Maximum Ratings

Storage Temperature…….. -55℃ to +125℃
Ambient Temperature with Power Applied.....-40℃ to +85℃
Input Voltage……..……+6.0V
Output Voltage ……....-0.3 to V_{CC} +0.3V
EN pin Voltage…… +6.0V
DC Input/Output Current ……700mA
Power Dissipation……...SOT23/400mW
SC70/300mW
TDFN/600mW

Note:
Stresses greater than those listed under MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

Recommended Operating Conditions

Symbol	Parameter	Min.	Typ.	Max.	Unit
V_{CC}	Operating Voltage	1.8	-	5.5	V
T_A	Operating temperature	-40	25	85	°C

Electrical Characteristics (T_A=25℃, Bypass capacitor=22nF)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
Output Voltage	$V_{OUT(E)}$ *2	$V_{IN}=V_{OUT(S)}$ *1+1.0V, I_{OUT}=30mA		$V_{OUT(S)}$ *0.98	$V_{OUT(S)}$	$V_{OUT(S)}$ *1.02	V
Maximum Output Current	I_{OUTMAX}	$V_{IN}=V_{OUT(S)}$+1.0V		300	-	-	mA
Dropout Voltage	Vdif*3	I_{OUT} = 300mA	1.7V≤$V_{OUT(S)}$ ≤1.8V	-	0.39	0.51	V
			1.9V≤$V_{OUT(S)}$ ≤2.3V	-	0.33	0.43	
			2.4V≤$V_{OUT(S)}$ ≤2.7V	-	0.30	0.39	
			2.8V≤$V_{OUT(S)}$≤3.3V	-	0.27	0.35	
Supply Current	I_{SS}	V_{IN} = $V_{OUT(S)}$ +1.0V, no load		-	70	100	μA
Standby Current	I_{SB}	V_{IN} = $V_{OUT(S)}$+1.0V EN=OFF		-	0.1	1	μA
Line Regulation	$\Delta V_{OUT}/\Delta V_{IN}*V_{OUT}$	$V_{OUT(S)}$+1.0V≤V_{IN}≤5.5V I_{OUT}=30 mA		-	0.05	0.2	%/V
Load Regulation	ΔV_{OUT2}	V_{IN} = $V_{OUT(S)}$+1.0V, 1.0mA≤I_{OUT} ≤300mA		-		0.6	%
Input Voltage	V_{IN}	-		1.8	-	5.5	V
Output Voltage Temperature Characteristic	$\Delta V_{OUT}/\Delta Topr*V_{OUT}$	I_{OUT}=30 mA -40℃≤Topr≤85℃		-	+/-100	-	ppm/℃
Ripple Rejection	PSRR	V_{IN}=[$V_{OUT(S)}$+1.0]V_{DC}+1Vp-p AC V_{OUT}=1.5V, I_{OUT}=30mA, f=1kHz		-	80	-	dB
Current Limit	I_{LIM}	V_{OUT} = $V_{OUT(S)}$*0.9		-	450	-	mA
Thermal Shutdown	T_{SD}				170		℃
Thermal Shutdown Hysteresis	ΔT_{SD}				40		
EN"High"Voltage	V_{ENH}	-		1.5	-	-	V
EN"Low"Voltage	V_{ENL}	-		-	-	0.3	
EN"High"Current	I_{ENH}	V_{IN}=$V_{OUT(S)}$+1.0V		-0.10	-	0.10	μA
EN"Low" Current	I_{ENL}	V_{IN}= $V_{OUT(S)}$+1.0V, EN=OFF		-0.10	-	0.10	
Output Discharge Resistance	Rdis	V_{IN}= $V_{OUT(S)}$+1.0V EN=OFF		-	200	-	Ω
Output Noise Voltage	e_{ON}	V_{OUT}=1.2V，10Hz to 100kHz, I_{OUT}=30mA, C_{OUT}=1μF		-	30	-	μV_{RMS}

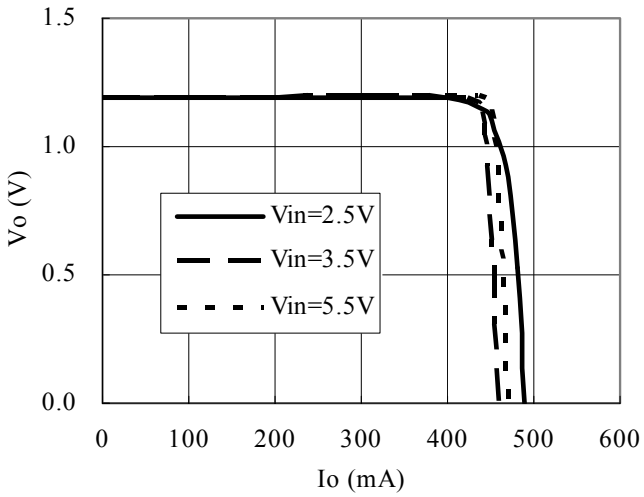
Note: *1: $V_{OUT(S)}$=Specified output voltage.
*2: $V_{OUT(E)}$=Effective output voltage.
(I.e. the output voltage when "$V_{OUT(S)}$+1.0V" is provided at the VIN pin while maintaining a certain I_{OUT} value).
*3: Vdif={$V_{IN1}^{(*5)}$-$V_{OUT1}^{(*4)}$}.
*4: V_{OUT1}=A voltage equal to 98% of the output voltage whenever an amply stabilized I_{OUT} {$V_{OUT(S)}$+ 1.0V} is input.
*5: V_{IN1}=The input voltage when V_{OUT1} appears as input voltage is gradually decreased.
*6: Unless otherwise stated, V_{IN}=$V_{OUT(S)}$+1.0V

Typical Performance and Characteristics

1. Output Voltage vs. Output Current

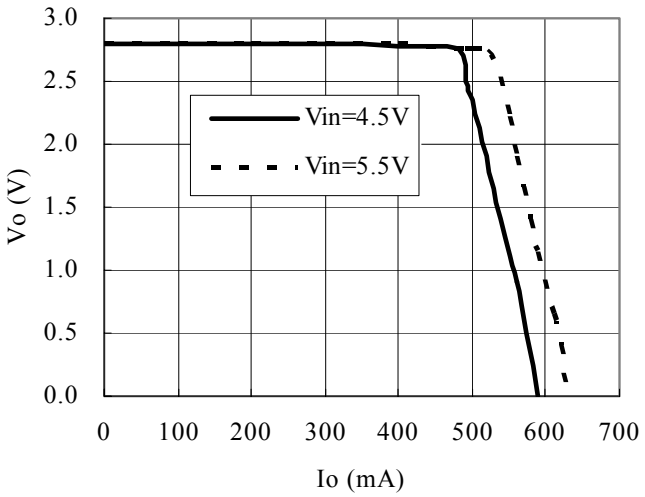
PT7M8202 (1.2V)

Cin=1μF(Ceramics), Cout=1μF(Ceramics)



PT7M8202 (3.3V)

Cin=1μF(Ceramics), Cout=1μF(Ceramics)

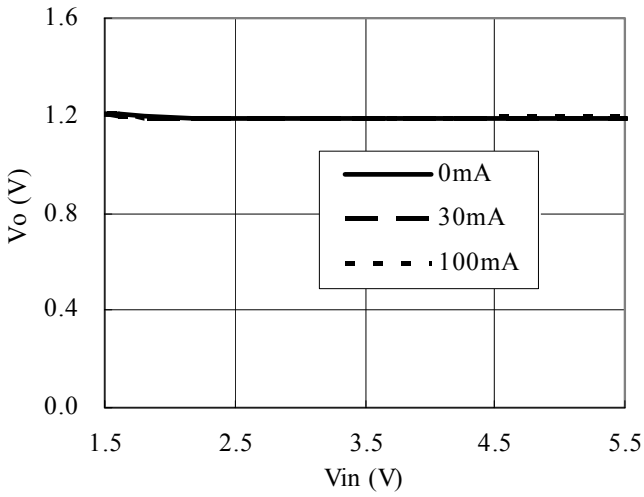


2. Output Voltage vs. Input Voltage

PT7M8202 (1.2V)

Topr=25℃

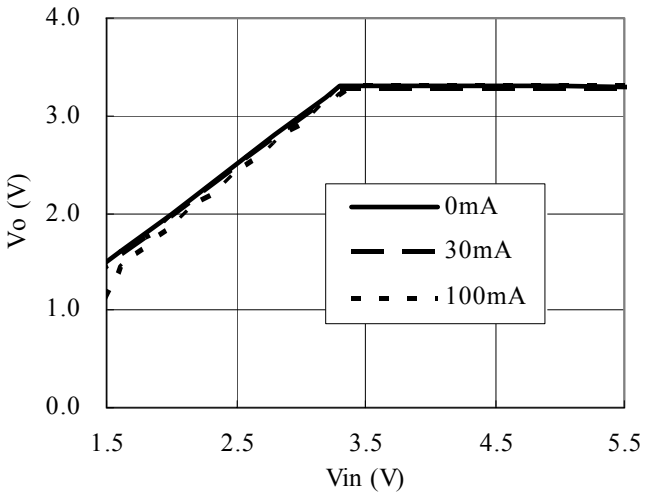
Cin=1μF(Ceramics), Cout=1μF(Ceramics)



PT7M8202 (3.3V)

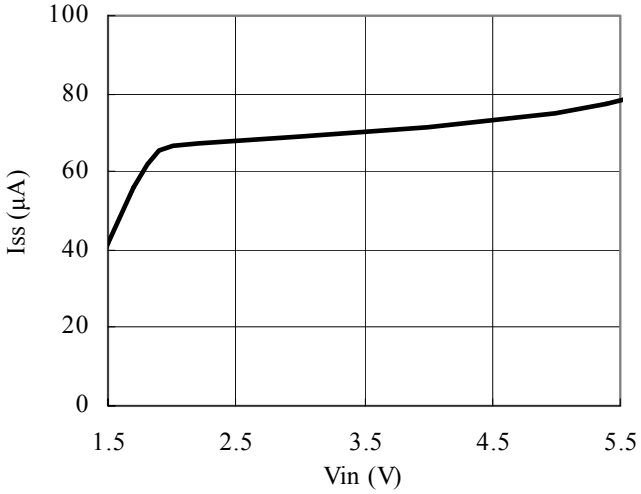
Topr=25℃

Cin=1μF(Ceramics), Cout=1μF(Ceramics)

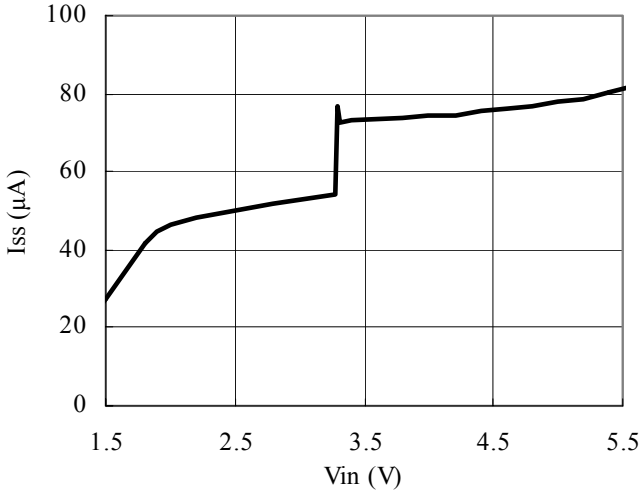


3. Supply Current vs. Input Voltage

PT7M8202 (1.2V)



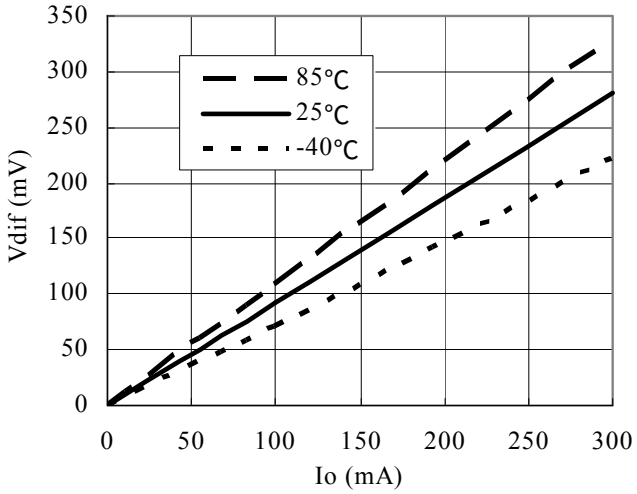
PT7M8202 (3.3V)



4.Dropout Voltage vs. Output Current

PT7M8202 (3.3V)

Cin=1μF(Ceramics), Cout=1μF(Ceramics)

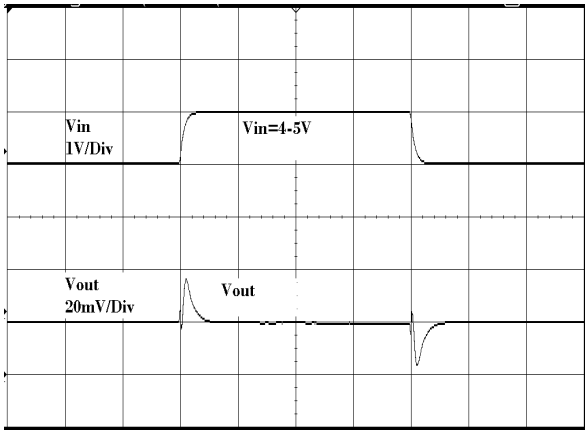


5. Line Transient Response

PT7M8202 (3.3V)

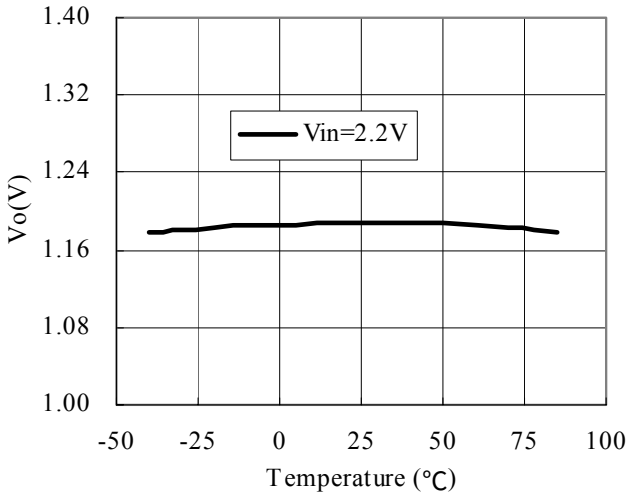
Cin=Cout=1μF(Ceramics), Iout=100mA

Time (50μs/Div)

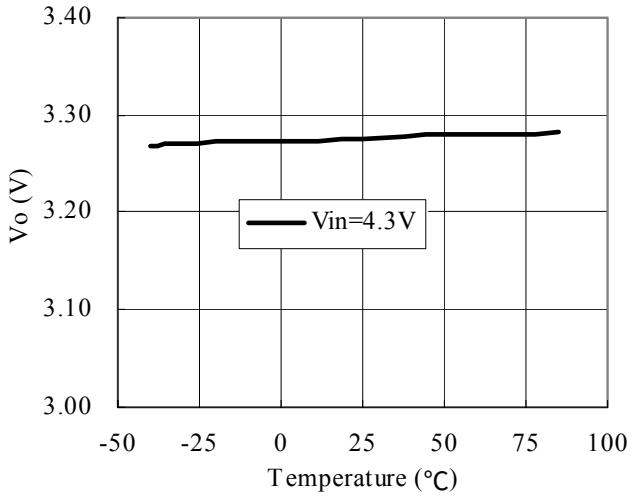


6. Output Voltage vs. Ambient Temperature

PT7M8202 (1.2V)
Vin=2.2V
Cin=1μF(Ceramics), Cout=1μF(Ceramics)

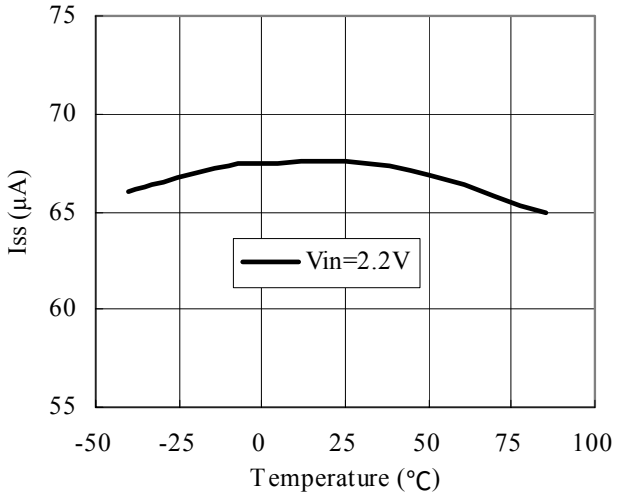


PT7M8202 (3.3V)
Vin=4.3V
Cin=1μF(Ceramics), Cout=1μF(Ceramics)

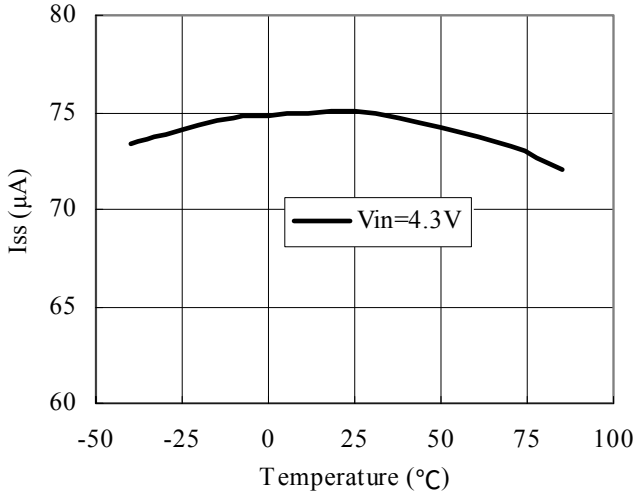


7. Supply Current vs. Ambient Temperature

PT7M8202 (1.2V)
Vin=2.2V
Cin=1μF(Ceramics), Cout=1μF(Ceramics)



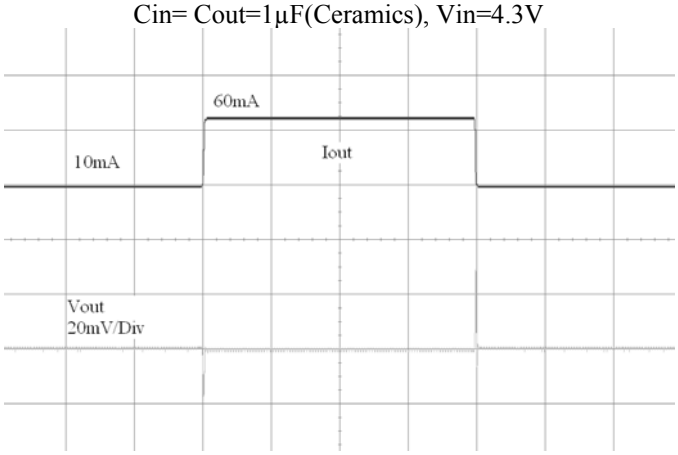
PT7M8202 (3.3V)
Vin=4.3V
Cin=1μF(Ceramics), Cout=1μF(Ceramics)



8. Load Transient Response

PT7M8202 (3.3V)

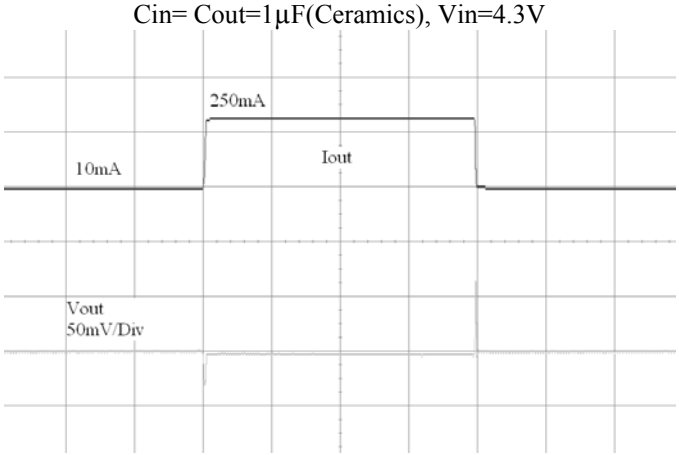
Cin= Cout=1µF(Ceramics), Vin=4.3V



Time (500µs/Div)

PT7M8202 (3.3V)

Cin= Cout=1µF(Ceramics), Vin=4.3V



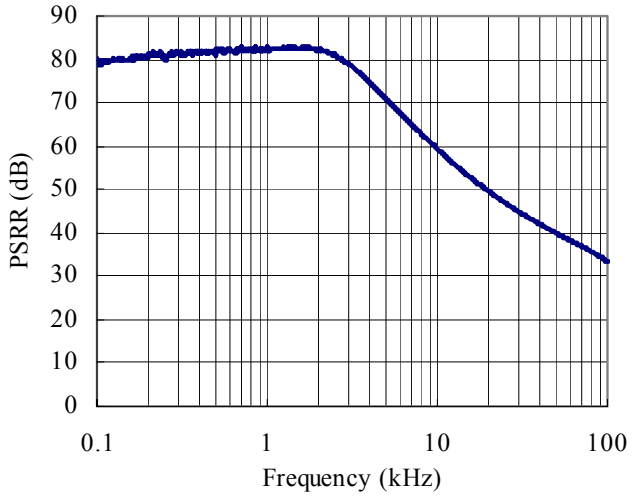
Time (500µs/Div)

9. PSRR

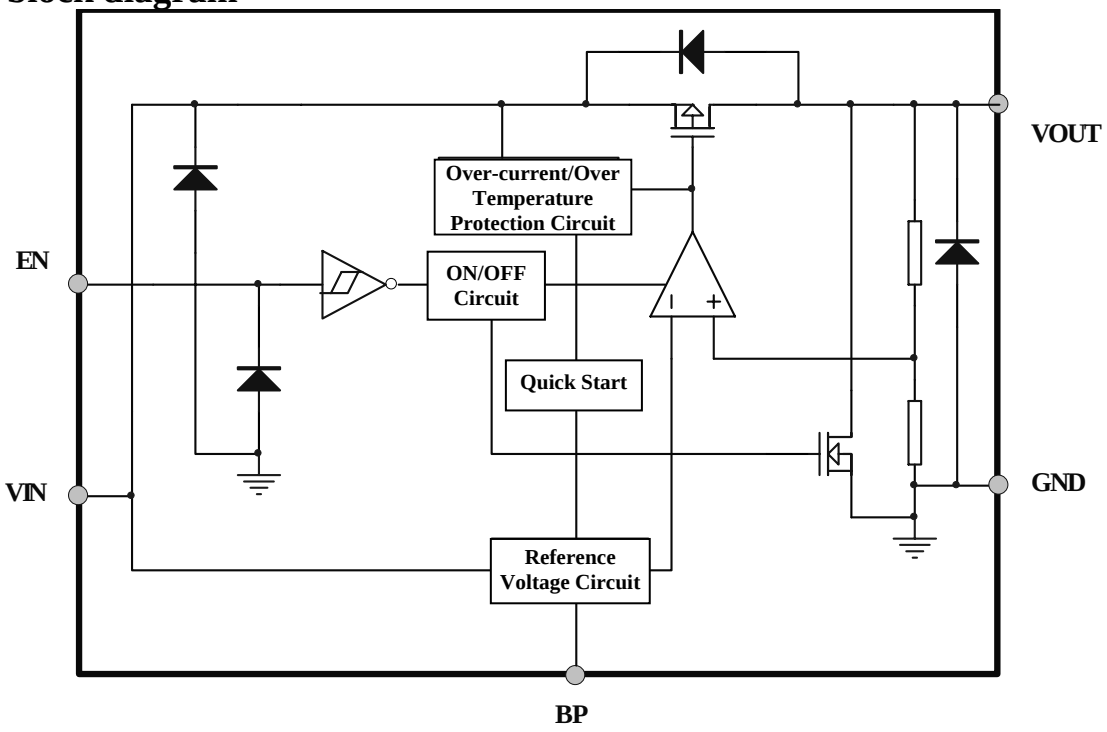
PT7M8202 (1.2V)

Vin=2.2V DC+1Vp-pAC

Cout=1uF(Ceramics), Iout=30mA



Function block diagram



Functional Description *(Refer to Function Block Diagram)*

Output Voltage

The divided output voltage is compared with the internal reference voltage by the error amplifier with internal phase compensator. The output of the error amplifier then drives the P-channel MOSFET to maintain a stable and constant output voltage.

Low ESR Capacitors

The internal phase compensator maintains the stable output voltage with low ESR ceramic input and output capacitors. 1μF low ESR (X5R/X7R) ceramic capacitor located as close as possible to the IC's pins is recommended.

Current Limit and Thermal Shutdown Protections

Current limit protection is used to limit the output current when an overload condition occurs. As a result, the output voltage will drop. Thermal shutdown protection will turn off the output to reduce the power dissipation when the operation junction temperature exceeds 170°C.

Bypass Capacitor and Low Noise

A 22nF between the BP pin and GND pin significantly reduces noise on the regulator output, it is critical that the capacitor connection between the BP pin and GND pin be direct and PCB traces should be as short as possible. There is a relation ship between the bypass capacitor value and the LDO regulator turn on time. DC leakage on this pin can affect the LDO regulator output noise and voltage regulation performance.

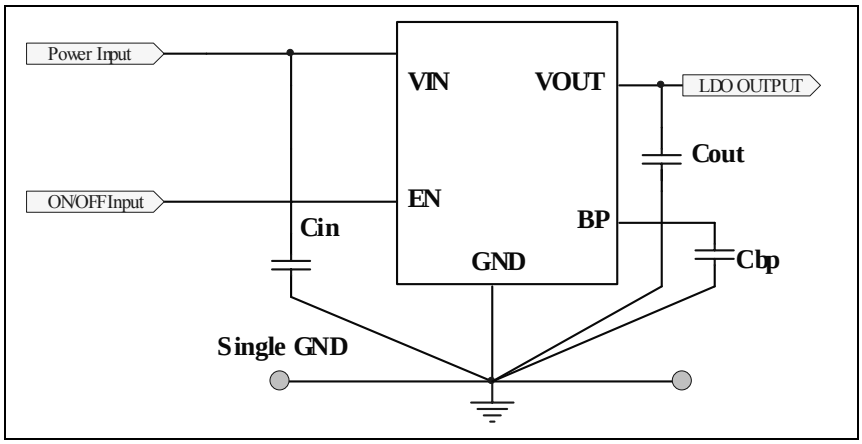
EN Pin

The output of the regulator in PT7M8202A/B can be controlled with EN pin. The EN pin should be connected to a "VIN" or a "GND" voltage as a floating input applied to inverter input of the enable circuitry will increase the current consumption.

■ **NOTE ON USE**

1. Please use this IC within the stated absolute maximum ratings.
2. Where wiring impedance is high, operations may become unstable due to noise and/or phase lag depending on output current. Please keep the resistance low between VIN and GND wiring in particular.
3. Please wire the input capacitor (Cin) and the output capacitor (Cout) as close to the IC as possible.

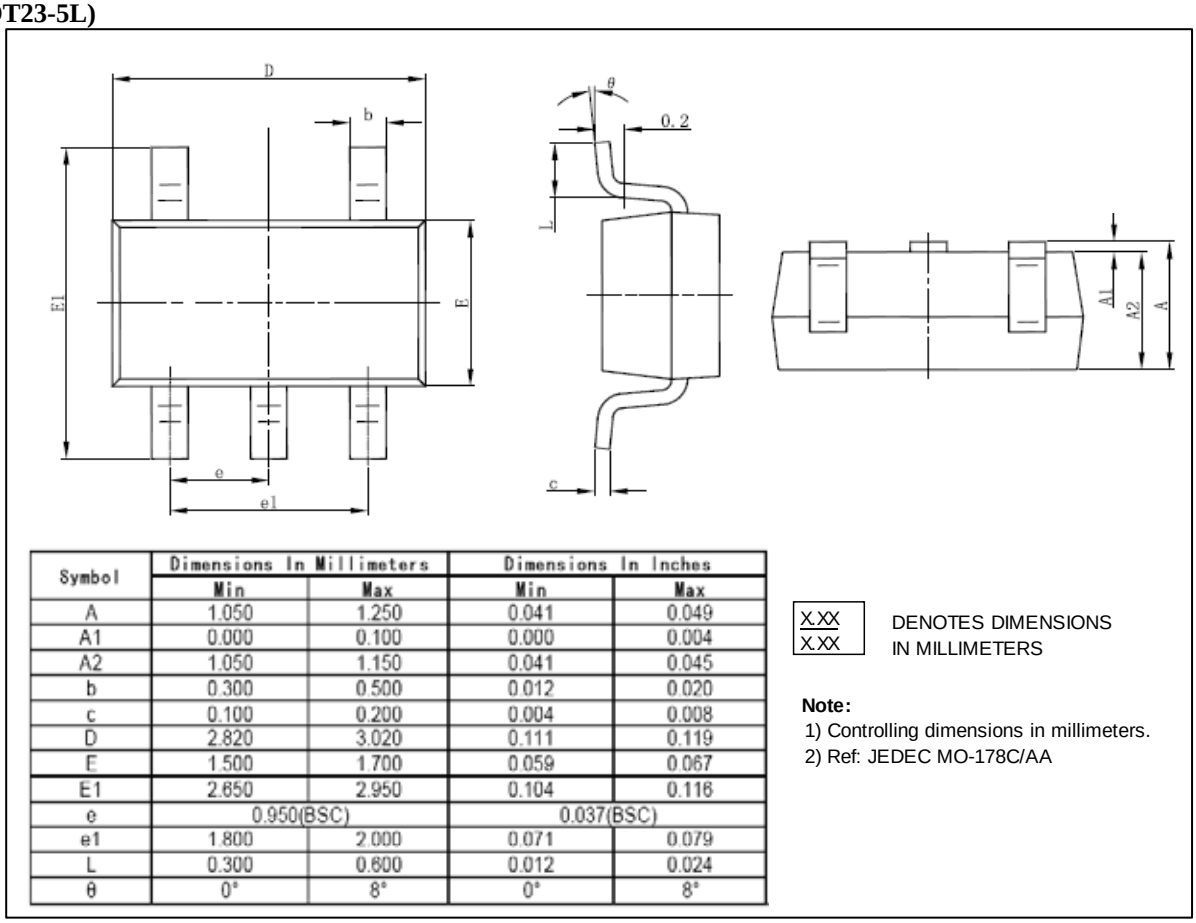
Application Circuit



Note: Cin=Cout=1μF, Cbp=22nF

Mechanical Information

TA5 (SOT23-5L)

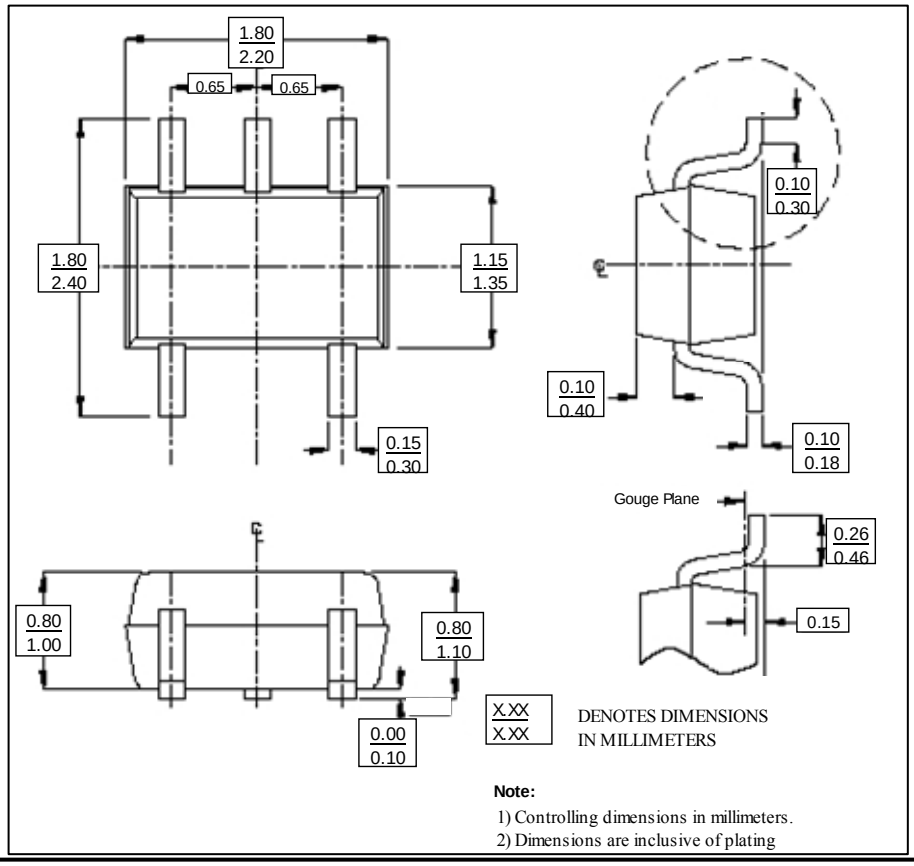


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

XX.XX
XX.XX DENOTES DIMENSIONS IN MILLIMETERS

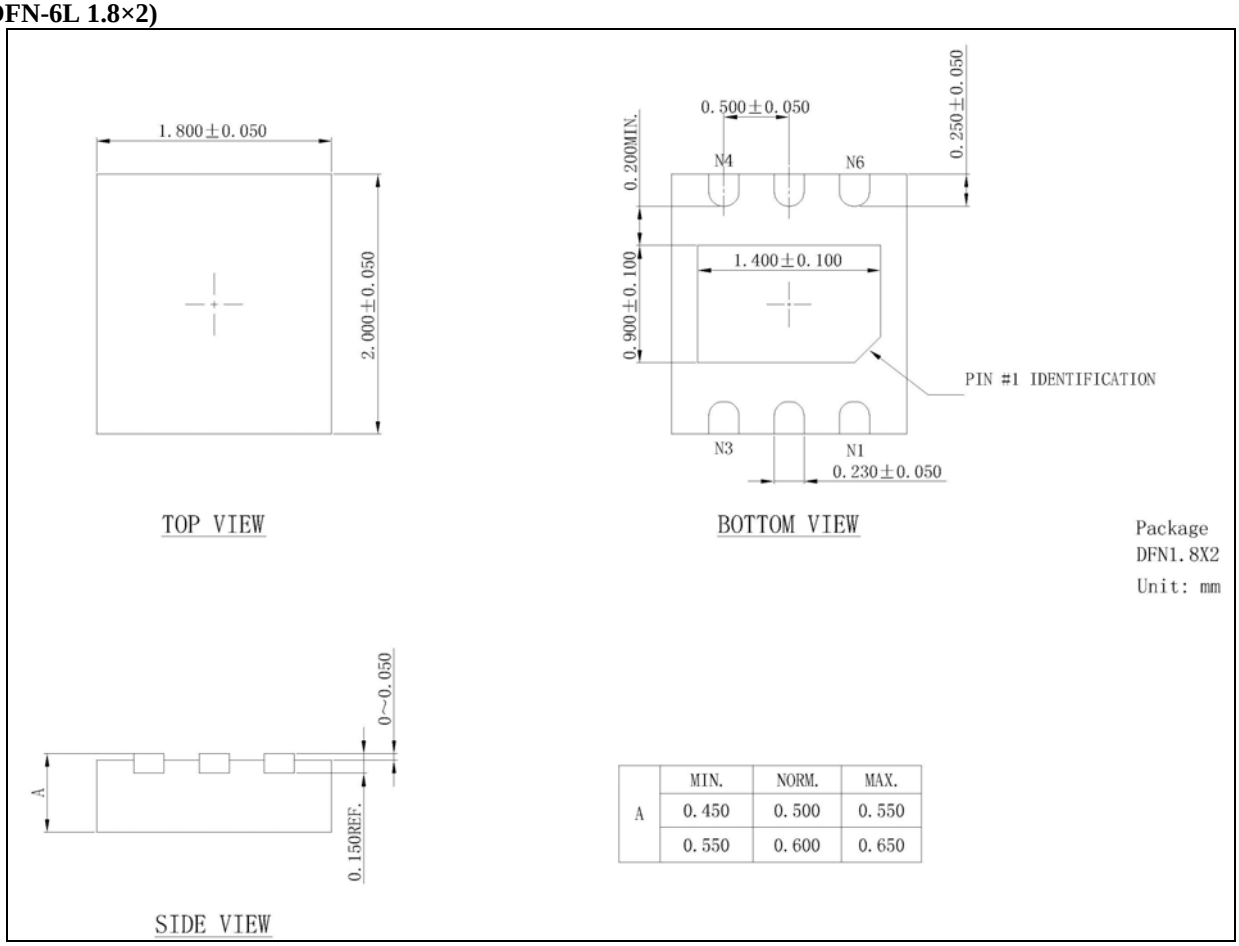
Note:
1) Controlling dimensions in millimeters.
2) Ref: JEDEC MO-178C/AA

C5 (SC70-5L)



Note:
1) Controlling dimensions in millimeters.
2) Dimensions are inclusive of plating

ZE(TDFN-6L 1.8×2)



	MIN.	NORM.	MAX.
A	0.450	0.500	0.550
	0.550	0.600	0.650

Ordering Information

Part Number	Package Code	Package
PT7M8202①②③TA5E	TA5	Lead free and Green SOT23-5L
PT7M8202①②③C5E	C5	Lead free and Green SC70-5L
PT7M8202①②③ZEE	ZE	Lead free and Green TDFN-6L

Notes:

- "①②③" refer to different functions. See below Table 1 and Table 2.
- E = Pb-free and Green
- Adding X Suffix= Tape/Reel

Table 1 Option Definition Table

Designator	Symbol	Description
① Regulators EN type	A	Low active
	B	High active
②③ Regulator Output voltage	12-33, 2A	Internally set sequential number relating output voltage of regulator , the detail is in Table 2

Table 2 Definition of designator

Designator ②③	VOUT (V)	Designator ②③	VOUT (V)	Designator ②③	VOUT (V)
12	1.2	20	2.0	28	2.8
13	1.3	21	2.1	29	2.9
14	1.4	22	2.2	30	3.0
15	1.5	23	2.3	31	3.1
16	1.6	24	2.4	32	3.2
17	1.7	25	2.5	33	3.3
18	1.8	26	2.6	2A	2.85
19	1.9	27	2.7		