


**SANYO Semiconductors**

# DATA SHEET

## LA7791T — Monolithic Linear IC For CATV/Cable Modem Variable Gain Controlled Amplifier

### Overview

The LA7791T is variable gain controlled amplifier with upstream driver. It is ideally suited for use with QAM/QSPK transmitter system.

### Functions

- Differential input amplifier
- Attenuator amplifier
- Driver amplifier with differential output
- Power Save function (Power Save control pin)
- Shut Down function (Shut Down control pin)
- Serial bus interface

### Specifications

**Maximum Ratings** at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum Supply Voltage	V <sub>CC</sub> max	Pin 2,19	6.0	V
Maximum Voltages1	V <sub>in</sub> max	Pin 8,9,10,12,18	V <sub>CC</sub>	V
Maximum Voltages2	V <sub>out</sub> max	Pin 15,16	8.0	V
Allowable Power Dissipation	P <sub>d</sub> max	Ta ≤ +75°C	830	mW
Operating Temperature Range	T <sub>opr</sub>		-20 to +75	°C
Storage Temperature Range	T <sub>stg</sub>		-55 to +150	°C

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# LA7791T

## Recommended Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended Supply Voltage	V <sub>CC</sub>	Pin 2,19	5.0	V
Operating Supply Voltage Range	V <sub>CC</sub> op	Pin 2,19	4.75 to 5.25	V

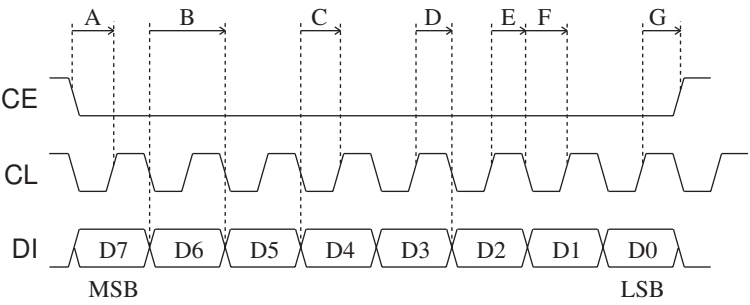
## Electrical Characteristics at Ta = 25°C, V<sub>CC</sub> = 5V, Vin = 29dBmV diff., f = 20MHz, Rin = 75Ω, Rout = 75Ω, unless otherwise noted.

Parameter	Symbol	Pin No.	Conditions	Ratings			Unit
				min	typ	max	
Quiescent Current 1	I <sub>CCO-1</sub>	2,15,16,19	0 to 15dB attenuation		180		mA
Quiescent Current 2	I <sub>CCO-2</sub>	2,15,16,19	16 to 63dB attenuation		90		mA
Quiescent Current 3	I <sub>CCO-ps</sub>	2,15,16,19	Power Save Mode (TXEN:V18=0V)		6.6		mA
Quiescent Current 4	I <sub>CCO-swsd</sub>	2,15,16,19	Software Shut Down Mode (D7=0)		3.4		mA
Quiescent Current 5	I <sub>CCO-sd</sub>	2,15,16,19	Shut Down Mode (SD:V12=0V)		1.2		mA
<b>Input Characteristics</b>							
Input Impedance	Zin	5,6		1.6	2	2.4	kΩ
<b>Overall Characteristics</b>							
Gain Flatness	Rfrq	5,6,15,16	Vout=60dBmV Diff, f=5 to 42MHz, Ref at 20MHz		0.5		dB
Gain Flatness	Rfrq	5,6,15,16	Vout=60dBmV Diff, f=5 to 65MHz, Ref at 20MHz		1.5	2.0	dB
Gain Control Range	Gcont	5,6,15,16	f=20MHz, Differential output		63		dB
Maximum Gain	Gmax	5,6,15,16	f=20MHz, Differential output	31.2	33.7	36.2	dB
Minimum Gain	Gmin	5,6,15,16	f=20MHz, Differential output		-29.3		dB
Gain Step	Gstep	5,6,15,16	f=20MHz, Differential output	0.7	1	1.3	dB
IM2	IM2	5,6,15,16	40MHz and 40.2MHz 54dBmV/tone Diff.	50	65		dBc
IM3	IM3	5,6,15,16	40MHz and 40.2MHz 54dBmV/tone Diff.	46	62		dBc
<b>Output Characteristics</b>							
Output Signal Level	Vo	5,6,15,16	Differential output		63		dBmV
Output Noise Level	Vn	5,6,15,16	Differential output		187	300	nV/√Hz
Switching transients voltage	Vtran	5,6,15,16	Differential output		5	100	mV
<b>Power Save Characteristics (Low active: Low---Power Save mode)</b>							
Power Save Attenuation	Att-ps	5,6,15,16, 18	Vin=29dBmV, 5 to 70MHz, Vin/Vout	59	85		dB
Setting Time	Tset	15,16,18	TXEN(18pin) on/off		2		us
Power Save on Voltage	Vps-on	15,16,18	Low, TXEN off			0.8	V
Power Save off Voltage	Vps-off	15,16,18	High, TXEN on	2.0		V <sub>CC</sub>	V
<b>Shut Down Characteristics (Low active: Low---Shut Down mode)</b>							
Shut Down on Voltage	Vshut-on	12,15,16	Low, SD(12pin) on			0.8	V
Shut Down off Voltage	Vshut-off	12,15,16	High, SD(12pin) off	2.0		V <sub>CC</sub>	V

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Serial Timing Characteristics

Parameter	Symbol	Pin No.	Conditions	Ratings			Unit
				min	typ	max	
CE to CL Rise Setup Time	$t_{SENS}$	8,10		100			ns
CE to CL Rise Hold Time	$t_{SENH}$	8,10		100			ns
DI to CL Setup Time	$t_{SDAS}$	9,10		100			ns
DI to CL Hold Time	$t_{SDAH}$	9,10		100			ns
DI Pulse Width High	$t_{DATAH}$	9		200			ns
DI Pulse Width Low	$t_{DATA L}$	9		300			ns
CL Pulse Width High	$t_{SCKH}$	10		200			ns
CL Pulse Width Low	$t_{SCKL}$	10		300			ns



- A)  $t_{SENS}$

B)  $t_{SDATAH}/t_{SDATAL}$

C)  $t_{SDAS}$

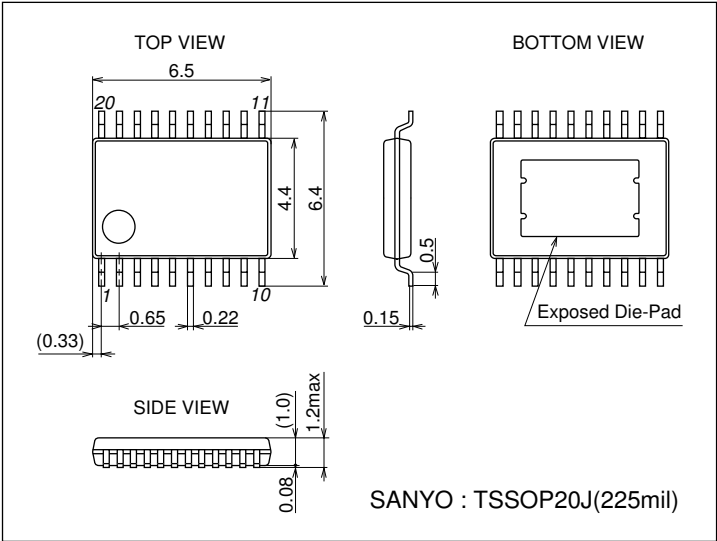
D)  $t_{SDAH}$
- E)  $t_{SCKH}$

F)  $t_{SCKL}$

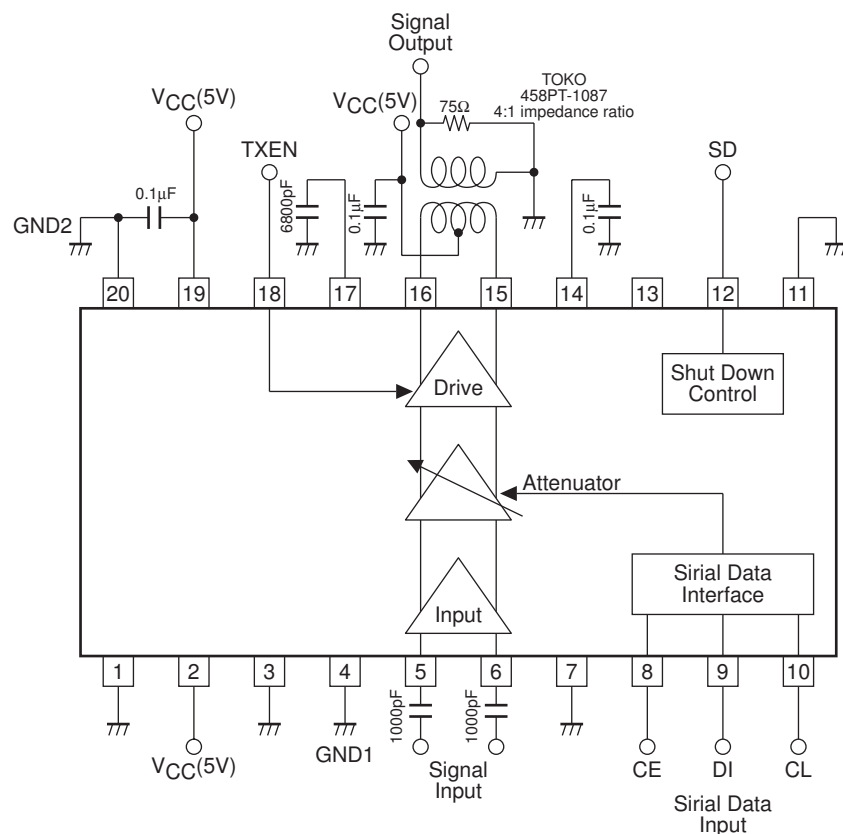
G)  $t_{SENH}$

Package Dimensions

unit : mm (typ)  
3279



## Block Diagram and Application Circuit Example



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