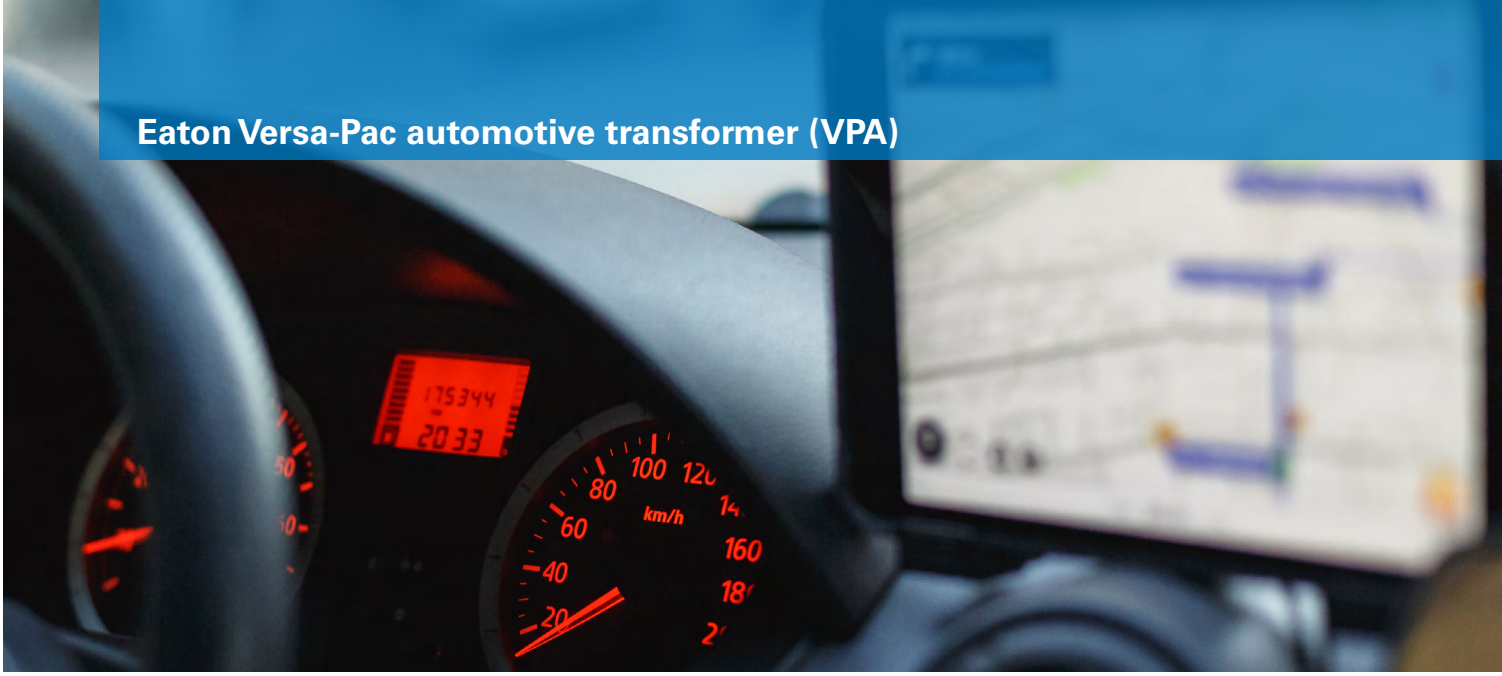
Eaton Versa-Pac automotive transformer (VPA)



Cost-effective configurable magnetics solutions for electronic applications

Eaton Versa-Pac family of configurable automotive grade transformers (VPA) are suitable for a wide range of high-reliability commercial and automotive applications.

Product description

Eaton Versa-Pac family of configurable automotive grade transformers (VPA) are suitable for a wide range of high-reliability commercial and automotive applications. The VPA family is offered in 4 industry standard SMT footprints and can be configured into multiple inductor and transformer solutions. Eaton's VPA contains six tightly coupled windings in a ferrite core design for high efficiency, versatility, and operating frequency range of over 1 MHz.

The VPA family is AEC-Q200 tested and suitable for high-reliability automotive applications and other high-performance applications in industrial, computing, medical, and energy. Configurable transformers like Eaton's VPA allow engineers to achieve the highest level of design flexibility across various inductor or transformer topologies.

Features and benefits

- 500 V isolation voltage
- High-reliability configurable magnetics platform suitable for automotive and other commercial applications
- Simple PCB layout configuration achieves hundreds of possible inductor and transformer configurations
- Four popular SMT footprints, compatible with the most competitive solutions on the market
- High-reliability performance, AECQ-200 tested
- High range of inductance values from 3.2 uH to 87 uH (each core)
- High frequency of operation to over 1 MHz, supporting new generation power circuits
- High temperature - 40 °C to + 125 °C
- Rugged bobbin construction design using ferrite core
- First to market configurable magnetics with decades of technical experience and global support

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Product specifications

Part number[7]	$L_{(BASE)}$[1] /µH nominal	FLL0[2] /µH minimum	FLL1[3] /µH reference	FLL2[4] /µH reference	$I_{RMS(BASE)}$[3] /A typical	$I_{SAT(BASE)}$[6] /A typical	$R_{(BASE)}$[4] /mΩ maximum @ +25 °C
VP2A1V							
VP2A1V-1600-R	78.4 ±30%	38.4	48	57	1.26	0.05	90
VP2A1V-0216-R	10.6 ±20%	5.93	7.9	2	1.26	0.78	90
VP2A1V-0116-R	5.7 ±20%	3.19	4.6	1.5	1.26	1.6	90
VP2A1V-0083-R	4.1 ±20%	2.29	3.5	1.1	1.26	2.26	90
VP2A1V-0066-R	3.2 ±20%	1.79	2.9	0.7	1.26	2.85	90
VP3A1V							
VP3A1V-0780-R	63.2 ±30%	30.9	29	49	1.47	0.05	61
VP3A1V-0138-R	11.2 ±20%	6.27	8.3	2.7	1.47	0.53	61
VP3A1V-0084-R	6.8 ±20%	3.8	5	0.9	1.47	1.1	61
VP3A1V-0055-R	4.5 ±20%	2.52	3.3	0.6	1.47	1.73	61
VP3A1V-0047-R	3.8 ±20%	2.12	2.8	0.5	1.47	2	61
VP4A1V							
VP4A1V-0860-R	87.0±30%	42.6	38	66	1.7	0.06	57
VP4A1V-0140-R	11.3 ±20%	6.32	8	6.3	1.7	1	57
VP4A1V-0075-R	6.1 ±20%	3.41	4.5	0.8	1.7	2.33	57
VP4A1V-0060-R	4.9 ±20%	2.74	3.7	0.7	1.7	2.83	57
VP4A1V-0047-R	3.8 ±20%	2.12	2.8	0.6	1.7	3.66	57
VP5A1V							
VP5A1V-1200-R	76.8 ±30%	37.6	35	55	2.08	0.083	47
VP5A1V-0155-R	9.9 ±20%	5.54	7.4	3	2.08	1.4	47
VP5A1V-0083-R	5.3 ±20%	2.96	4.5	2	2.08	2.58	47
VP5A1V-0067-R	4.3 ±20%	2.4	3.5	1.7	2.08	3.33	47
VP5A1V-0053-R	3.4 ±20%	1.9	3	1.2	2.08	3.9	47

1. $L_{(BASE)}$: Nominal inductance of a single phase @25 °C and it acts as only a reference for higher and lower temperature; test parameters: 300 kHz, 0.1 V_{rms}, 0.0 Adc, +25 °C
2. Full Load Inductance @25 °C (FLL0): Lower limit of inductance tested from six windings in parallel when $I_{SAT(BASE)}$ is loaded into all the six windings in parallel; test parameters: 300 kHz, 0.1 V_{rms}, +25 °C
3. Full Load Inductance @-55 °C (FLL1): Reference inductance value tested from six windings in parallel when $I_{SAT(BASE)}$ is loaded into all the six windings in parallel; test parameters: 300 kHz, 0.1 V_{rms}, -55 °C
4. Full Load Inductance @125 °C (FLL2): Reference inductance value tested from six windings in parallel when $I_{SAT(BASE)}$ is loaded into all the six windings in parallel; test parameters: 300 kHz, 0.1 V_{rms}, 125 °C
5. $I_{RMS(BASE)}$: RMS Current that results in a surface temperature of approximately 40 °C above ambient. The 40 °C rise occurs when the specified current flows through each of the six windings
6. Maximum DC Resistance of each winding
7. Hi-pot at 700V_{DC} from winding (WDG) to winding and from the windings to the core for 1 second
8. $I_{SAT(BASE)}$: Peak current that will result in 30% saturation of the core. This current value assumes that equal current flows in all six windings. For applications in which all windings are not simultaneously driven (i.e. flyback, SEPIC, Cuk, etc.), the saturation current per winding may be calculated as follows:

$$I_{SAT} = \frac{6 \times I_{SAT(BASE)}}{Number\ of\ Winding\ Driven}$$

9. Part Number Definition: VP2A1V-xxxx-R
   VP2A1V signify product code & the size of the package;
   -xxxx specify the AL, or nano Henries per turn squared;
   -R indicates RoHS compliant

See data sheet for complete specification details.

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