

48V/12V DC/DC Converter

Table of Contents

12V output, EMI Filter.....	3
12V output, reverse polarity protection.....	4
12V output, security switch.....	5
12V output, transient protection.....	6
48V input, EMI Filter.....	7
48V input, reverse polarity protection.....	8
48V input, security switch.....	9
48V input, transient protection.....	10
Bi directional synchronous buck boost converter, buffer capacitor.....	11
Bi directional synchronous buck boost converter, high side current sensor.....	12
Bi directional synchronous buck boost converter, high side switch.....	13
Bi directional synchronous buck boost converter, low side current sensor.....	14
Bi directional synchronous buck boost converter, low side switch.....	15
Bi directional synchronous buck boost converter, storage inductor.....	16
power supply, SMPS buck converter.....	17

48V/12V DC/DC Converter

VISHAY COMPONENTS USED:

- o Power MOSFETs
- o Diodes
- o Capacitors
- o Inductors/Customized Inductors
- o Transient Protection Devices
- o ESD Protection Devices
- o Reverse Polarity Protection Devices
- o Precision Resistors

Application Overview

With 48V battery line there will remain loads with 12V. For this reason future cars will have a central DC/DC converter bringing down 48V to 12V. Different topologies are possible as for example multiphase coupled and non-coupled inductors. For all topologies Vishay offers a broad portfolio of solutions with standard devices like MOSFETs, Diodes, Resistors, Capacitors and Inductors, as well as with customized magnetic solutions.

48V/12V DC/DC Converter : 12V output, EMI Filter

Al Cap

Product Name	Status	Description	Features	Package	Q-Level
260 CLA-V		Alumimum Capacitor SMD vibration proof high temperature	150...3300uF 16V...80V	16x16x16 to 18x18x21	AECQ200

Inductors

Product Name	Status	Description	Features	Package	Q-Level
IHLP-3232DZ-5A		Low Profile, High Current High Transient Current Spike Cabable, Shielded, Low DCR	0,22uH...33uH, Idc=36A...3.1A	3232	AECQ200
IHLP-4040DZ-5A		Low Profile, High Current, High Transient Current Spike Cabable Shielded, Low DCR	0,47uH...47uH, Idc=30A...2.5A	4040	AECQ200

MLCC

Product Name	Status	Description	Features	Package	Q-Level
VJ...31X RoHS Automotive MLCC		SMD MLCC for Automotive Applications	120pF...1uF 16V...1000V	0402 to 1812	AECQ200

48V/12V DC/DC Converter : 12V output, reverse polarity protection

MOSFET

Product Name	Status	Description	Features	Package	Q-Level
SQJQ402E		N-Channel 40-V (D-S) 175°C MOSFET	Rdson=1.7mOhm	PPAK 8x8L	AECQ101

48V/12V DC/DC Converter : 12V output, security switch

MOSFET

Product Name	Status	Description	Features	Package	Q-Level
SQJQ402E		N-Channel 40-V (D-S) 175°C MOSFET	Rdson=1.7mOhm	PPAK 8x8L	AECQ101

48V/12V DC/DC Converter : 12V output, transient protection

TVS Diode

Product Name	Status	Description	Features	Package	Q-Level
TPSMP6.8 thru TPSMP43A		surface mounteTransZorb Transient Voltage Suppressor	250W	SMP	AECQ101

48V/12V DC/DC Converter : 48V input, EMI Filter

Al Cap

Product Name	Status	Description	Features	Package	Q-Level
260 CLA-V		Alumimum Capacitor SMD vibration proof high temperature	150...3300uF; 16V...80V	16x16x16 18x18x21	

Custom Magnetics

Product Name	Status	Description	Features	Package	Q-Level
customized EMI filter		customized EMI filter			

MLCC

Product Name	Status	Description	Features	Package	Q-Level
VJ...31X RoHS Automotive MLCC		SMD MLCC for Automotive Applications	120pF...1uF; 16V...1000V	0402 to 1812	

48V/12V DC/DC Converter : 48V input, reverse polarity protection

MOSFET

Product Name	Status	Description	Features	Package	Q-Level
SQJQ410EL		N-Channel 100-V (D-S) 175°C MOSFET	Rdson=3.4mOhm	PPAK 8x8L	AECQ101

48V/12V DC/DC Converter : 48V input, security switch

MOSFET

Product Name	Status	Description	Features	Package	Q-Level
SQJQ410EL		N-Channel 100-V (D-S) 175°C MOSFET	Rdson=3.4mOhm	PPAK 8x8L	AECQ101

48V/12V DC/DC Converter : 48V input, transient protection

TVS Diode

Product Name	Status	Description	Features	Package	Q-Level
1.5 SMC Series		surface mounteTransZorb Transient Voltage Suppressor	1500W	SMCJ	

48V/12V DC/DC Converter : Bi directional synchronous buck boost converter, buffer capacitor

Al Cap

Product Name	Status	Description	Features	Package	Q-Level
260 CLA-V		Alumimum Capacitor SMD vibration proof high temperature	150...3300uF 16V...80V	16x16x16 to 18x18x21	AECQ200

48V/12V DC/DC Converter : Bi directional synchronous buck boost converter, high side current sensor

Shunt

Product Name	Status	Description	Features	Package	Q-Level
WSLP2726		Power metal strip resistor very high power	0.3mOhm...4mOhm	2726	AECQ200

48V/12V DC/DC Converter : Bi directional synchronous buck boost converter, high side switch

MOSFET

Product Name	Status	Description	Features	Package	Q-Level
SQJQ480E		N-Channel 80-V (D-S) 175°C MOSFET	Rdson=3.4mOhm	PPAK 8x8L	AECQ101

48V/12V DC/DC Converter : Bi directional synchronous buck boost converter, low side current sensor

Shunt

Product Name	Status	Description	Features	Package	Q-Level
WSK1216		Power metal strip resistor, very high power	0.5mOhm...1mOhm	1216	

48V/12V DC/DC Converter : Bi directional synchronous buck boost converter, low side switch

MOSFET

Product Name	Status	Description	Features	Package	Q-Level
SQJQ100E		N-Channel 40-V (D-S) 175°C MOSFET	Rdson=1.4mOhm	PPAK 8x8L	AECQ101

48V/12V DC/DC Converter : Bi directional synchronous buck boost converter, storage inductor

Custom Magnetics

Product Name	Status	Description	Features	Package	Q-Level
custom magnetics		customized coupled inductor			

Inductors

Product Name	Status	Description	Features	Package	Q-Level
IHLP-6767GZ-5A		Low Profile, High Current High Transient Current Spike Capable Shielded, Low DCR	0,47uH...47uH Idc=65A...7.25A	6767	AECQ200
IHLP-8787MZ-5A		Low Profile, High Current, High Transient Current Spike Capable, Shielded, Low DCR	0,47uH...100uH Idc=80A...9.1A	8787	AECQ200

48V/12V DC/DC Converter : power supply, SMPS buck converter

Inductors

Product Name	Status	Description	Features	Package	Q-Level
IHLP2020CZ-5A		Low Profile, High Current, High Transient Current Spike Capable Shielded, Low DCR	0,1uH...10uH, Idc=25A...2.25A	2020	AECQ200
IHLP2525CZ-5A		Low Profile, High Current, High Transient Current Spike Capable, Shielded, Low DCR	0,1uH...4.7uH, Idc=18A...3A	2525	AECQ200

MOSFET

Product Name	Status	Description	Features	Package	Q-Level
SQJQ480E		N-Channel 80-V (D-S) 175°C MOSFET	Rdson=3.4mOhm	PPAK 8x8L	AECQ101

Schottky Diode

Product Name	Status	Description	Features	Package	Q-Level
SS2P4		High Current Density Surface Mount Schottky Barrier Rectifier	If=2A; Vf=0.5V; Vrrm=40V	DO-220AA (SMP)	AECQ101