



SANYO Semiconductors

DATA SHEET

Monolithic Linear IC

L780S00 Series — 5 to 24V 1A 5-Pin Voltage Regulators with Strobe Pin

Features

- Output voltage
 L780S05 : 5V L780S08 : 8V L780S09 : 9V
 L780S10 : 10V L780S12 : 12V L780S15 : 15V
 L780S18 : 18V
- The strobe pin can be used to turn ON / OFF output voltage (active-low).
- 1A output current.
- On-chip thermal protector.
- On-chip overcurrent limiter.
- On-chip ASO protector.
- The use of package TO-220-5H (5 pins) facilitates mounting and thermal design.

Specifications

[Common to L780S00 series]

Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V _{CC} max	Pin 1	35	V
Strobe input voltage	V _{ST} max	Pin 4	18	V
Strobe input current	I _{ST} max	Pin 4	5	mA
Allowable power dissipation	Pd max		1.75	W
		Tc=25°C	20	W
Thermal resistance	θj-c		5	°C / W
Operating temperature	Topr		-20 to +80	°C
Storage temperature	Tstg		-55 to +150	°C

Strobe Operating Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Strobe operation start voltage	V _{st(on)}		2.4	V
Strobe operation stop voltage	V _{st(off)}		0.5	V

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L780S00 Series

[L780S05]

Recommended Operating Conditions at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Input voltage range	V _{IN}		7.5 to 20.0	V
Output current range	I _O		5 to 1000	mA

Operating Characteristics at Tj=25°C, V_{IN}=10V, I_O=500mA, V_{st}=0V, *Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Output voltage	V _{O1}		4.8	5.0	5.2	V
	V _{O2}	7V≤V _{IN} ≤20V, 5mA≤V _{IN} ≤1A	4.75		5.25	V
Line regulation 1	ΔV _{OLN1}	7V≤V _{IN} ≤25V		3	100	mV
Line regulation 2	ΔV _{OLN2}	8V≤V _{IN} ≤12V		1	50	mV
Load regulation 1	ΔV _{OLD1}	5mA≤I _O ≤1.5A			100	mV
Load regulation 2	ΔV _{OLD2}	250mA≤I _O ≤750mA			50	mV
Current dissipation	I _{CC}				8.0	mA
Current dissipation variation (Line)	ΔI _{CCLN}	7V≤V _{IN} ≤25V			1.3	mA
Current dissipation variation (Load)	ΔI _{CCLD}	5mA≤I _O ≤1A			0.5	mA
Output noise voltage	V _{NO}	10Hz≤f≤100kHz*		40		μV
Ripple rejection	R _r	f=120Hz, 8V≤V _{IN} ≤18V	62	78		dB
Dropout voltage	V _{drop}	I _O =1A		2.0		V
Output short current	I _{OS}	V _{IN} =35V		0.75		A
Peak output current	I _{OP}			2.2		A
Output voltage at strobe mode	V _{O(ston)}	V _{IN} =35V, V _{st} =5V, I _O =0A, *			0.8	V
Current dissipation at strobe mode	I _{CC(ston)}	V _{IN} =35V, V _{st} =5V, I _O =0A, *			3.0	mA
Strobe input current	I _{st}	V _{IN} =35V, V _{st} =5V, I _O =0A, *			1.0	mA

[L780S08]

Recommended Operating Conditions at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Input voltage range	V _{IN}		10.5 to 23.0	V
Output current range	I _O		5 to 1000	mA

Operating Characteristics at Tj=25°C, V_{IN}=15V, I_O=500mA, V_{st}=0V, *Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Output voltage	V _{O1}		7.7	8.0	8.3	V
	V _{O2}	10.5V≤V _{IN} ≤23V, 5mA≤V _{IN} ≤1A	7.6		8.4	V
Line regulation 1	ΔV _{OLN1}	10.5V≤V _{IN} ≤25V		6.0	160	mV
Line regulation 2	ΔV _{OLN2}	11V≤V _{IN} ≤17V		2.0	80	mV
Load regulation 1	ΔV _{OLD1}	5mA≤I _O ≤1.5A			160	mV
Load regulation 2	ΔV _{OLD2}	250mA≤I _O ≤750mA			80	mV
Current dissipation	I _{CC}				8.0	mA
Current dissipation variation (Line)	ΔI _{CCLN}	10.5V≤V _{IN} ≤25V			1.0	mA
Current dissipation variation (Load)	ΔI _{CCLD}	5mA≤I _O ≤1A			0.5	mA
Output noise voltage	V _{NO}	10Hz≤f≤100kHz*		52		μV
Ripple rejection	R _r	f=120Hz, 11.5V≤V _{IN} ≤21.5V	56	72		dB
Dropout voltage	V _{drop}	I _O =1A		2.0		V
Output short current	I _{OS}	V _{IN} =35V		0.75		A
Peak output current	I _{OP}			2.2		A
Output voltage at strobe mode	V _{O(ston)}	V _{IN} =35V, V _{st} =5V, I _O =0A, *			0.8	V
Current dissipation at strobe mode	I _{CC(ston)}	V _{IN} =35V, V _{st} =5V, I _O =0A, *			3.0	mA
Strobe input current	I _{st}	V _{IN} =35V, V _{st} =5V, I _O =0A, *			1.0	mA

L780S00 Series

[L780S09]

Recommended Operating Conditions at $T_a=25^{\circ}\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Input voltage range	V_{IN}		11.5 to 25.0	V
Output current range	I_O		5 to 1000	mA

Operating Characteristics at $T_j=25^{\circ}\text{C}$, $V_{IN}=16\text{V}$, $I_O=500\text{mA}$, $V_{st}=0\text{V}$, $*T_a=25^{\circ}\text{C}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Output voltage	V_{O1}		8.64	9.0	9.36	V
	V_{O2}	$11.5\text{V} \leq V_{IN} \leq 24\text{V}$, $5\text{mA} \leq I_O \leq 1\text{A}$	8.55		9.45	V
Line regulation 1	ΔV_{OLN1}	$11.5\text{V} \leq V_{IN} \leq 25\text{V}$		7	180	mV
Line regulation 2	ΔV_{OLN2}	$12\text{V} \leq V_{IN} \leq 20\text{V}$		2	90	mV
Load regulation 1	ΔV_{OLD1}	$5\text{mA} \leq I_O \leq 1.5\text{A}$			180	mV
Load regulation 2	ΔV_{OLD2}	$250\text{mA} \leq I_O \leq 750\text{mA}$			90	mV
Current dissipation	I_{CC}				8.0	mA
Current dissipation variation (Line)	ΔI_{CCLN}	$11.5\text{V} \leq V_{IN} \leq 26\text{V}$			1.0	mA
Current dissipation variation (Load)	ΔI_{CCLD}	$5\text{mA} \leq I_O \leq 1\text{A}$			0.5	mA
Output noise voltage	V_{NO}	$10\text{Hz} \leq f \leq 100\text{kHz}^*$		57		μV
Ripple rejection	R_r	$f=120\text{Hz}$, $12\text{V} \leq V_{IN} \leq 22\text{V}$	56	72		dB
Dropout voltage	V_{drop}	$I_O=1\text{A}$		2.0		V
Output short current	I_{OS}	$V_{IN}=35\text{V}$		0.75		A
Peak output current	I_{OP}			2.2		A
Output voltage at strobe mode	$V_{O(ston)}$	$V_{IN}=35\text{V}$, $V_{st}=5\text{V}$, $I_O=0\text{A}$, *			0.8	V
Current dissipation at strobe mode	$I_{CC(ston)}$	$V_{IN}=35\text{V}$, $V_{st}=5\text{V}$, $I_O=0\text{A}$, *			3.0	mA
Strobe input current	I_{st}	$V_{IN}=35\text{V}$, $V_{st}=5\text{V}$, $I_O=0\text{A}$, *			1.0	mA

[L780S10]

Recommended Operating Conditions at $T_a=25^{\circ}\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Input voltage range	V_{IN}		13.0 to 25.0	V
Output current range	I_O		5 to 1000	mA

Operating Characteristics at $T_j=25^{\circ}\text{C}$, $V_{IN}=17\text{V}$, $I_O=500\text{mA}$, $V_{st}=0\text{V}$, $*T_a=25^{\circ}\text{C}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Output voltage	V_{O1}		9.6	10.0	10.4	V
	V_{O2}	$12.5\text{V} \leq V_{IN} \leq 25\text{V}$, $5\text{mA} \leq I_O \leq 1\text{A}$	9.5		10.5	V
Line regulation 1	ΔV_{OLN1}	$12.5\text{V} \leq V_{IN} \leq 28\text{V}$		8	200	mV
Line regulation 2	ΔV_{OLN2}	$14\text{V} \leq V_{IN} \leq 20\text{V}$		2.5	100	mV
Load regulation 1	ΔV_{OLD1}	$5\text{mA} \leq I_O \leq 1.5\text{A}$			200	mV
Load regulation 2	ΔV_{OLD2}	$250\text{mA} \leq I_O \leq 750\text{mA}$			100	mV
Current dissipation	I_{CC}				8.0	mA
Current dissipation variation (Line)	ΔI_{CCLN}	$12.5\text{V} \leq V_{IN} \leq 25\text{V}$			1.0	mA
Current dissipation variation (Load)	ΔI_{CCLD}	$5\text{mA} \leq I_O \leq 1\text{A}$			0.5	mA
Output noise voltage	V_{NO}	$10\text{Hz} \leq f \leq 100\text{kHz}^*$		63		μV
Ripple rejection	R_r	$f=120\text{Hz}$, $13\text{V} \leq V_{IN} \leq 23\text{V}$	55	72		dB
Dropout voltage	V_{drop}	$I_O=1\text{A}$		2.0		V
Output short current	I_{OS}	$V_{IN}=35\text{V}$		0.75		A
Peak output current	I_{OP}			2.2		A
Output voltage at strobe mode	$V_{O(ston)}$	$V_{IN}=35\text{V}$, $V_{st}=5\text{V}$, $I_O=0\text{A}$, *			0.8	V
Current dissipation at strobe mode	$I_{CC(ston)}$	$V_{IN}=35\text{V}$, $V_{st}=5\text{V}$, $I_O=0\text{A}$, *			3.0	mA
Strobe input current	I_{st}	$V_{IN}=35\text{V}$, $V_{st}=5\text{V}$, $I_O=0\text{A}$, *			1.0	mA

L780S00 Series

[L780S12]

Recommended Operating Conditions at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Input voltage range	V _{IN}		15.0 to 27.0	V
Output current range	I _O		5 to 1000	mA

Operating Characteristics at Tj=25°C, V_{IN}=19V, I_O=500mA, V_{st}=0V, *Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Output voltage	V _{O1}		11.5	12.0	12.5	V
	V _{O2}	14.5V≤V _{IN} ≤27V, 5mA≤V _{IN} ≤1A	11.4		12.6	V
Line regulation 1	ΔV _{OLN1}	14.5V≤V _{IN} ≤30V		10	240	mV
Line regulation 2	ΔV _{OLN2}	16V≤V _{IN} ≤22V		3	120	mV
Load regulation 1	ΔV _{OLD1}	5mA≤I _O ≤1.5A			240	mV
Load regulation 2	ΔV _{OLD2}	250mA≤I _O ≤750mA			120	mV
Current dissipation	I _{CC}				8.0	mA
Current dissipation variation (Line)	ΔI _{CCLN}	14.5V≤V _{IN} ≤30V			1.0	mA
Current dissipation variation (Load)	ΔI _{CCLD}	5mA≤I _O ≤1A			0.5	mA
Output noise voltage	V _{NO}	10Hz≤f≤100kHz*		75		μV
Ripple rejection	R _r	f=120Hz, 15V≤V _{IN} ≤25V	55	71		dB
Dropout voltage	V _{drop}	I _O =1A		2.0		V
Output short current	I _{OS}	V _{IN} =35V		0.75		A
Peak output current	I _{OP}			2.2		A
Output voltage at strobe mode	V _{O(ston)}	V _{IN} =35V, V _{st} =5V, I _O =0A, *			0.8	V
Current dissipation at strobe mode	I _{CC(ston)}	V _{IN} =35V, V _{st} =5V, I _O =0A, *			3.0	mA
Strobe input current	I _{st}	V _{IN} =35V, V _{st} =5V, I _O =0A, *			1.0	mA

[L780S15]

Recommended Operating Conditions at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Input voltage range	V _{IN}		18.0 to 30.0	V
Output current range	I _O		5 to 1000	mA

Operating Characteristics at Tj=25°C, V_{IN}=23V, I_O=500mA, V_{st}=0V, *Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Output voltage	V _{O1}		14.4	15.0	15.6	V
	V _{O2}	17.5V≤V _{IN} ≤30V, 5mA≤V _{IN} ≤1A	14.25		15.75	V
Line regulation 1	ΔV _{OLN1}	17.5V≤V _{IN} ≤30V		11	300	mV
Line regulation 2	ΔV _{OLN2}	20V≤V _{IN} ≤26V		3	150	mV
Load regulation 1	ΔV _{OLD1}	5mA≤I _O ≤1.5A			300	mV
Load regulation 2	ΔV _{OLD2}	250mA≤I _O ≤750mA			150	mV
Current dissipation	I _{CC}				8.0	mA
Current dissipation variation (Line)	ΔI _{CCLN}	17.5V≤V _{IN} ≤30V			1.0	mA
Current dissipation variation (Load)	ΔI _{CCLD}	5mA≤I _O ≤1A			0.5	mA
Output noise voltage	V _{NO}	10Hz≤f≤100kHz*		90		μV
Ripple rejection	R _r	f=120Hz, 18.5V≤V _{IN} ≤28.5V	54	70		dB
Dropout voltage	V _{drop}	I _O =1A		2.0		V
Output short current	I _{OS}	V _{IN} =35V		0.75		A
Peak output current	I _{OP}			2.2		A
Output voltage at strobe mode	V _{O(ston)}	V _{IN} =35V, V _{st} =5V, I _O =0A, *			0.8	V
Current dissipation at strobe mode	I _{CC(ston)}	V _{IN} =35V, V _{st} =5V, I _O =0A, *			3.0	mA
Strobe input current	I _{st}	V _{IN} =35V, V _{st} =5V, I _O =0A, *			1.0	mA

L780S00 Series

[L780S18]

Recommended Operating Conditions at $T_a=25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Input voltage range	V_{IN}		21.0 to 33.0	V
Output current range	I_O		5 to 1000	mA

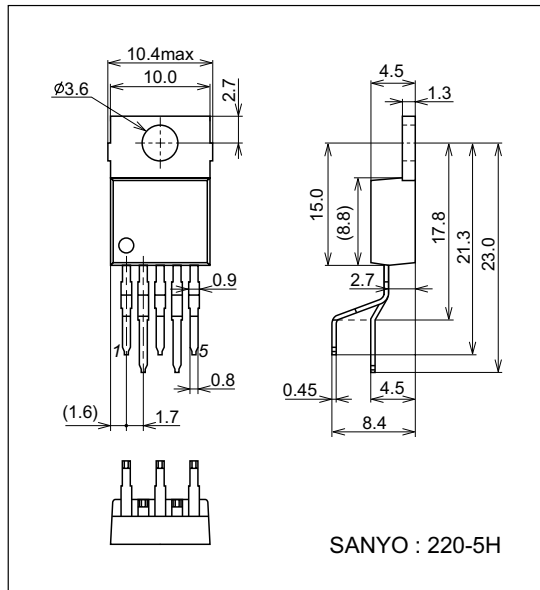
Operating Characteristics at $T_j=25^\circ\text{C}$, $V_{IN}=27\text{V}$, $I_O=500\text{mA}$, $V_{st}=0\text{V}$, $*T_a=25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Output voltage	V_{O1}		17.3	18.0	18.7	V
	V_{O2}	$21\text{V} \leq V_{IN} \leq 33\text{V}$, $5\text{mA} \leq I_O \leq 1\text{A}$	17.1		18.9	V
Line regulation 1	ΔV_{OLN1}	$21\text{V} \leq V_{IN} \leq 33\text{V}$		15	360	mV
Line regulation 2	ΔV_{OLN2}	$24\text{V} \leq V_{IN} \leq 30\text{V}$		5	180	mV
Load regulation 1	ΔV_{OLD1}	$5\text{mA} \leq I_O \leq 1.5\text{A}$			360	mV
Load regulation 2	ΔV_{OLD2}	$250\text{mA} \leq I_O \leq 750\text{mA}$			180	mV
Current dissipation	I_{CC}				8.0	mA
Current dissipation variation (Line)	ΔI_{CCLN}	$21\text{V} \leq V_{IN} \leq 33\text{V}$			1.0	mA
Current dissipation variation (Load)	ΔI_{CCLD}	$5\text{mA} \leq I_O \leq 1\text{A}$			0.5	mA
Output noise voltage	V_{NO}	$10\text{Hz} \leq f \leq 100\text{kHz}^*$		110		μV
Ripple rejection	R_r	$f=120\text{Hz}$, $22\text{V} \leq V_{IN} \leq 32\text{V}$	53	69		dB
Dropout voltage	V_{drop}	$I_O=1\text{A}$		2.0		V
Output short current	I_{OS}	$V_{IN}=35\text{V}$		0.75		A
Peak output current	I_{OP}			2.2		A
Output voltage at strobe mode	$V_{O(ston)}$	$V_{IN}=35\text{V}$, $V_{st}=5\text{V}$, $I_O=0\text{A}$, *			0.8	V
Current dissipation at strobe mode	$I_{CC(ston)}$	$V_{IN}=35\text{V}$, $V_{st}=5\text{V}$, $I_O=0\text{A}$, *			3.0	mA
Strobe input current	I_{st}	$V_{IN}=35\text{V}$, $V_{st}=5\text{V}$, $I_O=0\text{A}$, *			1.0	mA

Package Dimensions

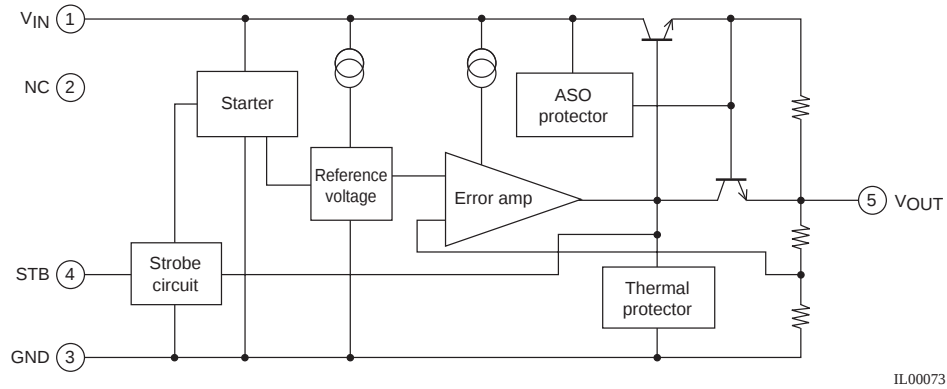
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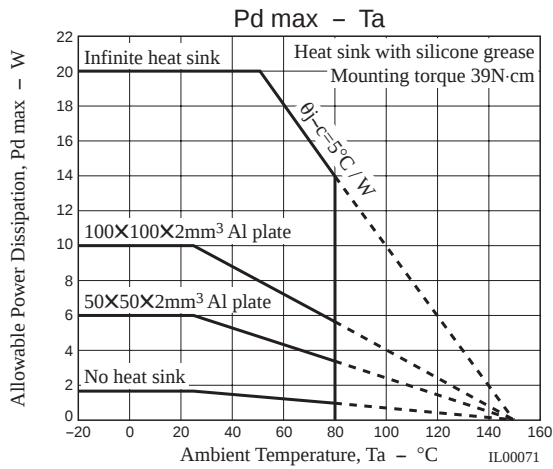
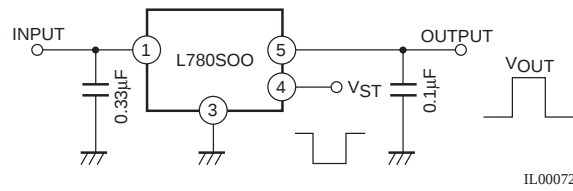


L780S00 Series

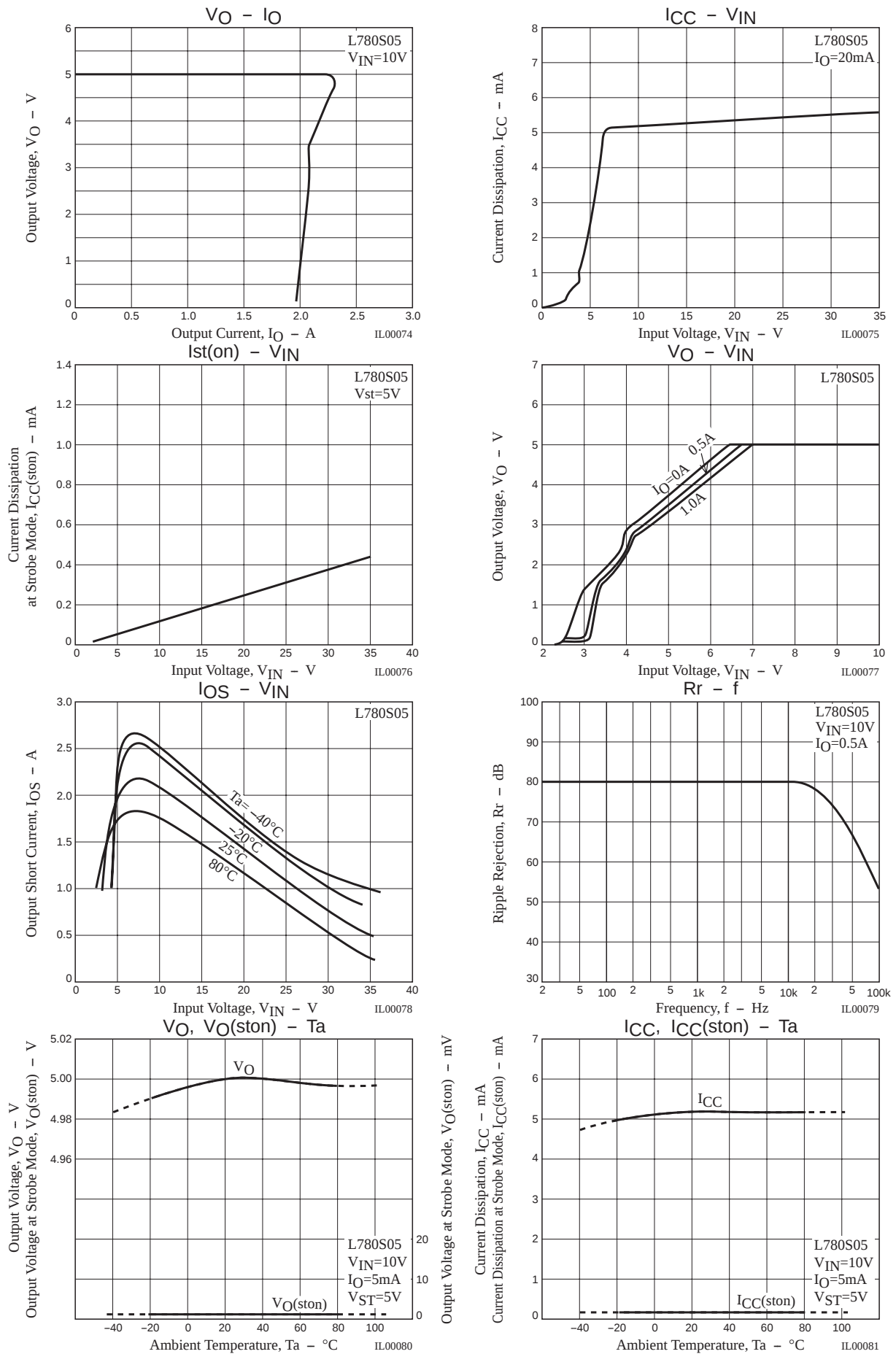
Equivalent Circuit Block Diagram



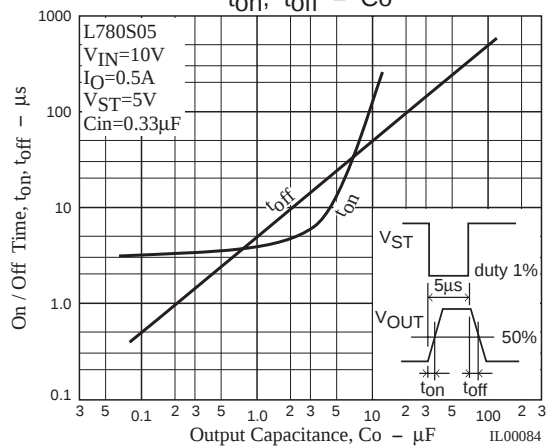
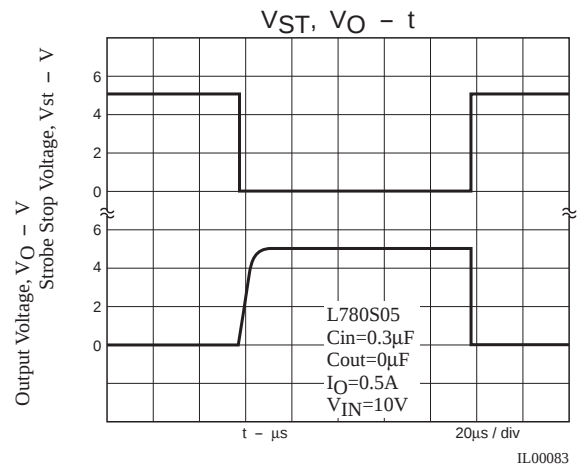
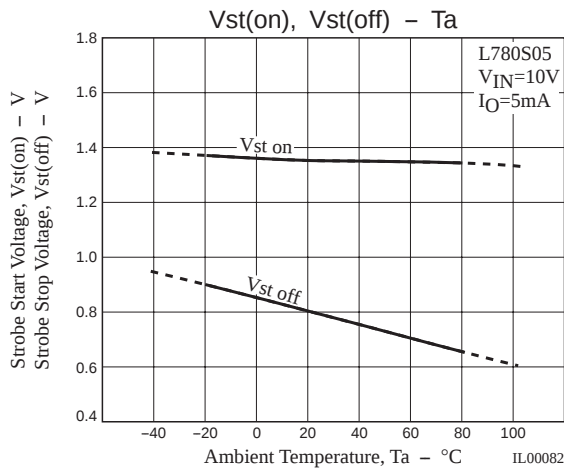
DC Characteristics Test Circuit (Common to L780S00 series)



L780S00 Series



L780S00 Series



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