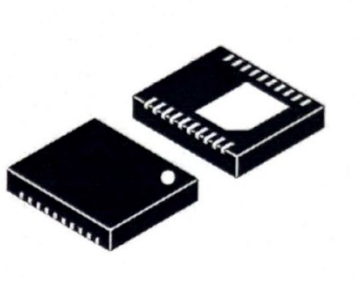
58V 8A Drain Power Modulation

1.FEATURES



- Wide Input Voltage Range: 2.7V~58V
- Low Rdson : 18mΩ
- 7A DC, 8A Peak Output Current
- Pulse & Continuous Mode Supported
- Negitive Voltage Enable
- On-Short Over Voltage Protection
- N-mosfet Integrated for High side and Low side Current Source and Sink
- 5.5mm × 4.0mm × 0.9mm DFN20L Package

2.DESCRIPTION

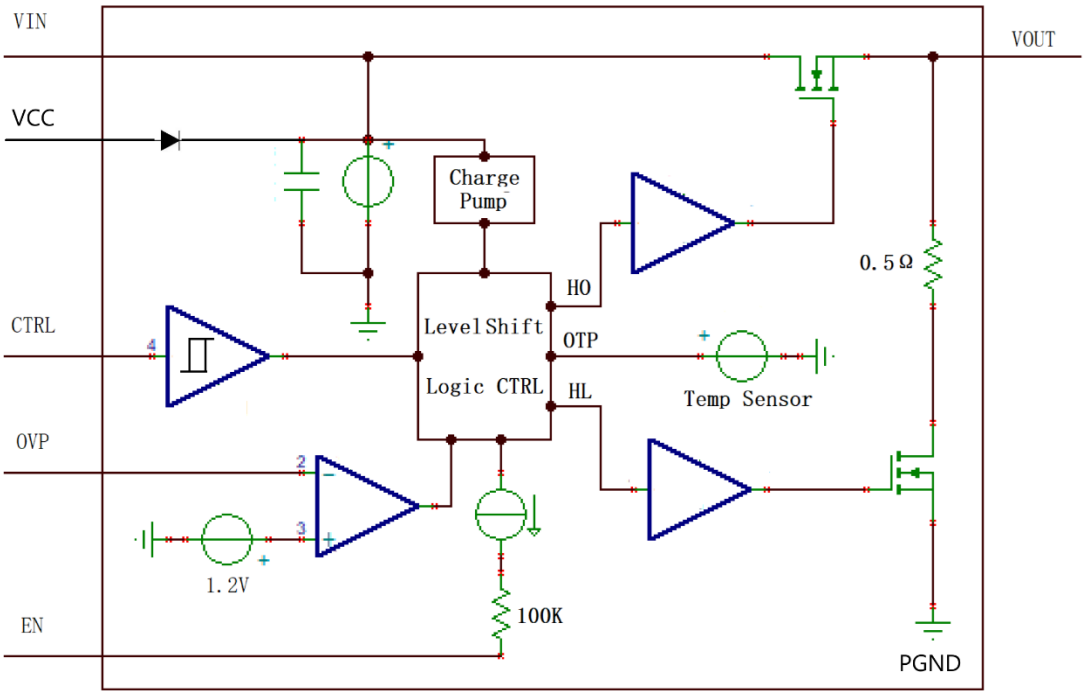
The CDPM2758P is a high-power modulation switch chip. It is equipped with an N-channel MOSFET with extremely low on impedance, which helps reduce system losses and improve operational reliability. The built-in MOSFET of the chip can quickly respond to external digital modulation signals and achieve rapid rise and fall of output voltage. The chip is equipped with a discharge channel to accelerate the falling edge of the output voltage. In order to improve the reliability of the system, the chip also integrates input overvoltage protection, overheating protection, and negative voltage enable control.

3.APPLICATIONS

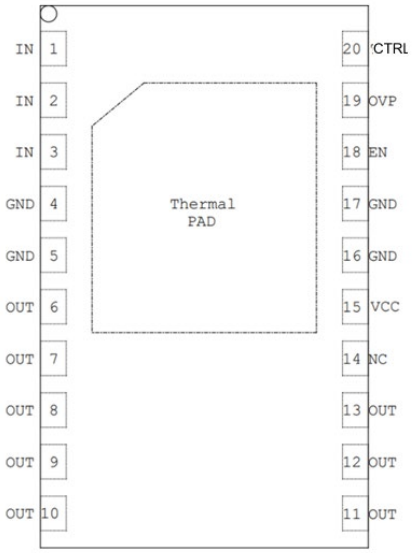
- Power amplifier drain modulation
- TR component power modulation

■ Phased array radar

4.BLOCK DIAGRAM



5.Pin Configuration and Functions



TOP View

PIN		I/O	DESCRIPTION
No.	Name		
1,2,3	VIN	-	Power input
6,7,8,9,10 11,12,13	VOUT	-	Power output
4,5,16,17	GND	-	GND
14	NC	-	No connection
15	VCC	I	External VCC supply when VIN < 5V
18	EN	I	Negative Voltage enable
19	OVP	I	Over voltage protection,when ovp active, one-short protection : the device turn-off output until EN or VIN resuppled. Tied this pin to GND when no use. VOVP = 1.2*(RH+RL)/RL
20	CTRL	I	PWM signal input,when EN enable,output follows the pwm phase
-	EP	-	Thermal pad ,tied to GND and drill to GND plane by via to achive a better heat dissipation

6.ABSOLUTE MAXIMUM RATINGS

over operating free-air temperature range (unless otherwise noted)

		min	max	unit
VIN	Input Voltage	-0.3	60	V
VOUT	Output Voltage	-0.3	VIN	V
OVP	Over voltage protection	-0.3	6	V
CTRL	PWM control signal	-0.3	6	V
EN	Enable PIN	-5	5	V
IMAX	Max continuous current	-	8	A
IMAX,PLS	Max Pulsed current	-	10	A
Tmin	Minimum Pulse with	80	-	ns
Tmax	Max Pulse with		DC	ns
Cout	Out capacitive load		10	nF
Tj	Junction temperature		135	℃
Tstg	Storage temperature	-65	150	℃

7.ESD Ratings

			VALUE	UNIT
$V_{(ESD)}$	Electrostatic discharge	Human body model (HBM), per ANSI/ESDA/ JEDEC JS-001, all pins(1)	±2000	V
		Charged device model (CDM), per JEDEC specification JESD22-C101, all pins(2)	±1000	

(1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.
(2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

8.Recommended Operating Conditions

over operating free-air temperature range (unless otherwise noted)

		min	nom	max	unit
VIN	Input Voltage	2.7		58	V
VCC	External supply when vin<5V	5	5.5	6	V
CTRL	PWM control signal	2.4	3.3	6	V
EN	Enable PIN	-5		5	V
Cout	Out capacitive load	0.1	1	5	nF
TA	Ambient Temperature	-55		125	℃

Note : when VIN >= 5V No External VCC needed and left VCC pin

9.Thermal Information

THERMAL METRIC		DFN20 Package	unit
RθJA	Junction-to-ambient thermal resistance	40	°C/W
RθJC(top)	Junction-to-case (top) thermal resistance	48	°C/W
RθJB	Junction-to-board thermal resistanc	10	°C/W

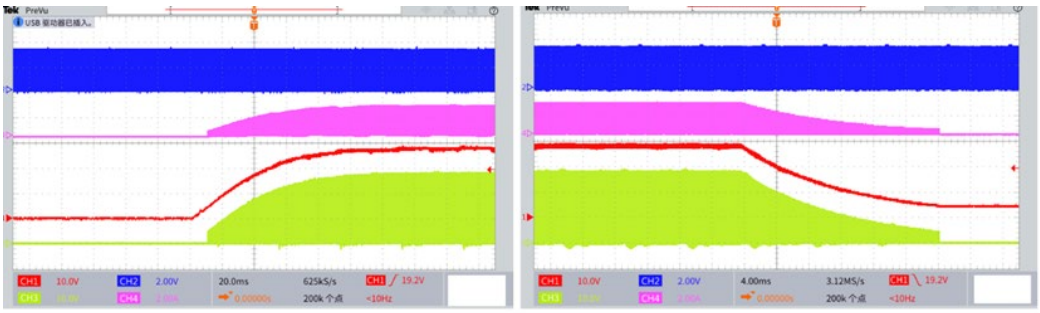
10.Electrical Characteristics

VIN = 5V; TTL = 3.3V; EN=-2V;T = 25℃

PARAMETER	Test conditions	Item	min	nom	max	Unit
VIN						
VIN	VCC=NC	VIN	4.5	-	58	V
	VCC_EXT=5V		2.7	-	58	
$I_{Vin\_DISABLED}$	EN=0	I_{Vin}	-	16	20	μA
$I_{Vin\_ENABLED}$	EN=-2, no load	I_{Vin}	-		10	mA
N-mosfet						
High side mos	1000mA	Rdson	17	18	22-	mΩ
Low side mos	20mA EN=-0.6V	Rdson	0.4	0.5	0.6	Ω
OVP						
Vth	VIN=5 to 58 or Vcc=5V	Vovp	1.18	1.2	1.22	V
CTRL						

VIH	On	TTL	2	-	2.2	V
VIL	Off	TTL	1.4	-	1.7	V
OTP						
Tsd	Design assurance		-	150	-	°C
Tsd Hys	Design assurance		-	20	-	°C
EN						
EN VIH	EN enable	EN	-	-1.2	-	V
EN VIL	EN disable	EN	-	-1.0	-	V
EN current		EN	-	-	2	μA
OUT						
Vout Tr	Cload=1nF	Vout	-	20	-	ns
Vout Tf	Cload=1nF， Iout=2.5A	Vout	-	20	-	ns

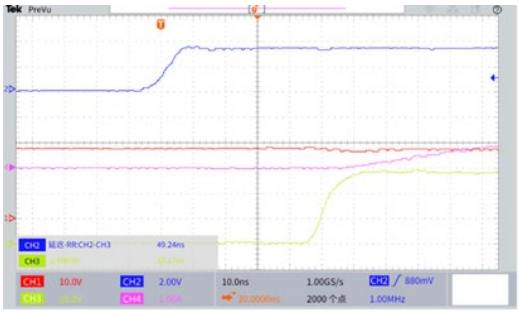
11.AC Characteristics



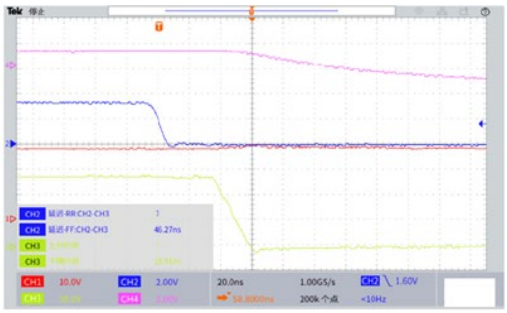
Startup VIN=28V,EN=-2V,TTL=3.3V,Iload=2.5A,
50%duty cycle,Freq=1MHz， Cout=2.2nf

Shutdown VIN=28V,EN=-2V,TTL=3.3V,Iload=2.5A,
50%duty cycle,Freq=1MHz， Cout=2.2nf

CH1:VIN CH2:CTRL CH3:OUT CH4:Iout

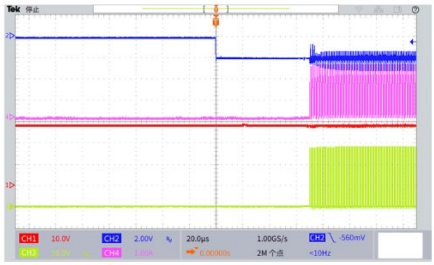


VIN=28V,EN=-2V,TTL=3.3V,Iload=2.5A,50%duty cycle,Freq=1MHz，Cout=2.2nf

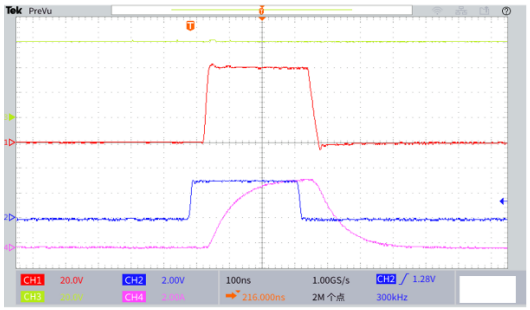


VIN=28V,EN=-2V,TTL=3.3V,Iload=2.5A,50%duty cycle,Freq=1MHz，Cout=2.2nf

CH1:VIN CH2:CTRL CH3:OUT CH4:Iout

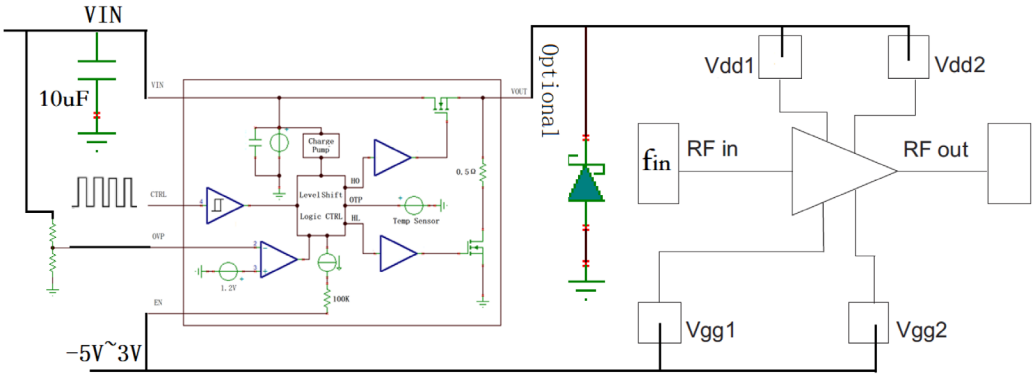


EN on

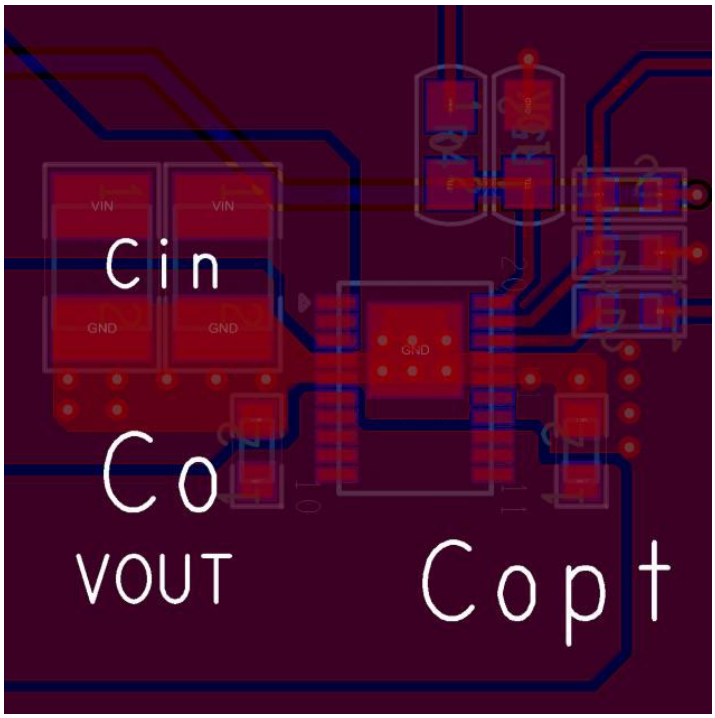


58Vin;Cout=2.2nf;load=6A,TTL:300kHz,10%Duty cycle.

12. Application and Implementation

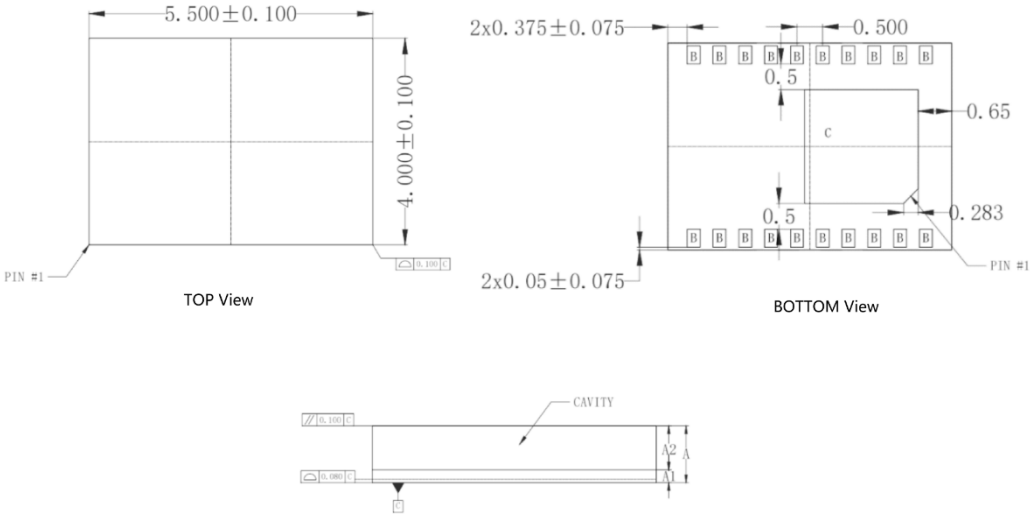


13.Layout Guidelines



14.PACKAGE MATERIALS INFORMATION

DFN20L:



sign	min	nom	max
A	0.87	0.92	0.97
A1	0.18	0.22	0.26
A2		0.7	
B		0.25×0.35	
C		2.2×2.2	
PITCH		0.5	

UNIT:mm

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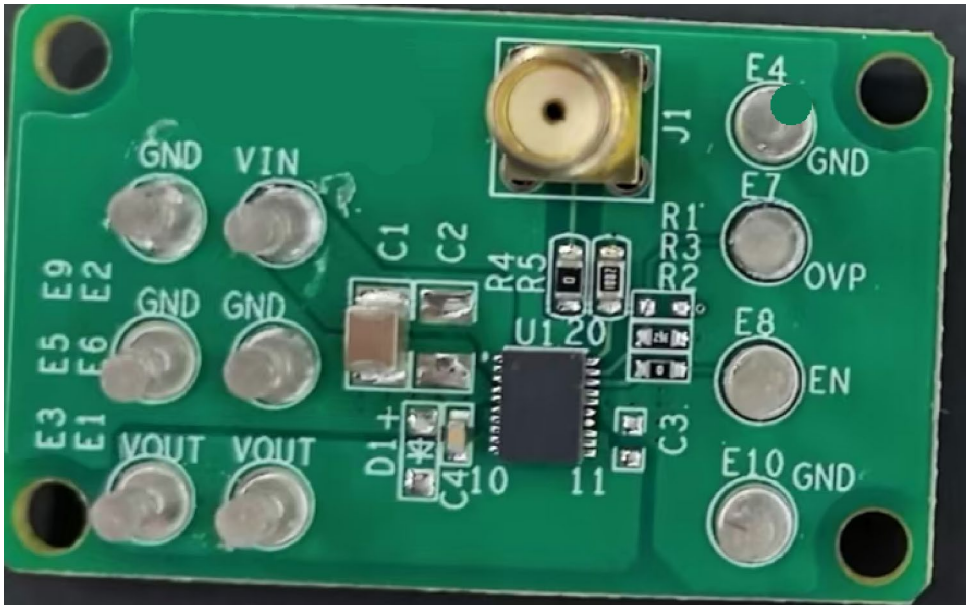
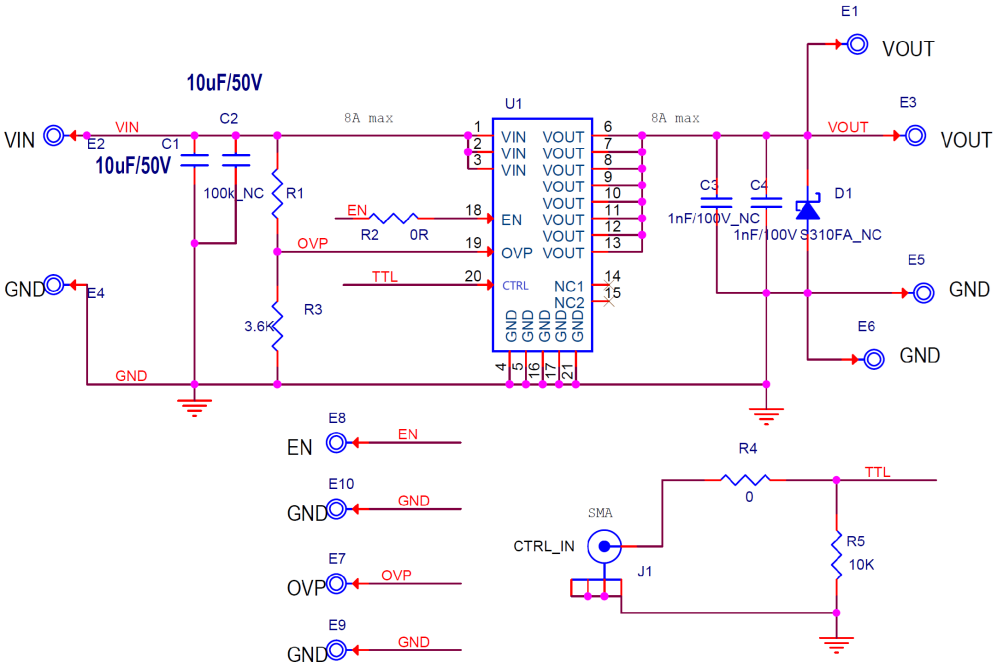
DEMO KIT





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