GSC78LXX

POSITIVE VOLTAGE REGULATOR

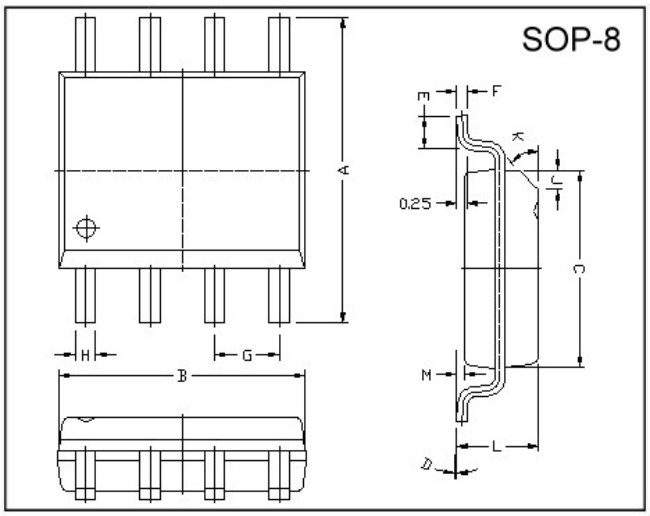
Description

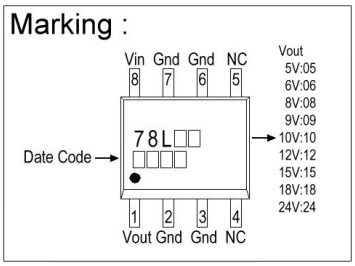
The GSC78LXX series of positive regulators are available in the SOP-8 package and with 5V, 6V, 8V, 9V, 10V, 12V, 15V, 18V and 24V fixed output voltages, making it useful in a wide range of applications. These regulators can provide local on-card regulation, eliminating the distribution problems associated with single point regulation. Each type employs internal current limiting, thermal shut-down and safe operating area protection, making it essentially indestructible. If adequate heat sinking is provided, they can deliver over 100mA output current. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltages and currents. GSC78LXX is characterized for operation from 0℃ to +125℃.

Features

- Internal Short-Circuit Current Limiting
- Internal Thermal Overload Protection
- No External Components Required

Package Dimensions





REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	5.80	6.20	M	0.10	0.25
B	4.80	5.00	H	0.35	0.49
C	3.80	4.00	L	1.35	1.75
D	0°	8°	J	0.375 REF.	
E	0.40	0.90	K	45°	
F	0.19	0.25	G	1.27 TYP.	

Absolute Maximum Ratings

Parameter		Ratings	Unit
Input voltage	GSC78L05 ~ 10	30	V
	GSC78L12 ~ 18	35	V
	GSC78L24	40	V
Output current		100	mA
Operating junction temperature range		0 ~ 125	℃
Storage temperature range		-55 ~ 150	℃
Power Dissipation		750*	mW

*When tested in free air condition, without heat sinking.

Electrical Characteristics

GSC78L05 (Refer to the test circuits, Tj=0~125℃, Io=40mA, Vin=10V, Cin=0.33μF, Co=0.1μF unless otherwise specified)

Symbol		Min.	Typ.	Max.	Unit	Test Conditions
VO	A-Rank (3%)	4.85	5.0	5.15	V	Vin=10V, Io=40mA, Tj=25℃ 7V ≤ Vin ≤ 20V, 1mA ≤ Io ≤ 40mA 7V ≤ Vin ≤ Vmax, 1mA ≤ Io ≤ 70mA (Note2)
	B-Rank (5%)	4.75	-	5.25		
ΔVO (Line Regulation)		-	18	75	mV	7V ≤ Vin ≤ 20V, Io=40mA, Tj=25℃
		-	10	54		8V ≤ Vin ≤ 20V, Io=40mA, Tj=25℃
ΔVO (Load Regulation)		-	20	60	mV	Vin=10V, 1mA ≤ Io ≤ 100mA, Tj=25℃
		-	5	30		Vin=10V, 1mA ≤ Io ≤ 40mA, Tj=25℃
IQ		-	3.0	5.0	mA	Vin=10V, Io=0mA, Tj=25℃
Δ IQ		-	-	0.1	mA	Vin=10V, 1mA ≤ Io ≤ 40mA
		-	-	1.0		8V ≤ Vin ≤ 20V, Io=40mA
Vn		-	40	-	μV	10Hz ≤ f ≤ 100KHz
RR		47	62	-	dB	8V ≤ Vin ≤ 20V, f=120Hz, Tj=25℃
VD		-	1.7	-	V	Io=100mA, Tj=25℃
ΔVo / ΔTj		-	-0.65	-	mV/℃	Io=5mA, 0℃ ≤ Tj ≤ 125℃

GSC78L06 (Refer to the test circuits, Tj=0~125℃, Io=40mA, Vin=12V, Cin=0.33μF, Co=0.1μF unless otherwise specified)

Symbol		Min.	Typ.	Max.	Unit	Test Conditions
VO	A-Rank (3%)	5.82	6.0	6.18	V	Vin=12V, Io=40mA, Tj=25℃ 8.5V ≤ Vin ≤ 20V, 1mA ≤ Io ≤ 40mA 8.5V ≤ Vin ≤ Vmax, 1mA ≤ Io ≤ 70mA (Note2)
	B-Rank (5%)	5.70	-	6.30		
ΔVO (Line Regulation)		-	64	175	mV	8.5V ≤ Vin ≤ 20V, Io=40mA, Tj=25℃
		-	54	125		9V ≤ Vin ≤ 20V, Io=40mA, Tj=25℃
ΔVO (Load Regulation)		-	12.8	80	mV	Vin=12V, 1mA ≤ Io ≤ 100mA, Tj=25℃
		-	5.8	40		Vin=12V, 1mA ≤ Io ≤ 70mA, Tj=25℃
IQ		-	3.9	6.0	mA	Vin=12V, Io=0mA, Tj=25℃
Δ IQ		-	-	0.1	mA	Vin=12V, 1mA ≤ Io ≤ 40mA
		-	-	1.5		9V ≤ Vin ≤ 20V, Io=40mA
Vn		-	49	-	μV	10Hz ≤ f ≤ 100KHz
RR		40	46	-	dB	10V ≤ Vin ≤ 20V, f=120Hz, Tj=25℃
VD		-	1.7	-	V	Io=100mA, Tj=25℃
ΔVo / ΔTj		-	0.75	-	mV/℃	Io=5mA, 0℃ ≤ Tj ≤ 125℃

GSC78L08 (Refer to the test circuits, Tj=0~125℃, Io=40mA, Vin=14V, Cin=0.33μF, Co=0.1μF unless otherwise specified)

Symbol		Min.	Typ.	Max.	Unit	Test Conditions
VO	A-Rank (3%)	7.76	8.0	8.24	V	Vin=14V, Io=40mA, Tj=25℃ 10.5V ≤ Vin ≤ 23V, 1mA ≤ Io ≤ 40mA 10.5V ≤ Vin ≤ Vmax, 1mA ≤ Io ≤ 70mA (Note2)
	B-Rank (5%)	7.60	-	8.40		
ΔVO (Line Regulation)		-	10	175	mV	10.5V ≤ Vin ≤ 23V, Io=40mA, Tj=25℃
		-	8	125		11V ≤ Vin ≤ 23V, Io=40mA, Tj=25℃
ΔVO (Load Regulation)		-	15	80	mV	Vin=14V, 1mA ≤ Io ≤ 100mA, Tj=25℃
		-	8	40		Vin=14V, 1mA ≤ Io ≤ 70mA, Tj=25℃
IQ		-	2.0	5.5	mA	Vin=14V, Io=0mA, Tj=25℃
Δ IQ		-	-	0.1	mA	Vin=14V, 1mA ≤ Io ≤ 40mA
		-	-	1.5		11V ≤ Vin ≤ 23V, Io=40mA
Vn		-	49	-	μV	10Hz ≤ f ≤ 100KHz
RR		39	45	-	dB	11V ≤ Vin ≤ 21V, f=120Hz, Tj=25℃
VD		-	1.7	-	V	Io=100mA, Tj=25℃
ΔVo / ΔTj		-	0.75	-	mV/℃	Io=5mA, 0℃ ≤ Tj ≤ 125℃

GSC78L09 (Refer to the test circuits, Tj=0~125℃, Io=40mA, Vin=15V, Cin=0.33μF, Co=0.1μF unless otherwise specified)

Symbol		Min.	Typ.	Max.	Unit	Test Conditions
VO	A-Rank (3%)	8.73	9.0	9.27	V	Vin=15V, Io=40mA, Tj=25℃ 11.5V ≤ Vin ≤ 24V, 1mA ≤ Io ≤ 40mA 11.5V ≤ Vin ≤ Vmax, 1mA ≤ Io ≤ 70mA (Note2)
	B-Rank (5%)	8.55	-	9.45		
ΔVO (Line Regulation)		-	90	200	mV	11.5V ≤ Vin ≤ 24V, Io=40mA, Tj=25℃
		-	100	150		13V ≤ Vin ≤ 24V, Io=40mA, Tj=25℃
ΔVO (Load Regulation)		-	20	90	mV	Vin=15V, 1mA ≤ Io ≤ 100mA, Tj=25℃
		-	10	45		Vin=15V, 1mA ≤ Io ≤ 40mA, Tj=25℃
IQ		-	2.0	6.0	mA	Vin=15V, Io=0mA, Tj=25℃
Δ IQ		-	-	0.1	mA	Vin=15V, 1mA ≤ Io ≤ 40mA
		-	-	1.5		13V ≤ Vin ≤ 24V, Io=40mA
Vn		-	49	-	μV	10Hz ≤ f ≤ 100KHz
RR		38	44	-	dB	12V ≤ Vin ≤ 23V, f=120Hz, Tj=25℃
VD		-	1.7	-	V	Io=100mA, Tj=25℃
ΔVo / ΔTj		-	0.75	-	mV/℃	Io=5mA, 0℃ ≤ Tj ≤ 125℃

GSC78L10 (Refer to the test circuits, Tj=0~125℃, Io=40mA, Vin=17V, Cin=0.33μF, Co=0.1μF unless otherwise specified)

Symbol		Min.	Typ.	Max.	Unit	Test Conditions
VO	A-Rank (3%)	9.70	10.0	10.30	V	Vin=17V, Io=40mA, Tj=25℃ 13V ≤ Vin ≤ 25V, 1mA ≤ Io ≤ 40mA 13V ≤ Vin ≤ Vmax, 1mA ≤ Io ≤ 70mA (Note2)
	B-Rank (5%)	9.50	-	10.50		
ΔVO (Line Regulation)		-	51	175	mV	13V ≤ Vin ≤ 25V, Io=40mA, Tj=25℃
		-	42	125		14V ≤ Vin ≤ 25V, Io=40mA, Tj=25℃
ΔVO (Load Regulation)		-	20	90	mV	Vin=17V, 1mA ≤ Io ≤ 100mA, Tj=25℃
		-	11	40		Vin=17V, 1mA ≤ Io ≤ 40mA, Tj=25℃
IQ		-	4.2	6.0	mA	Vin=17V, Io=0mA, Tj=25℃
Δ IQ		-	-	0.1	mA	Vin=17V, 1mA ≤ Io ≤ 40mA
		-	-	1.5		14V ≤ Vin ≤ 25V, Io=40mA
Vn		-	62	-	μV	10Hz ≤ f ≤ 100KHz
RR		37	44	-	dB	15V ≤ Vin ≤ 25V, f=120Hz, Tj=25℃
VD		-	1.7	-	V	Io=100mA, Tj=25℃

GSC78L12 (Refer to the test circuits, Tj=0~125℃, Io=40mA, Vin=19V, Cin=0.33μF, Co=0.1μF unless otherwise specified)

Symbol		Min.	Typ.	Max.	Unit	Test Conditions
VO	A-Rank (3%)	11.64	12.0	12.36	V	Vin=19V, Io=40mA, Tj=25℃ 14.5V ≤ Vin ≤ 27V, 1mA ≤ Io ≤ 40mA 14.5V ≤ Vin ≤ Vmax, 1mA ≤ Io ≤ 70mA (Note2)
	B-Rank (5%)	11.40	-	12.60		
ΔVO (Line Regulation)		-	25	300	mV	14.5V ≤ Vin ≤ 27V, Io=40mA, Tj=25℃
		-	20	250		16V ≤ Vin ≤ 27V, Io=40mA, Tj=25℃
ΔVO (Load Regulation)		-	25	150	mV	Vin=19V, 1mA ≤ Io ≤ 100mA, Tj=25℃
		-	12	75		Vin=19V, 1mA ≤ Io ≤ 40mA, Tj=25℃
IQ		-	2.0	6.0	mA	Vin=19V, Io=0mA, Tj=25℃
Δ IQ		-	-	0.1	mA	Vin=19V, 1mA ≤ Io ≤ 40mA
		-	-	1.5		16V ≤ Vin ≤ 27V, Io=40mA
Vn		-	80	-	μV	10Hz ≤ f ≤ 100KHz
RR		37	65	-	dB	15V ≤ Vin ≤ 25V, f=120Hz, Tj=25℃
VD		-	1.7	-	V	Io=100mA, Tj=25℃
ΔVo / ΔTj		-	-1.0	-	mV/℃	Io=5mA, 0℃ ≤ Tj ≤ 125℃

GSC78L15 (Refer to the test circuits, Tj=0~125℃, Io=40mA, Vin=23V, Cin=0.33μF, Co=0.1μF unless otherwise specified)

Symbol		Min.	Typ.	Max.	Unit	Test Conditions
VO	A-Rank (3%)	14.55	15.0	15.45	V	Vin=23V, Io=40mA, Tj=25℃ 17.5V ≤ Vin ≤ 30V, 1mA ≤ Io ≤ 40mA 17.5V ≤ Vin ≤ Vmax, 1mA ≤ Io ≤ 70mA (Note2)
	B-Rank (5%)	14.25	-	15.75		
ΔVO (Line Regulation)		-	25	150	mV	17.5V ≤ Vin ≤ 30V, Io=40mA, Tj=25℃
		-	15	75		20V ≤ Vin ≤ 30V, Io=40mA, Tj=25℃
ΔVO (Load Regulation)		-	20	150	mV	Vin=23V, 1mA ≤ Io ≤ 100mA, Tj=25℃
		-	25	150		Vin=23V, 1mA ≤ Io ≤ 70mA, Tj=25℃
IQ		-	2.2	6.5	mA	Vin=23V, Io=0mA, Tj=25℃
Δ IQ		-	-	0.1	mA	Vin=23V, 1mA ≤ Io ≤ 40mA
		-	-	1.5		20V ≤ Vin ≤ 30V, Io=40mA
Vn		-	90	-	μV	10Hz ≤ f ≤ 100KHz
RR		34	63	-	dB	18.5V ≤ Vin ≤ 28.5V, f=120Hz, Tj=25℃
VD		-	1.7	-	V	Io=100mA, Tj=25℃
ΔVo / ΔTj		-	-1.3	-	mV/℃	Io=5mA, 0℃ ≤ Tj ≤ 125℃

GSC78L18 (Refer to the test circuits, Tj=0~125℃, Io=40mA, Vin=27V, Cin=0.33μF, Co=0.1μF unless otherwise specified)

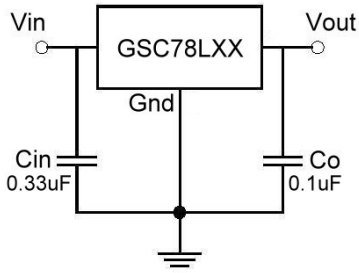
Symbol		Min.	Typ.	Max.	Unit	Test Conditions
VO	A-Rank (3%)	17.46	18.0	18.54	V	Vin=27V, Io=40mA, Tj=25℃ 21V ≤ Vin ≤ 33V, 1mA ≤ Io ≤ 40mA 21V ≤ Vin ≤ Vmax, 1mA ≤ Io ≤ 70mA (Note2)
	B-Rank (5%)	17.10	-	18.9		
ΔVO (Line Regulation)		-	145	300	mV	21V ≤ Vin ≤ 33V, Io=40mA, Tj=25℃
		-	135	250		22V ≤ Vin ≤ 33V, Io=40mA, Tj=25℃
ΔVO (Load Regulation)		-	30	170	mV	Vin=27V, 1mA ≤ Io ≤ 100mA, Tj=25℃
		-	15	85		Vin=27V, 1mA ≤ Io ≤ 40mA, Tj=25℃
IQ		-	2.0	6.0	mA	Vin=27V, Io=0mA, Tj=25℃
Δ IQ		-	-	0.1	mA	Vin=27V, 1mA ≤ Io ≤ 40mA
		-	-	1.5		21V ≤ Vin ≤ 33V, Io=40mA
Vn		-	150	-	μV	10Hz ≤ f ≤ 100KHz
RR		34	48	-	dB	23V ≤ Vin ≤ 33V, f=120Hz, Tj=25℃
VD		-	1.7	-	V	Io=100mA, Tj=25℃
ΔVo / ΔTj		-	-1.8	-	mV/℃	Io=5mA, 0℃ ≤ Tj ≤ 125℃

GSC78L24 (Refer to the test circuits, Tj=0~125℃, Io=40mA, Vin=33V, Cin=0.33μF, Co=0.1μF unless otherwise specified)

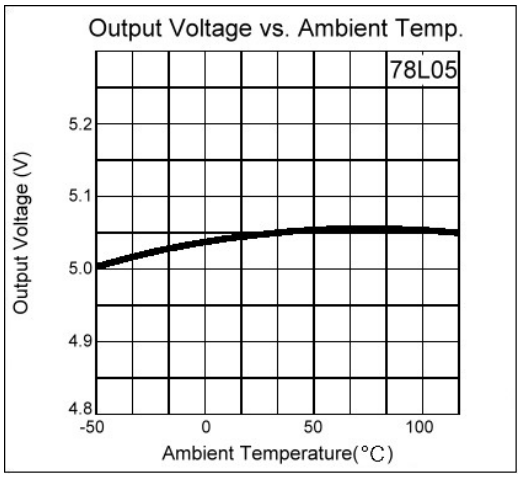
Symbol		Min.	Typ.	Max.	Unit	Test Conditions
VO	A-Rank (3%)	23.28	24.0	24.72	V	Vin=33V, Io=40mA ,Tj=25℃ 27V ≤ Vin ≤ 38V, 1mA ≤ Io ≤ 40mA 27V ≤ Vin ≤ Vmax, 1mA ≤ Io ≤ 70mA (Note2)
	B-Rank (5%)	22.80	-	25.20		
ΔVO (Line Regulation)		-	160	300	mV	27V ≤ Vin ≤ 38V, Io=40mA, Tj=25℃
		-	150	250		28V ≤ Vin ≤ 38V, Io=40mA, Tj=25℃
ΔVO (Load Regulation)		-	40	200	mV	Vin=33V, 1mA ≤ Io ≤ 100mA, Tj=25℃
		-	20	100		Vin=33V, 1mA ≤ Io ≤ 40mA, Tj=25℃
IQ		-	2.2	6.0	mA	Vin=33V, Io=0mA, Tj=25℃
Δ IQ		-	-	0.1	mA	Vin=33V, 1mA ≤ Io ≤ 40mA
		-	-	1.5		27V ≤ Vin ≤ 38V, Io=40mA
Vn		-	200	-	μV	10Hz ≤ f ≤ 100KHz
RR		34	45	-	dB	27V ≤ Vin ≤ 38V, f=120Hz, Tj=25℃
VD		-	1.7	-	V	Io=100mA, Tj=25℃
ΔVo / ΔTj		-	-2.0	-	mV/℃	Io=5mA, 0℃ ≤ Tj ≤ 125℃

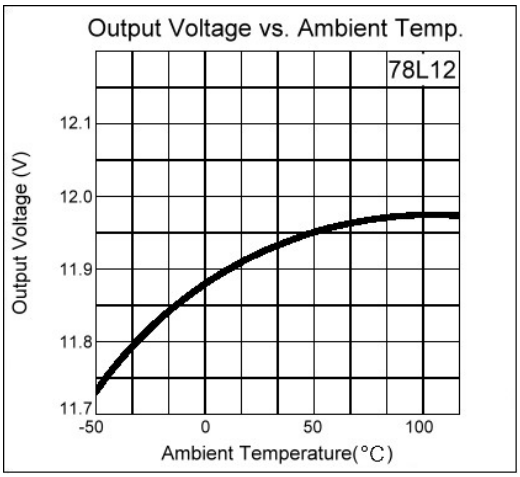
Note1: The Maximum steady state usable output current is dependent on input voltage, heat sinking, lead length of the package and copper of PCB .The data above represent pulse test conditions with junction temperatures specified at the initiation of test.
Note2: Power dissipation<0.75W

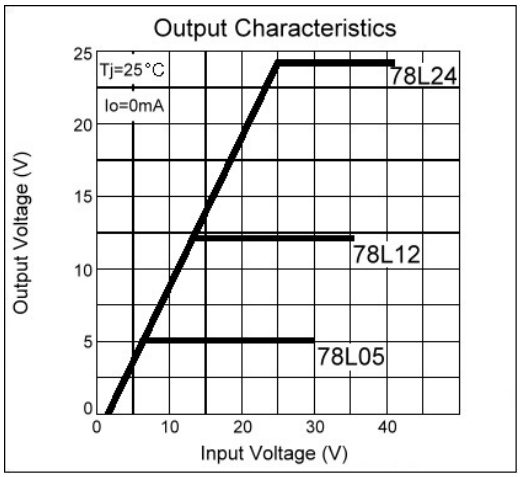
Typical Application

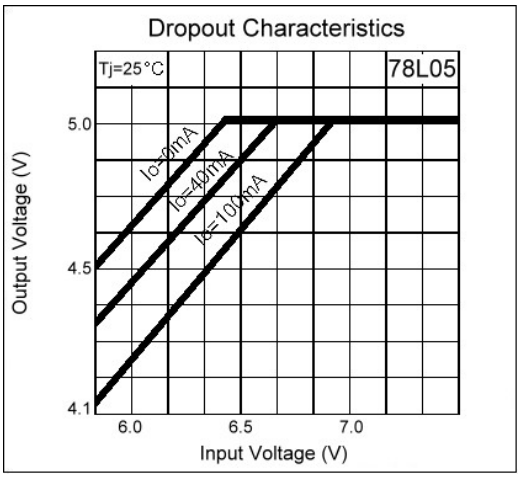


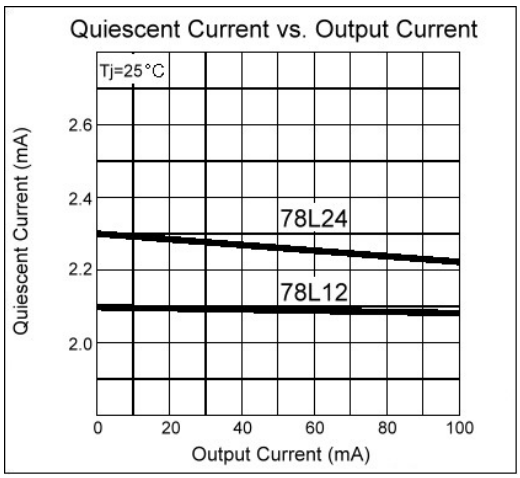
Characteristics Curve

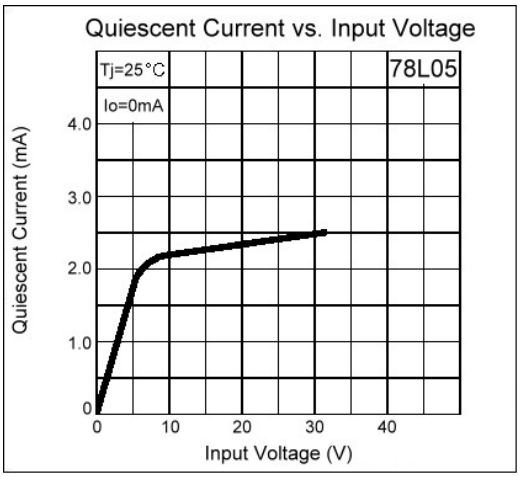












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