Stereo Headphone Driver, 6dB Gain Low Voltage, Internal Mute Function No Popping Noise When Power On / Off

FEATURES

- Large output voltage swing
- Low supply voltage 2.7 to 6.5V
- Internal mute function
- No popping noise
- High SNR , Slew rate
- Low distortion
- Excellent power supply ripple rejection
- Low power consumption

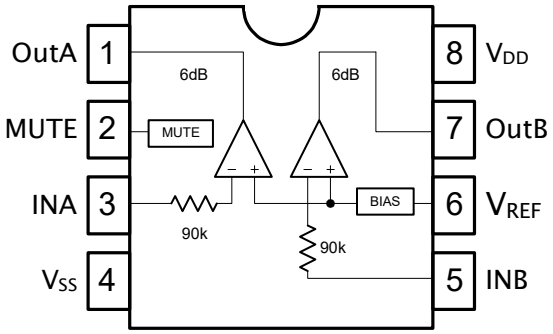
APPLICATIONS

- MP3, PDA
- Portable Digital Audio.
- CD-ROM, DVD-ROM, CD-RW, DVD-RW
- Cross-reference : BH3544F
- Space saving package SOP8, MSOP8.

DESCRIPTION

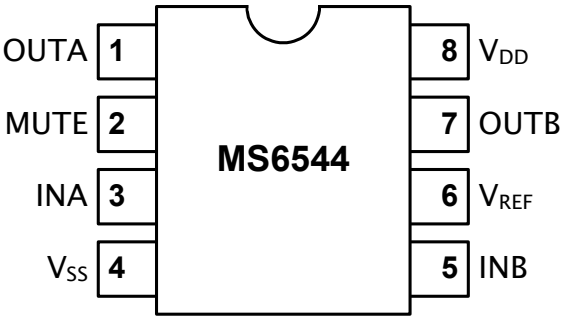
The MS6544 is an integrated class AB stereo headphone driver contained in SO8 and MSOP8 packages. The mute function to prevent popping sounds when the power is turned on and off. It has good performance at low voltage operation, the MS6544 ideally suited for use in portable digital audio equipment.

BLOCK DIAGRAM



PIN CONFIGURATION

Symbol	Pin	Description
OutA	1	Output A
Mute	2	Mute control (Low: mute on, High: mute off)
INA	3	Input A
V_{SS}	4	Negative supply
INB	5	Input B
V_{REF}	6	Reference volatge
OutB	7	Output B
V_{DD}	8	Positive supply



SOP8，MSOP8

ORDERING INFORMATION

Package	Part number	Packaging Marking	Transport Media
8-Pin SOP	MS6544GTR	MS6544G	2.5k Units Tape and Reel
8-Pin SOP	MS6544GU	MS6544G	100 Units Tube
8-Pin MSOP	MS6544MGTR	MS6544G	3.5k Units Tape and Reel
8-Pin MSOP	MS6544MU	MS6544G	80 Units Tube

Lead free, RoHS Compliance

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Rating	Unit
V_{DD}	Supply Voltage	6.5	V
V_{ESD}	Electrostatic Handling	-4500 to 4500	V
T_{STG}	Storage Temperature Range	-65 to 150	℃
T_A	Operating Ambient Temperature Range	-40 to 85	℃
T_J	Maximum Junction Temperature	150	℃
T_S	Soldering Temperature, 10 seconds	260	℃
R_{THJA}	Thermal Resistance from Junction to Ambient in Free Air SOP8 MSOP8	 175 235	℃/W

OPERATING RATINGS

Symbol	Parameter	Min	Typ	Max	Unit
V_{DD}	Supply Voltage	2.7	-	6.5	V

5V ELECTRICAL CHARACTERISTICS

(Ta=25℃, V_{DD}=5V, V_{SS}=0V, Vo=2Vpp, f=1kHz, A_V=1, R_L=32Ω; unless otherwise specified)

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
DC Characteristics							
I_Q	Quiescent current	Vo=0Vpp 2 channels	Mute On	-	1.5	1.6	mA
			Mute Off	3.7	3.9	4.1	mA
V_{TM}	Mute control voltage	Mute on		0	-	1	V
		Mute off		3.3	-	V_{DD}	V
G_{VC}	Voltage Gain	6dB		5	6	7	dB
PSRR	Power supply rejection ratio	Vripple = -20dBV, 100Hz		57	60	-	dB
CS	Channel separation	Vo=0dBV		100	117	-	dB
ATT	Mute attenuation	Vo=0dBV		100	115	-	dB
AC Characteristics							
S/N	Signal-to-noise	Vo=4Vpp		95	99	-	dB
THD+N	Total harmonic distortion plus noise	Vo=2Vpp		-	-64	-62	dB
SR	Slew rate	Unity gain inverting		-	5	-	V/μs
Po	Maximum output power	(THD+N)/S<0.1%, 2 ch		130	140	-	mW
V_O	Maximum output voltage swing	(THD+N)/S<0.1%		4.1	4.2	-	Vpp

3.3V ELECTRICAL CHARACTERISTICS

(Ta=25℃, V_{DD}=3.3V, V_{SS}=0V, Vo=2Vpp, f=1kHz, A_V=1, R_L=32Ω; unless otherwise specified)

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
DC Characteristics							
I_Q	Quiescent current	Vo=0Vpp 2 channels	Mute On	-	1.3	1.4	mA
			Mute Off	-	3.3	3.5	mA
V_{TM}	Mute control voltage	Mute on		0	-	1	V
		Mute off		2.7	-	V_{DD}	V
PSRR	Power supply rejection ratio	Vripple = -20dBV, 100Hz		57	60	-	dB
CS	Channel separation	Vo=0dBV		100	115	-	dB
ATT	Mute attenuation	Vo=0dBV		100	115	-	dB
AC Characteristics							
S/N	Signal-to-noise	Vo=2.6Vpp		93	97	-	dB
THD+N	Total harmonic distortion plus noise	Vo=2Vpp		-	-64	-62	dB
Po	Maximum output power	(THD+N/S)<0.1%, 2 ch		49	52	-	mW
V_O	Maximum output voltage swing	(THD+N)/S<0.1%		2.5	2.6	-	Vpp

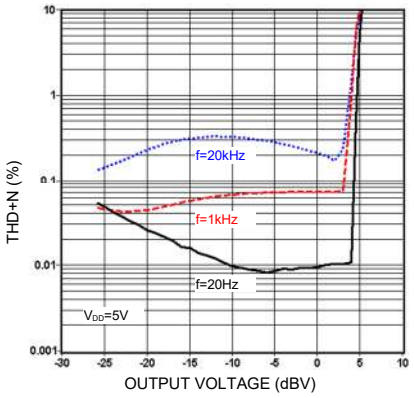
2.7V ELECTRICAL CHARACTERISTICS

(Ta=25℃, V_{DD}=2.7V, V_{SS}=0V, Vo=2Vpp, f=1kHz, A_V=1, R_L=32Ω; unless otherwise specified)

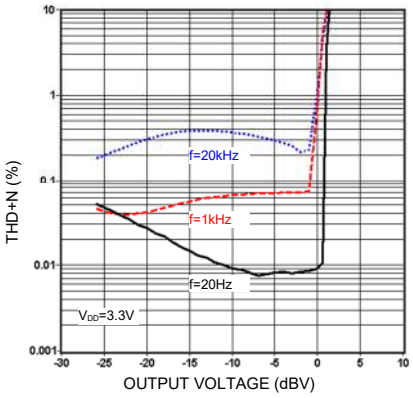
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
DC Characteristics							
I_Q	Quiescent current	Vo=0Vpp 2 channels	Mute On	-	1.2	1.3	mA
			Mute Off	-	3.0	3.2	mA
V_{TM}	Mute control voltage	Mute on		0	-	1	V
		Mute off		2.5	-	V_{DD}	V
PSRR	Power supply rejection ratio	Vripple = -20dBV, 100Hz		57	60	-	dB
CS	Channel separation	Vo=-3dBV		100	112	-	dB
ATT	Mute attenuation	Vo=-3dBV		100	115	-	dB
AC Characteristics							
S/N	Signal-to-noise	Vo=2Vpp		92	96	-	dB
THD+N	Total harmonic distortion plus noise	Vo=2Vpp		-	-64	-62	dB
Po	Maximum output power	(THD+N/S)<0.1%, 2 ch		28	31	-	mW
V_O	Maximum output voltage swing	(THD+N)/S<0.1%		1.9	2	-	Vpp

TYPICAL PERFORMANCE CHARACTERISTICS

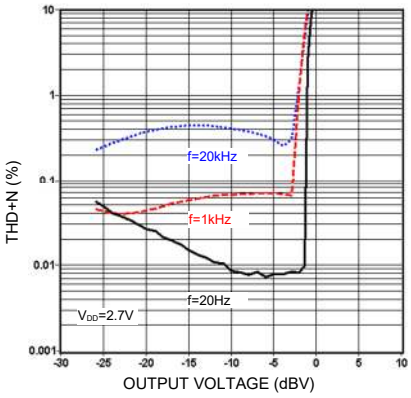
(Ta=25℃, R_L=32Ω; unless otherwise specified)



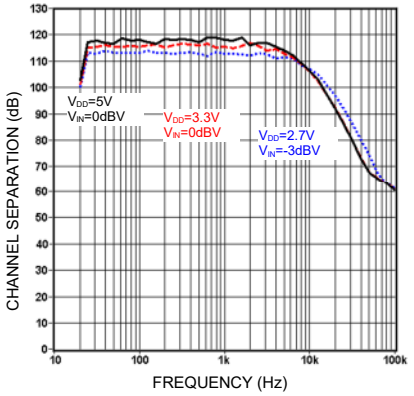
THD+N vs. output voltage



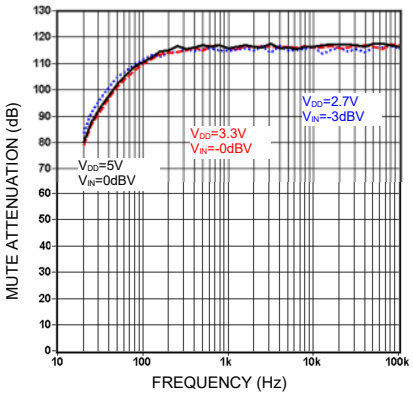
THD+N vs. output voltage



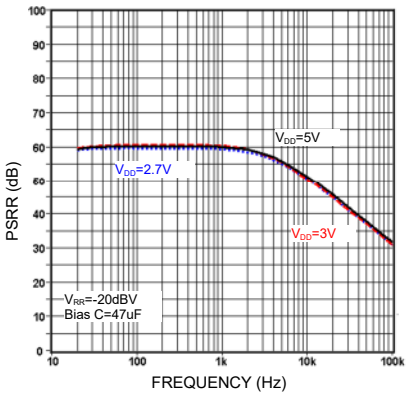
THD+N vs. output voltage



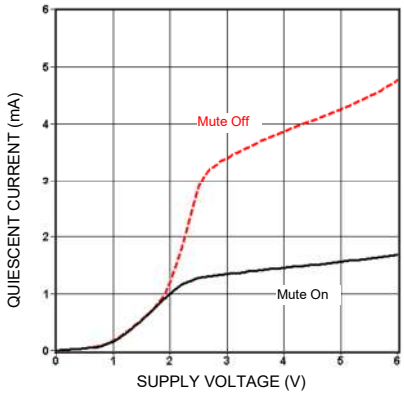
Channel separation vs. frequency



Mute Attenuation vs. frequency



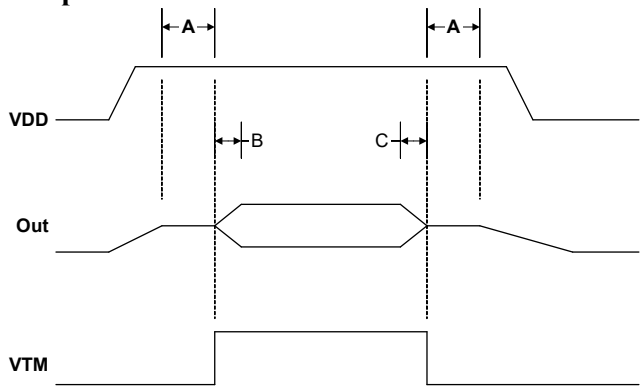
PSRR vs. frequency



Quiescent current vs. supply voltage

MUTE FUNCTION

Mute operation

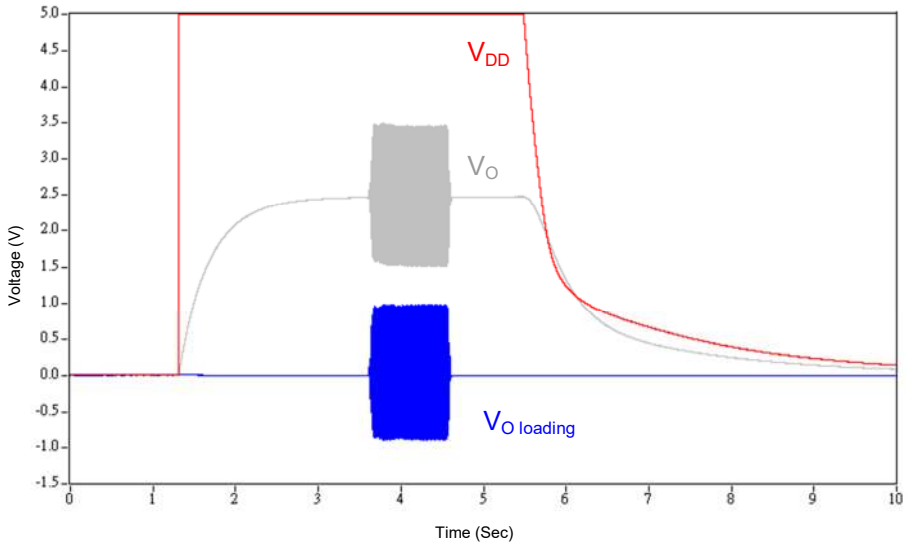


A: Mute period
Set Mute = Low to prevent the popping noise when power is turned on and off.

B: Mute release time
The time constant is decided by R and C of pin 2.

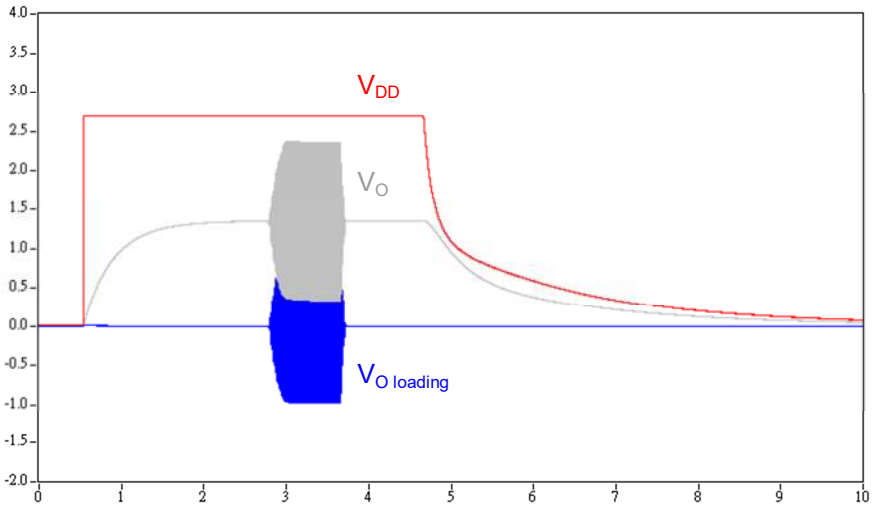
C: Mute start time
The time constant like Mute release time.

Mute function to prevent the popping noise



Conditions :
VDD = 5V, Vo =2Vpp

Process :
Mute On, VDD On, Mute Off
Mute On, VDD Off

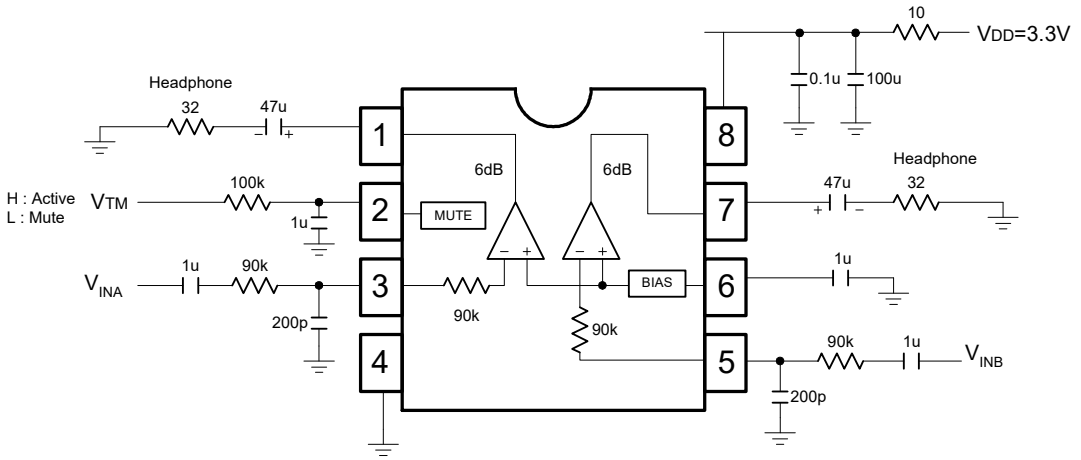


Conditions :
VDD = 2.7V, Vo =2Vpp

Process :
Mute On, VDD On, Mute Off
Mute On, VDD Off

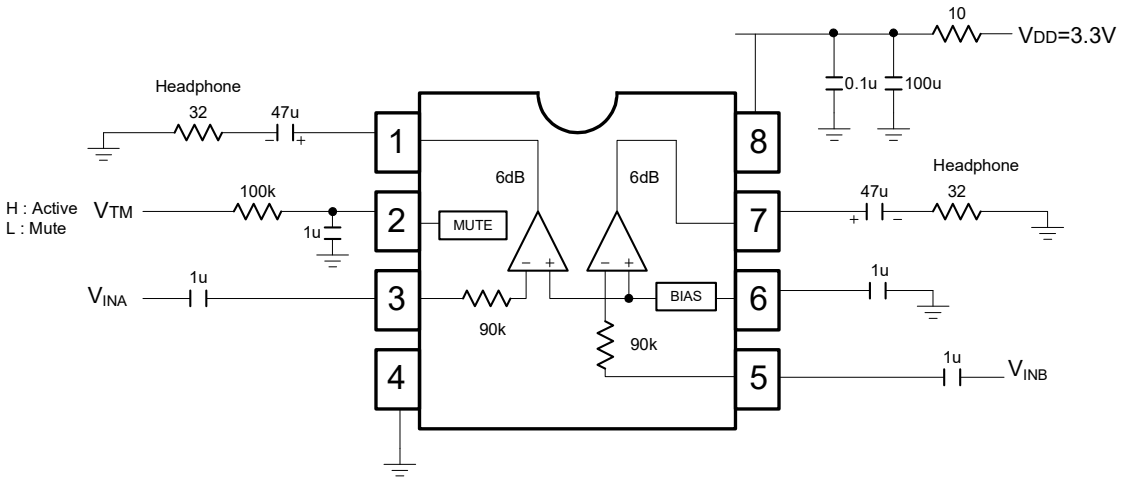
APPLICATION INFORMATION

Low voltage application



f_{-3dB} = 17.6kHz
DC_{gain} = 1

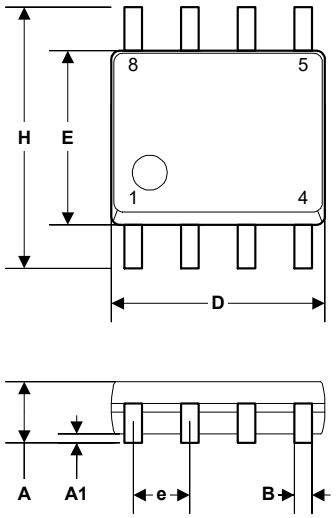
Fig.1 The 1st order low pass filter for MP3 solution with MS6544.



DC_{gain} = 2 for MS6544

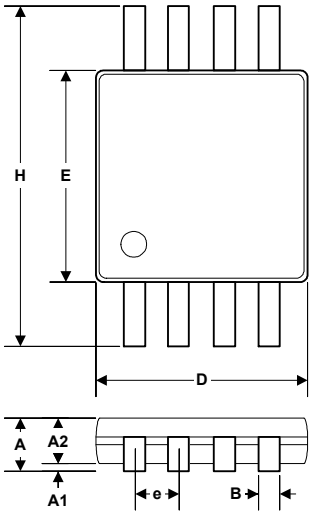
Fig.2 The basic application.

EXTERNAL DIMENSIONS



Symbol	Dimension in mm		Dimension in inch	
	Min	Max	Min	Max
A	1.35	1.75	0.0532	0.0688
A1	0.10	0.25	0.0040	0.0098
B	0.33	0.51	0.013	0.020
C	0.19	0.25	0.0075	0.0098
D	4.80	5.00	0.1890	0.1968
H	5.80	6.20	0.2284	0.2440
E	3.80	4.00	0.1497	0.1574
e	1.27 BSC		0.050 BSC	
L	0.40	1.27	0.016	0.050

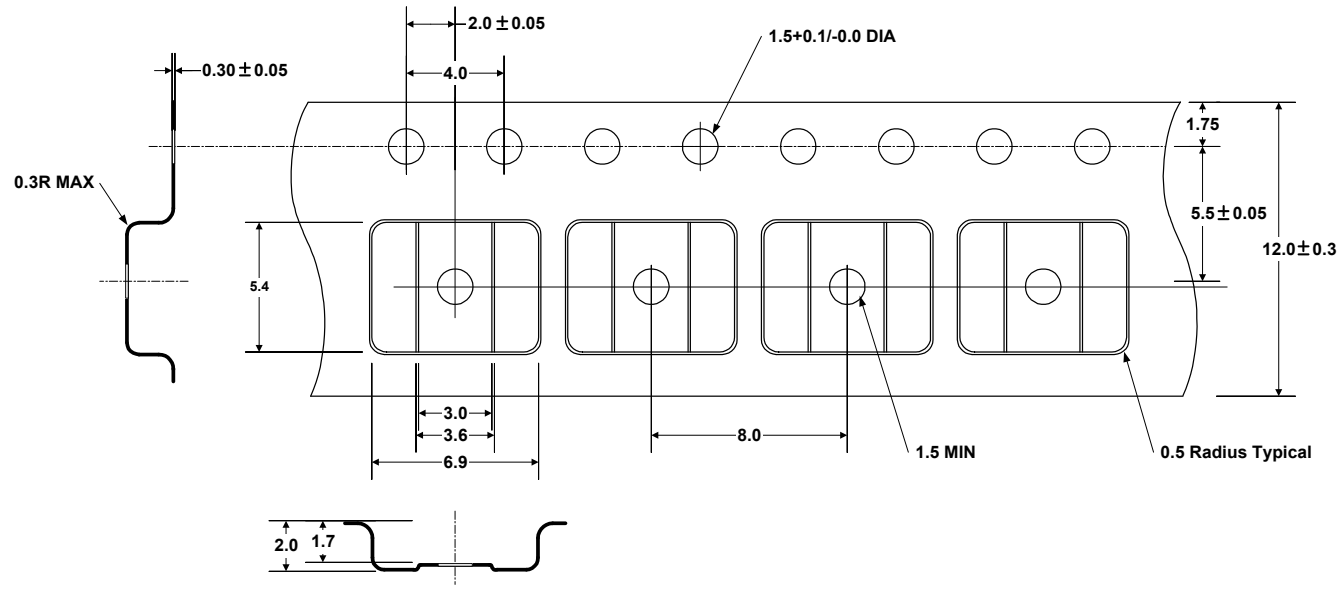
SOP8



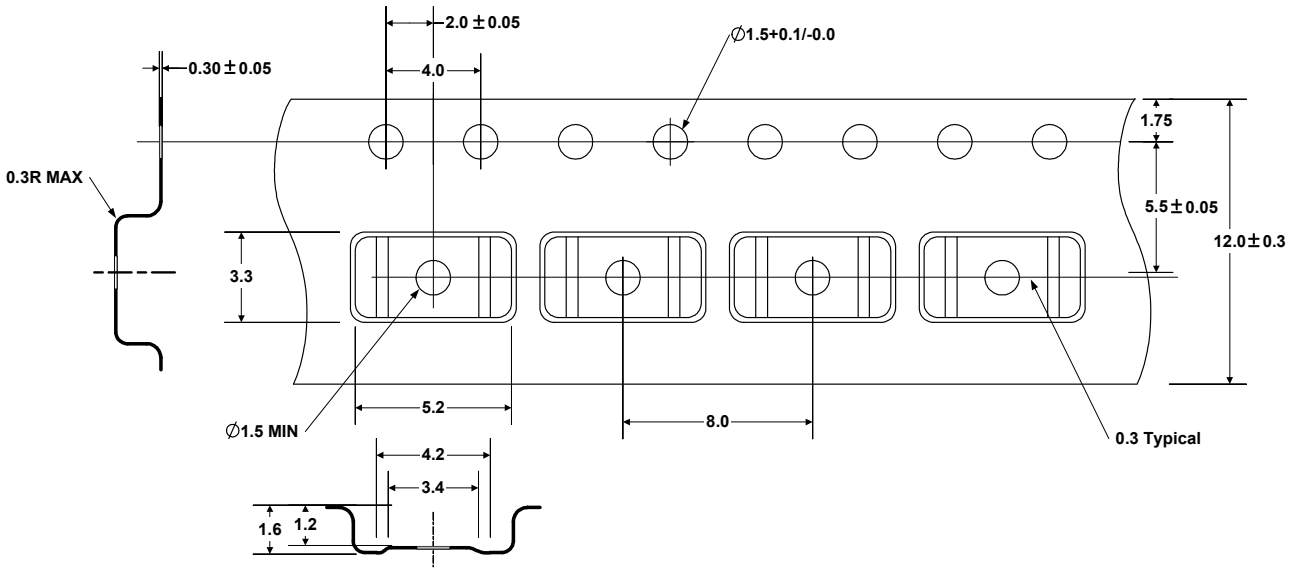
Symbol	Dimension in mm		Dimension in inch	
	Min	Max	Min	Max
A	0.81	1.12	0.032	0.048
A1	0.05	0.15	0.002	0.006
A2	0.76	0.86	0.030	0.038
B	0.28	0.38	0.011	0.015
C	0.13	0.23	0.005	0.009
D	2.90	3.10	0.114	0.122
H	4.70	5.10	0.185	0.201
E	2.90	3.10	0.114	0.122
e	0.65		0.026	
L	0.40	0.66	0.016	0.026

MSOP8

TAPE AND REEL (Unit : mm)



SOP8



MSOP8