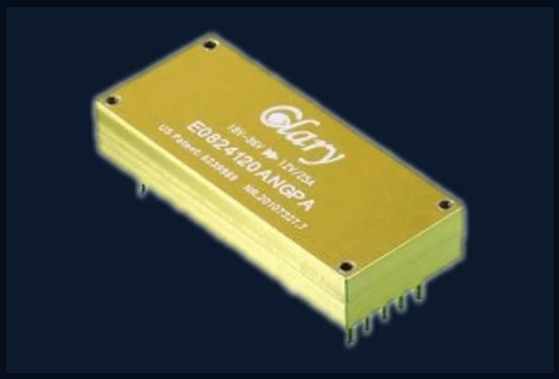
E08 SERIES

Extreme 1/8 Brick

DC/DC Converter



28V / 11A · 36V~75V or 18~36V Input · Patented Buck-Reset Forward
>93% Peak Efficiency · 360 W/in³ · 4.80×10■ hrs MTBF

OCP | OVP | OTP | Remote ON/OFF | Voltage Trim ±10% | Remote Sense | -40°C to +110°C | CE / RoHS

Demo photo only. Actual outlook and marking may vary.

308W	11A	93%	360 W/in³	4.80M hrs	450 kHz
MAX OUTPUT	MAX CURRENT	PEAK EFF.	POWER DENSITY	MTBF	SWITCH FREQ

PRODUCT OVERVIEW

The E08 Series provides three standard outputs including 28V/11A, 12V/25A, and 5V/60A from 18~36V or 36~75V input ranges with industry standard 1/8-Brick pin assignment that operates at -40°C~+110°C case temperature range. The efficient converter core is designed with patented "Buck-Reset Forward" topology at 450KHz switching frequency achieving 93% conversion efficiency and 360W/in³ power density.

A proprietary ultra-fast current limiting circuit eliminates "Short-Circuit-Current-Runaway" with propagation delay as short as 60nS — simplifying system power design for high-performance computing, semiconductor testing, and other equipment where conventional modules cannot be used.

MODEL NUMBER SYSTEM

E08	24/48	050/120/280	I/A	P/N	0–3	0	XXXX
Series	VIN	VOUT	Startup/Shut	Enable	Pin Len	Standoff	Suffix

24: 18V~36V | 48: 36V~75V 280=28V 120=12V 050=5V I=–40/+110°C A=–60/+130°C P=Positive N=Negative

Example: E0848280IN20 → 48V input · 28V output · –40/+110°C · Neg.logic · 0.20" pin · 0.02" standoff

OTHER STANDARD MODEL LIST (Contact factory for special input / output)

18V~36V Input (24V Bus)

Model Number	Max Input	Max Output	Pout	Eff.
E0824280xxxE-11xx0	18V~36V	28.0V/11A	308W	92.5%
E0824120xxxE-25xx0	18V~36V	12.0V/25A	300W	94.9%
E0824050xxxE-60xx0	18V~36V	5.0V/60A	300W	91.8%

36V~75V Input (48V Bus)

Model Number	Max Input	Max Output	Pout	Eff.
E0848280xxxE-11xx0	**36V~75V**	**28.0V/11A**	**308W**	**93.5%**
E0848120xxxE-25xx0	36V~75V	12.0V/25A	300W	94.9%
E0848050xxxE-60xx0	36V~75V	5.0V/60A	300W	91.8%

GENERAL SPECIFICATIONS OF E0848280IN20-11PSS

Absolute Maximum Ratings

Temperature — Operation	-40°C to +110°C
Temperature — Storage	-55°C to +125°C
Input Voltage — Operation	-0.5V to +80Vdc
Input Voltage — Transient (100mS)	100V Maximum
Input-Output Isolation	2.0 KVdc
Input-Case Isolation	1.0 KVdc
Output-Case Isolation	1.0 KVdc
Remote Control Voltage	-0.5V to +12Vdc

General Parameters

Conversion Efficiency	Typical	**93%**
Switching Frequency	Typical	**450 KHz**
MTBF	Bellcore TR-332 / GB 25[illegible]	**4.80×10■ hrs**
OTP Set Point	Internal	**110°C (Tc) ±5°C**
Weight	Metal enclosure	**32g**

Control Functions

Remote Control — Logic High	+3.0V to +6.5V
Remote Control — Logic Low	0V to +1.0V
Input Current of Remote Control Pin	-0.5mA ~ +1.5mA

Input

Operation Voltage Range	+36V to +75Vdc
Reflected Ripple (LEXT=10µH)	20mA rms / 60mAp-p
Power ON Voltage Ranges	+34.0V to +36.0Vdc
Power OFF Voltage Ranges	+31.2V to +33.2Vdc
Off State Input Current (VNOM)	6mA Max
Latch-State Input Current (VNOM)	8mA Max
Input Capacitance	20.0µF Max

Output

Parameter	Condition	Value
Voltage Accuracy	Typical	**±1.0%**
Line Regulation	Full Input Range	**±0.2%**
Load Regulation	0%~100%	**±0.2%**
Temperature Drift	-40°C ~ 100°C	**±0.03%/°C**
Output Tolerance Band	All Conditions	**±4%**
Ripple & Noise (20MHz)	Peak-Peak (RMS)	**3% (1%) Vo**
Over Voltage Protection	VNOM, 10% Load	**115~130% Vo**
Output Current Limits	VNOM	**108%~125%**
Voltage Trim	VNOM, 10% Load	**±10%**
Input Ripple Rejection (<1KHz)	VNOM, Full Load	**-50dB**
Step Load (2.5A/µS)	50%~75% Load	**±6%Vo/500µS**
Start-Up Delay Time	VNOM, Full Load	**20mS/250mS**

■ ABSOLUTE MAXIMUM RATINGS — Do Not Exceed

Exceeding these limits may permanently damage the device and voids warranty.

Always protect input with a fuse or other overcurrent protection device.

48V Bus Series (36V ~ 75V Input)

Part Number	Input	Vout	Iout	Pout	Eff.
E0848280xxxE-11xx0	**36–75V**	**28.0V**	**11A**	**308W**	**93.0%**
E0848120xxxE-25xx0	36–75V	12.0V	25A	300W	94.9%
E0848050xxxE-60xx0	36–75V	5.0V	60A	300W	91.8%

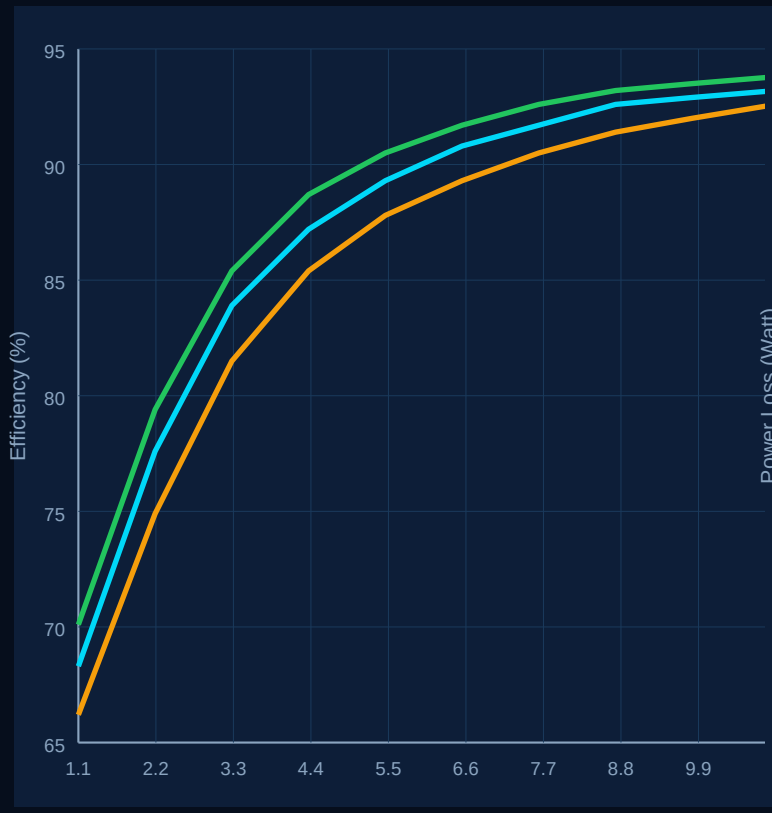
24V Bus Series (18V ~ 36V Input)

Part Number	Input	Vout	Iout	Pout	Eff.
E0824280xxxE-11xx0	18–36V	28.0V	11A	308W	92.5%
E0824120xxxE-25xx0	18–36V	12.0V	25A	300W	94.9%
E0824050xxxE-60xx0	18–36V	5.0V	60A	300W	91.8%

* Contact OneTech Integration for special input/output configurations.

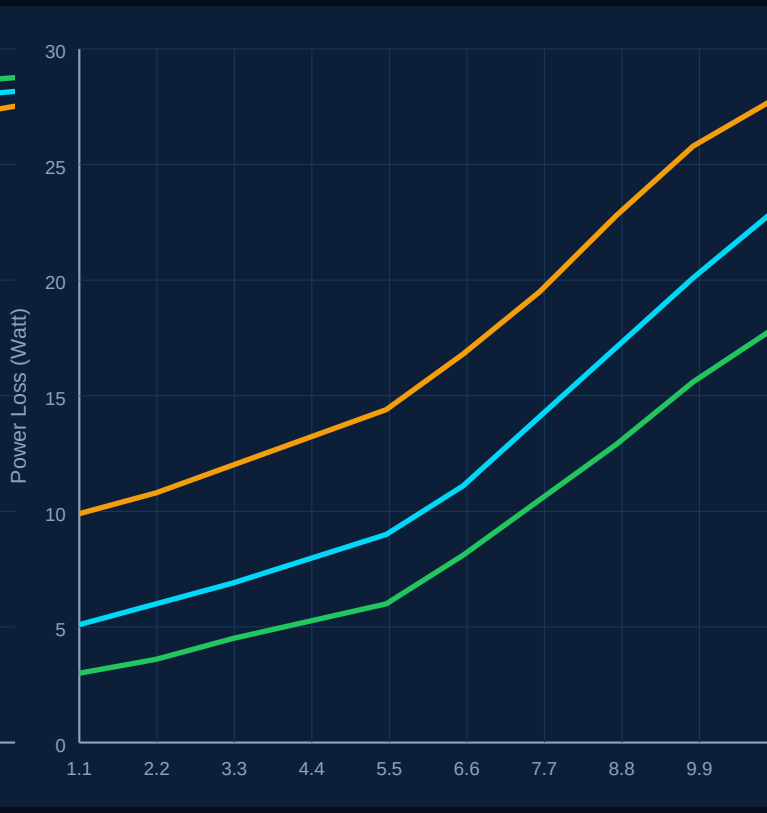
EFFICIENCY VS. LOAD CURRENT (24Vin / 28Vout / 11A reference)

Efficiency plot of E0824280IN20-11xx0



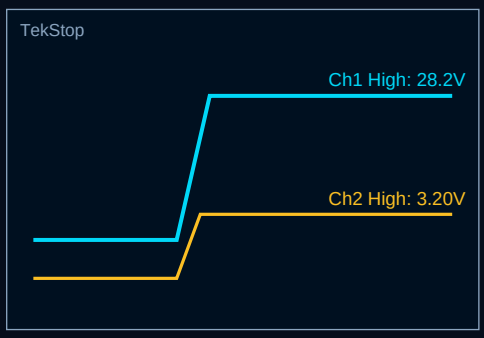
Efficiency (%) vs Io (Amp)

Power loss curves of E0824280IN20-11xx0

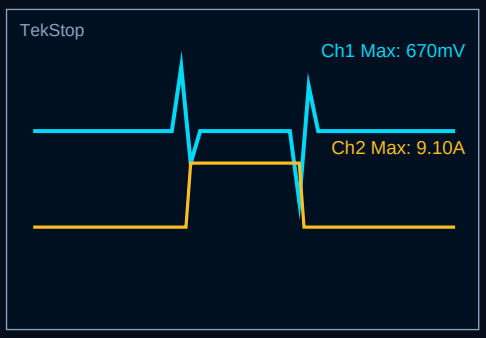


Power Loss (Watt) vs Io (Amp)

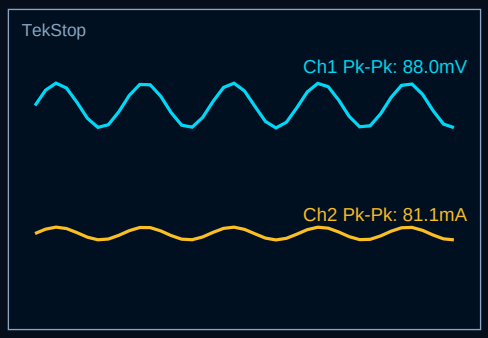
TYPICAL WAVES AND CURVES (Below waveforms are made on a 24Vin/28Vout/11A as typical reference.)



Start-up waveform of E0824280IN20-11xx0
(VIN: 24V, Load: 11A)

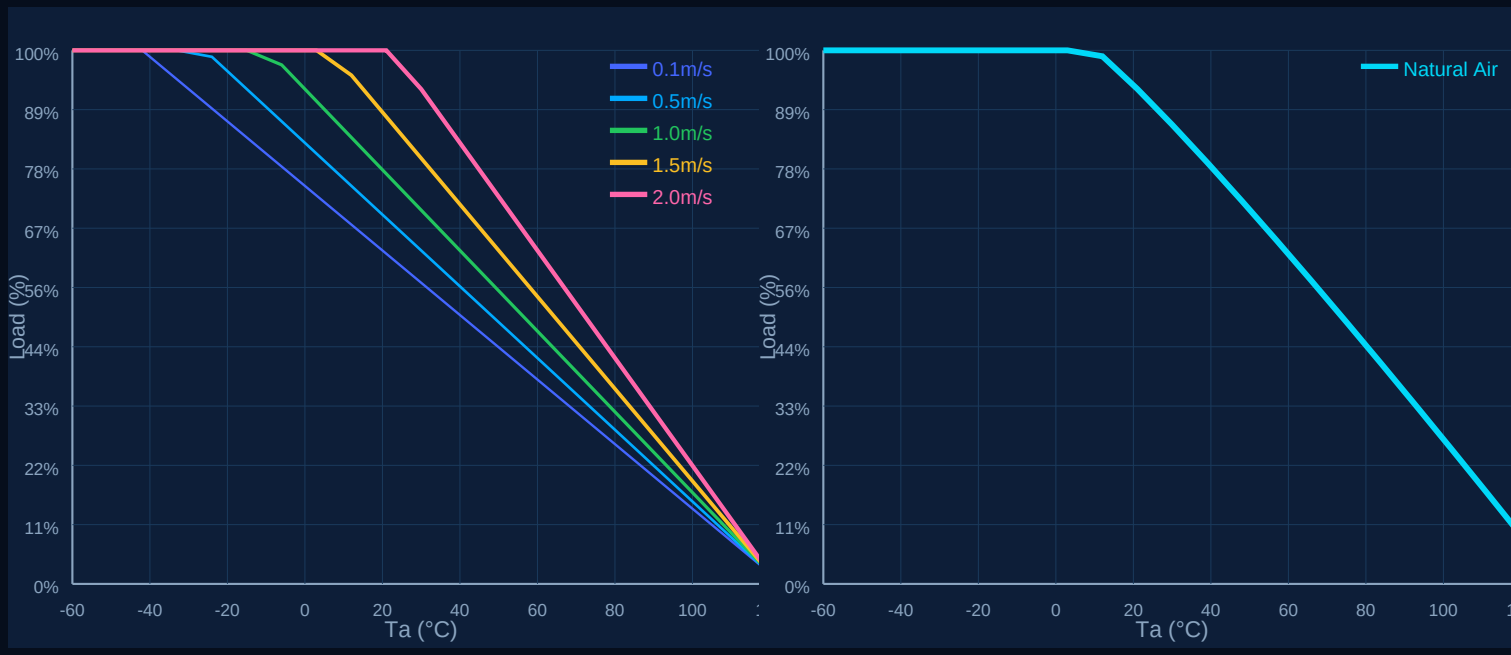


Transient response of E0824280IN20-11xx0
(VIN: 24V, Load: 7.5A/5.5A@2.5A/μS)



Input/Output ripples of E0824280IN20-11xx0
(VIN: 24V, Load: 11A, LIN=10uH)

DERATING CURVES

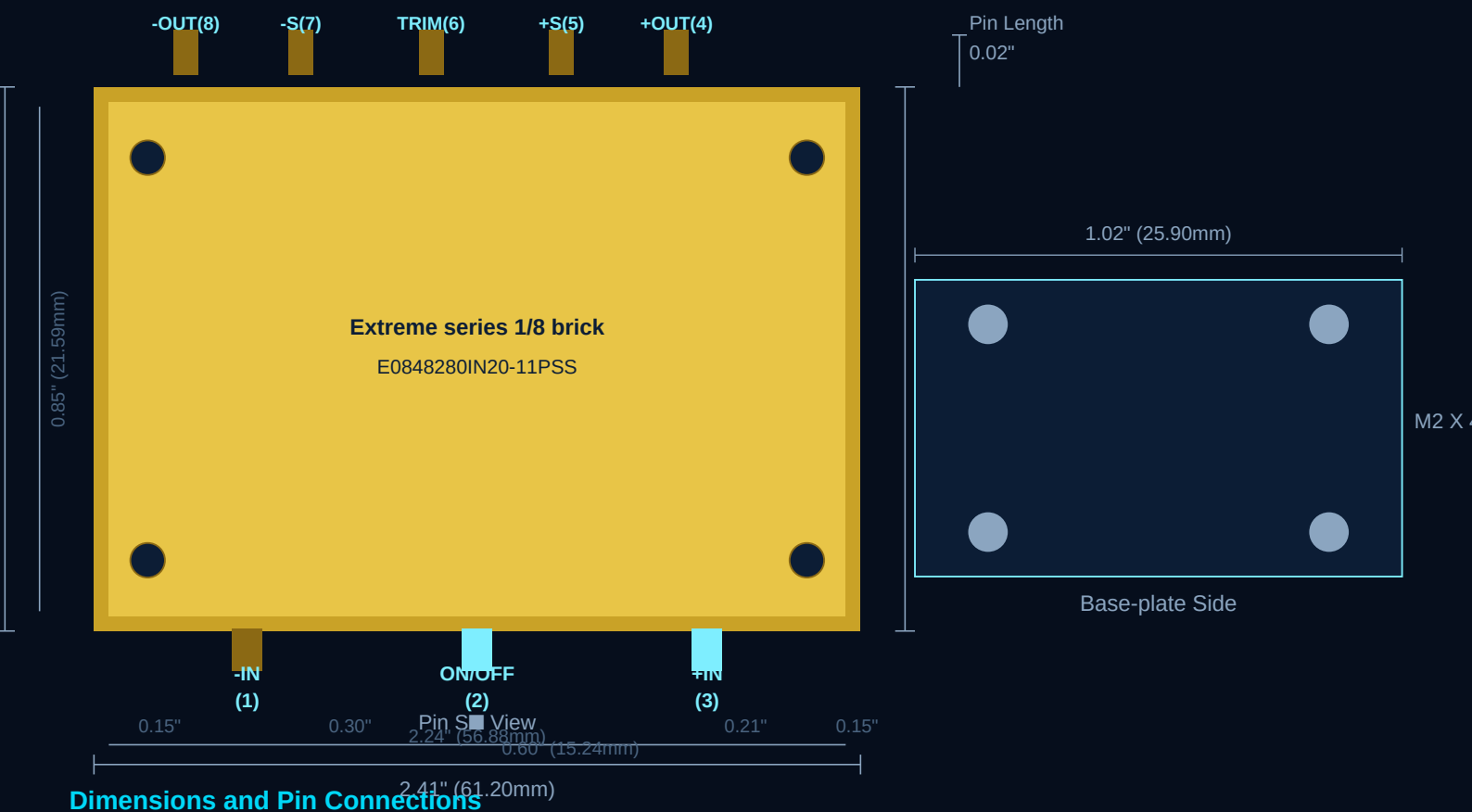


Calculated derating of E0824280IN20-11xx0 along with no additional heat sink Figure: Derating of E0824280IN20-11xx0 being attaching to system cold walls @ TC

NOTE:

Due to natural interaction between various tolerances of the components used in this product, de-rating performance of different units of the same model can be similar but not exactly the same. A higher OTP set point may also result in de-rating curves that "appear" to be much better. However, the key should always be whether or not the other devices in customer system are able to survive in a constant high temperature environment. De-rating curves are used as reference only and it is strongly recommended for actual usage to run the units under the curves limits in real application. Due to the very high power density, in the majority of actual applications, attaching the unit to the system cold wall would usually be highly recommended.

MECHANICAL DRAWING



Dimensions and Pin Connections

Designation	Function Description	Pin #
-IN	Negative input	1
PC	Remote control. To turn-on and turn-off output.	2
+IN	Positive input	3
+Vo	Positive output	4
+S	Positive remote sense	5
TRIM	Output voltage adjust	6
-S	Negative remote sense	7
-Vo	Negative output	8

Dimensions:	inches (mm)
Tolerances:	.xx±0.02 .xxx±0.01
Weight:	32g
Base plate:	Anode oxide aluminum alloy
Mounting inserts:	M2 or through-hole
Maximum torque:	1.3in-lb (0.15Nm)
Pin material:	Copper alloy or Brass
Pin plating:	Golden over Nickel

General Operating Information

General — Absolute Maximum Ratings

Some ratings shown in ABSOLUTE MAXIMUM RATINGS are the absolute maximum ratings referring to no destruction or design limits, normally tested with each indicated single parameter by exceeding the limits of its absolute maximum ratings or electrical characteristics. The stress exceeding the absolute maximum ratings may cause permanent damage, function and performance degraded to the converter.

Isolation

Operational or Basic insulation is performed in accordance with EN60950. All product series, built in DC-to-DC converter power supplies, should be installed in end-use equipment for printed wiring board or chassis mountable, and intend to be supplied by isolated secondary circuit. Consideration should be given to measure the case temperature and ensure that it does not exceed the maximum case temperature during module operation.

When the supply to DC/DC converter meets all requirements for SELV, the output is considered to remain SELV limit. For supply voltage from 60V to 75V DC, reinforced insulation must be provided in the 75V power source that isolates the input from the mains. The isolation withstanding 2000V DC between input and output, 1000V DC between input/output and case with all series, is verified in an electrical strength test.

Flammability

The flammability ratings of plastic parts and PCBs meet UL-94V-0.

Safety Standards

All product series of Onetech DC/DC converters are designed to comply with UL in accordance with EN60950 safety of information technology equipment. These DC/DC converters meet the U.S. and Canadian Standard for safety of information technology equipment applicable requirement in CSA/UL60950. Most product series of Onetech DC/DC converters are recognized by UL, CSA and TUV.

Fusing

A fuse should be used at the input of each converter to isolate the failed one from others, keeping the system continue to operate and prevent the damage of power distribution wiring from over heating. A slow blow fuse should be used with 10A~20A rating or less; it is recommended using a fuse with the lowest current rating.

Over-Temperature Protection

The over temperature protection set point is 5°C~10°C higher of maximum operation base plate temperature, which can be as high

Input (+IN, -IN) — Voltage Range

The input voltage range of 36V~75V meets the requirement of European Telecom Standard ETS 300 132-2 for normal input voltage range in -48V (-40.5V~-57.0V) and -60V (-50.0V~-72.0V) DC power systems. The absolute maximum continuous input voltage is 75V DC and withstands 100V DC/100ms maximum transient voltage. The range 18V~36V for 24V version is also available.

Input Capacitance

The input characteristic of a DC/DC converter may be referred as a negative-incremental impedance element in its input voltage range. Sometimes, oscillation will occur when high impedance power source is applied to supply power to a DC/DC converter. An external input capacitor is recommended to reduce the characteristic impedance and eliminate the oscillation between the DC/DC converter and the source.

ON/OFF Control (PC Pin)

The remote on/off control pin can be connected to an external ON/OFF control signal for turning ON and OFF the converter. Two control logic options are available.

NEGATIVE LOGIC — ON: Short to negative power input pin or apply voltage of logic low. OFF: Opening circuit or apply the voltage of logic high.

POSITIVE LOGIC — ON: Opening circuit or apply the voltage of logic high. OFF: Short to negative power input pin or apply voltage of logic low.

A mechanical switch or an open collector NPN transistor (open drain N channel FET) can be used to drive the ON/OFF pin. The device must be capable of sinking 1mA minimum at a logic low voltage 1.0V and withstands 12V DC minimum. Additional external components such as diodes or resistors in series are not recommended.

Output (+OUT, -OUT) — Ripple & Noise

The ripple of DC/DC converters is measured as peak-to-peak voltage from 0 to 20MHz including the noise and the fundamental ripple. The ripple and noise can be reduced significantly by paralleling a de-coupling capacitor to the output terminal.

Over Current Protection (OCP)

These DC/DC converters provide OCP function to withstand continuous overload or short circuit condition in the output. The converter will recover to normal operation after the overload is removed. The OCP set point of these DC/DC converters is 108%~125% of rated output current.

General Operating Information (continued)

Remote Sense (+S, -S)

These DC/DC converters have the remote sense pins that can be used to compensate voltage drop due to the resistance in the distribution system. It allows the output voltage can be regulated at the load or a selected point. The sense line must be located close to a ground trace or a ground panel to reduce noise; a twisted wire pair is recommended for discrete wiring. The sense pin will compensate 0.5V maximum of voltage drop between the sensed voltage and the voltage of output pins.

Output Voltage Adjust (TRIM)

These DC/DC converters have the secondary control pin used to adjust output voltage beyond or below nominal output voltage. Trim up above OVP set point may cause a converter to enter the over voltage protection state. The TRIM pin is noise sensitive and the external resistors should be located within 1cm of the converter. If not using the trim feature, leave the TRIM pin open.

TRIM UP: connect a trim resistor (RU) between TRIM pin and -S pin.

TRIM DOWN: connect a trim resistor (RD) between TRIM pin and +S pin.

Output Capacitance

The extra output capacitance is required to improve the voltage regulation when powering a load with significant dynamic current requirement. Put a low ESR capacitor to the load as close as possible to handle the high frequency component of dynamic load current and put the higher value of electrolytic capacitor to handle the mid-frequency component. The stray capacitance, resistance and inductance of distribution system are used as feedback components that would in affecting stability and dynamic response performance of power converter.

In general, 47μF~68μF/A of output current can be used for 3.3V output power module. For example, a 35A DC/DC converter, the de-coupling capacitor up to 4700μF can be used on the premise of not affecting the stability. Capacitor of a higher value, as much capacitance as possible, is however not encouraged as it may result in stability risks to the converters. Since the stored energy of the capacitor is proportional to V^2, the de-coupling capacitor should be reduced by a factor of $(Vo/3.3)^2$ for modules with higher output voltage. The absolute maximum value of output capacitance is 10,000μF. Simply adding a MLCC of a few to a few tens of μF close to the load should be sufficient for most modern applications.

General Module Thermal Considerations

The DC/DC converter product series are designed to operate in a variety of thermal environments; however sufficient cooling should be considered and effectively arranged for reliable operation. The heat is removed from the module by conduction, convection and radiation to the surrounding, but convection is the most important method for the normal application at sea level. Increased airflow may strongly influence the module thermal performance. Proper cooling can be verified by measuring the temperature of base plate.

The available load current with different ambient air temperature and airflow at nominal input voltage for each model is according to real test done in a wind tunnel. The 90% of available current shown in the derating curves is the highest recommended value for reliable system design. The actual system design would in fact strongly affect the derating performance and generally result in three variable factors: conversion efficiency, module temperature, and module thermal resistance.

Conversion Efficiency

The heat is generated by power loss. The synchronous rectification technology can make power module converting the required power with dramatic efficiency and dissipating fewer power compared with traditional technology. Higher efficiency is better for any kind of cooling conditions because the temperature is always lower and the reliability could also be better secured. Efficiency change between different modules also has significant effect on the temperature rise to affect the derating performance. This effect can be seen more clearly especially in high temperature operation.

Module Thermal Resistance

The maximum allowable temperature for operation is limited under Tc=110°C. Sink-Plate technology is available to reduce the module thermal resistance.

For the 1.0mm metal plate — θM: 11.29 (Free-Air) 7.36 (100LFM) 5.65 (200LFM) 4.20 (300LFM) 3.03 (500LFM)

For the 3.0mm Sink-Plate — θS3: 9.13 (Free-Air) 5.95 (100LFM) 4.49 (200LFM) 3.40 (300LFM) 2.45 (500LFM)

For the 5.0mm Sink-Plate — θS5: 7.28 (Free-Air) 4.91 (100LFM) 3.17 (200LFM) 2.44 (300LFM) 1.83 (500LFM)

PO = (110–Ta) / (θM)(1/η–1)

Setting the case temperature below 90°C during operation is highly recommended. All industrial graded products default OTP trigger point is set under 110°C for safe operation and longer converter life.

Module Noise Considerations

Input Side Conducted Noise — Conductive EMC Regulations

In order to achieve a useful EMC filter circuit design, the limits of conducted emissions EN55011/FCC derived from CISPR22 must be well understood. The class A and class B requirements referring to the industrial standard and the domestic standard depend on the antenna used for detecting the noise. The European standards give a higher limit for quasi-peak antenna and the lower limit for average antenna, and both limits must be met for the equipment to pass. The FCC standards used in North America have similar specifications.

Common Mode Noise

Common mode noise is one major noise source of a power module. It comes from a common-mode current caused by fast voltage change on the switching device and coupled through capacitances between the switching device and other components. The common-mode energy travels on all the lines or wires in the same direction at the same time, causing all the devices between the lines to perform no attenuation. A common mode choke or a ground choke may provide impedance between the lines and ground to reduce common current. To connect capacitors between the lines and ground properly would also be helpful to reduce the noise.

Differential Mode Noise

Differential-mode noise is the AC-component of pulsating input current caused by pulsating switching current in the power stage of the power module. This produces a noise voltage between the positive and negative input power terminal, which is opposite in direction or phase with respect to each other. Generally, all Onetech converters have an internal input filter circuit to filter the differential-mode conducted noise. An external capacitor should be placed between input lines to further reduce the noise level to meet EMC requirement. The capacitor should be placed close to the module to minimize the loop cross-sectional area and further reduce possible emission due to high frequency ripple current. Twisting the input leads or laying out PCB power planes would also be helpful for noise cancellation.

Bandwidth of EMC Components

No component is ideal for all frequency ranges. A capacitor may lose its capacitive property when the lead inductance dominates its impedance and an inductor will become a capacitive element when parasitic capacitance becomes important at high frequency. The Bandwidth of EMC Components should be taken into consideration when designing an EMC filter circuit. Connecting ceramic capacitor(s) with electrolytic capacitor in parallel and connecting low inductance inductor(s) of reasonably large size should provide a better bandwidth.

Output Side Ripple/Noise

The output ripple/noise performance can be improved by adding more low-ESR external capacitors close to output terminals. The reference trace layout should provide corrective measuring capability and improve output ripple/noise performance.

Note that the result of noise measurement on the bench can be worse than the actual performance with the system when the bench measurement ignores one fact: Improper test set up might form the shape of an unwanted antenna that significantly confuses the test result. On the bench, some engineers would use probes (instead of BNC connectors) to hitch the converter's pins, and read the result. That way, the probes would form the shape of an antenna, which would bypass the internal filter circuit of the converter and pick up radiation noise that is supposed to be filtered inside the converter already. Such incorrect measurement would read big noise readings and will never pass. Therefore, the MLCC in the above reference layout is apparently needed to filter the noise outside of the converter, and capture the true reading of the ripple. Note that it is no use to put that MLCC inside the converter, because the extra noise is because the "antenna" bypasses the internal filter.

Radiated Noise

The magnetic field radiation and electric field radiation were called "near-field" radiation that decays quickly as a function of distance not usually affects the radiated measurements. However, electromagnetic radiation caused by high frequency current flow through circuit element or traces can be radiated to far distance. It can be minimized by proper board layout that keeps all leads with AC current short circuit. To twist or run those leads as ground planes to minimize loop cross-sectional area would also be greatly helpful. Onetech has six-side metal package option for several product series and could provide extra RFI shielding performance for critical application. It should be noted that in many cases if the device fails in the common mode current test, it will also fail in the radiated-emission test since the lines would carry common mode noise and perform as an antenna to emit radiated noise.

General Application Information

Storage/Handling — Module Storage

It is user's liability to avoid module being overexposure to moisture during storage; board mount assembly and board rework. A below 30°C temperature and 85%RH storage condition is acceptable for max. 24 hours on line storage to avoid possible risk from wave soldering process.

The solder terminal plating material of Onetech module is gold metal, which can meet MSL1 level requirement for long-term storage. However, the module must go through a de-moisture process by being placed into a chamber of 85°C for 12 hours before use, to prevent the module from risk of explosion caused by heated moisture during soldering process. The recommended module storage condition is 30°C-60%RH.

Module Handling

The user must take responsibility during storage, board mount assembly and board rework to avoid module over stress due to drop, impact or any kind of tools touch to its surface and components. The user should also prevent the module from the damage of electrostatic discharge. Except for activities following the application notes herein stated, any extra direct work without consulting and/or consensus with Onetech, including but not limited to cutting pins, adding or removing potting compound or glues or enclosures, unauthorized electrical and/or mechanical analysis, would result in waiver of Onetech's service and warranty liabilities whatsoever.

Hand Soldering

Hand soldering is the preferred method for Onetech module. A temperature-controlled 70W solder iron with 0.125" tip and 425°C setting is suitable for terminal soldering work. The soldering time is 3S~6S for 0.04" terminal pin diameter, 5S~10S for 0.06" terminal pin diameter and 8S~16S for 0.08" terminal pin diameter.

The minimum soldering time is defined as the time required for the terminal to reach 125°C. The maximum soldering time is the time required for the terminal to reach 165°C. The power module's internal temperature must stay below the storage temperature of 183°C or at least less than the critical continuous temperature of 183°C.

Wave Soldering

Onetech understands that wave soldering is the most popular soldering method for the solder attachment of through-hole component leads for mass volume productions. Onetech power modules are designed to be compatible with single-wave, dual-wave or turbid-wave soldering machines.

The suggested soldering process is to keep the power module's internal temperature below 183°C. The typical recommended preheat temperature range is between 90°C and 105°C on the module-side of the circuit board. The pin-side of circuit board preheat temperature is recommended to be greater than 120°C, and preferable within 100°C of the solder-wave temperature. A maximum preheat rate of 4°C/s is suggested. The maximum recommended solder pot temperature is 250°C with a typical solder-wave dwell time of 3 seconds or up to 6 seconds maximum.

To remove a module soldered on board: Note that the correct way to remove a part soldered on the system board is to desolder it. Use a proper desoldering tool to heat up the solder point and remove the converter easily with minimized risk of hurting the system board.

Cleaning and Drying

Post solder cleaning is usually the final process of circuit board assembly prior to electrical-board testing. The result of inadequate circuit board cleaning can affect both the reliability of a power module and the testability of the finished circuit-board assembly. Onetech power modules are compatible with most cleaning processes but the cleaning materials should be chosen to be compatible with plastic parts or potted silicone material inside the module.

The drying process should be equipped with blowers capable of generating 1000CFM of air or above, so that the amount of rinse water left can be dried off with least heat. Hand held air guns are not recommended due to the variability and non-consistency of the operation. For open-frame power module constructions with magnetic structures that have un-potted windings or cavities, a heating process of 100°C-0.5 hours inside the chamber is recommended.

Pad Layout & Through Hole Specifications

Pad Layout

The pad layout of Onetech power module depends on its current rating. The low current model just requires a simple through hole to carry load current. However, the large current models would introduce high I²R loss at the solder point, which may cause over heating effect and further reduce the reliability. The pad layout for high current terminal pins becomes the most important consideration of the circuit board design.

For the 0.04" (1.0mm) terminal pins

Use the 0.05" (1.25mm) diameter plated through hole with minimum 0.08" (2.0mm) diameter solder pad for all modules layout.

For the 0.06" (1.5mm) terminal pins

Use the 0.075" (1.80mm) diameter plated through hole with minimum 0.12" (3.0mm) diameter solder pad for the low current circuit board layout. Based on the layout described above, it is necessary to have 4pcs~8pcs 0.5mm diameter of current distribution via to surround each through hole for reducing the current density and I²R loss while the current is high. The optional double pin layout will be necessary when ultra high current module was used.

For the 0.08" (2.0mm) terminal pins

LOW CURRENT MODULE: Use the 0.10" (2.54mm) diameter plated through hole with minimum 0.16" (4.0mm) diameter solder pad for the circuit board layout.

HIGH CURRENT MODULE: Use the 0.10" (2.54mm) diameter plated through hole with minimum 0.16" (4.0mm) diameter solder pad for the circuit board layout. It is necessary to have 5pcs~10pcs 0.5mm diameter of current distribution via to surround each through hole to reduce the current density and I²R loss. The optional double pin layout will be necessary when ultra high current module was used.

Quality — Reliability (MTBF)

Calculated MTBF in accordance with Bellcore TR-332 issue 6, December 1997:

4,801,570 hours at +25°C (failure rate: 280.265 FIT) 2,015,270 hours at +50°C (failure rate: 486.211 FIT) 940,807 hours at +70°C (failure rate: 1,062.918 FIT)

The assumptions are full load at the specified case temperature under ground benign (GB) environment condition.

Warranty

Onetech Power Technology warrants to the original purchaser or the end user that the products conform to its data sheet, and are free from material and workmanship defects for a period of two years since the date of manufacturing, when the product is used within the specified conditions and not processed by any party other than Onetech Power.

GENERAL PRODUCT LIMITED WARRANTY: All products are sold on an "AS-IS" and "AS-AVAILABLE" basis.

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Important Notes

① Input MUST be protected by fuses or overcurrent protection device per module.

② All specifications at nominal input, full load, 25°C unless otherwise noted.

③ Specifications subject to change without notice. Contact OneTech Integration to confirm.

④ Not for life-critical, nuclear, medical life-support, or hazardous systems without written approval.

ORDERING INFORMATION & CONTACT

Taiwan-Engineered · Globally Supported

Email
sales@onetech-integration.com

Phone
+886-3-495-3882

Website
www.onetech-integration.com

Address
Taiwan, R.O.C.

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⑤ Do not cut pins, remove base plate, or modify without written consent from OneTech Integration.

⑥ De-rating curves are provided as reference only. Operate units under curve limits in real applications.

⑦ Due to the very high power density, attaching the unit to the system cold wall is highly recommended.

⑧ Contact factory for special input/output configurations beyond the standard model list.