

2 x 6 WATT STEREO POWER AMPLIFIER

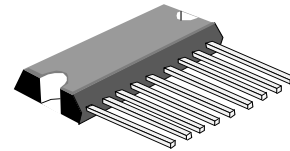
KKA1519

The KKA1519B, KKA1519B1, KKA1519B1Q is an integrated class-B dual output amplifier in a 9-lead single in-line (SIL) plastic medium power package. The device is primarily developed for car radio applications.

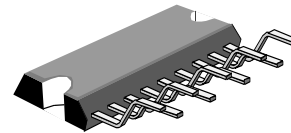
Features

Requires very few external components	Thermally protected
High output power	Thermally protected
Fixed gain	Reverse polarity safe
Good ripple rejection	Compatible with TDA1517 (except gain)
Mute/stand-by switch	No switch-on/switch-off plop
Load dump protection	Protected against electrostatic discharge
Capability to handle high energy on outputs ($V_p = 0\text{ V}$)	

ORDERING INFORMATION



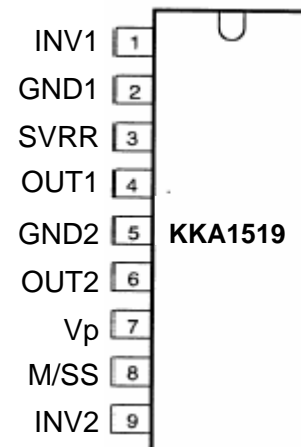
KKA1519B1 → SOT131-2



KKA1519B1Q → SOT157-2
 $T_A = -55^\circ\text{ to }125^\circ\text{ C}$ for all packages

PINNING

1	INV1	non-inverting input 1
2	GND1	ground (signal)
3	SVRR	supply voltage ripple rejection
4	OUT1	output 1
5	GND2	ground (substrate)
6	OUT2	output 2
7	V_p	supply voltage
8	M/SS	mute/stand-by switch
9	INV2	non-inverting input 2



QUICK REFERENE DATA

parameter	conditions	symbol	min.	typ.	max.	unit
Supply voltage range						
operating		V_p	6,0	14,4	18,0	V
non-operating		V_p	-	-	30	V
load dump protected		V_p	-	-	45	V
Repetitive peak output current		I_{ORM}	-	-	2,5	A
Total quiescent current		I_{tot}		40	80	mA
Stand-by current		I_{sb}		0,1	100	mA
Switch-on current		I_{sw}			40	mA
Input impedance		$ Z_I $	50			k Ω
Output power	THD= 0,5%;4 Ω			5		W
	THD=10%;4 Ω			6		W
Channel separation		α	40			dB
Noise output voltage		$V_{no(rms)}$			150	μ V
Supply voltage ripple rejection	f=100Hz	SVRR	40			dB
	f=1kHz to 10 kHz	SVRR	48			dB
Crystal temperature		T_c			150	$^{\circ}$ C

DC CHARACTERISTICS (note 1) $V_p = 14,4$ V; $T_{amb} = 25$ $^{\circ}$ C; unless otherwise specified

parameter	conditions	symbol	min.	Typ.	max.	unit
Supply						
Supply voltage range	note 2	V_p	6,0	14,4	18,0	V
Quiescent current		I_P	-	40	80	mA
DC output voltage	note 3	V_o	-	6,95	-	V
Mute/stand-by switch						
Switch-on voltage level	see Fig.3	V_{ON}	8,5	-	-	V
Mute condition						
Output signal in mute position	$V_I = 1$ V (max.); f = 20 Hz to 15 kHz	V_{mute}	3,3	-	6,4	V
		V_o	-	-	20	mV
Stand-by condition						
DC current in stand-by condition		V_{sb}	0	-	2 100	V
		I_{sb}	-	-	40	μ A
Switch-on current		I_{sw}	-	12		μ A

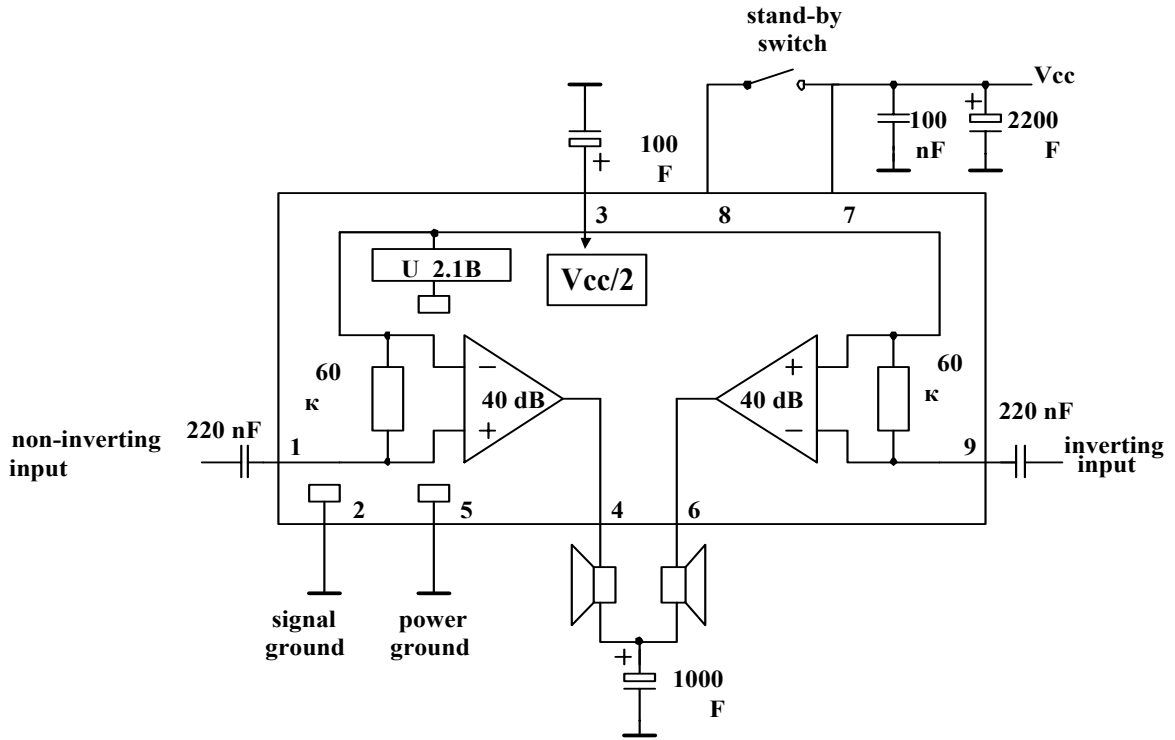
AC CHARACTERISTICS (note 1)

 $V_p=14,4V$; $R_L=4\Omega$; $f=1kHz$; $T_{amb}=25^\circ C$ unless otherwise specified

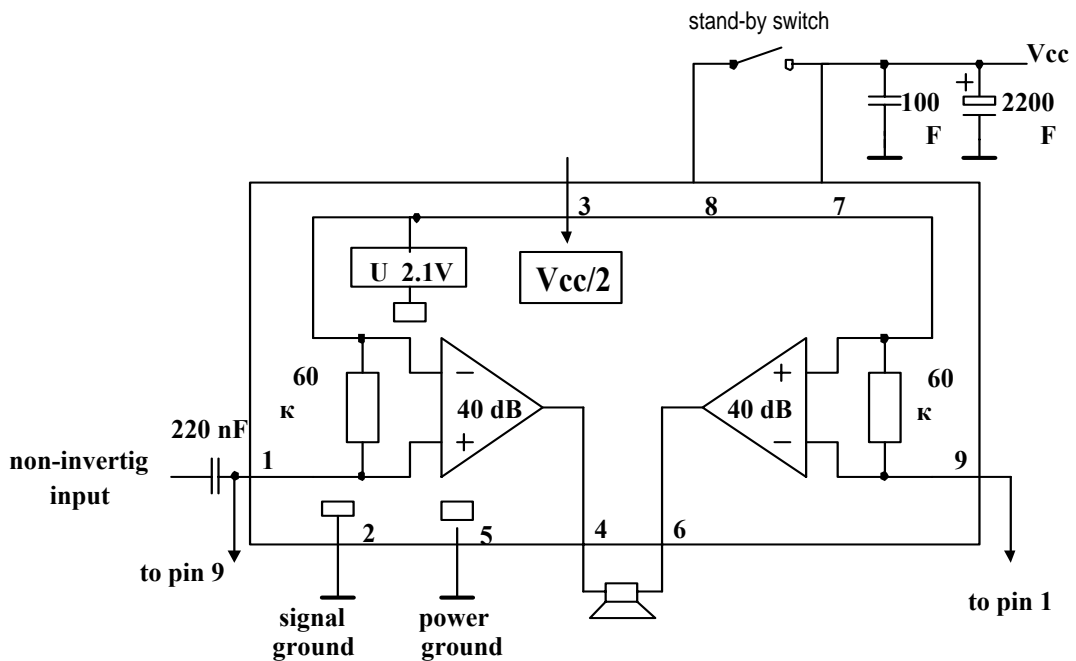
parameter	conditions	symbol	min.	typ.	max.	unit
Output power	note 4; THD = 0,5%	P_O	4	5	-	W
	THD = 10%	P_O	5,5	6,0	-	W
Total harmonic distortion	$P_O=1W$	THD	-	0,1	-	%
Low frequency roll-off	note 5; -3 dB	f_L	-	45	-	Hz
High frequency roll-off	-1 dB	f_H	20	-	-	kHz
Closed loop voltage gain		G_v	39	40	41	dB
Supply voltage ripple rejection						
	note 6					
ON						
ON	$f=100\text{ Hz}$	SVRR	40	-	-	dB
	$f=10\text{ Hz to }10\text{ kHz}$	SVRR	48	-	-	dB
mute		SVRR	48	-	-	dB
stand-by		SVRR	80	-	-	dB
Input impedance		$ Z_{il} $	50	60	75	$k\Omega$
Noise output voltage	note 7;					
ON	$R_S=0\Omega$	$V_{no(rms)}$	-	150	-	mV
ON	$R_S=10\text{ k}\Omega$	$V_{no(rms)}$	-	250	500	mV
mute	note 8	$V_{no(rms)}$	-	120	-	mV
Channel separation	$R_S=10\text{ k}\Omega$	a	40	-	-	dB
Channel balance		$ DG_v $	-	0,1	1	dB

Notes to the characteristics

- All characteristics are measured using the circuit shown in Fig. 4.
- The circuit is DC adjusted at $V_p=6V$ to $18V$ and AC operating at $V_p=8,5V$ to $18V$.
- At $18V < V_p < 30V$ the DC output voltage $< V_p/2$.
- Output power is measured directly at the output pins of the IC.
- Frequency response externally fixed.
- Ripple rejection measured at the output with a source impedance of $0\ \Omega$ (maximum ripple amplitude of $2V$) and a frequency between 100 Hz and 10 kHz .
- Noise voltage measured in a bandwidth of 20 Hz to 20 kHz .
- Noise output voltage independent of R^{\wedge} ($V_j = 0V$).



Stereo application circuit diagram



BTL application circuit diagram

DC ELECTRICAL CHARACTERISTICS (Voltages Referenced to GND)

Symbol	Parameter	Test Conditions	V _{CC} V	Guaranteed Limit			Unit
				≥-55°C	25°C	≤125°C	
V _{IH}	Minimum High-Level Input Voltage	V _{OUT} =0.5 V or V _{CC} - 0.5 V	5.0	3.5	3.5	3.5	V
		V _{OUT} =1.0 V or V _{CC} - 1.0 V	10	7	7	7	
		V _{OUT} =1.5 V or V _{CC} - 1.5 V	15	11	11	11	
V _{IL}	Maximum Low - Level Input Voltage	V _{OUT} =0.5 V or V _{CC} - 0.5 V	5.0	1.5	1.5	1.5	V
		V _{OUT} =1.0 V or V _{CC} - 1.0 V	10	3	3	3	
		V _{OUT} =1.5 V or V _{CC} - 1.5 V	15	4	4	4	
V _{OH}	Minimum High-Level Output Voltage	V _{IN} =GND or V _{CC}	5.0	4.95	4.95	4.95	V
			10	9.95	9.95	9.95	
			15	14.95	14.95	14.95	
		V _{IL} =1.5V, V _{IH} =3.5V, I _O =-1μA	5.0	4.5	4.5	4.5	
		V _{IL} =3.0V, V _{IH} =7.0V, I _O =-1μA	10	9.0	9.0	9.0	
		V _{IL} =4.0V, V _{IH} =11V, I _O =-1μA	15	13.5	13.5	13.5	
V _{OL}	Maximum Low-Level Output Voltage	V _{IN} =GND or V _{CC}	5.0	0.05	0.05	0.05	V
			10	0.05	0.05	0.05	
			15	0.05	0.05	0.05	
		V _{IL} =1.5V, V _{IH} =3.5V, I _O =1μA	5.0	0.5	0.5	0.5	
		V _{IL} =3.0V, V _{IH} =7.0V, I _O =1μA	10	1.0	1.0	1.0	
		V _{IL} =4.0V, V _{IH} =11V, I _O =1μA	15	1.5	1.5	1.5	
I _{IN}	Maximum Input Leakage Current	V _{IN} = GND or V _{CC}	18	±0.1	±0.1	±1.0	μA
I _{CC}	Maximum Quiescent Supply Current (per Package)	V _{IN} = GND or V _{CC}	5.0	1	1	30	μA
			10	2	2	60	
			15	4	4	120	
			20	20	20	600	
I _{OL}	Minimum Output Low (Sink) Current	V _{IN} = GND or V _{CC}					mA
		U _{OL} =0.4 V	5.0	0.64	0.51	0.36	
		U _{OL} =0.5 V	10	1.6	1.3	0.9	
I _{OH}	Minimum Output High (Source) Current	V _{IN} = GND or V _{CC}					mA
		U _{OH} =2.5 V	5.0	-2.0	-1.6	-1.15	
		U _{OH} =4.6 V	5.0	-0.64	-0.51	-0.36	
		U _{OH} =9.5 V	10	-1.6	-1.3	-0.9	
	U _{OH} =13.5 V	15	-4.2	-3.4	-2.4		

AC ELECTRICAL CHARACTERISTICS ($C_L=50\text{pF}$, $R_L=200\text{ k}\Omega$, Input $t_r=t_f=20\text{ ns}$)

Symbol	Parameter	V _{CC} V	Guaranteed Limit			Unit
			≥-55°C	25°C	≤125°C	
f _{max}	Maximum Clock Frequency (Figure 1)	5.0	3.5	3.5	3.0	MHz
		10	8	8	6	
		15	12	12	10	
t _{PLH} , t _{PHL}	Maximum Propagation Delay, Clock to Q or \bar{Q} (Figure 1)	5.0	300	300	450	ns
		10	130	130	200	
		15	90	90	150	
t _{PLH}	Maximum Propagation Delay, Set to Q or Reset to Q (\bar{Q} Figure 2)	5.0	300	300	450	ns
		10	130	130	200	
		15	90	90	150	
t _{PHL}	Maximum Propagation Delay, Set to \bar{Q} or Reset to Q (Figure 2)	5.0	400	400	600	ns
		10	170	170	250	
		15	120	120	150	
t _{TLH} , t _{THL}	Maximum Output Transition Time, Any Output (Figure 1)	5.0	200	200	250	ns
		10	100	100	150	
		15	80	80	100	
C _{IN}	Maximum Input Capacitance	5.0		7.5		pF

TIMING REQUIREMENTS($C_L=50\text{pF}$, $R_L=200\text{ k}\Omega$, Input $t_r=t_f=20\text{ ns}$)

Symbol	Parameter	V _{CC} V	Guaranteed Limit			Unit
			≥-55°C	25°C	≤125°C	
t _w	Minimum Pulse Width, Clock (Figure 1)	5.0	140	140	200	ns
		10	60	60	80	
		15	40	40	50	
t _w	Minimum Pulse Width, Set or Reset (Figure 2)	5.0	180	180	250	ns
		10	80	80	120	
		15	50	50	80	
t _{su}	Minimum Setup Time, Data to Clock (Figure 3)	5.0	40	40	40	ns
		10	20	20	20	
		15	15	15	15	
t _h	Minimum Hold Time, Clock to Data (Figure 3)	5.0	5	5	8	ns
		10	5	5	5	
		15	5	5	5	
t _r , t _f	Maximum Input Rise or Fall Time, Clock (Figure 1)	5.0	500	500	500	μs
		10	30	30	30	
		15	6	6	6	

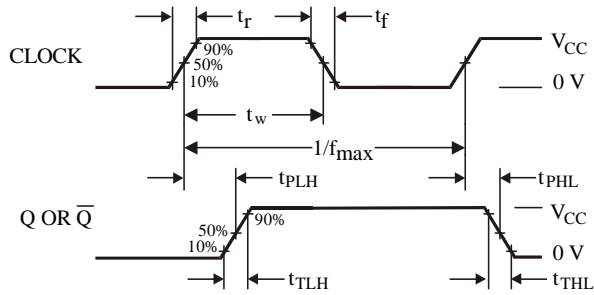


Figure 1. Switching Waveforms

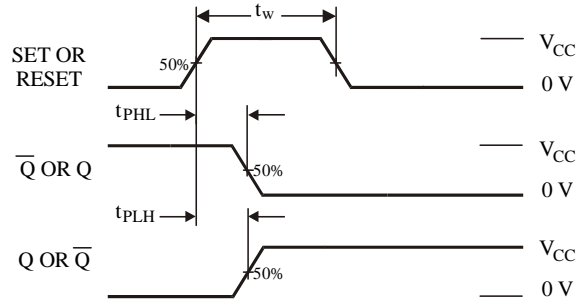


Figure 2. Switching Waveforms

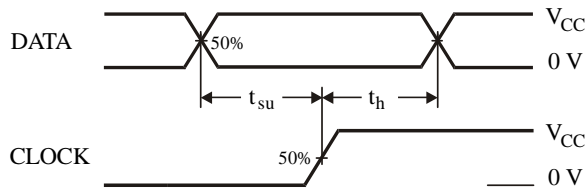
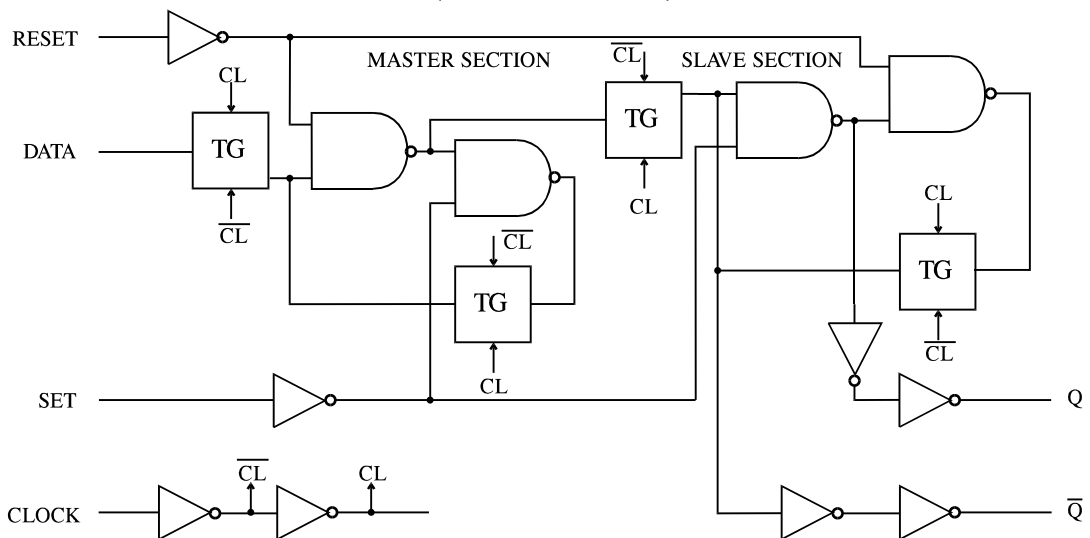
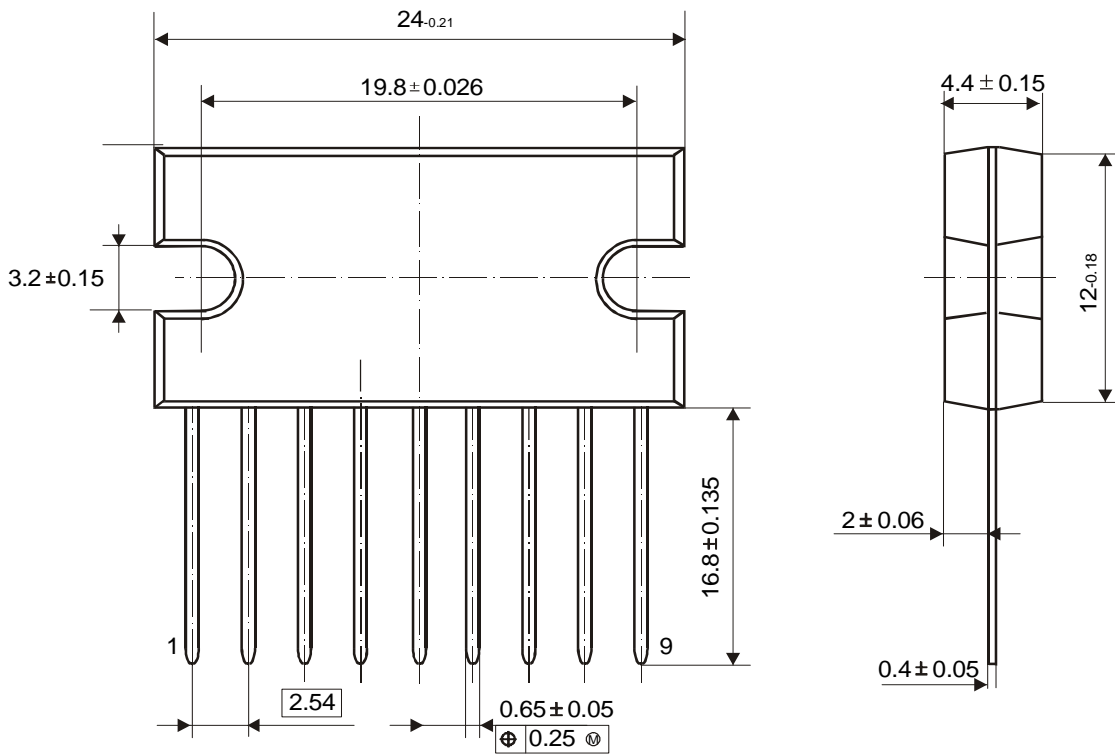


Figure 3. Switching Waveforms

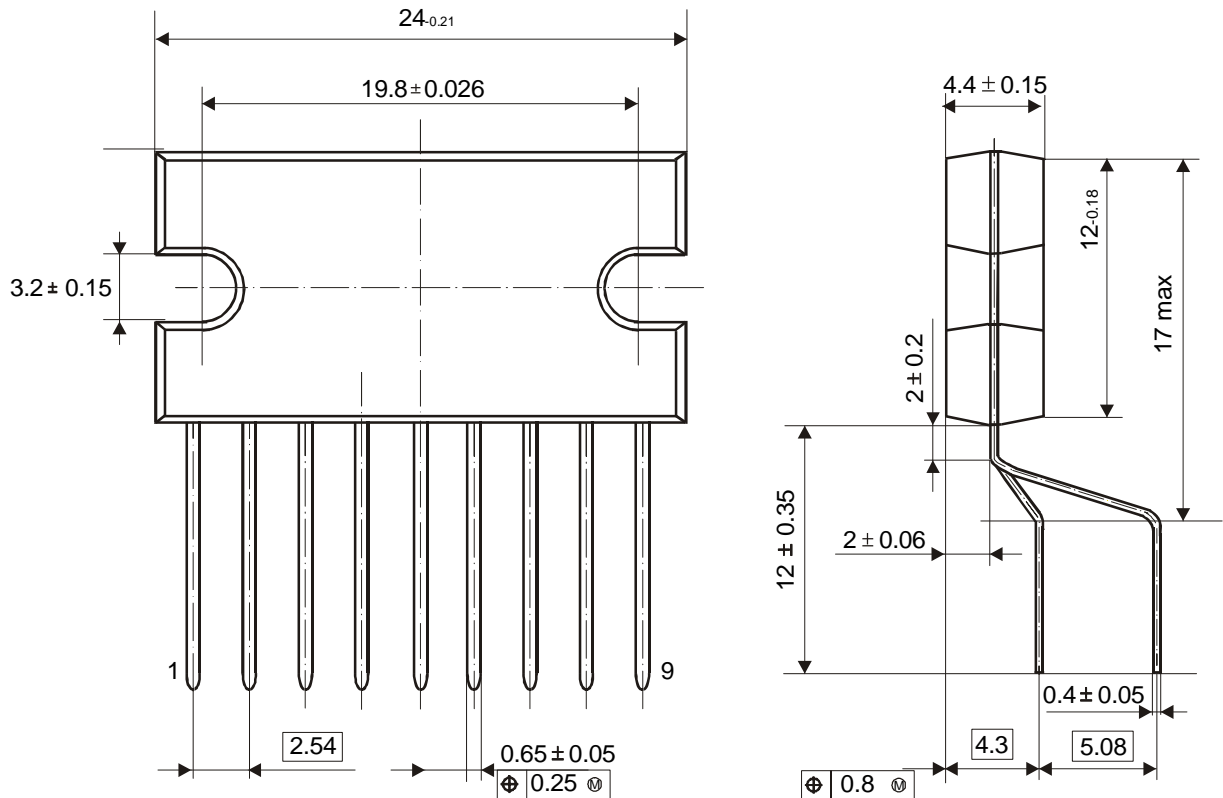
**EXPANDED LOGIC DIAGRAM
(1/2 of the Device)**



● 9-Pin Plastic Power Single-in-Line (SIL-9MPF, SOT 131-2)



● 9-Pin Plastic Power DIL-Bent-SIL (SIL-9P, SOT 157-2)



- 9-Pin Plastic Power Single-in-Line (SIL-9MPF, SOT 110-1)

