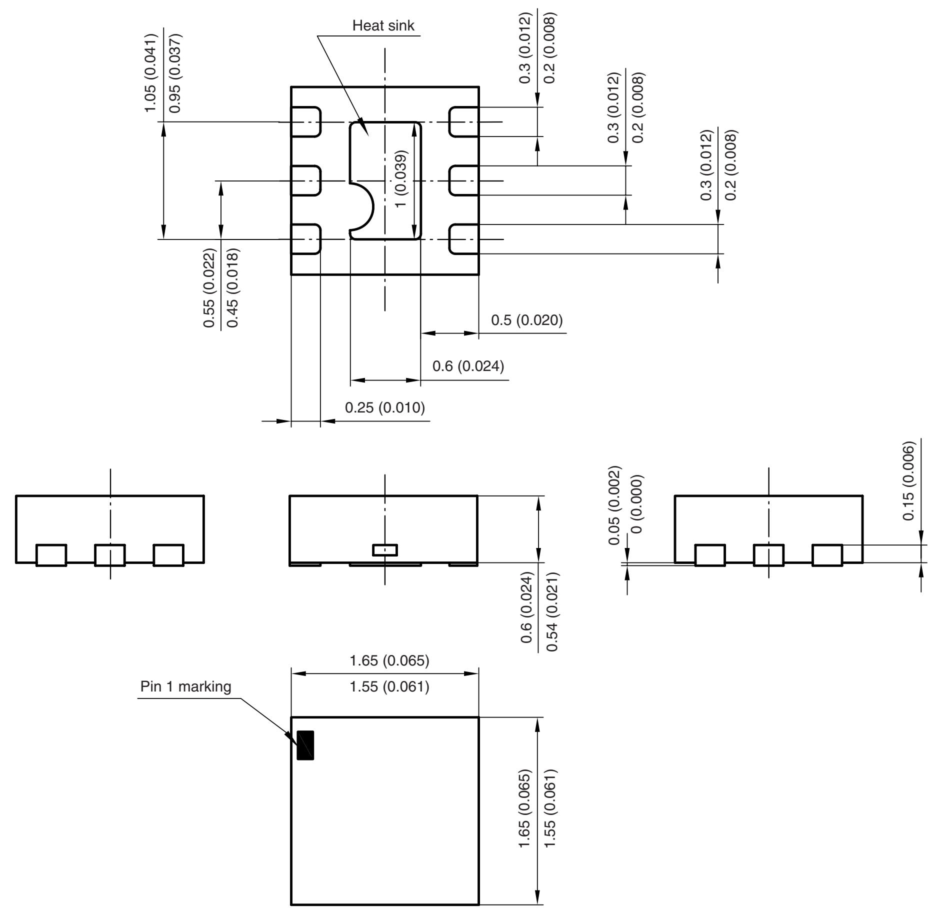
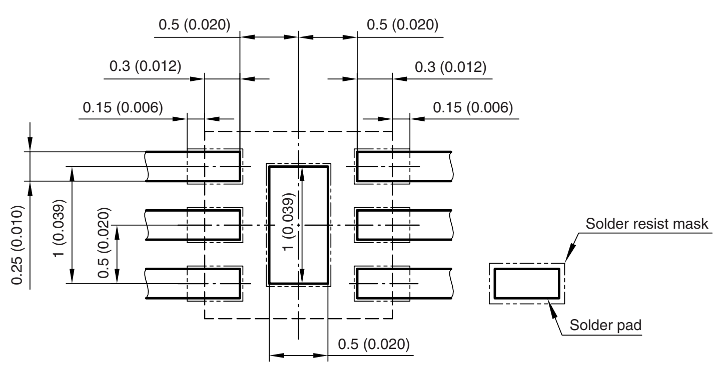


Fig. 5 - Typical Peak Clamping Voltage V_C vs. Peak Pulse Current I_{PP}

PACKAGE DIMENSIONS in millimeters (inches): **LLP75-7L**



Foot print recommendation:



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Created - Date: 04. April 2006
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