5-V, 10-MHz GBWP, Low-Noise Operational Amplifiers

Features

- Supply Voltage: 2.5 V to 5.5 V or ±1.25 V to ±2.75 V
- Offset Voltage: ±1.5 mV at 25°C (Max)
- GBWP: 10 MHz, Slew Rate: 3 V/μs
- Rail-to-Rail Input and Output
- Low Noise: 10 nV/√Hz at 1 kHz
- Low 1/f Noise: 20 nV/√Hz at 10 Hz
- Low Power: 1.5 mA per Channel (Max)
- Operating Temperature Range: −40°C to 125°C

Applications

- Audio Equipment
- Instrumentation
- Sensor Interface
- IoT Device

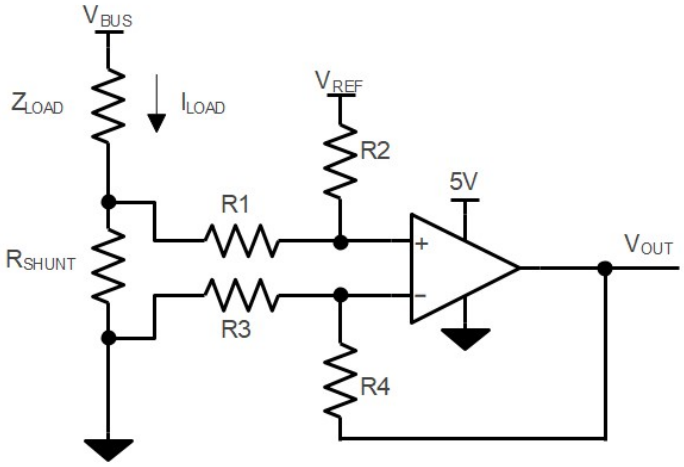
Description

The TPA655x is a series of single, dual, and quad RRIO op amps with low offset, low power, and stable high-frequency response. The series incorporates 3PEAK's proprietary and patented design techniques to achieve 10-MHz bandwidth, 3-V/μs slew rate, and low distortion.

The TPA655x op amps have 1-μV_{PP} voltage noise at 0.1 Hz to 10 Hz, because the bipolar transistor in the input stage with low 1/f noise is used as the input stage.

Considering the requirements of the low standby power in some special applications, there is a shutdown function which is TPA6551N with only 0.5-μA shutdown current.

Typical Application Circuit



$V_{OUT} = (I_{LOAD} \times R_{SHUNT}) \times (R2 / R1) + V_{REF}$

When R3 = R1, R2 = R4, $R_{SHUNT} << R1$

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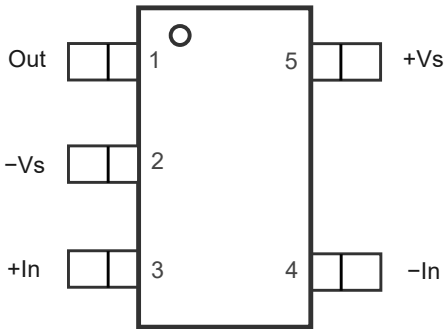
Revision History

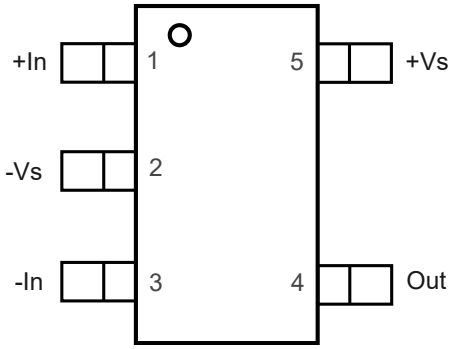
Date	Revision	Notes
2023-03-28	Rev.A.0	Initial version.
2024-02-15	Rev.A.1	Removed the "CMOS" in the Description. Corrected the handwriting errors. The physical object has not changed.
2024-12-10	Rev.A.2	The following updates are all about the new datasheet formats or typos, and the actual product remains unchanged. • Updated the Tape and Reel Information.

Pin Configuration and Functions

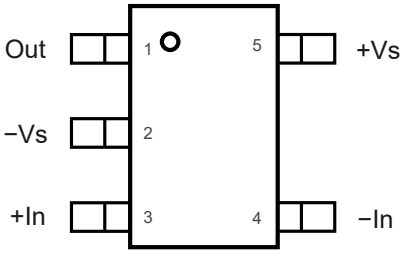
TPA6551
SOT23-5
Top View



TPA6551U
SOT23-5
Top View



TPA6551
SOT353 (SC70-5)
Top View



TPA6551U
SOT353 (SC70-5)
Top View

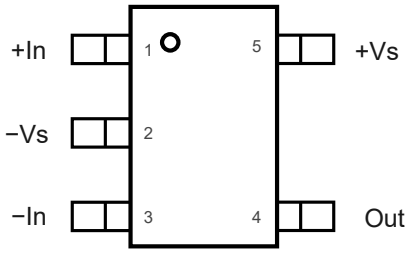
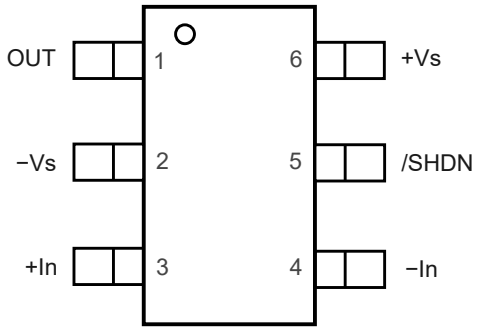


Table 1. Pin Functions: TPA6551, TPA6551U

Pin No.		Name	I/O	Description
TPA6551	TPA6551U			
1	4	Out	O	Output.
2	2	$-V_S$		Negative power supply.
3	1	+In	I	Non-inverting input.
4	3	−In	I	Inverting input.
5	5	$+V_S$		Positive power supply.

TPA6551N
SOT23-6
Top View



TPA6551N
SOT363 (SC70-6)
Top View

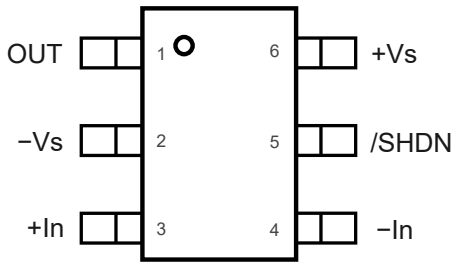
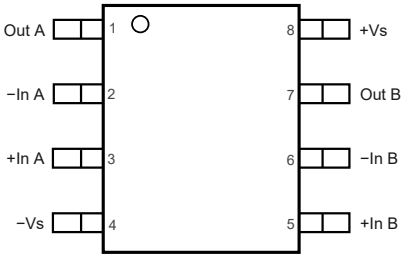


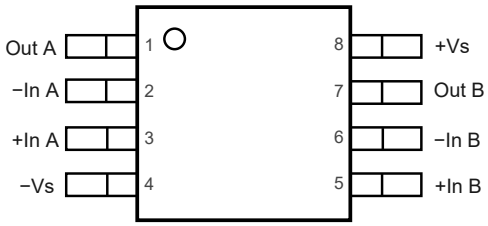
Table 2. Pin Functions: TPA6551N

Pin No.	Name	I/O	Description
1	Out	O	Output.
2	$-V_S$		Negative power supply.
3	+In	I	Non-inverting input.
4	−In	I	Inverting input.
5	/SHDN	I	Shut down input. The device is shut down when the low-level input voltage is on the input; the device is active when the high-level input voltage is on the input. The device is active by default with a 10-MΩ internal pull-up resistor.
6	$+V_S$		Positive power supply.

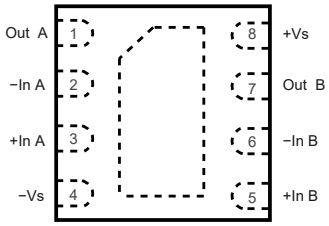
TPA6552
SOP8
Top View



TPA6552
MSOP8
Top View



TPA6552
DFN2X2-8
Top View

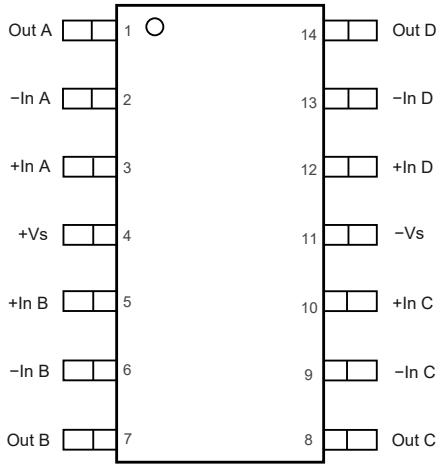


TPA6552
TSSOP8
Top View

Table 3. Pin Functions: TPA6552

Pin No.	Name	I/O	Description
1	Out A	O	Output.
2	−In A	I	Inverting input.
3	+In A	I	Non-inverting input.
4	$-V_S$		Negative power supply.
5	+In B	I	Non-inverting input.
6	−In B	I	Inverting input.
7	Out B	O	Output.
8	$+V_S$		Positive power supply.

TPA6554
SOP14
Top View



TPA6554
TSSOP14
Top View

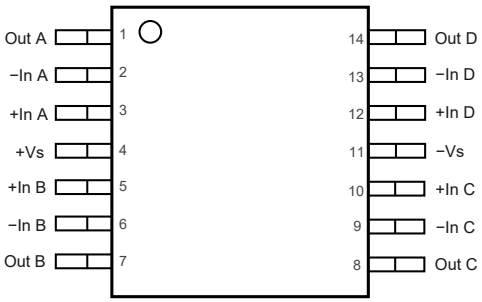


Table 4. Pin Functions: TPA6554

Pin No.	Name	I/O	Description
1	Out A	O	Output.
2	−In A	I	Inverting input.
3	+In A	I	Non-inverting input.
4	$+V_S$		Positive power supply.
5	+In B	I	Non-inverting input.
6	−In B	I	Inverting input.
7	Out B	O	Output power supply.
8	Out C	O	Output power supply.
9	−In C	I	Inverting input.
10	+In C	I	Non-inverting input.
11	$-V_S$		Negative power supply.
12	+In D	I	Non-inverting input.
13	−In D	I	Inverting input.
14	Out D	O	Output.

Specifications

Absolute Maximum Ratings (1)

Parameter		Min	Max	Unit
	Supply Voltage, $(+V_S) – (-V_S)$		6.5	V
	Input Voltage	$(-V_S) – 0.3$	$(+V_S) + 0.3$	V
	Differential Input Voltage	$(-V_S) – (+V_S)$	$(+V_S) – (-V_S)$	V
	Input Current: +IN, −IN (2)	−10	10	mA
	Output Voltage	$(-V_S) – 0.3$	$(+V_S) + 0.3$	V
	Output Short-Circuit Duration (3)		Infinite	
T_J	Maximum Junction Temperature		150	°C
T_A	Operating Temperature Range	−40	125	°C
T_{STG}	Storage Temperature Range	–65	150	°C
T_L	Lead Temperature (Soldering 10 sec)		260	°C

(1) Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. Exposure to any Absolute Maximum Rating condition for extended periods may affect device reliability and lifetime.
(2) The inputs are protected by ESD protection diodes to each power supply. If the input extends more than 300 mV beyond the power supply, the input current should be limited to less than 10 mA.
(3) A heat sink may be required to keep the junction temperature below the absolute maximum. This depends on the power supply voltage and how many amplifiers are shorted. Thermal resistance varies with the amount of PC board metal connected to the package. The specified values are for short traces connected to the leads.

ESD, Electrostatic Discharge Protection

Parameter		Condition	Minimum Level	Unit
HBM	Human Body Model ESD	ANSI/ESDA/JEDEC JS-001 (1)	2	kV
CDM	Charged Device Model ESD	ANSI/ESDA/JEDEC JS-002 (2)	1	kV

(1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.
(2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

Recommended Operating Conditions

Parameter		Min	Typ	Max	Unit
V_S	Supply Voltage, $(+V_S) – (-V_S)$	2.5 or ± 1.25		5.5 or ± 2.25	V
T_A	Operating Temperature Range	−40		125	°C

Thermal Information

Package Type	θ_{JA}	θ_{JC}	Unit
SOT353 (SC70-5)	400	150	°C/W
SOT23-5	250	81	°C/W
SOT23-6	250	81	°C/W
SOP8	158	43	°C/W
MSOP8	210	45	°C/W
TSSOP8	191	44	°C/W
SOP14	120	36	°C/W
TSSOP14	180	35	°C/W

Electrical Characteristics

All test conditions: V_S = 5 V, T_A = 25°C, R_L = 10 kΩ, C_L = 100 pF, unless otherwise noted.

Symbol	Parameter	Conditions	T_A	Min	Typ	Max	Unit
Power Supply							
V_S	Supply Voltage Range			2.5		5.5	V
I_Q	Quiescent Current per Amplifier	V_S = 2.5 V to 5.5 V, TPA6551			0.9	1.2	mA
			−40°C to 125°C			1.5	mA
		V_S = 2.5 V to 5.5 V, TPA6552/TPA6554			0.8	1	mA
			−40°C to 125°C			1.2	mA
PSRR	Power Supply Rejection Ratio	V_S = 2.5 V to 5.5 V		88	110		dB
			−40°C to 125°C	83			dB
Shutdown, TPA6551N Only							
	Quiescent Current in Shutdown Mode				0.5	2	μA
V_{IL}	Input Low Voltage	Shutdown				0.15 × V_S	V
V_{IH}	Input High Voltage	Active		0.85 × V_S			V
	Input Current		−40°C to 125°C		0.5	2	μA
	Turn-on time				20		μs
	Turn-off time				2		μs
Input Characteristics							
V_{OS}	Input Offset Voltage	V_{CM} = 0 V, 2.5 V		−1	0.15	1	mV
			−40°C to 125°C	−2		2	mV
		V_{CM} = 5 V		−1.5	0.25	1.5	mV
			−40°C to 125°C	−3		3	mV
$V_{OS}TC$	Input Offset Voltage Drift		−40°C to 125°C		2		μV/°C
I_B	Input Bias Current	V_{CM} = 2.5 V			400		nA
			−40°C to 125°C		600		nA
I_{OS}	Input Offset Current	V_{CM} = 2.5 V			10		nA
			−40°C to 125°C		20		nA
C_{IN}	Input Capacitance	Differential mode			2		pF
		Common mode			4		pF
A_V	Open-Loop Voltage Gain	V_O = 0.5 V to 4.5 V		78	100		dB
			−40°C to 125°C	70			dB
V_{CMR}	Common-Mode Input Voltage Range		−40°C to 125°C	(−V_S)		(+V_S)	V

Symbol	Parameter	Conditions	T_A	Min	Typ	Max	Unit
CMRR	Common-Mode Rejection Ratio	V_{CM} = 0 V to 3.5 V		80	100		dB
			−40°C to 125°C	75			dB
		V_{CM} = 0 V to 5 V		70	90		dB
			−40°C to 125°C	65			dB
Output Characteristics							
	Output Voltage Swing from Positive Rail	V_S = 5.5 V, R_L = 10 kΩ to V_S / 2			5	12	mV
			−40°C to 125°C			15	mV
		V_S = 5.5 V, R_L = 2 kΩ to V_S / 2			25	35	mV
			−40°C to 125°C			40	mV
	Output Voltage Swing from Negative Rail	V_S = 5.5 V, R_L = 10 kΩ to V_S / 2			3	12	mV
			−40°C to 125°C			15	mV
		V_S = 5.5 V, R_L = 2 kΩ to V_S / 2			12	25	mV
			−40°C to 125°C			30	mV
I_{SC}	Output Short-Circuit Current	V_S = 5.5 V, source		68	90		mA
			−40°C to 125°C	50			mA
		V_S = 5.5 V, sink		98	120		mA
			−40°C to 125°C	75			mA
AC Specifications							
GBW	Gain-Bandwidth Product				10		MHz
SR	Slew Rate	G = 1, 2-V step			3		V/μs
t_{OR}	Overload Recovery				1.8		μs
t_S	Settling Time, 0.1%	G = 1, 2-V step			1		μs
PM	Phase Margin	R_L = 10 kΩ, C_L = 100 pF			60		°
GM	Gain Margin	R_L = 10 kΩ, C_L = 100 pF			15		dB
	Channel Separation	f = 100 kHz			100		dB
Noise Performance							
E_N	Input Voltage Noise	f = 0.1 Hz to 10 Hz, V_{CM} = 2.5 V			0.2		μV_{RMS}
e_N	Input Voltage Noise Density	f = 10 Hz, V_{CM} = 2.5 V			20		nV/√Hz
		f = 1 kHz, V_{CM} = 2.5 V			10		nV/√Hz
i_N	Input Current Noise	f = 1 kHz			500		fA/√Hz
THD+N	Total Harmonic Distortion and Noise	f = 1 kHz , G = 1, R_L = 10 kΩ, V_{OUT} = 1 V_{pp}			0.007		%

Typical Performance Characteristics

All test conditions: V_S = 5 V, T_A = +25°C, unless otherwise noted.

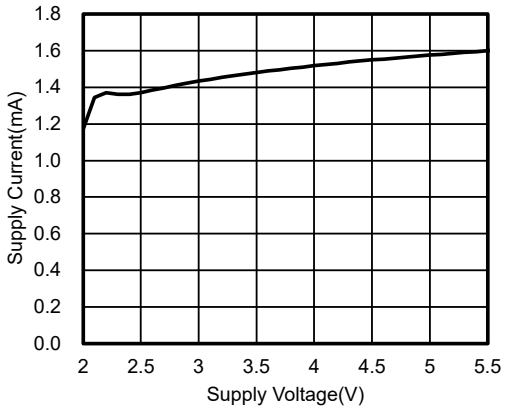


Figure 1. Supply Current vs. Supply Voltage, 2 ch

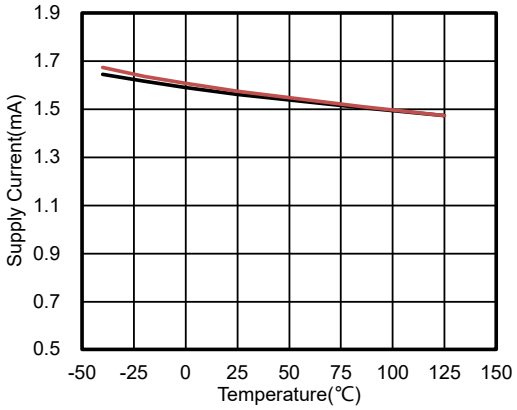


Figure 2. Supply Current vs. Temperature, 2 ch, 2 pcs

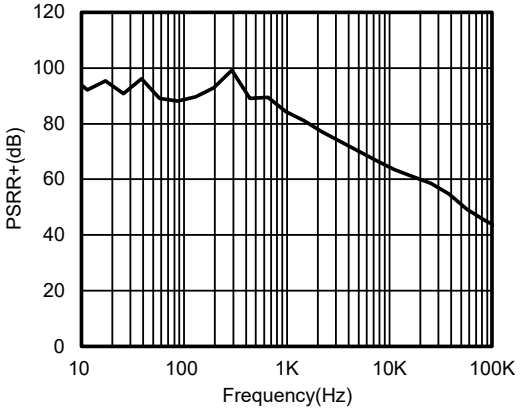


Figure 3. PSRR+ vs. Frequency

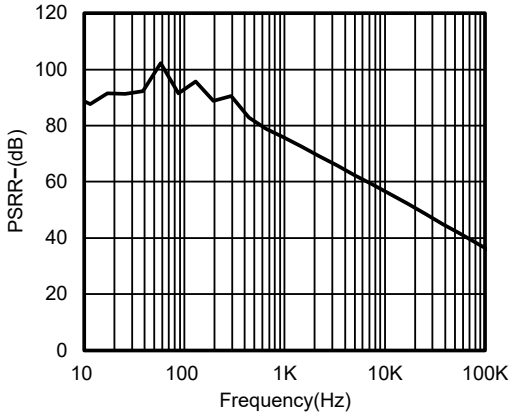


Figure 4. PSRR− vs. Frequency

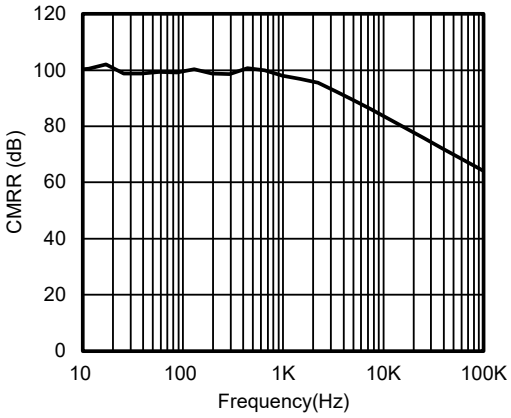


Figure 5. CMRR vs. Frequency

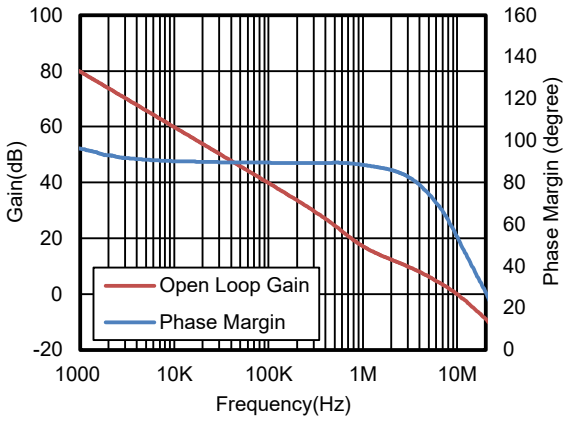


Figure 6. Open-Loop Gain and Phase Margin vs. Frequency, R_L = 10 kΩ, C_L = 100 pF

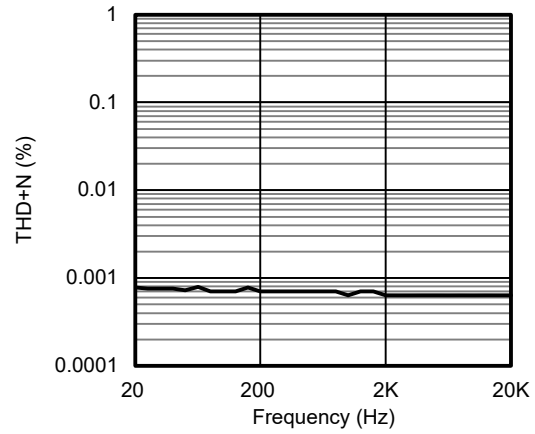


Figure 7. THD vs. Frequency, G = 1, V_{IN} = 1 V_{RMS}

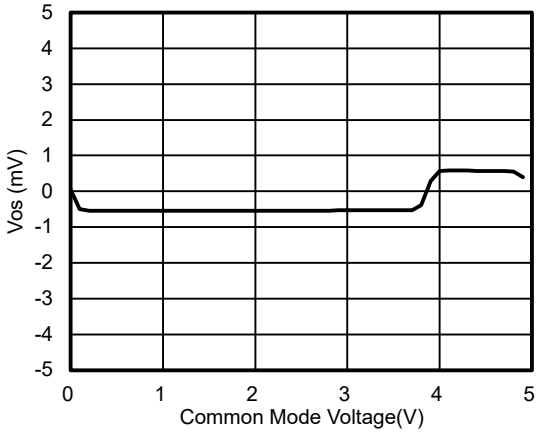


Figure 8. V_{OS} vs. V_{CM}, V_S = 5.5 V

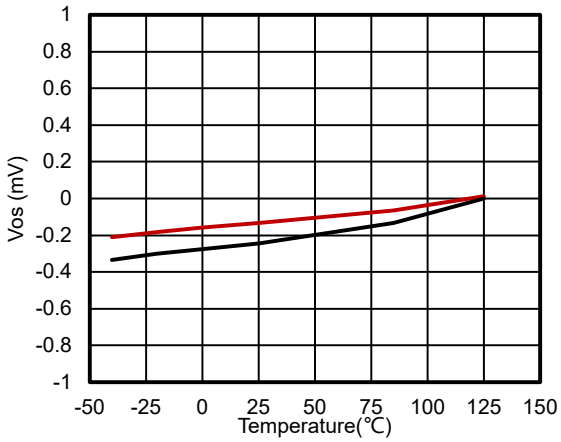


Figure 9. V_{OS} vs. Temperature, 2 pcs

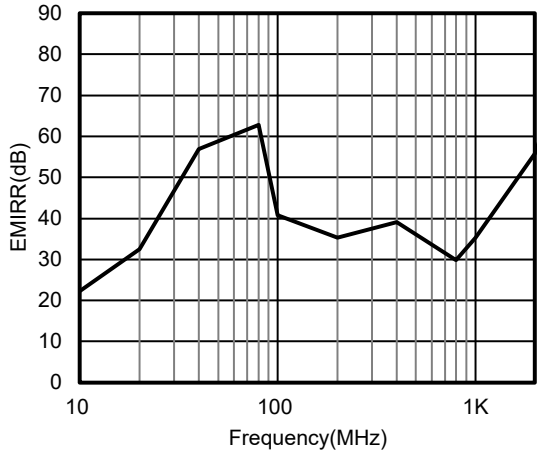


Figure 10. EMIRR vs. Frequency

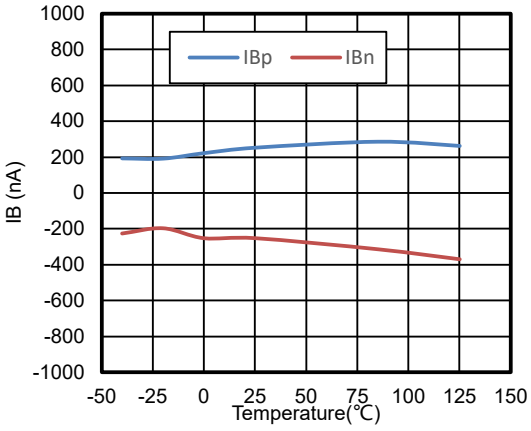


Figure 11. I_B vs. Temperature

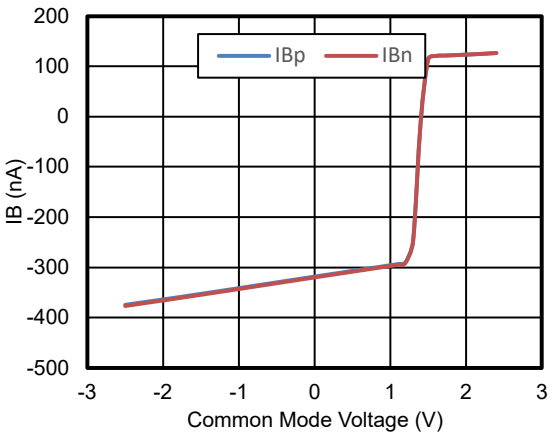


Figure 12. I_B vs. Common Voltage, ($-V_S$) = −2.5 V, ($+V_S$) = 2.5 V

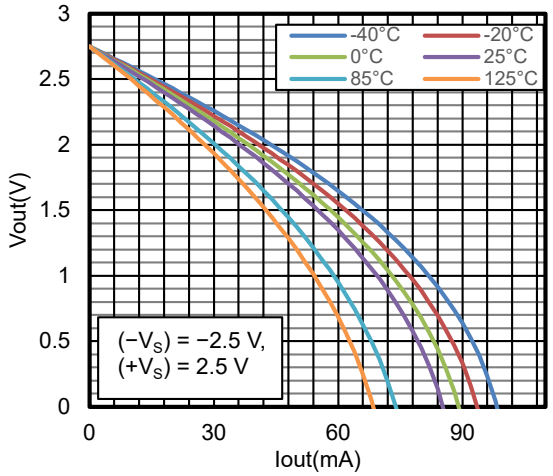


Figure 13. Output Voltage vs. Output Current, ($-V_S$) = −2.5 V, ($+V_S$) = 2.5 V

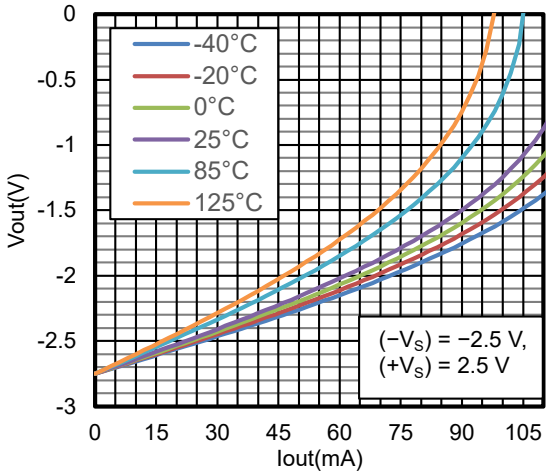


Figure 14. Output Voltage vs. Output Current, ($-V_S$) = −2.5 V, ($+V_S$) = 2.5 V

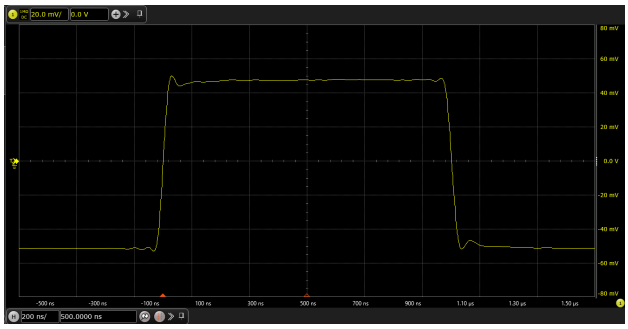


Figure 15. 100-mV Small-Signal Step Response

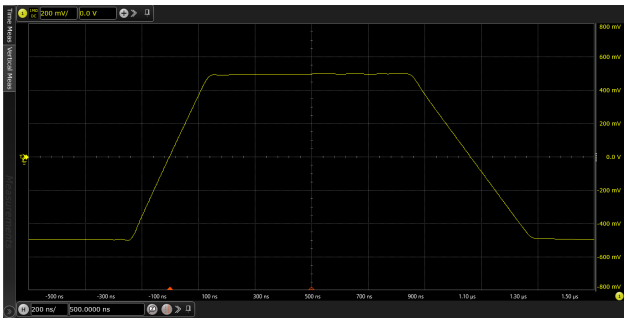


Figure 16. 1-V Large-Signal Step Response

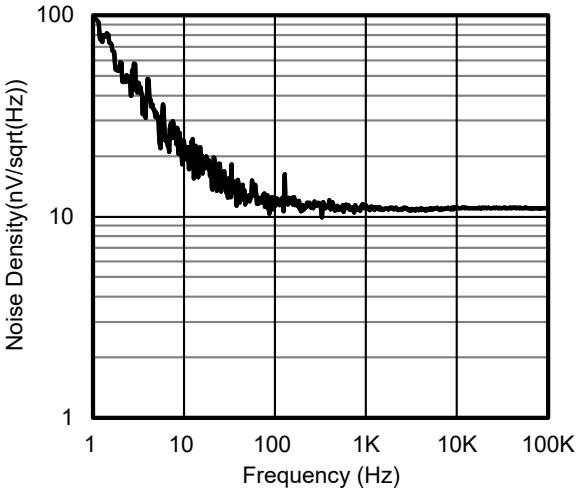


Figure 17. Voltage Noise Spectral Density vs. Frequency, V_S = 5 V

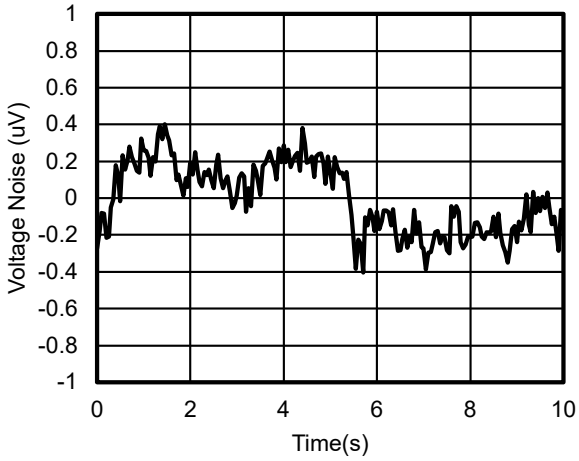


Figure 18. 0.1-Hz to 10-Hz Voltage Noise, V_S = 5 V

Detailed Description

Overview

The TPA655x op amps can operate on a single-supply voltage (2.5 V to 5.5 V), or a split-supply voltage (±1.25 V to ±2.75 V), making them highly versatile and easy to use. The power-supply pins should have local bypass ceramic capacitors (typically 0.01 µF to 0.1 µF). These amplifiers are fully specified from 2.5 V to 5.5 V and over the extended temperature range from −40°C to +125°C. Parameters that exhibit variance with regard to operating voltage or temperature are presented in Typical Performance Characteristics.

Functional Block Diagram

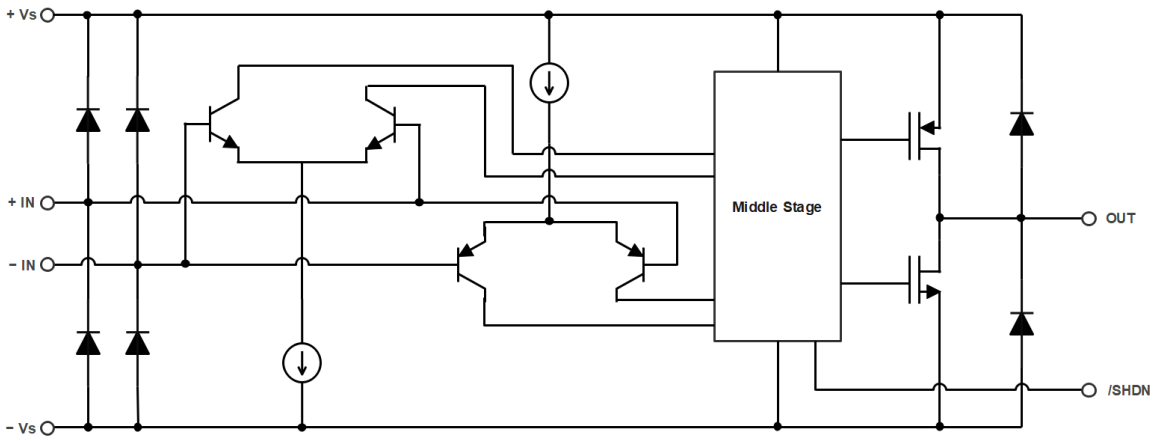


Figure 19. Functional Block Diagram

Feature Description

Operating Voltage

The TPA655x operational amplifiers are designed for single-supply operation from 2.5 V to 5.5 V, or dual-supply operation from ±1.25 V to ±2.75 V.

Rail-to-Rail Input

The input common-mode voltage range of the TPA655x series extends 100 mV beyond the supply rails. This performance is achieved with a complementary input stage: a PNP input differential pair in parallel with an NPN input differential pair. The PNP pair is active for inputs from 100 mV below the negative supply to approximately $(+V_S)$ – 1.5 V, whereas the NPN pair is active for input voltages close to the positive rail, typically $(+V_S)$ – 1.5 V to 100 mV above the positive supply. There is around 200 mV transition region at $(+V_S)$ – 1.5 V where both pairs are on. Within this transition region, PSRR, CMRR, offset voltage, offset drift, and THD can degrade compared to that operating outside this region.

Rail-to-Rail Output

The TPA655x series delivers rail-to-rail output swing capability with a class-AB output stage. Different load conditions change the ability of the amplifier to swing close to the rails.

Shutdown Function

The shutdown function of the TPA655x is only available in the TPA655xN series. The voltage level of this is referenced to the supply voltage of the operational amplifier. The operational amplifier is enabled with a valid high voltage and shut down by a valid low voltage. When the single supply is used, a valid high level is defined as 0.85 × ($+V_S$) of the positive supply and a valid low level is defined as 0.15 × ($+V_S$) of the positive supply. For example, with $+V_S$ at 5 V and $-V_S$ at 0 V, a valid high level is defined as 4.25 V, and a valid low level is defined as 0.75 V. If dual or split power supplies are used, ensure that the valid high or valid low input signals are properly referred to the positive supply voltage. For example, with $+V_S$ at 2.5 V and $-V_S$ at −2.5 V, a valid high level is defined as 1.75 V, and a valid low level is defined as −1.75 V. The pin of SHDN is internally pulled up to a valid high level when this pin is left open state, so the amplifier is enabled initially if nothing is connected to the shutdown pin. The output state of the amplifier is assumed as high-impedance state if shut down.

Low 1/f Input Voltage Noise

The TPA655x series uses bipolar transistor as input pair which brings very low 1/f voltage noise. The 1/f corner frequency of the device is lower than 100 Hz. The input voltage noise at 0.1 to 10 Hz is 1 μV_{PP}, so the device is very suitable for applications that need low noise within the low-frequency range.

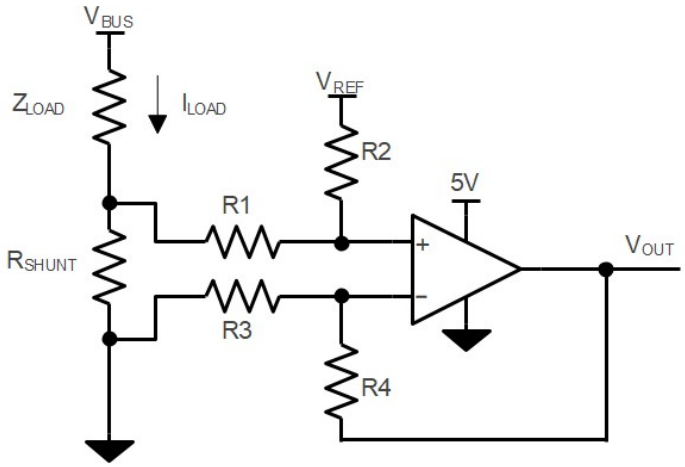
Application and Implementation

> Note
>
> Information in the following application sections is not part of the 3PEAK's component specification and 3PEAK does not warrant its accuracy or completeness. 3PEAK's customers are responsible for determining suitability of components for their purposes. Customers should validate and test their design implementation to confirm system functionality.

Application Information

Low-Side Current-Sensing Application

Figure 20 shows the TPA655x configured in a low-side current sensing application. The low-side current sensing method consists of placing a sense resistor between the load and the circuit ground. The voltage dropping across the resistor is amplified by different amplifier circuits with the TPA655x. V_{REF} can be used to add bias voltage to output voltage. Particular attention must be paid to the matching and precision of R1, R2, R3, and R4, to maximize the accuracy of the measurement.



$$V_{OUT} = (I_{LOAD} \times R_{SHUNT}) \times (R2 / R1) + V_{REF}$$

When R3 = R1, R2 = R4, $R_{SHUNT} << R1$

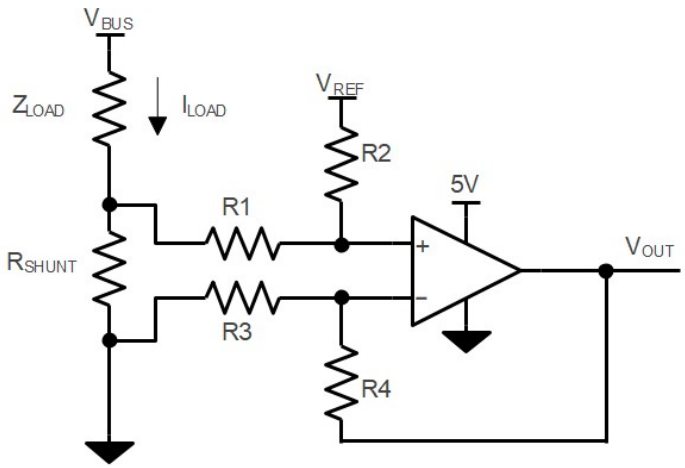
Figure 20. Dual-Supply Operation Connections

Power Supply Recommendations

Place 0.1-μF bypass capacitors close to the power supply pins to reduce coupling errors from the noise or high-impedance power supplies.

Typical Application

Figure 21 shows the typical application schematic.

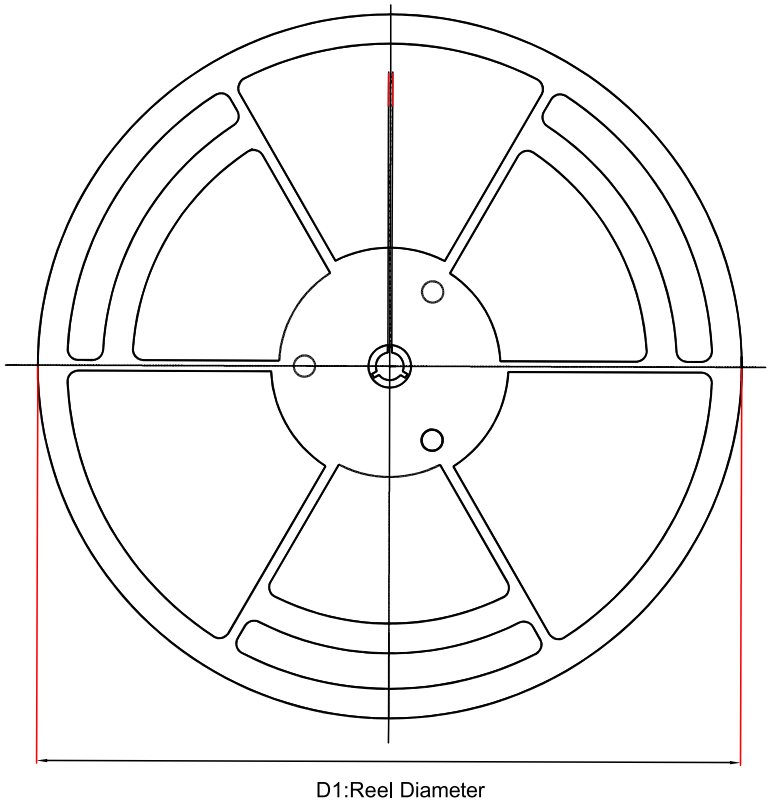


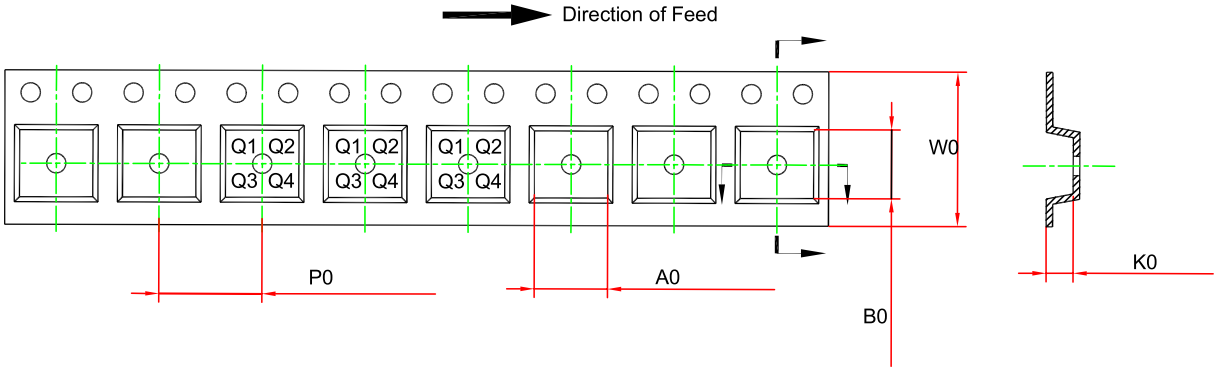
$$V_{OUT} = (I_{LOAD} \times R_{SHUNT}) \times (R2 / R1) + V_{REF}$$

When R3 = R1, R2 = R4, $R_{SHUNT} << R1$

Figure 21. Typical Application Circuit

Tape and Reel Information





Order Number	Package	D1 (mm)	W1 (mm)	A0 (mm) (1)	B0 (mm) (1)	K0 (mm) (1)	P0 (mm)	W0 (mm)	Pin1 Quadrant
TPA6551N-S6TR	SOT23-6	180	12	3.3	3.2	1.4	4	8	Q3
TPA6551-S5TR	SOT23-5	180	12	3.3	3.25	1.4	4	8	Q3
TPA6551U-S5TR	SOT23-5	180	12	3.3	3.25	1.4	4	8	Q3
TPA6551U-SC5R	SOT353	178	12.1	2.4	2.5	1.2	4	8	Q3
TPA6552-SO1R	SOP8	330	17.6	6.5	5.4	2	8	12	Q1
TPA6552-VS1R	MSOP8	330	17.6	5.3	3.4	1.3	8	12	Q1

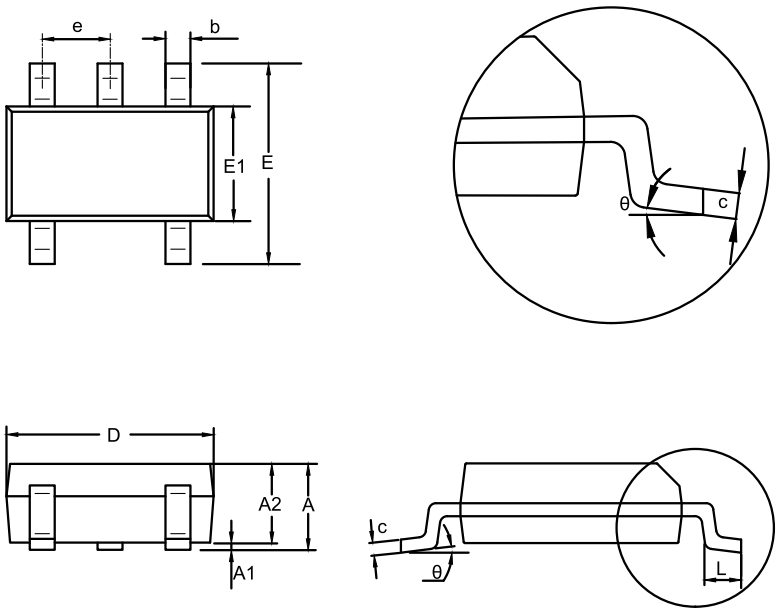
Order Number	Package	D1 (mm)	W1 (mm)	A0 (mm) (1)	B0 (mm) (1)	K0 (mm) (1)	P0 (mm)	W0 (mm)	Pin1 Quadrant
TPA6554-SO2R	SOP14	330	21.6	6.5	9.0	2.1	8	16	Q1
TPA6554-TS2R	TSSOP14	330	17.6	6.8	5.5	1.5	8	12	Q1

(1) The value is for reference only. Contact the 3PEAK factory for more information.

Package Outline Dimensions

SOT353 (SC70-5)

Package Outline Dimensions SC5(SOT353-5-A)



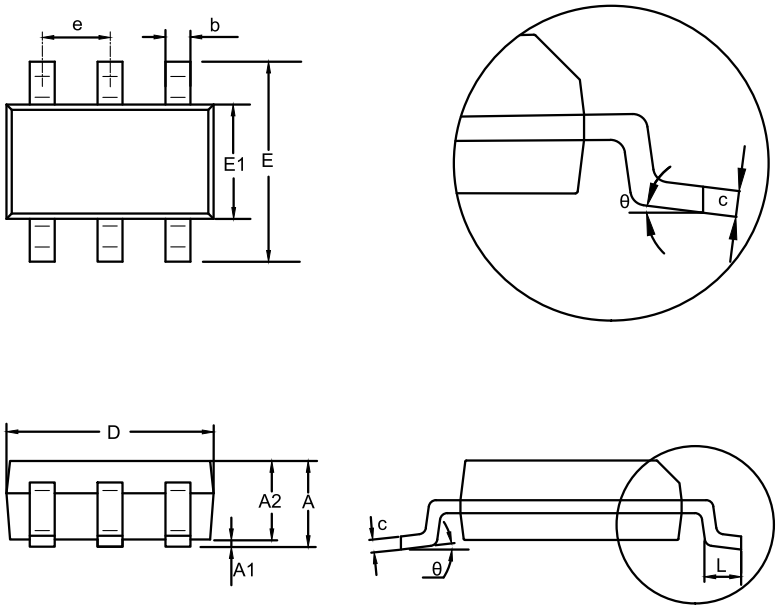
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.850	1.100	0.033	0.043
A1	0.000	0.100	0.000	0.004
A2	0.800	1.000	0.031	0.039
b	0.150	0.350	0.006	0.014
c	0.110	0.230	0.004	0.009
D	2.000	2.200	0.079	0.087
E	2.150	2.450	0.085	0.096
E1	1.150	1.350	0.045	0.053
e	0.650 BSC		0.026 BSC	
L	0.260	0.460	0.010	0.018
θ	0	8°	0	8°

NOTES

1. Do not include mold flash or protrusion.
2. This drawing is subject to change without notice.

SOT363 (SC70-6)

Package Outline Dimensions SC6(SOT363-6-A)



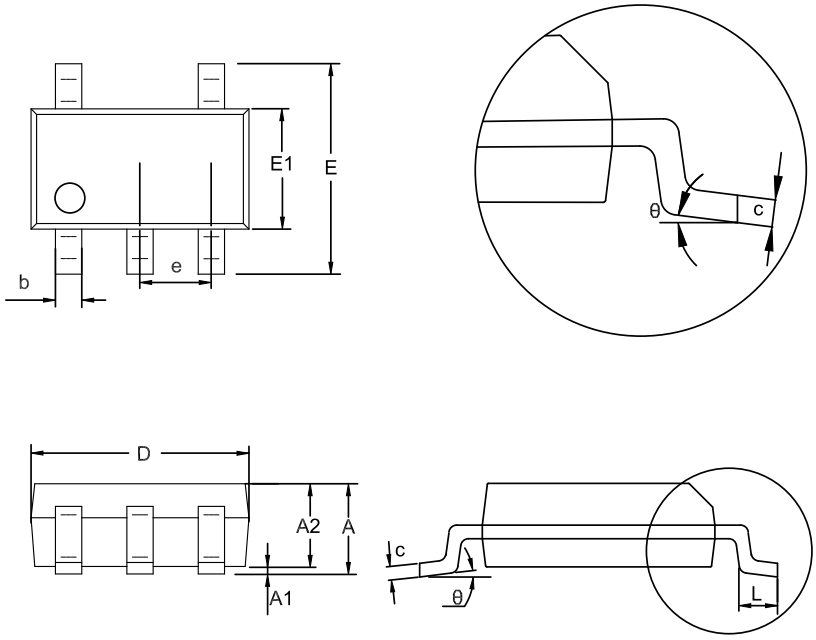
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.850	1.100	0.033	0.043
A1	0.000	0.100	0.000	0.004
A2	0.800	1.000	0.031	0.039
b	0.150	0.350	0.006	0.014
c	0.080	0.230	0.003	0.009
D	2.000	2.200	0.079	0.087
E	2.150	2.450	0.085	0.096
E1	1.150	1.350	0.045	0.053
e	0.650 BSC		0.026 BSC	
L	0.260	0.460	0.010	0.018
θ	0	8°	0	8°

NOTES

1. Do not include mold flash or protrusion.
2. This drawing is subject to change without notice.

SOT23-5

Package Outline Dimensions S5T(SOT23-5-A)



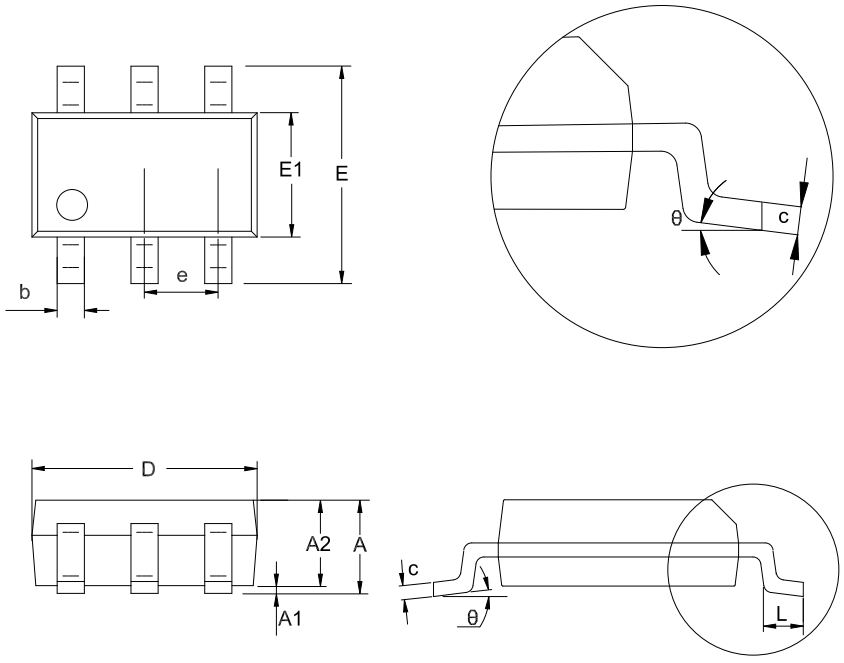
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.050	1.250	0.041	0.049
A1	0.000	0.150	0.000	0.006
A2	1.000	1.200	0.039	0.047
b	0.280	0.500	0.011	0.020
c	0.100	0.230	0.004	0.009
D	2.820	3.020	0.111	0.119
E	2.600	3.000	0.102	0.118
E1	1.500	1.720	0.059	0.068
e	0.950 BSC		0.037 BSC	
L	0.300	0.600	0.012	0.024
θ	0	8°	0	8°

NOTES

1. Do not include mold flash or protrusion.
2. This drawing is subject to change without notice.

SOT23-6

Package Outline Dimensions S6T(SOT23-6-A)



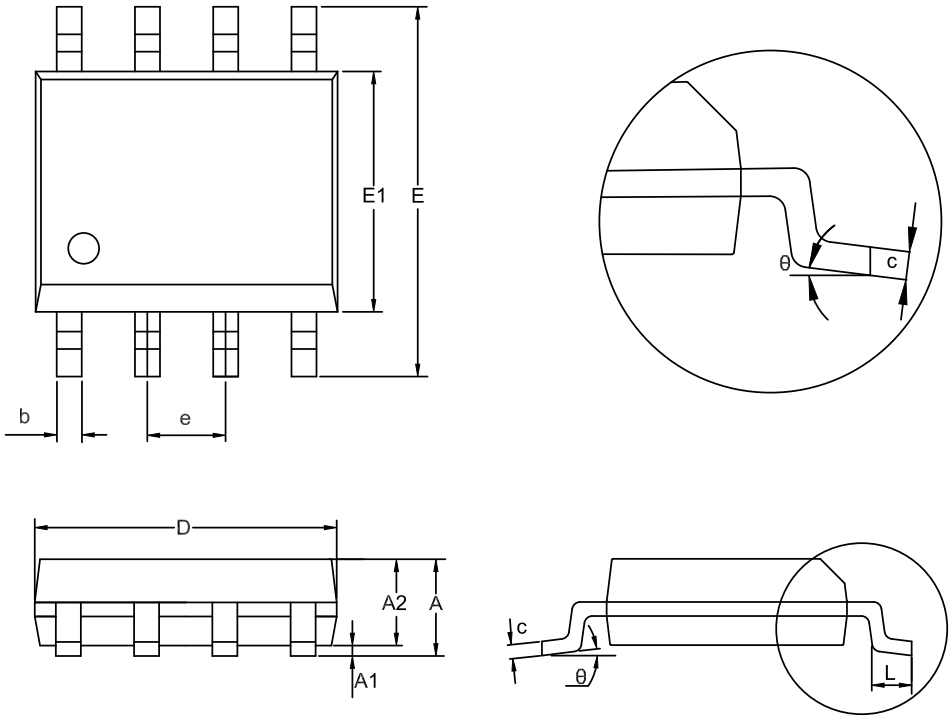
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.050	1.250	0.041	0.049
A1	0.000	0.150	0.000	0.006
A2	1.000	1.200	0.039	0.047
b	0.280	0.500	0.011	0.020
c	0.100	0.230	0.004	0.009
D	2.820	3.020	0.111	0.119
E	2.600	3.000	0.102	0.118
E1	1.500	1.720	0.059	0.068
e	0.950 BSC		0.037 BSC	
L	0.300	0.600	0.012	0.024
θ	0	8°	0	8°

NOTES

1. Do not include mold flash or protrusion.
2. This drawing is subject to change without notice.

SOP8

Package Outline Dimensions SO1(SOP-8-A)



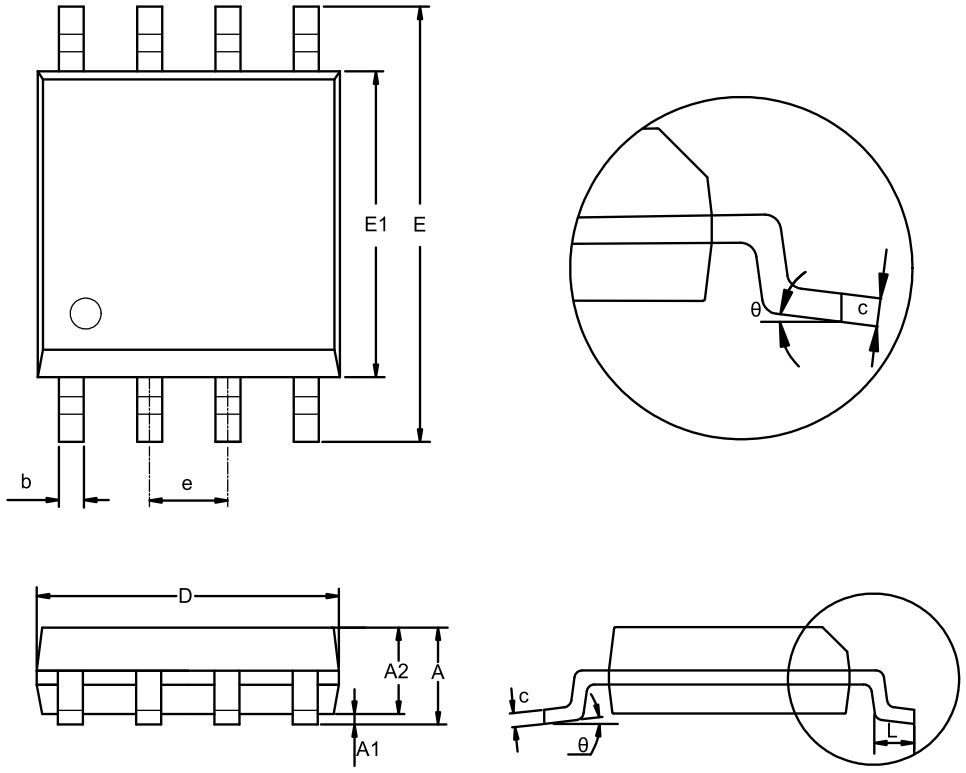
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.350	1.750	0.053	0.069
A1	0.050	0.250	0.002	0.010
A2	1.250	1.550	0.049	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.700	5.100	0.185	0.201
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
e	1.270 BSC		0.050 BSC	
L	0.400	1.000	0.016	0.039
θ	0	8°	0	8°

NOTES

1. Do not include mold flash or protrusion.
2. This drawing is subject to change without notice.

MSOP8

Package Outline Dimensions VS1(MSOP-8-A)



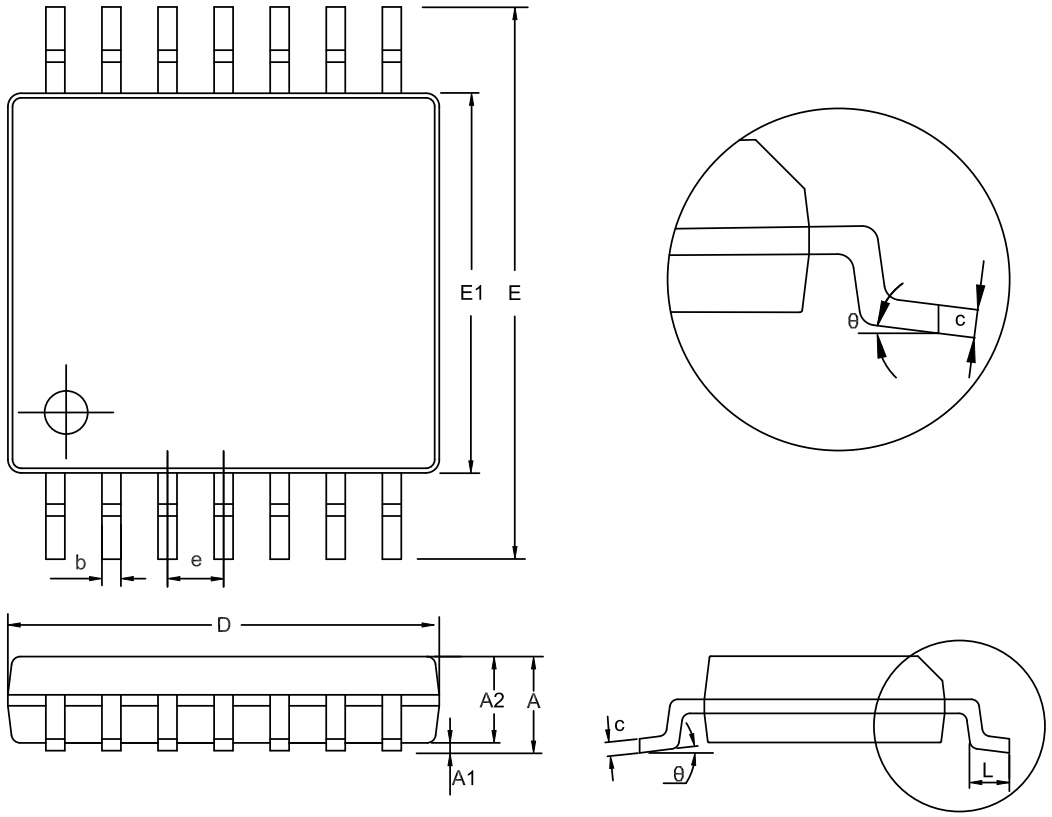
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.800	1.100	0.031	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
E	4.700	5.100	0.185	0.201
E1	2.900	3.100	0.114	0.122
e	0.650 BSC		0.026 BSC	
L	0.400	0.800	0.016	0.031
θ	0	8°	0	8°

NOTES

1. Do not include mold flash or protrusion.
2. This drawing is subject to change without notice.

TSSOP14

Package Outline Dimensions TS2(TSSOP-14-A)



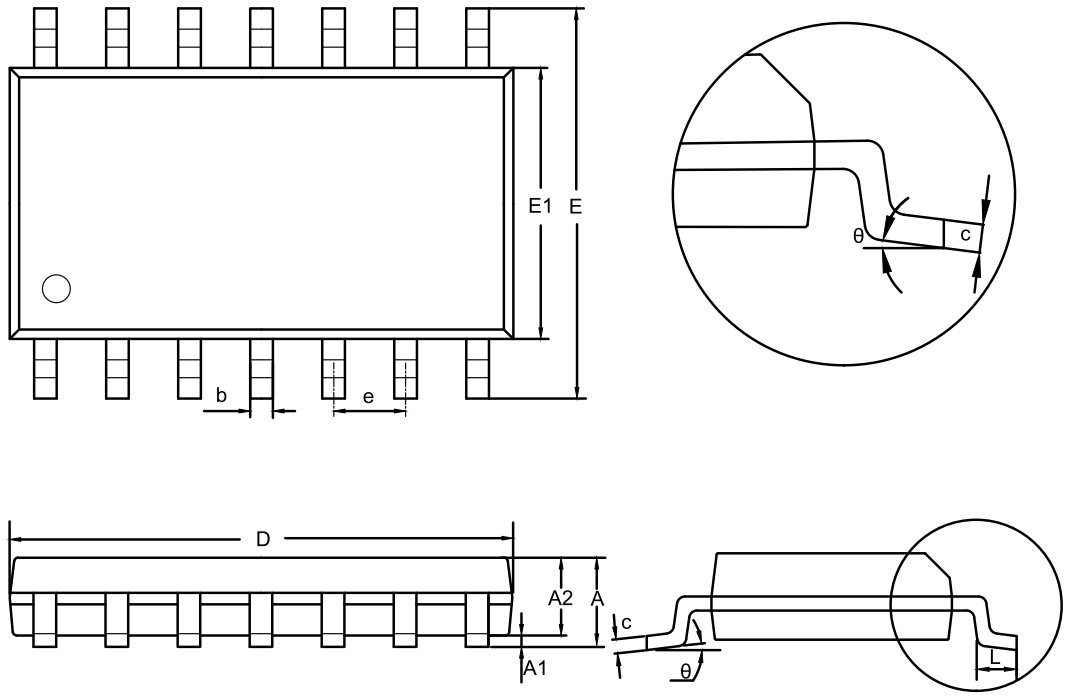
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.900	1.200	0.035	0.047
A1	0.050	0.150	0.002	0.006
A2	0.800	1.050	0.031	0.041
b	0.190	0.300	0.007	0.012
c	0.090	0.200	0.004	0.008
D	4.900	5.100	0.193	0.201
E	6.200	6.600	0.244	0.260
E1	4.300	4.500	0.169	0.177
e	0.650 BSC		0.026 BSC	
L	0.450	0.750	0.018	0.030
θ	0	8°	0	8°

NOTES

1. Do not include mold flash or protrusion.
2. This drawing is subject to change without notice.

SOP14

Package Outline Dimensions SO2(SOP-14-A)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.350	1.750	0.053	0.069
A1	0.050	0.250	0.002	0.010
A2	1.250	1.650	0.049	0.065
b	0.310	0.510	0.012	0.020
c	0.100	0.250	0.004	0.010
D	8.450	8.850	0.333	0.348
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
e	1.270 BSC		0.050 BSC	
L	0.400	1.270	0.016	0.050
θ	0	8°	0	8°

NOTES

1. Do not include mold flash or protrusion.
2. This drawing is subject to change without notice.

Order Information

Order Number	Operating Temperature Range	Package	Marking Information	MSL	Transport Media, Quantity	Eco Plan
TPA6551U-SC5R	−40 to 125°C	SOT353 (SC70-5)	65U	3	Tape and Reel, 3000	Green
TPA6551-S5TR	−40 to 125°C	SOT23-5	655	3	Tape and Reel, 3000	Green
TPA6551U-S5TR	−40 to 125°C	SOT23-5	65U	3	Tape and Reel, 3000	Green
TPA6551N-S6TR	−40 to 125°C	SOT23-6	65N	3	Tape and Reel, 3000	Green
TPA6552-SO1R	−40 to 125°C	SOP8	A6552	3	Tape and Reel, 4000	Green
TPA6552-VS1R	−40 to 125°C	MSOP8	A6552	3	Tape and Reel, 3000	Green
TPA6554-SO2R	−40 to 125°C	SOP14	A6554	3	Tape and Reel, 2500	Green
TPA6554-TS2R	−40 to 125°C	TSSOP14	A6554	3	Tape and Reel, 3000	Green

Green: 3PEAK defines "Green" to mean RoHS compatible and free of halogen substances.

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