

42V standoff, 5A Step-Down DCDC Synchronous Converter

DESCRIPTION

The ETA2858 is a high power, 42V standoff, 4.5-36V wide input range step-down DCDC converter. It integrates a low R_{DS(on)} high side FET and a synchronous low side driver. With an external synchronous low side MOSFET, it strategically manages heat dissipation and is capable delivering more than 25W of power at the output, i.e. 5A current at 5V out. ETA2858 also includes CC/CV output regulation, output load compensation, external programmable switching frequency for EMI optimization, making it a perfect solution for Car Charger application.

ETA2858 is housed in a compact DFN3x3-12 package.

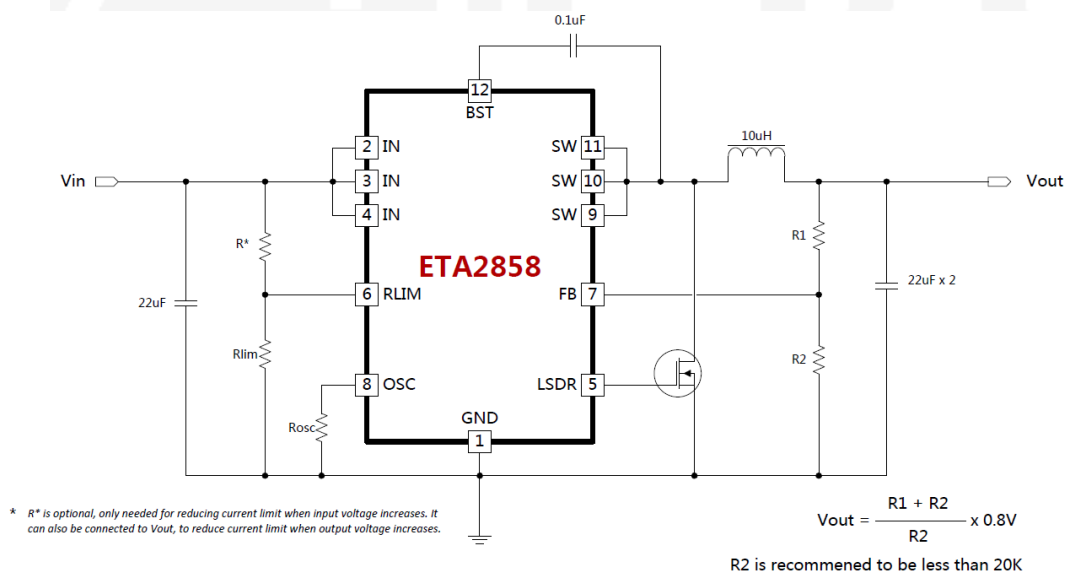
FEATURES

- ◆ 42V standoff
- ◆ 4.5 – 36V wide range of working input voltage
- ◆ Up to 5A output current
- ◆ Up to 98% converting efficiency
- ◆ External Sync FET driver
- ◆ Frequency and current limit programmable
- ◆ Load-resistance compensation
- ◆ 99% duty cycle for 12V output at 12V input
- ◆ No External Sense resistor for current limit

APPLICATIONS

- ◆ Car Charger
- ◆ High Voltage / High Current converting for general purpose

TYPICAL APPLICATION



ORDERING INFORMATION

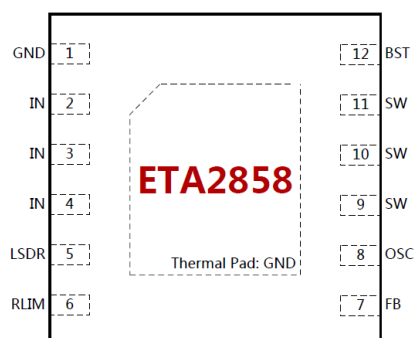
PART No.
ETA2858D3M

PACKAGE
DFN3x3-12

TOP MARK
ETA2858
YWW2L

Pcs/Reel
5000

PIN CONFIGURATION



ABSOLUTE MAXIMUM RATINGS

(Note: Exceeding these limits may damage the device. Exposure to absolute maximum rating conditions for long periods may affect device reliability.)

VIN Voltage	-0.3V to 42V
SW, EN Voltage	-0.3V to VIN+0.3V
BST Voltage	-0.3V to SW+6V
Other Pins Voltage.....	-0.3V to 6V
SW to ground current.....	Internally limited
Operating Temperature Range	-40°C to 85°C
Storage Temperature Range	-55°C to 150°C
Thermal Resistance	θ_{JC} θ_{JA}
DFN3X3-12.....	3 48 °C /W
Lead Temperature (Soldering, 10ssec)	260°C
ESD HBM (Human Body Mode)	2KV
ESD MM (Machine Mode)	200V

ELECTRICAL CHARACTERISTICS

(VIN = 12V, unless otherwise specified. Typical values are at TA = 25°C.)

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Input Standoff Voltage		42			V
Input Voltage Range		4.5		36	V
Input UVLO	Rising, Hysteresis=300mV		4.4		V
Input OVP	Rising, Hysteresis=1.5V		37.5		V
Input Supply Current	VFB=0.85V, no switching		0.5	0.8	mA
Input Shutdown Current	OSC Floating or VOSC>1.8V		6		μA
FB Voltage		0.776	0.800	0.824	V
DC Load Compensation	IOUT=2A, FB sink current		1		μA
	IOUT=5A, FB sink current		2.5		μA
Switching Frequency	ROSC=33KΩ		300		KHZ
Foldback Frequency	VOUT=0, ROSC=33KΩ		75		KHZ
Maximum Duty Cycle		90	99		%
High side Switch On Resistance	ISW=500mA		45		mΩ
Output Current Limit	RLIM=50KΩ		3		A
	RLIM=30KΩ		5		A
SW Leakage Current	VIN=12V, VSW=0, OSC floating			1	μA
Voltage of OSC and RLIM pin			0.6		V
OUTPUT Short Circuit Hiccup Threshold			75%*VFB		V

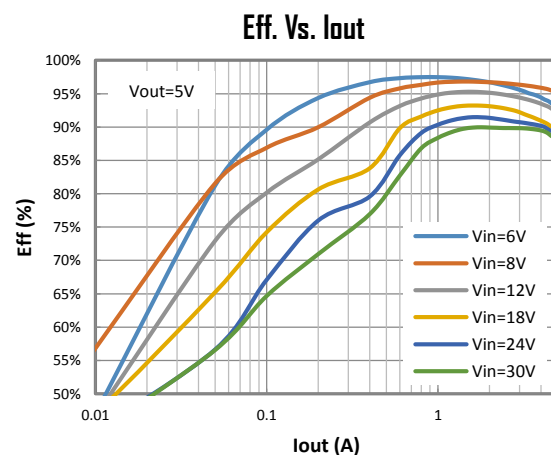
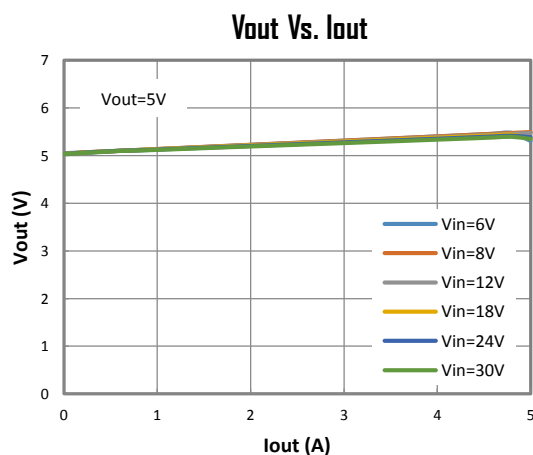
Short Circuit Hiccup time	ON	1	ms
	OFF	150	ms
Gate Driver Sink Impedance		0.9	Ω
Gate Driver Voltage	$V_{IN}=12V$	6	V
Gate Driver Source Impedance		3	Ω
Thermal Shutdown	Rising, Hysteresis=30°C	150	°C

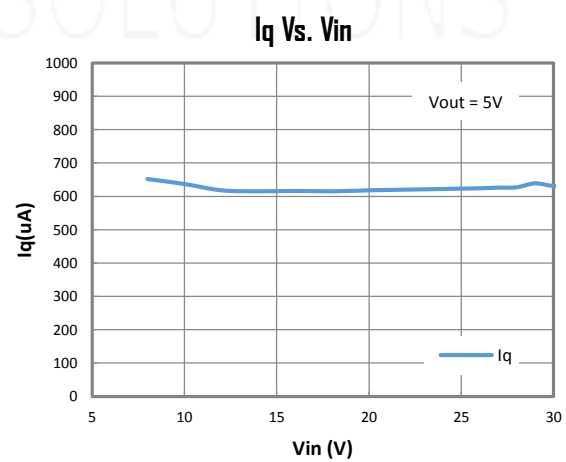
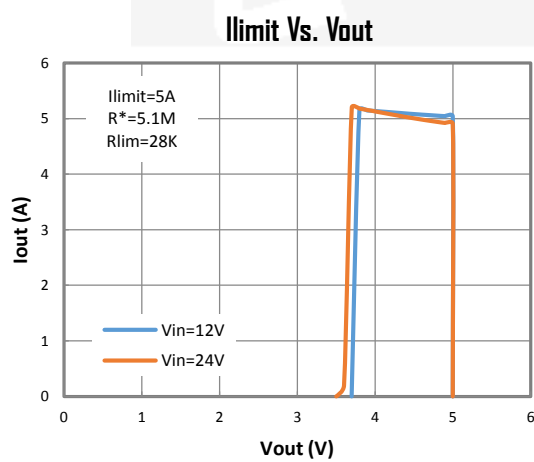
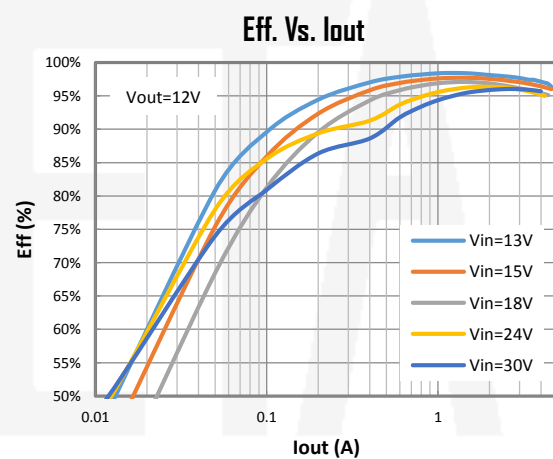
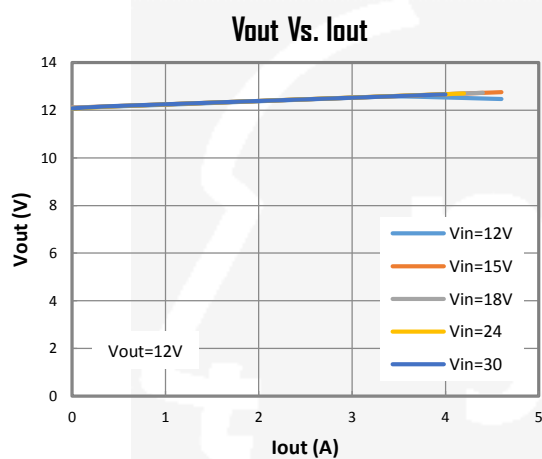
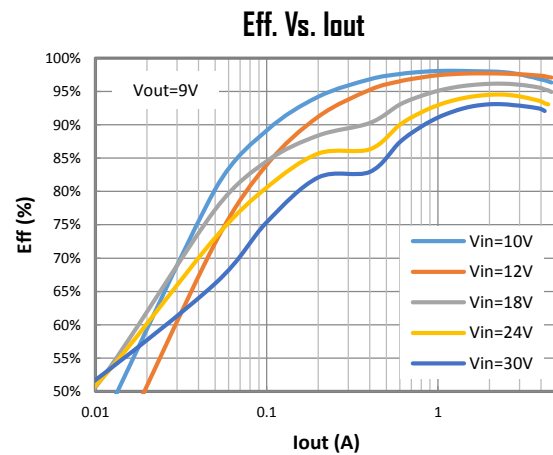
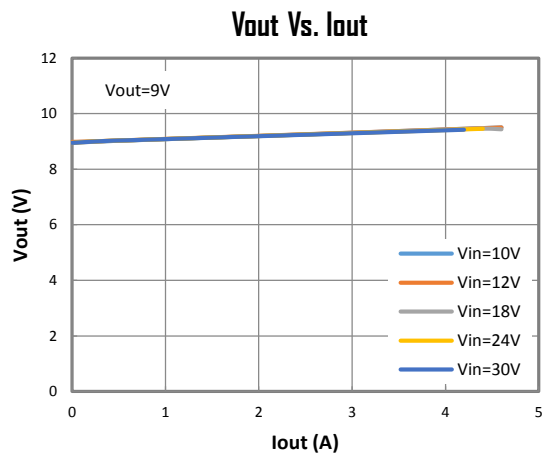
PIN DESCRIPTION

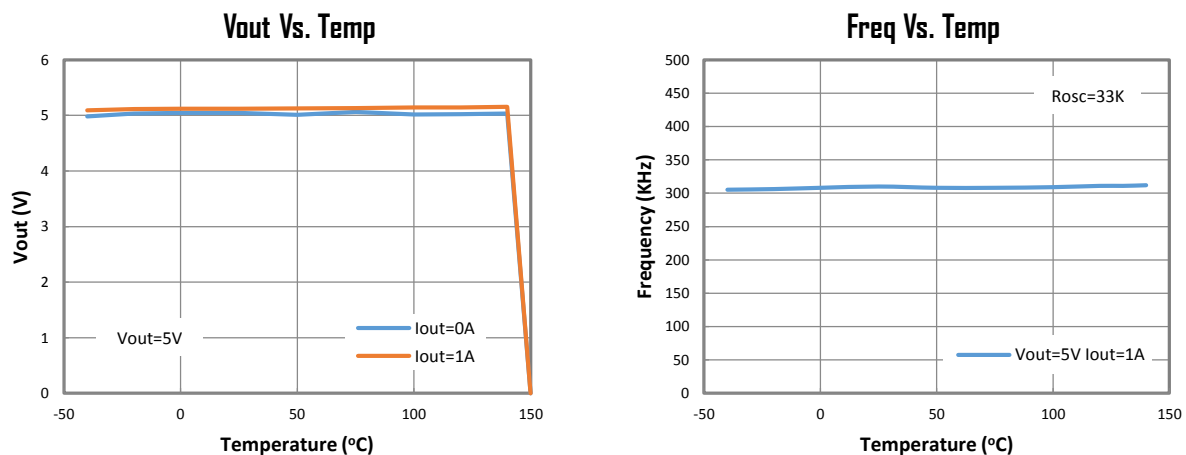
PIN #	NAME	DESCRIPTION
1	GND	Ground Pin
2,3,4	IN	Power Input Pin
5	LSDR	Low side Synchronous gate drive pin. Drive an external synchronous MOSFET
6	RLIM	External Current limit set pin. Connect a resistor at this pin to GND to set the output current limit $I_{out(max)} = \frac{150K}{R_{lim}} (A)$
7	FB	Output feedback resistor pin. Connect a resistor ladder at this pin and out and ground to set the output voltage
8	OSC	External Switching frequency set pin. Connect a resistor at this pin to GND to set the switching frequency. Pulling high this OSC pin will disable the chip. $f_{osc} = \frac{600K / R_{osc} - 1}{55} (MHz)$
9,10,11	SW	Switching pin. Connect an inductor between this pin and output
12	BST	Boost trap pin. Connect a 100nF capacitor between this pin and SW

TYPICAL CHARACTERISTICS

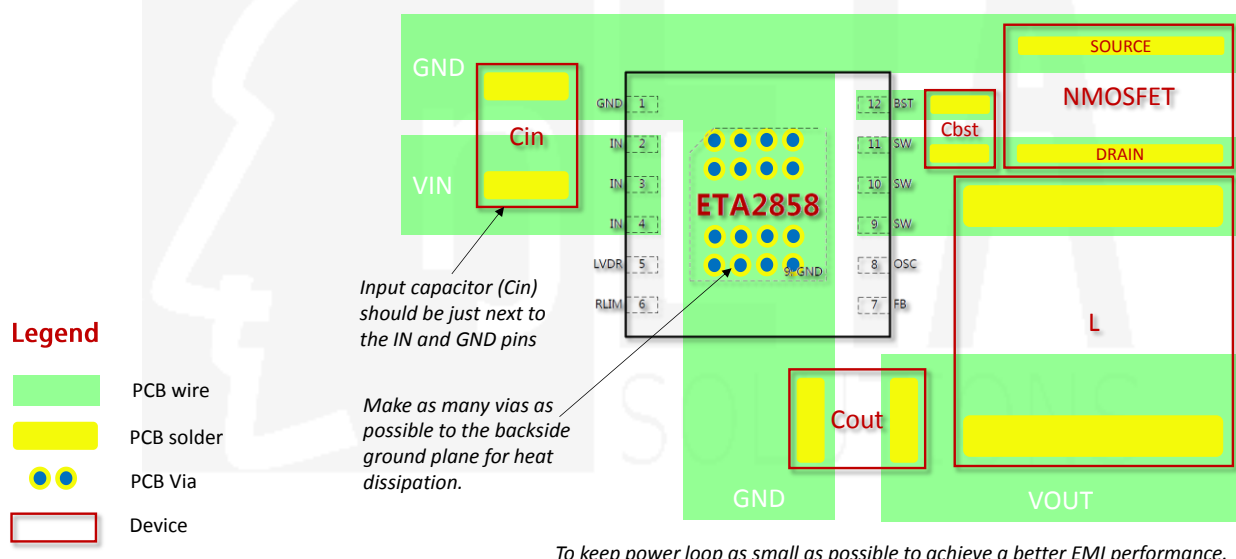
(Typical values are at $T_A = 25^\circ C$, $R_{osc}=33K$, $R_{lim}=28K$, $R^*=5.1M$, unless otherwise specified.)







PCB GUIDELINES

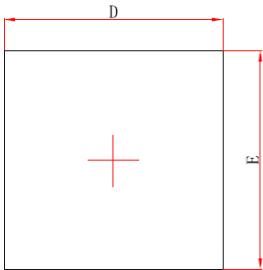


THERMAL CONSIDERATIONS

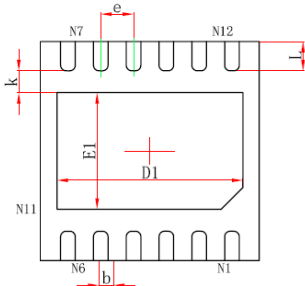
Because ETA2858 is mainly designed for car charger and other high voltage / high current power conversion, and the car charger always has limited room for heat dissipation and also works in a high temperature environment, the PCB has to be very delicately designed to ensure a good heat dissipation. ETA2858, external low-side NMOSFET, and inductor are the 3 major heat generation parts. These 3 parts are recommended be well placed to distribute the heat generation. And back side of ETA2858 and external low-side NMOSFET must be soldered to the large GND plane. And a 2oz - copper PCB will have better heat conduction than 1oz - copper PCB.

PACKAGE OUTLINE

Package: DFN3x3-12

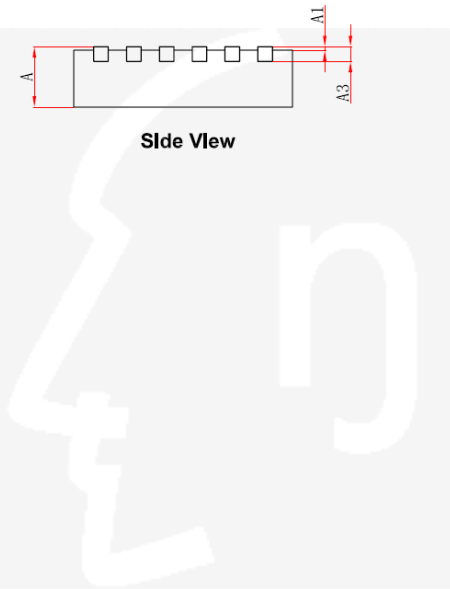


Top View



Bottom View

Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min.	Max.	Min.	Max.
A	0.700/0.800	0.800/0.900	0.028/0.031	0.031/0.035
A1	0.000	0.050	0.000	0.002
A3	0.203REF.		0.008REF.	
D	2.924	3.076	0.115	0.121
E	2.924	3.076	0.115	0.121
D1	2.450	2.650	0.096	0.104
E1	1.500	1.700	0.059	0.067
k	0.200MIN.		0.008MIN.	
b	0.150	0.250	0.006	0.010
e	0.450TYP.		0.018TYP.	
L	0.324	0.476	0.013	0.019



Side View