Ordering number: EN 1700E

Monolithic Linear IC

SANYO No.1700E

L780S00 Series

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

Features

- Output voltage

L780S05:	5V	L780S06:	6V	L780S07:	7V
L780S08:	8V	L780S09:	9V	L780S10:	10V
L780S12:	12V	L780S15:	15V	L780S18:	18V
L780S20:	20V	L780S24:	24V		

- 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 TO220-5H (5 pins) facilitates mounting and thermal design.

[Common to L780S00 series]

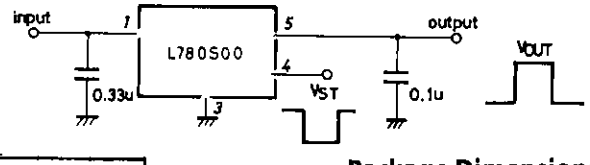
Maximum Ratings at Ta=25°C

				unit
Maximum Supply Voltage	V_{CCmax}	Pin 1	35	V
Strobe Input Voltage	V_{STmax}	Pin 4	18	V
Strobe Input Current	I_{STmax}	Pin 4	5	mA
Allowable Power Dissipation	Pdmax		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

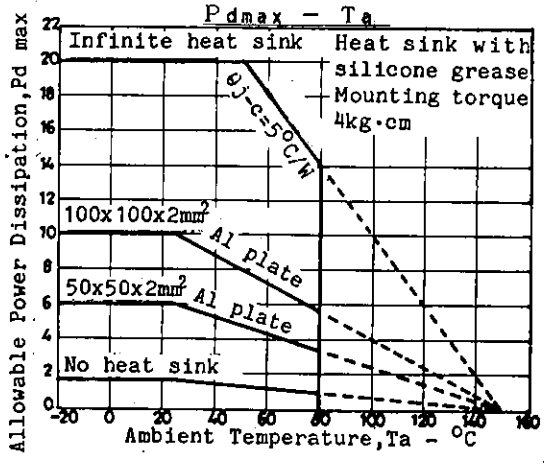
Strobe Operating Characteristics at Ta=25°C

			unit
Strobe Operation Start Voltage	Vst(on)	2.4	V
Strobe Operation Stop Voltage	Vst(off)	0.5	V

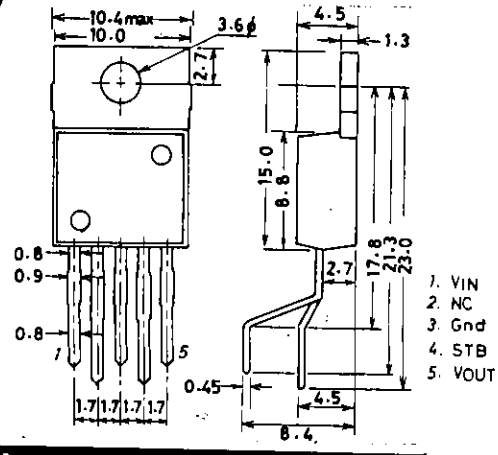
DC Characteristics Test Circuit (Common to L780S00 series)



Unit (capacitance: F)



Package Dimensions
(unit: mm)
3079



L780S05

Recommended Operating Conditions at Ta=25°C

			unit
Input Voltage Range	V_{IN}	7.5 to 20.0	V
Output Current Range	Io	5 to 1000	mA

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

			min	typ	max	unit
Output Voltage 1	Vo1		4.8	5.0	5.2	V
Line Regulation 1	ΔVoln1	7V≦V_{IN}≦25V		3	100	mV
Line Regulation 2	ΔVoln2	8V≦V_{IN}≦12V		1	50	mV
Load Regulation 1	ΔVold1	5mA≦Io≦1.5A			100	mV
Load Regulation 2	ΔVold2	250mA≦Io≦750mA			50	mV
Output Voltage 2	Vo2	7V≦V_{IN}≦20V, 5mA≦V_{IN}≦1A	4.75		5.25	V
Current Dissipation	Icc				8.0	mA
Current Dissipation Variation (Line)	ΔIccln	7V≦V_{IN}≦25V			1.3	mA
Current Dissipation Variation (Load)	ΔIccld	5mA≦Io≦1A			0.5	mA
Output Noise Voltage	V_{NO}	10Hz≦f≦100kHz*		40		uV
Ripple Rejection	Rr	f=120Hz, 8V≦V_{IN}≦18V	62	78		dB
Dropout Voltage	Vdrop	Io=1A		2.0		V
Output Short Current	Ios	V_{IN}=35V		0.75		A
Peak Output Current	Iop			2.2		A
Output Voltage at Strobe Mode	Vo(ston)	V_{IN}=35V, Vst=5V, Io=0, *			0.8	V
Current Dissipation at Strobe Mode	Icc(ston)	"			3.0	mA
Strobe Input Current	Ist	"			1.0	mA

L780S06

Recommended Operating Conditions at Ta=25°C

			unit
Input Voltage Range	V_{IN}	8.5 to 21.0	V
Output Current Range	Io	5 to 1000	mA

Operating Characteristics at Tj=25°C, V_{IN}=11V, Io=500mA, Vst=0V, *Ta=25°C

			min	typ	max	unit
Output Voltage 1	Vo1		5.75	6.0	6.25	V
Line Regulation 1	ΔVoln1	8V≦V_{IN}≦25V		5	120	mV
Line Regulation 2	ΔVoln2	9V≦V_{IN}≦13V		1.5	60	mV
Load Regulation 1	ΔVold1	5mA≦Io≦1.5A			120	mV
Load Regulation 2	ΔVold2	250mA≦Io≦750mA			60	mV
Output Voltage 2	Vo2	8V≦V_{IN}≦21V, 5mA≦V_{IN}≦1A	5.7		6.3	V
Current Dissipation	Icc				8.0	mA
Current Dissipation Variation (Line)	ΔIccln	8V≦V_{IN}≦25V			1.3	mA
Current Dissipation Variation (Load)	ΔIccld	5mA≦Io≦1A			0.5	mA
Output Noise Voltage	V_{NO}	10Hz≦f≦100kHz*		45		uV
Ripple Rejection	Rr	f=120Hz, 9V≦V_{IN}≦19V	59	75		dB
Dropout Voltage	Vdrop	Io=1A		2.0		V
Output Short Current	Ios	V_{IN}=35V		0.75		A
Peak Output Current	Iop			2.2		A
Output Voltage at Strobe Mode	Vo(ston)	V_{IN}=35V, Vst=5V, Io=0, *			0.8	V
Current Dissipation at Strobe Mode	Icc(ston)	"			3.0	mA
Strobe Input Current	Ist	"			1.0	mA

L780S07

Recommended Operating Conditions at Ta=25°C

			unit
Input Voltage Range	V_{IN}	9.5 to 22.0	V
Output Current Range	Io	5 to 1000	mA

Operating Characteristics at Tj=25°C, V_{IN}=12V, Io=500mA, Vst=0V, *Ta=25°C

			min	typ	max	unit
Output Voltage 1	Vo1		6.72	7.0	7.28	V
Line Regulation 1	ΔVoln1	9V≦V_{IN}≦26V		6	140	mV
Line Regulation 2	ΔVoln2	10V≦V_{IN}≦14V		2	70	mV
Load Regulation 1	ΔVold1	5mA≦Io≦1.5A			140	mV
Load Regulation 2	ΔVold2	250mA≦Io≦750mA			70	mV
Output Voltage 2	Vo2	9V≦V_{IN}≦22V, 5mA≦V_{IN}≦1A	6.65		7.35	V
Current Dissipation	Icc				8.0	mA
Current Dissipation Variation (Line)	ΔIccln	9V≦V_{IN}≦25V			1.3	mA
Current Dissipation Variation (Load)	ΔIccld	5mA≦Io≦1A			0.5	mA
Output Noise Voltage	V_{NO}	10Hz≦f≦100kHz*		46		uV
Ripple Rejection	Rr	f=120Hz, 10V≦V_{IN}≦21V	58	73		dB
Dropout Voltage	Vdrop	Io=1A		2.0		V
Output Short Current	Ios	V_{IN}=35V		0.75		A
Peak Output Current	Iop			2.2		A
Output Voltage at Strobe Mode	Vo(ston)	V_{IN}=35V, Vst=5V, Io=0, *			0.8	V
Current Dissipation at Strobe Mode	Icc(ston)	"			3.0	mA
Strobe Input Current	Ist	"			1.0	mA

L780S08

Recommended Operating Conditions at Ta=25°C

			unit
Input Voltage Range	V_{IN}	10.5 to 23.0	V
Output Current Range	Io	5 to 1000	mA

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

			min	typ	max	unit
Output Voltage 1	Vo1		7.7	8.0	8.3	V
Line Regulation 1	ΔVoln1	10.5V≦V_{IN}≦25V		6.0	160	mV
Line Regulation 2	ΔVoln2	11V≦V_{IN}≦17V		2.0	80	mV
Load Regulation 1	ΔVold1	5mA≦Io≦1.5A			160	mV
Load Regulation 2	ΔVold2	250mA≦Io≦750mA			80	mV
Output Voltage 2	Vo2	10.5V≦V_{IN}≦23V, 5mA≦V_{IN}≦1A	7.6		8.4	V
Current Dissipation	Icc				8.0	mA
Current Dissipation Variation (Line)	ΔIccln	10.5V≦V_{IN}≦25V			1.0	mA
Current Dissipation Variation (Load)	ΔIccld	5mA≦Io≦1A			0.5	mA
Output Noise Voltage	V_{NO}	10Hz≦f≦100kHz*		52		uV
Ripple Rejection	Rr	f=120Hz, 11.5V≦V_{IN}≦21.5V	56	72		dB
Dropout Voltage	Vdrop	Io=1A		2.0		V
Output Short Current	Ios	V_{IN}=35V		0.75		A
Peak Output Current	Iop			2.2		A
Output Voltage at Strobe Mode	Vo(ston)	V_{IN}=35V, Vst=5V, Io=0, *			0.8	V
Current Dissipation at Strobe Mode	Icc(ston)	"			3.0	mA
Strobe Input Current	Ist	"			1.0	mA

L780S09

Recommended Operating Conditions at Ta=25°C

			unit
Input Voltage Range	V_{IN}	11.5 to 25.0	V
Output Current Range	Io	5 to 1000	mA

Operating Characteristics at Tj=25°C, V_{IN}=16V, Io=500mA, Vst=0V, *Ta=25°C

			min	typ	max	unit
Output Voltage 1	Vo1		8.64	9.0	9.36	V
Line Regulation 1	ΔVoln1	11.5V≦V_{IN}≦25V		7	180	mV
Line Regulation 2	ΔVoln2	12V≦V_{IN}≦20V		2	90	mV
Load Regulation 1	ΔVold1	5mA≦Io≦1.5A			180	mV
Load Regulation 2	ΔVold2	250mA≦Io≦750mA			90	mV
Output Voltage 2	Vo2	11.5V≦V_{IN}≦24V, 5mA≦V_{IN}≦1A	8.55		9.45	V
Current Dissipation	Icc				8.0	mA
Current Dissipation Variation (Line)	ΔIccln	11.5V≦V_{IN}≦26V			1.0	mA
Current Dissipation Variation (Load)	ΔIccld	5mA≦Io≦1A			0.5	mA
Output Noise Voltage	V_{NO}	10Hz≦f≦100kHz*		57		uV
Ripple Rejection	Rr	f=120Hz, 12V≦V_{IN}≦22V	56	72		dB
Dropout Voltage	Vdrop	Io=1A		2.0		V
Output Short Current	Ios	V_{IN}=35V		0.75		A
Peak Output Current	Iop			2.2		A
Output Voltage at Strobe Mode	Vo(ston)	V_{IN}=35V, Vst=5V, Io=0,*			0.8	V
Current Dissipation at Strobe Mode	Icc(ston)	"			3.0	mA
Strobe Input Current	Ist	"			1.0	mA

L780S10

Recommended Operating Conditions at Ta=25°C

			unit
Input Voltage Range	V_{IN}	13.0 to 25.0	V
Output Current Range	Io	5 to 1000	mA

Operating Characteristics at Tj=25°C, V_{IN}=17V, Io=500mA, Vst=0V, *Ta=25°C

			min	typ	max	unit
Output Voltage 1	Vo1		9.6	10.0	10.4	V
Line Regulation 1	ΔVoln1	12.5V≦V_{IN}≦28V		8	200	mV
Line Regulation 2	ΔVoln2	14V≦V_{IN}≦20V		2.5	100	mV
Load Regulation 1	ΔVold1	5mA≦Io≦1.5A			200	mV
Load Regulation 2	ΔVold2	250mA≦Io≦750mA			100	mV
Output Voltage 2	Vo2	12.5V≦V_{IN}≦25V, 5mA≦V_{IN}≦1A	9.5		10.5	V
Current Dissipation	Icc				8.0	mA
Current Dissipation Variation (Line)	ΔIccln	12.5V≦V_{IN}≦25V			1.0	mA
Current Dissipation Variation (Load)	ΔIccld	5mA≦Io≦1A			0.5	mA
Output Noise Voltage	V_{NO}	10Hz≦f≦100kHz*		63		uV
Ripple Rejection	Rr	f=120Hz, 13V≦V_{IN}≦23V	55	72		dB
Dropout Voltage	Vdrop	Io=1A		2.0		V
Output Short Current	Ios	V_{IN}=35V		0.75		A
Peak Output Current	Iop			2.2		A
Output Voltage at Strobe Mode	Vo(ston)	V_{IN}=35V, Vst=5V, Io=0,*			0.8	V
Current Dissipation at Strobe Mode	Icc(ston)	"			3.0	mA
Strobe Input Current	Ist	"			1.0	mA

L780S12

Recommended Operating Conditions at Ta=25°C

			unit
Input Voltage Range	V_{IN}	15.0 to 27.0	V
Output Current Range	Io	5 to 1000	mA

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

			min	typ	max	unit
Output Voltage 1	Vo1		11.5	12.0	12.5	V
Line Regulation 1	ΔVoln1	$14.5V \leq V_{IN} \leq 30V$		10	240	mV
Line Regulation 2	ΔVoln2	$16V \leq V_{IN} \leq 22V$		3	120	mV
Load Regulation 1	ΔVold1	$5mA \leq Io \leq 1.5A$			240	mV
Load Regulation 2	ΔVold2	$250mA \leq Io \leq 750mA$			120	mV
Output Voltage 2	Vo2	$14.5V \leq V_{IN} \leq 27V$, $5mA \leq V_{IN} \leq 1A$	11.4		12.6	V
Current Dissipation	Icc				8.0	mA
Current Dissipation Variation (Line)	ΔIccln	$14.5V \leq V_{IN} \leq 30V$			1.0	mA
Current Dissipation Variation (Load)	ΔIccld	$5mA \leq Io \leq 1A$			0.5	mA
Output Noise Voltage	V_{NO}	$10Hz \leq f \leq 100kHz$*		75		uV
Ripple Rejection	Rr	f=120Hz, $15V \leq V_{IN} \leq 25V$	55	71		dB
Dropout Voltage	Vdrop	Io=1A		2.0		V
Output Short Current	Ios	V_{IN}=35V		0.75		A
Peak Output Current	Iop			2.2		A
Output Voltage at Strobe Mode	Vo(ston)	V_{IN}=35V, Vst=5V, Io=0,*			0.8	V
Current Dissipation at Strobe Mode	Icc(ston)	"			3.0	mA
Strobe Input Current	Ist	"			1.0	mA

L780S15

Recommended Operating Conditions at Ta=25°C

			unit
Input Voltage Range	V_{IN}	18.0 to 30.0	V
Output Current Range	Io	5 to 1000	mA

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

			min	typ	max	unit
Output Voltage 1	Vo1		14.4	15.0	15.6	V
Line Regulation 1	ΔVoln1	$17.5V \leq V_{IN} \leq 30V$		11	300	mV
Line Regulation 2	ΔVoln2	$20V \leq V_{IN} \leq 26V$		3	150	mV
Load Regulation 1	ΔVold1	$5mA \leq Io \leq 1.5A$			300	mV
Load Regulation 2	ΔVold2	$250mA \leq Io \leq 750mA$			150	mV
Output Voltage 2	Vo2	$17.5V \leq V_{IN} \leq 30V$, $5mA \leq V_{IN} \leq 1A$	14.25		15.75	V
Current Dissipation	Icc				8.0	mA
Current Dissipation Variation (Line)	ΔIccln	$17.5V \leq V_{IN} \leq 30V$			1.0	mA
Current Dissipation Variation (Load)	ΔIccld	$5mA \leq Io \leq 1A$			0.5	mA
Output Noise Voltage	V_{NO}	$10Hz \leq f \leq 100kHz$*		90		uV
Ripple Rejection	Rr	f=120Hz, $18.5V \leq V_{IN} \leq 28.5V$	54	70		dB
Dropout Voltage	Vdrop	Io=1A		2.0		V
Output Short Current	Ios	V_{IN}=35V		0.75		A
Peak Output Current	Iop			2.2		A
Output Voltage at Strobe Mode	Vo(ston)	V_{IN}=35V, Vst=5V, Io=0,*			0.8	V
Current Dissipation at Strobe Mode	Icc(ston)	"			3.0	mA
Strobe Input Current	Ist	"			1.0	mA

L780S18

Recommended Operating Conditions at Ta=25°C

			unit
Input Voltage Range	V_{IN}	21.0 to 33.0	V
Output Current Range	Io	5 to 1000	mA

Operating Characteristics at Tj=25°C, V_{IN}=27V, Io=500mA, Vst=0V, *Ta=25°C

			min	typ	max	unit
Output Voltage 1	Vo1		17.3	18.0	18.7	V
Line Regulation 1	ΔVoln1	21V≦V_{IN}≦33V		15	360	mV
Line Regulation 2	ΔVoln2	24V≦V_{IN}≦30V		5	180	mV
Load Regulation 1	ΔVold1	5mA≦Io≦1.5A			360	mV
Load Regulation 2	ΔVold2	250mA≦Io≦750mA			180	mV
Output Voltage 2	Vo2	21V≦V_{IN}≦33V, 5mA≦V_{IN}≦1A	17.1		18.9	V
Current Dissipation	Icc				8.0	mA
Current Dissipation Variation (Line)	ΔIccln	21V≦V_{IN}≦33V			1.0	mA
Current Dissipation Variation (Load)	ΔIccld	5mA≦Io≦1A			0.5	mA
Output Noise Voltage	V_{NO}	10Hz≦f≦100kHz*		110		uV
Ripple Rejection	Rr	f=120Hz, 22V≦V_{IN}≦32V	53	69		dB
Dropout Voltage	Vdrop	Io=1A		2.0		V
Output Short Current	Ios	V_{IN}=35V		0.75		A
Peak Output Current	Iop			2.2		A
Output Voltage at Strobe Mode	Vo(ston)	V_{IN}=35V, Vst=5V, Io=0,*			0.8	V
Current Dissipation at Strobe Mode	Icc(ston)	"			3.0	mA
Strobe Input Current	Ist	"			1.0	mA

L780S20

Recommended Operating Conditions at Ta=25°C

			unit
Input Voltage Range	V_{IN}	23.0 to 35.0	V
Output Current Range	Io	5 to 1000	mA

Operating Characteristics at Tj=25°C, V_{IN}=29V, Io=500mA, Vst=0V, *Ta=25°C

			min	typ	max	unit
Output Voltage 1	Vo1		19.2	20.0	20.8	V
Line Regulation 1	ΔVoln1	23V≦V_{IN}≦35V		15	400	mV
Line Regulation 2	ΔVoln2	26V≦V_{IN}≦32V		5	200	mV
Load Regulation 1	ΔVold1	5mA≦Io≦1.5A			400	mV
Load Regulation 2	ΔVold2	250mA≦Io≦750mA			200	mV
Output Voltage 2	Vo2	24V≦V_{IN}≦35V, 5mA≦V_{IN}≦1A	19.0		21.0	V
Current Dissipation	Icc				8.0	mA
Current Dissipation Variation (Line)	ΔIccln	23V≦V_{IN}≦35V			1.0	mA
Current Dissipation Variation (Load)	ΔIccld	5mA≦Io≦1A			0.5	mA
Output Noise Voltage	V_{NO}	10Hz≦f≦100kHz*		110		uV
Ripple Rejection	Rr	f=120Hz, 24V≦V_{IN}≦34V	53	67		dB
Dropout Voltage	Vdrop	Io=1A		2.0		V
Output Short Current	Ios	V_{IN}=35V		0.75		A
Peak Output Current	Iop			2.2		A
Output Voltage at Strobe Mode	Vo(ston)	V_{IN}=35V, Vst=5V, Io=0,*			0.8	V
Current Dissipation at Strobe Mode	Icc(ston)	"			3.0	mA
Strobe Input Current	Ist	"			1.0	mA

L780S24

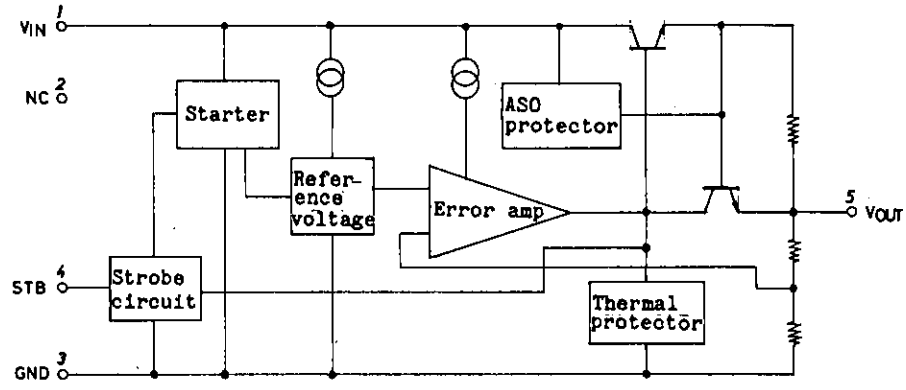
Recommended Operating Conditions at Ta=25°C

			unit
Input Voltage Range	V_{IN}	27.0 to 35.0	V
Output Current Range	Io	5 to 1000	mA

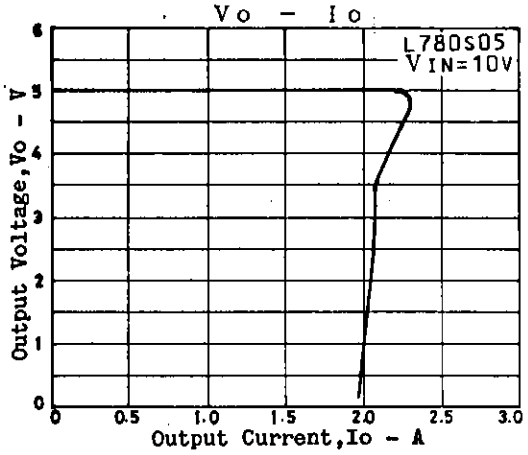
Operating Characteristics at Tj=25°C, V_{IN}=33V, Io=500mA, Vst=0V, *Ta=25°C

			min	typ	max	unit
Output Voltage 1	Vo1		23.0	24.0	25.0	V
Line Regulation 1	ΔVoln1	$27V \leqq V_{IN} \leqq 35V$		18	480	mV
Line Regulation 2	ΔVoln2	$30V \leqq V_{IN} \leqq 35V$		6	240	mV
Load Regulation 1	ΔVold1	$5mA \leqq Io \leqq 1.5A$			480	mV
Load Regulation 2	ΔVold2	$250mA \leqq Io \leqq 750mA$			240	mV
Output Voltage 2	Vo2	$27V \leqq V_{IN} \leqq 35V$, $5mA \leqq V_{IN} \leqq 1A$	22.8		25.2	V
Current Dissipation	Icc				8.0	mA
Current Dissipation Variation (Line)	ΔIccln	$27V \leqq V_{IN} \leqq 35V$			1.0	mA
Current Dissipation Variation (Load)	ΔIccld	$5mA \leqq Io \leqq 1A$			0.5	mA
Output Noise Voltage	V_{NO}	$10Hz \leqq f \leqq 100kHz$*		180		uV
Ripple Rejection	Rr	f=120Hz, $28V \leqq V_{IN} \leqq 34V$	50	66		dB
Dropout Voltage	Vdrop	Io=1A		2.0		V
Output Short Current	Ios	V_{IN}=35V		0.75		A
Peak Output Current	Iop			2.2		A
Output Voltage at Strobe Mode	Vo(ston)	V_{IN}=35V, Vst=5V, Io=0,*			0.8	V
Current Dissipation at Strobe Mode	Icc(ston)	"			3.0	mA
Strobe Input Current	Ist	"			1.0	mA

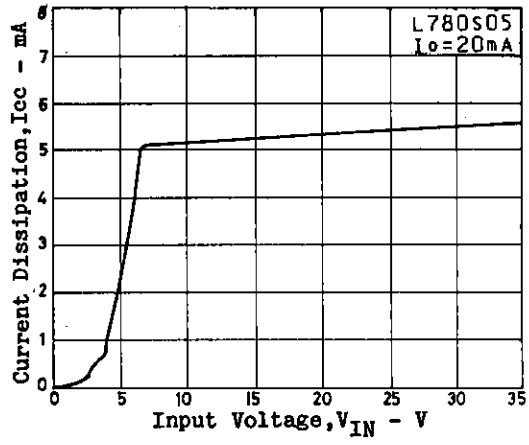
Equivalent Circuit Block Diagram



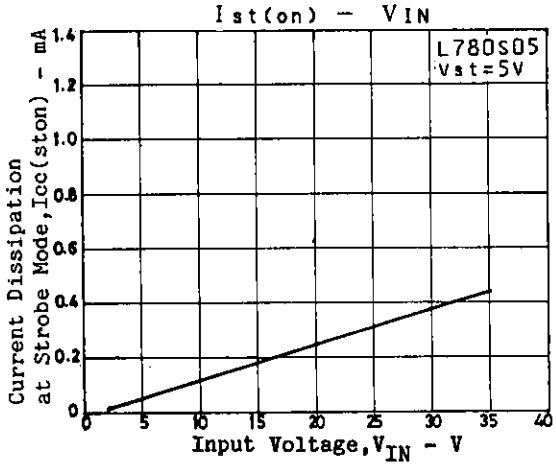
Vo – Io



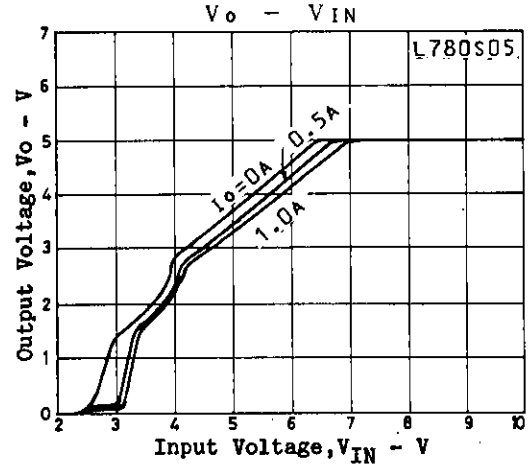
Icc – VIN



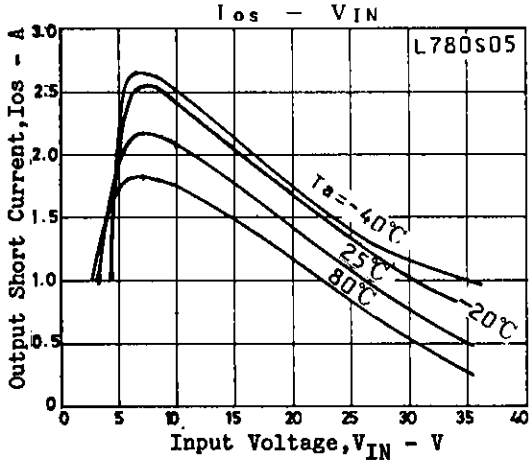
Ist(on) – VIN



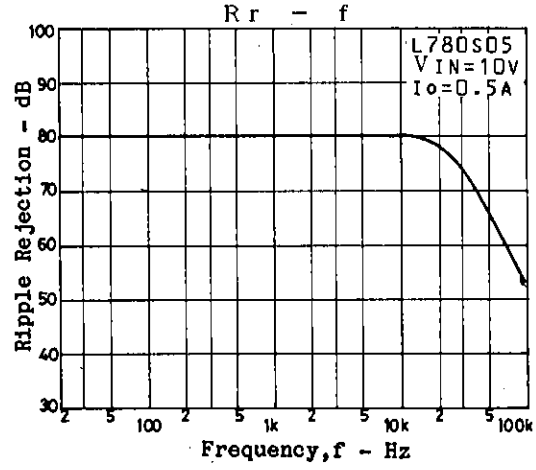
Vo – VIN



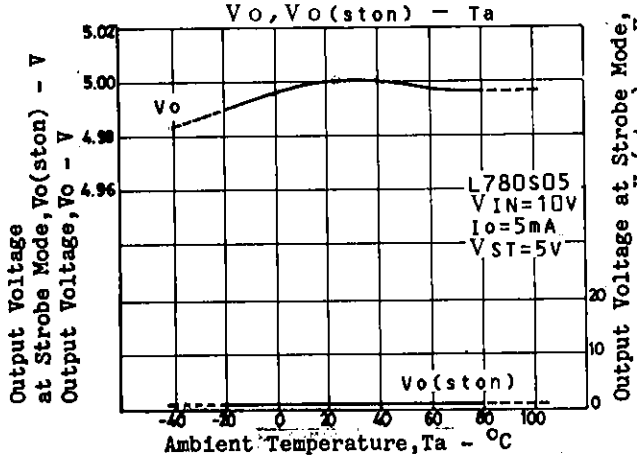
Ios – VIN



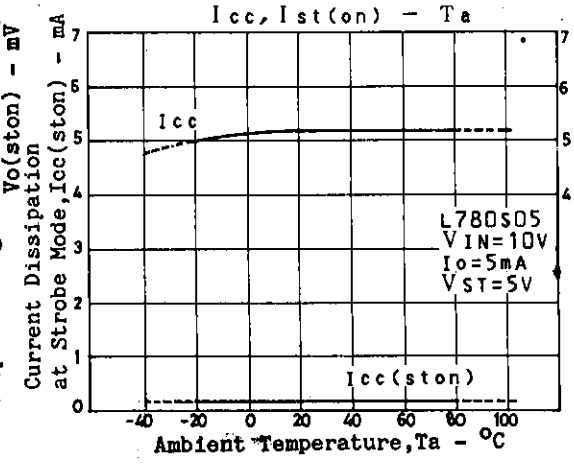
Rr – f

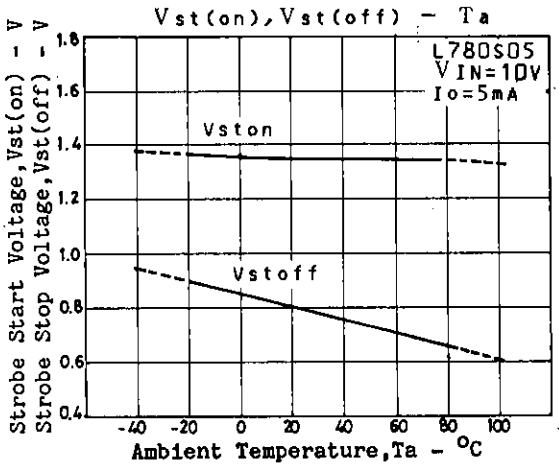


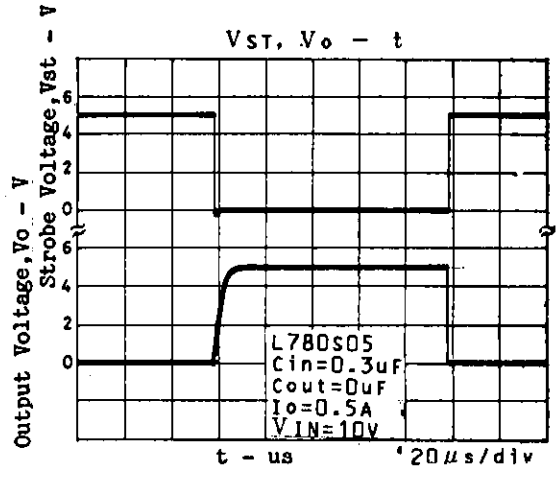
Vo,Vo(ston) – Ta

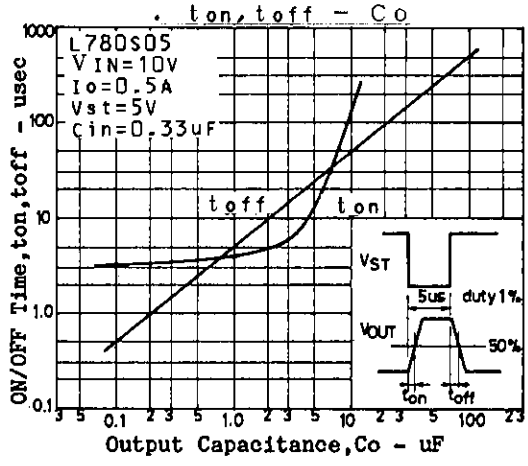


Icc,Ist(on) – Ta









■ No products described or contained herein are intended for use in surgical implants, life-support systems, aerospace equipment, nuclear power control systems, vehicles, disaster/crime-prevention equipment and the like, the failure of which may directly or indirectly cause injury, death or property loss.

■ Anyone purchasing any products described or contained herein for an above-mentioned use shall:
① Accept full responsibility and indemnify and defend SANYO ELECTRIC CO., LTD., its affiliates, subsidiaries and distributors and all their officers and employees, jointly and severally, against any and all claims and litigation and all damages, cost and expenses associated with such use:
② Not impose any responsibility for any fault or negligence which may be cited in any such claim or litigation on SANYO ELECTRIC CO., LTD., its affiliates, subsidiaries and distributors or any of their officers and employees jointly or severally.

■ Information (including circuit diagrams and circuit parameters) herein is for example only; it is not guaranteed for volume production. SANYO believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.