

Brief Application Guide

Basic Control Circuit

Passive solutions to support motor controllers

TDK Corporation offers a wide range of EPCOS and TDK brand components ideally suited for the design and development of control circuits. These components include a wide range of general passive devices including signal inductors, signal transformers, magnetics, chokes, common mode filters, aluminum electrolytic capacitors, film capacitors, SMD varistors and surge arresters. Together with TDK's other group companies; TDK Electronics, InvenSense, Micronas and Tronics, a full range of sensors and sensor systems are available for controlling specific applications.

Magnetics

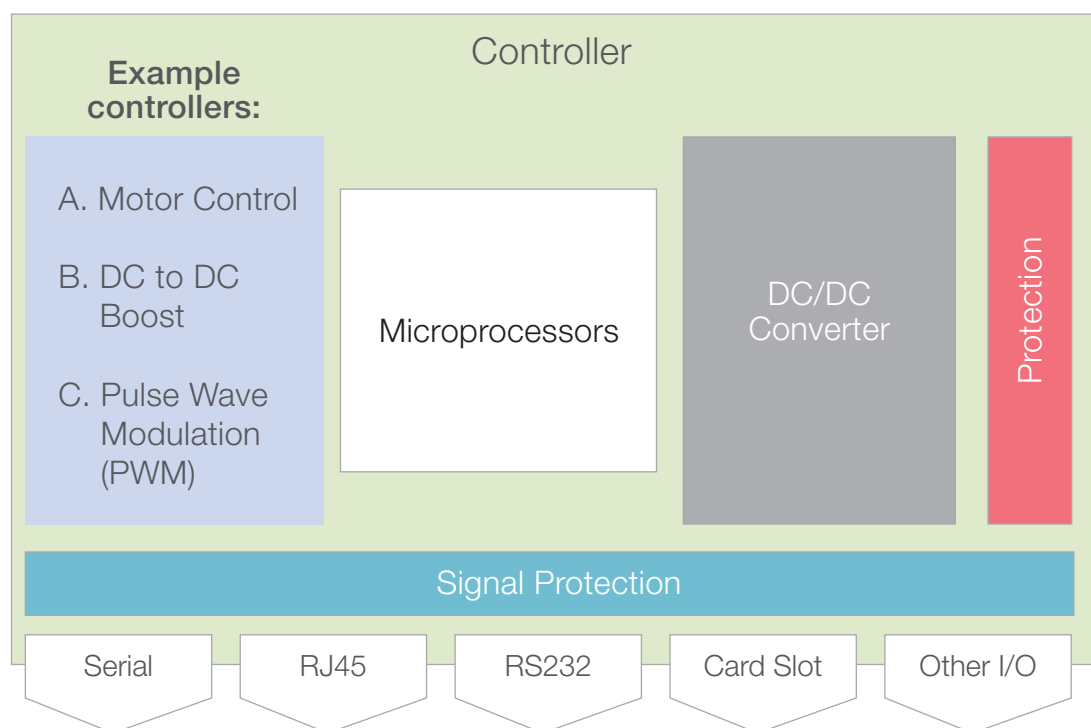
- Signal Inductors
- Common Mode Filters
- Signal Transformers
- Inductors
- Chokes

Capacitors

- Aluminum Electrolytic single-ended
- Aluminum Electrolytic snap-in
- Ceramic Capacitors
- Film Capacitors - general
- Film Capacitors - Performance

Protection Devices

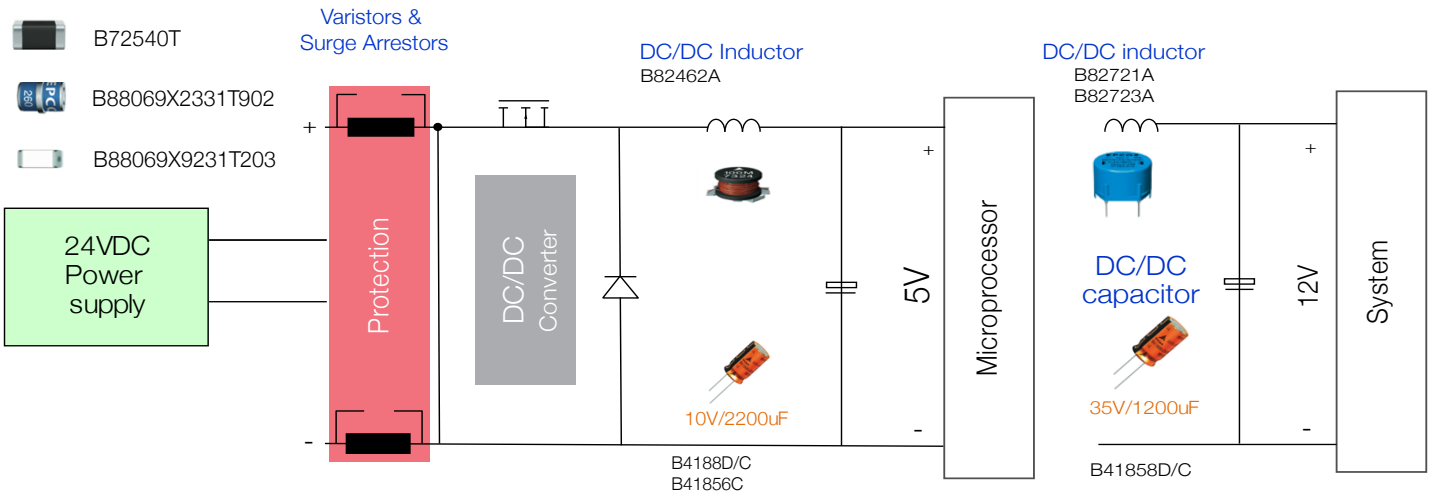
- Varistors SMD
- Surge Arresters



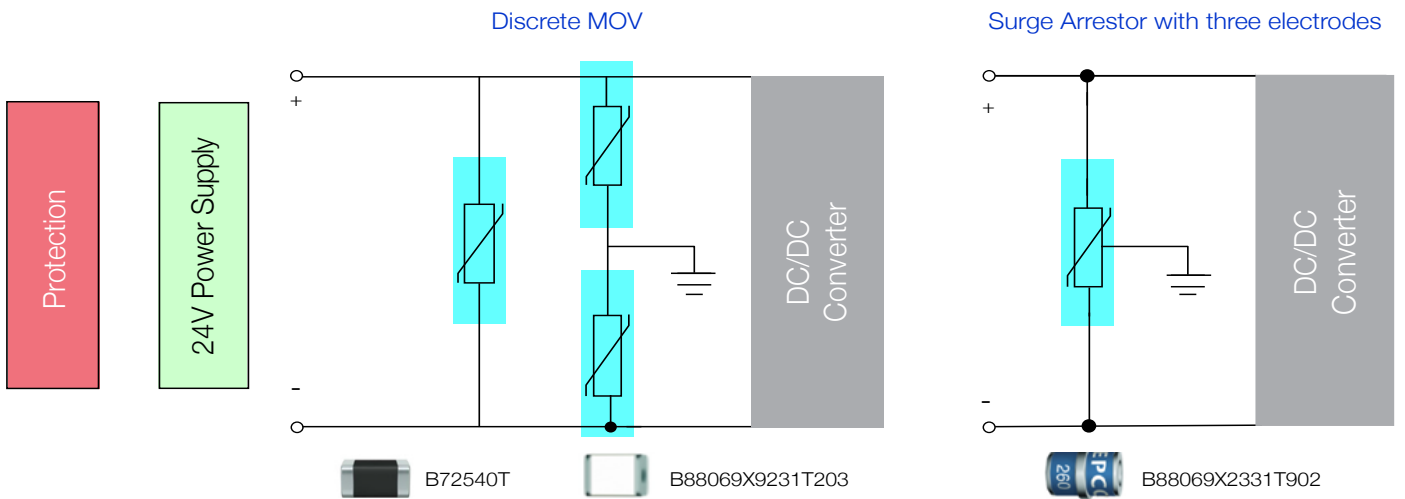
SERIES	TECHNICAL DATA	FEATURES	SERIES TYPE	GENERAL	SIGNAL	PROTECTION	DC/DC
SIGNAL INDUCTORS							
	L_R : 1 ... 4.7 μ H I_R : 0.7 ... 1.15A $R_{25^\circ\text{C}}$: 100 m Ω ... 250 m Ω	<ul style="list-style-type: none"> Temperature range up to +145 °C High Q factor High resonance frequency Qualified to AEC-Q200 Suitable for lead-free reflow soldering RoHS-compatible 	B82422H1102K000 B82422H1152K000 B82422H1222K000 B82422H1332K000 B82422H1472K000	•	•		•
COMMON MODE FILTERS							
	$R_{25^\circ\text{C}}$: 6 m Ω ... 1.6 Ω I_R : 330 mA ... 8 A V_R : 20 ... 80 V DC	<ul style="list-style-type: none"> Excellent common mode impedance and noise suppression in a compact case Low profile and small size 	ACM2520-801-3P-T002 ACM4520-421-2P-T000 ACM4520-901-2P-T000 ACM4520V-421-2P-T00 ACM4520V-901-2P-T00 ACM1211-701-2P-L-TL01 ACM2012E-900-2P-T00		•		•
SIGNAL TRANSFORMERS							
	L_R : 150 ... 200 μ H C_R : 25 ... 35 μ F 1CT : 1 CT	<ul style="list-style-type: none"> ALT Series, wound chip, pulse transformers developed for LAN Compatible with 10BASE-T, 100BASE-TX, and 1000BASE-T High-quality product, auto wound Conforms to the RoHS Directive 	ALT3232M-151-T001 ALT4532M-171-T001 ALT4532M-201-T001		•		
POWER INDUCTORS							
	L_R : 10 ... 47 μ H I_R : 0.54 ... 1.15A $R_{25^\circ\text{C}}$: 140 m Ω ... 640 m Ω	<ul style="list-style-type: none"> Temperature range up to +150 °C High rated current Low DC resistance Suitable for lead-free reflow soldering Qualified to AEC-Q200 RoHS-compatible 	B82462A4473K000 B82462A4103M000 B82462A4153K000 B82462A4223K000 B82462A4333K000	•			•
CHOKES							
	L_R : 2.5 μ H ... 1 mH $I_{R_{max}}$: 2 ... 8A V_R : 250 V AC	<ul style="list-style-type: none"> High resonance frequency from special winding technique Suitable for wave soldering Design complies with EN, VDE and UL standards RoHS-compatible Powerline common mode 	B82721A2252N020 B82721A2602N020 B82721A2202N001 B82721A2262N001 B82721A2362N001 B82721A2402N020 B82723A2602N001 B82723A2802N001	•			•
ALUMINUM ELECTROLYTIC CAPACITOR							
	C_R : 1000 ... 2700 μ F I_R : 2 ... 2.858 A V_R : 10 ... 35 V DC	<ul style="list-style-type: none"> Very low impedance at high frequency. Long useful life. High ripple current capability. RoHS-compatible. 	B41888D3228M000 B41888C3278M000 B41888C4228M000 B41856C4228M000 B41858C7128M000 B41858D7108M000 B41858D7158M000				•
PROTECTION DEVICES – VARISTOR SMD							
	C_R : 800 ... 8800 μ F I_{max} : 800A ... 4.5 kA V_R : 5.6 ... 85 V DC T: -55 - 125°C	<ul style="list-style-type: none"> EIA 1210 - 2220 chip size UL approval to UL1449 Bidirectional protection Low leakage current Long-term ESD stability RoHS-compatible Stable performance at high temp w/o derating 	B72540T0400K062 B72530U1450K062 B72540T6500S162 B72540T6500K062 B72540T0600K062			•	
	C_R : 0.6 ... 10 μ F V_R : 5.6 ... 16 V DC	<ul style="list-style-type: none"> EIA 0402 chip size, SOD-723 Hi-speed series, low capacitance RoHS-compatible 	B72590D0050H260 B72590D0150H060 B72590D0160H060		•		
	C_R : 0.6 ... 3 μ F V_R : 5.6 ... 16 V DC	<ul style="list-style-type: none"> EIA 0603 chip size, SOD-523 Hi-speed series, low capacitance RoHS-compatible 	B72500D0050H160 B72500D0160H060		•		
	C_R : 3 ... 10 μ F V_R : 16 V DC	<ul style="list-style-type: none"> 0508 chip size, 4-fold array 0612 chip size, 4-fold array 	B72714D0160H060 B72724D0160H062		•		
SURGE ARRESTERS							
	C_R : < 0.8 μ F I_{max} : 2 kA, 10x 8x20 μ s V_{BD} : 90 V DC	<ul style="list-style-type: none"> EIA 1812 surface mount 2 electrode arrester 	B88069X9231T203		•	•	
	C_R : < 1.5 μ F I_{max} : 10 kA, 10x 8/20 μ s V_{BD} : 90 V DC	<ul style="list-style-type: none"> Surface mount 3 electrode arrester 	B88069X2331T902			•	

BASIC CIRCUIT

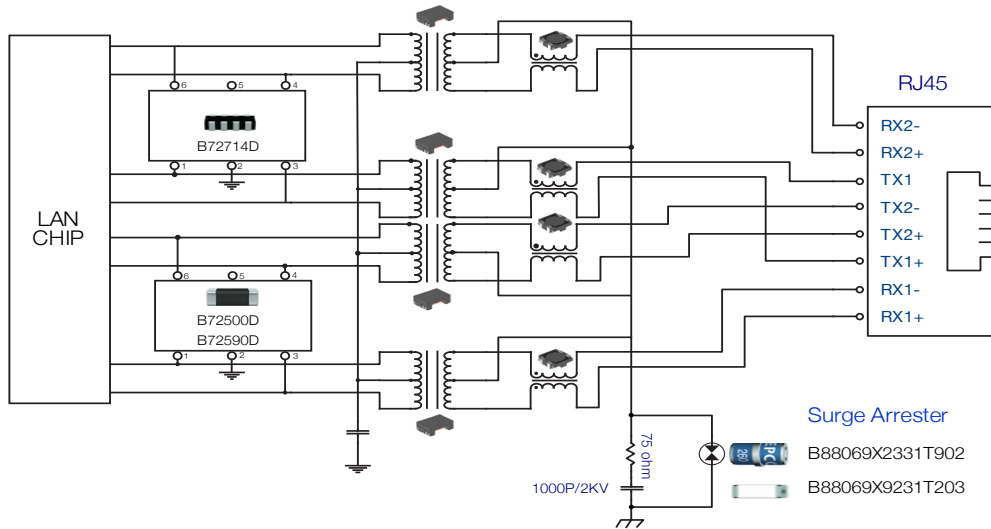
DC/DC POWER SUPPLY (BUCK)

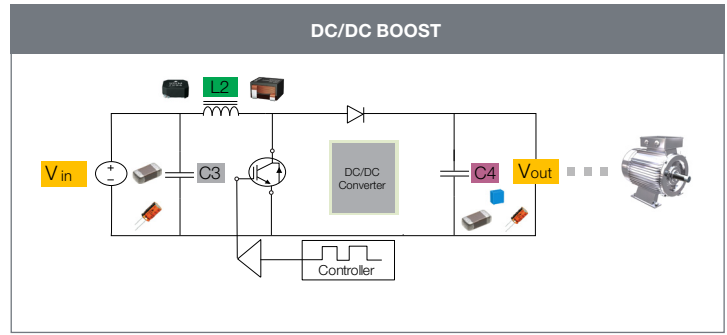
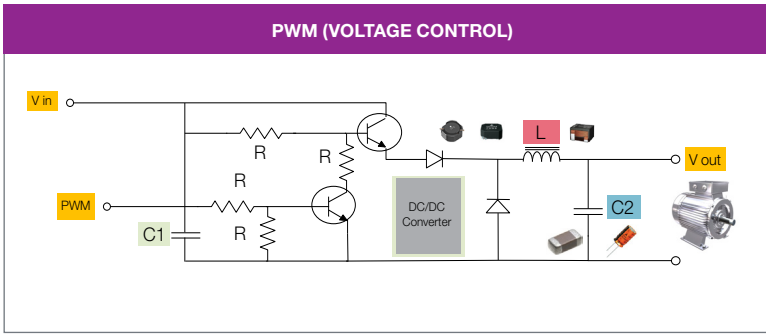


INPUT PROTECTION (DC LINE-IN)



SIGNAL (SIGNAL PROTECTION)





SERIES	TECHNICAL DATA	FEATURES	SERIES TYPE	C1	C2	L	C3	C4	L2
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CERAMIC CAPACITORS									
	General, High Cap, Mid/High Voltage	$C_R: 10\text{nF} \dots 100\mu\text{F}$ $V_R: 4 \dots 2000\text{V}$	<ul style="list-style-type: none"> • 0201 to 3025 sizes • Crack Mitigation 	C	•	•		•	•
				CKG		•			

FILM CAPACITORS - DC									
	General (stacked/wound)	$C_R: 0.0010 \dots 220 \mu\text{F}$, $V_R: 50 \dots 630 \text{V DC}$	<ul style="list-style-type: none"> • High pulse strength, high contact reliability 	B3252x	•				
	High pulse (wound)	$C_R: 1.0 \dots 40000 \text{nF}$, $V_R: 250 \dots 2000 \text{V DC}$	<ul style="list-style-type: none"> • High pulse strength, high contact reliability 	B3265x		•			
	MKP DC link - high power	$C_R: 1.0 \dots 40000 \text{nF}$, $V_R: 250 \dots 2000 \text{V DC}$	<ul style="list-style-type: none"> • High CV product, compact, good self-healing properties, High reliability, over-voltage capability 	B3267x		•			
	MKP DC link - high density	$C_R: 1.5 \dots 480 \mu\text{F}$, $V_R: 450 \dots 1400 \text{V DC}$	<ul style="list-style-type: none"> • Low losses with high current capability 	B3277x		•			
	MKP DC link - THB series	$C_R: 1.5 \dots 120 \mu\text{F}$, $V_R: 450 \dots 1100 \text{V DC}$	<ul style="list-style-type: none"> • For severe ambient conditions 	B3277xH		•			
	Power Factor Correction	$C_R: 0.068 \dots 2.2 \mu\text{F}$, $V_R: 450 \dots 630 \text{V DC}$	<ul style="list-style-type: none"> • Very high ripple and peak current, high frequency • AC operation capability 	B3267xP		•			
	MKP DC Link (125°C)	$C_R: 1.0 \dots 50 \mu\text{F}$, $V_R: 630 \dots 840 \text{V DC}$	<ul style="list-style-type: none"> • Over-voltage capability, low losses with high current capability 	B3277xP		•			

FILM CAPACITORS - AC									
	EMI suppresion	$C_R: 0.01 \dots 30 \mu\text{F}$, $V_R: 305 \text{V AC}$	<ul style="list-style-type: none"> • Very small, self - healing properties 	B3292x		•			•
	MKP AC filtering	$C_R: 1.0 \dots 70 \mu\text{F}$, $V_R: 250 \dots 310 \text{V AC}$	<ul style="list-style-type: none"> • Optimized AC voltage performance 	B3275x		•			•
	EMI suppresion (MKP)	$C_R: 0.001 \dots 1.0 \mu\text{F}$, $V_R: 300 \text{V AC}$	<ul style="list-style-type: none"> • Very small, self - healing properties 	B3202x		•			•

ALUMINIUM ELECTROLYTIC CAPACITORS - SINGLE ENDED									
	Low ESR, compact (135°C)	$C_R: 270 \dots 12000 \mu\text{F}$, $V_R: 25 \dots 75 \text{V DC}$	<ul style="list-style-type: none"> • Ultra compact design, high ripple current capability 	B41897	•				•
	Very low impedance (105°C)	$C_R: 22 \dots 10000 \mu\text{F}$, $V_R: 10 \dots 100 \text{V DC}$	<ul style="list-style-type: none"> • Very low impedance at high frequency, very low ESR 	B41858	•				•
		$C_R: 47 \dots 3300 \mu\text{F}$, $V_R: 16 \dots 100 \text{V DC}$		B41859	•				•
	Low impedance (105°C)	$C_R: 22 \dots 2200 \mu\text{F}$, $V_R: 16 \dots 100 \text{V DC}$	<ul style="list-style-type: none"> • Very low impedance at high frequency 	B41856	•				•
	High ripple current (125°C)	$C_R: 330 \dots 6800 \mu\text{F}$, $V_R: 25 \dots 75 \text{V DC}$	<ul style="list-style-type: none"> • High operating temperature capability, High ripple current capability 	B41895	•				•
	Extended useful life (105°C)	$C_R: 4.7 \dots 68 \mu\text{F}$, $V_R: 350 \dots 450 \text{V DC}$	<ul style="list-style-type: none"> • Extra long useful life (12000 to 15000h/105°C) 	B43890		•			
	Long useful life (105°C)	$C_R: 3.3 \dots 330 \mu\text{F}$, $V_R: 160 \dots 450 \text{V DC}$	<ul style="list-style-type: none"> • Very long useful life (8000 to 10000h/ 105°C) 	B43888		•			

ALUMINIUM ELECTROLYTIC CAPACITORS - SNAP-IN									
	Very compact (85°C)	$C_R: 100 \dots 3300 \mu\text{F}$, $V_R: 200 \dots 450 \text{V DC}$	<ul style="list-style-type: none"> • Extremely high CV, very compact 	B43630	•				
	Ultra compact (105°C)	$C_R: 82 \dots 3300 \mu\text{F}$, $V_R: 200 \dots 450 \text{V DC}$		B43640	•				

MAGNETICS									
	SMT Power Inductors	$L_R: 0.11 \dots 11 \text{A}$, $L_R: 0.33 \dots 1000 \mu\text{H}$	<ul style="list-style-type: none"> • Wound, unshielded, shielded 	B82477				•	
				B82559					
				B82464				•	
				B82472					•
	Inductor for Power Curcuits	$L_R: 1 \dots 470 \mu\text{H}$	<ul style="list-style-type: none"> • Wound, shielded 	CLF				•	•