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]

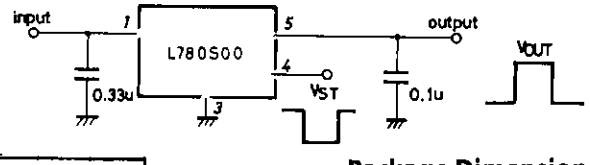
Maximum Ratings at Ta=25°C

				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

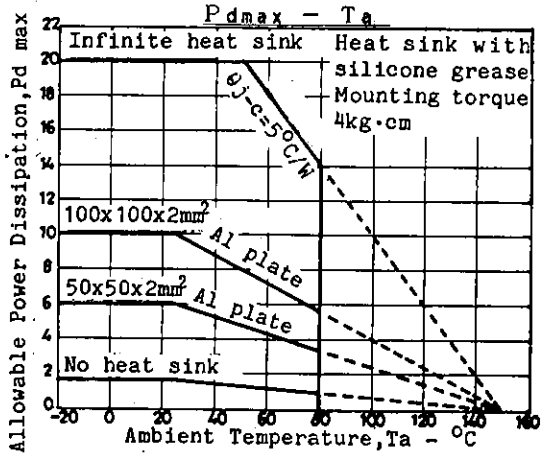
Strobe Operating Characteristics at Ta=25°C

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

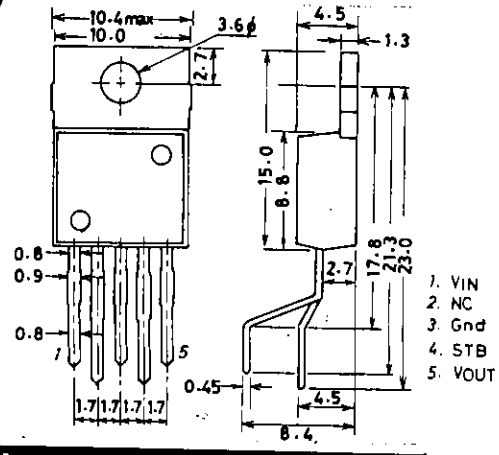
DC Characteristics Test Circuit (Common to L780S00 series)



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≦V_{IN}≦30V		10	240	mV
Line Regulation 2	ΔVoln2	16V≦V_{IN}≦22V		3	120	mV
Load Regulation 1	ΔVold1	5mA≦Io≦1.5A			240	mV
Load Regulation 2	ΔVold2	250mA≦Io≦750mA			120	mV
Output Voltage 2	Vo2	14.5V≦V_{IN}≦27V, 5mA≦V_{IN}≦1A	11.4		12.6	V
Current Dissipation	Icc				8.0	mA
Current Dissipation Variation (Line)	ΔIccln	14.5V≦V_{IN}≦30V			1.0	mA
Current Dissipation Variation (Load)	ΔIccld	5mA≦Io≦1A			0.5	mA
Output Noise Voltage	V_{NO}	10Hz≦f≦100kHz*		75		uV
Ripple Rejection	Rr	f=120Hz, 15V≦V_{IN}≦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≦V_{IN}≦30V		11	300	mV
Line Regulation 2	ΔVoln2	20V≦V_{IN}≦26V		3	150	mV
Load Regulation 1	ΔVold1	5mA≦Io≦1.5A			300	mV
Load Regulation 2	ΔVold2	250mA≦Io≦750mA			150	mV
Output Voltage 2	Vo2	17.5V≦V_{IN}≦30V, 5mA≦V_{IN}≦1A	14.25		15.75	V
Current Dissipation	Icc				8.0	mA
Current Dissipation Variation (Line)	ΔIccln	17.5V≦V_{IN}≦30V			1.0	mA
Current Dissipation Variation (Load)	ΔIccld	5mA≦Io≦1A			0.5	mA
Output Noise Voltage	V_{NO}	10Hz≦f≦100kHz*		90		uV
Ripple Rejection	Rr	f=120Hz, 18.5V≦V_{IN}≦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

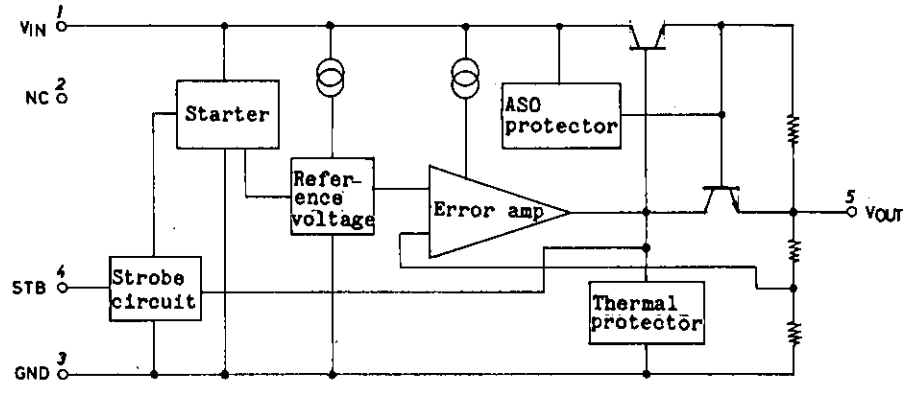
Recommended Operating Conditions at Ta=25°C

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

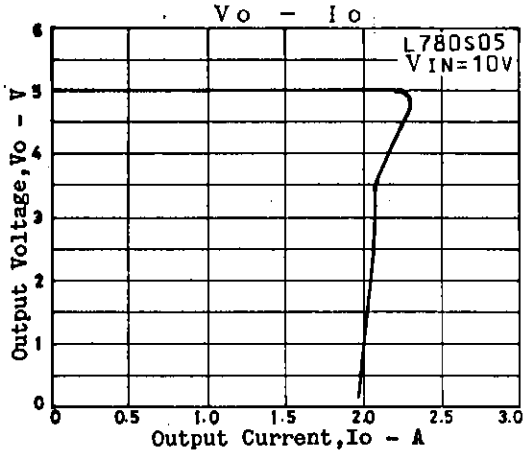
Operating Characteristics at Tj=25°C, V_{IN}=33V, Io=500mA, Vst=0V, *Ta=25°C

			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

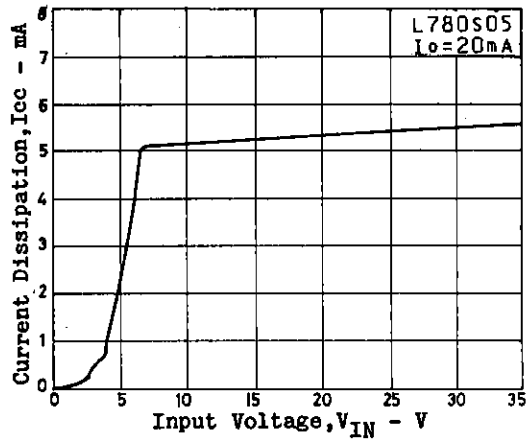
Equivalent Circuit Block Diagram



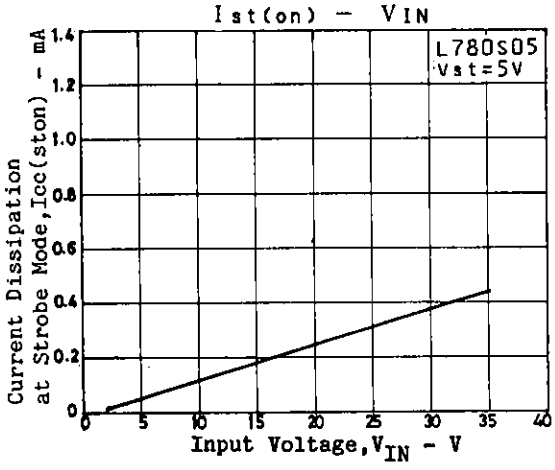
Vo – Io



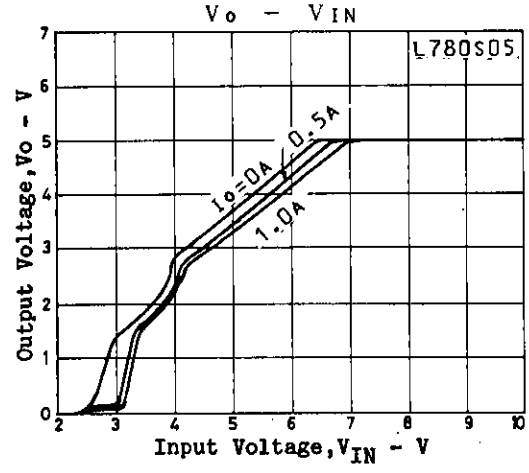
Icc – VIN



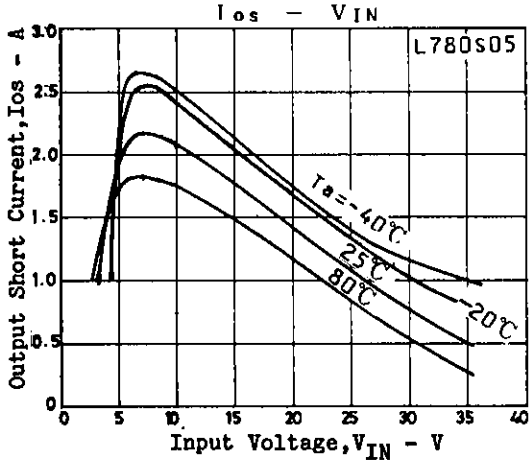
Ist(on) – VIN



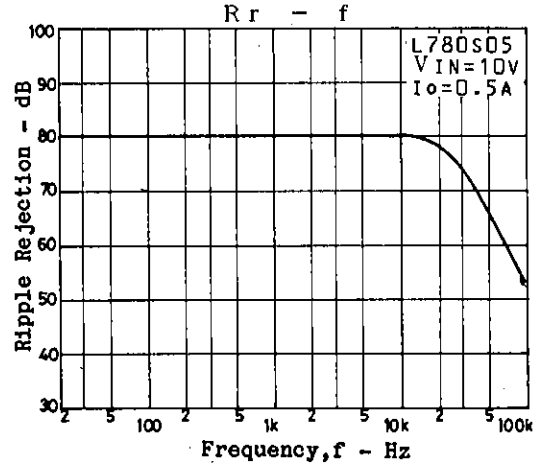
Vo – VIN



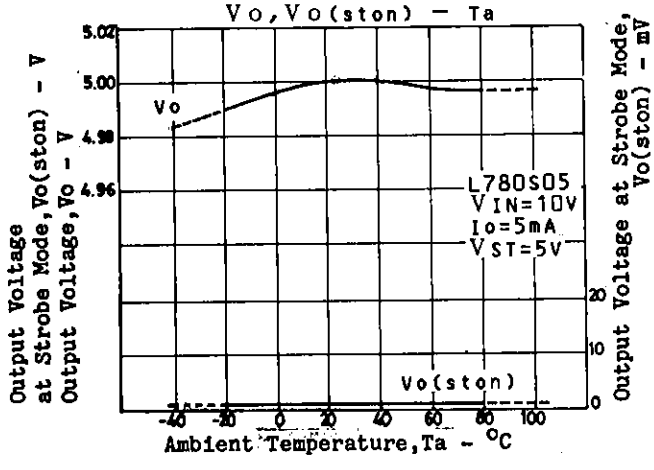
Ios – VIN



Rr – f



Vo,Vo(ston) – Ta



Icc,Ist(on) – Ta