APX4558

DUAL CHANNEL LOW NOISE GENERAL PURPOSE OPERATIONAL AMPLIFIER

NEW PRODUCT

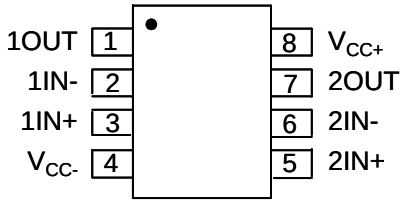
Description

The APX4558 device is a dual low noise operational amplifier. The wide bandwidth and low noise make it very suited to audio applications.

The device is short-circuit protected, and the internal frequency compensation ensures stability without external components.

Pin Assignments

(Top View)



SO-8

Features

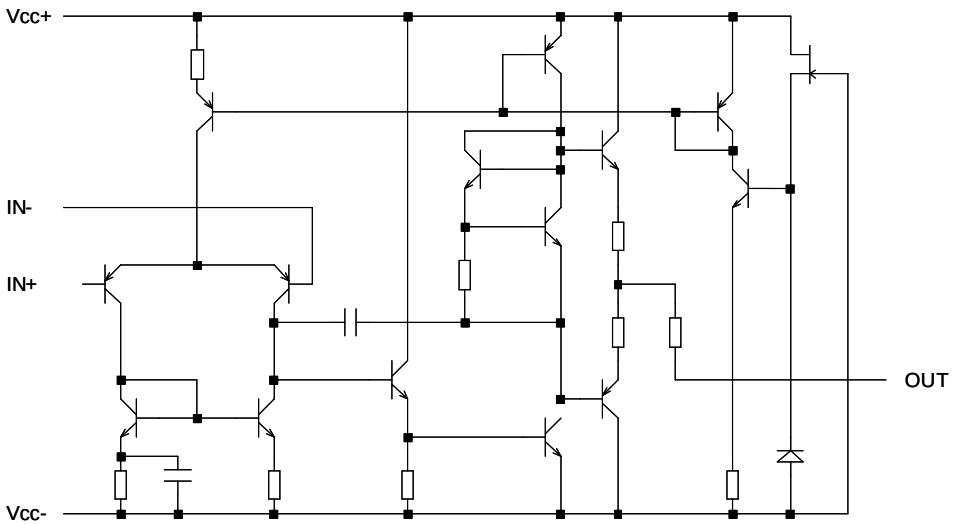
- Unity-Gain Bandwidth . . . 3 MHz typical
- Gain and Phase match between amplifiers
- Low Noise . . . 8 nV/$\sqrt{\text{Hz}}$ typical at 1 kHz
- Wide Common-Mode and Differential voltage ranges
- No frequency compensation required
- Low power consumption
- No latch-up
- Green mold compound (No Br, Sb) (Note 1)

Applications

- Audio pre amps
- RCA line out buffers

Notes: 1. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied. Please visit our website at http://www.diodes.com/products/lead_free.html.

Schematic Diagram



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Pin Descriptions

Pin #	Name	Description
1	1OUT	Amplifier 1 output
2	1IN-	Amplifier 1 inverting input
3	1IN+	Amplifier 1 non-inverting input
4	V_{CC-}	Negative supply pin for amplifier 1 and amplifier 2
5	2IN+	Amplifier 2 non-inverting input
6	2IN-	Amplifier 2 inverting input
7	2OUT	Amplifier 2 output
8	V_{CC+}	Positive supply pin for amplifier 1 and amplifier 2.

Absolute Maximum Ratings (Note 2)

Symbol	Parameter	Rating	Unit
V_{CC+}	Supply voltage (Note 3)	18	V
V_{CC-}		-18	
V_{ID}	Differential input voltage (Note 4)	±30	V
V_I	Input voltage (any input) (Note 3, 5)	±15	V
	Duration of output short circuit to ground, one amplifier at a time (Note 6)	Unlimited	
T_J	Junction Temperature (Note 7)	150	°C
T_{STG}	Storage Temperature	-65 to 150	°C

Notes:
2. Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under Recommended Operating Conditions is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
3. All voltage values, unless otherwise noted, are with respect to the midpoint between V_{CC+} and V_{CC-}.
4. Differential voltages are at IN+ with respect to IN–.
5. The magnitude of the input voltage must never exceed the magnitude of the supply voltage or 15 V, whichever is less.
6. Temperature and/or supply voltages must be limited to ensure that the dissipation rating is not exceeded.
7. Maximum power dissipation is a function of T_J (max), θ_{JA}, and T_A. The maximum allowable power dissipation at any allowable ambient temperature is $P_D = (T_J (max) – T_A)/\theta_{JA}$. Operating at the absolute maximum T_J of 150°C can affect reliability.

Recommended Operating Conditions

Symbol	Parameter		Min	Max	Unit
V_{CC+}	Supply voltage (Note 3)		5	15	V
V_{CC-}			-5	-15	
T_A	Operating Ambient Temperature Range	APX4558	0	70	°C
		APX4558I	-40	105	

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Electrical Characteristics ($V_{CC\pm}$ = ±15V, T_A = 25C, unless otherwise stated)

Symbol	Parameter	Conditions	T_A	Min	Typ.	Max	Unit
AC Characteristics							
V_{IO}	Input offset voltage	V_O = 0V	25°C		0.5	6	mV
			Full temp			7.5	
I_{IO}	Input offset current	V_O = 0V	25°C		5	200	nA
			Full temp			300	
I_{IB}	Input bias current	V_O = 0V	25°C		150	500	nA
			Full temp			800	
V_{ICR}	Common-mode input voltage range		25°C	±12	±14		V
V_{OM}	Maximum output voltage swing	R_L = 10kΩ	25°C	±12	±14		V
		R_L = 2kΩ	25°C	±10	±13		
			Full temp	±10			
A_{VD}	Large-signal differential voltage amplification	R_L ≥ 2kΩ V_O = ±10V	25°C	20	300		V/mV
			Full temp	15			
R_{IN}	Input resistance		25°C	0.3	5		MΩ
CMRR	Common-mode rejection ratio	V_{IN} = $V_{ICR(Min)}$	25°C	70	90		dB
PSRR	Power supply rejection ratio	$V_{CC\pm}$ = ±15V to ±9V	25°C	76	90		dB
I_{CC}	Supply current both amplifiers	V_O = 0V, No load	25°C		2.5	5.6	mA
			T_A min		3	6.6	
			T_A max		2.3	5	
AC Characteristics							
B_1	Unity-gain bandwidth		25°C		3		MHz
SR	Slew rate at unity gain	V_I = ±10V, R_L = 2kΩ, C_L = 100pF	25°C	1.1	1.7		V/µs
v_n	Equivalent input noise voltage (closed loop)	G=100, R_S = 100Ω F = 1kHz, BW = 1Hz	25°C		8		nV/$\sqrt{Hz}$
V_{O1}/V_{O2}	Crosstalk attenuation	Open loop, R_S = 1kΩ	25°C		85		dB
		G = 100, f = 10kHz			105		
t_r	Rise time	V_I = 20mV, R_L = 2kΩ, C_L = 100pF	25°C		0.13		µs
	overshoot		25°C		5		%
Power and Thermal Characteristics							
P_D	Total power dissipation both amplifiers	V_O = 0V, No load	25°C		75	170	mW
			T_A min		90	200	
			T_A max		70	150	
θ_{JA}	Thermal Resistance Junction-to-Ambient	SO-8 (Note 8)			130		°C/W
θ_{JC}	Thermal Resistance Junction-to-Case	SO-8 Note 8)			15		°C/W

Notes: 8. Test condition for SO-8: Device mounted on FR-4 substrate PC board, with minimum recommended pad layout
9. Full temp is specified as 0 to 70°C for the APX4558 and -40 to 105°C for the APX48558I

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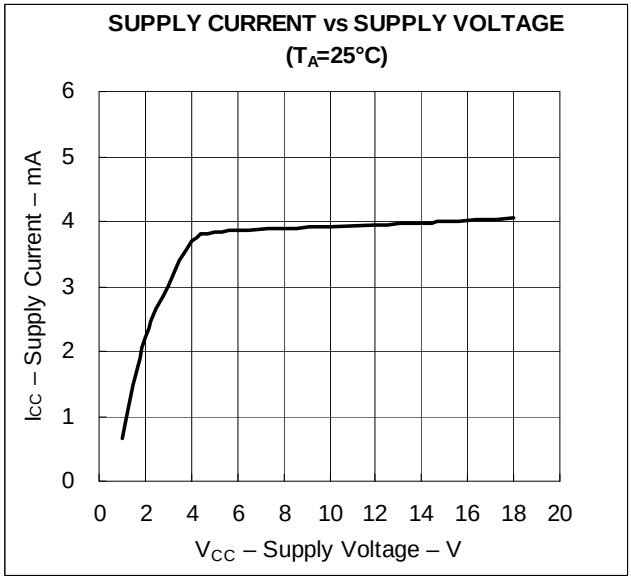
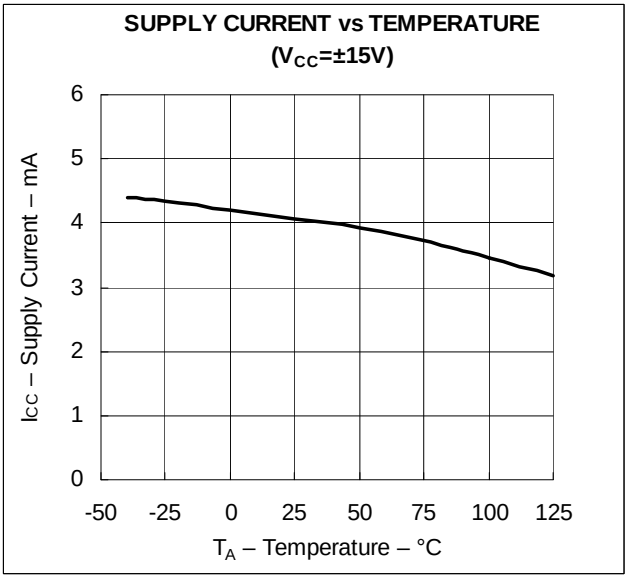
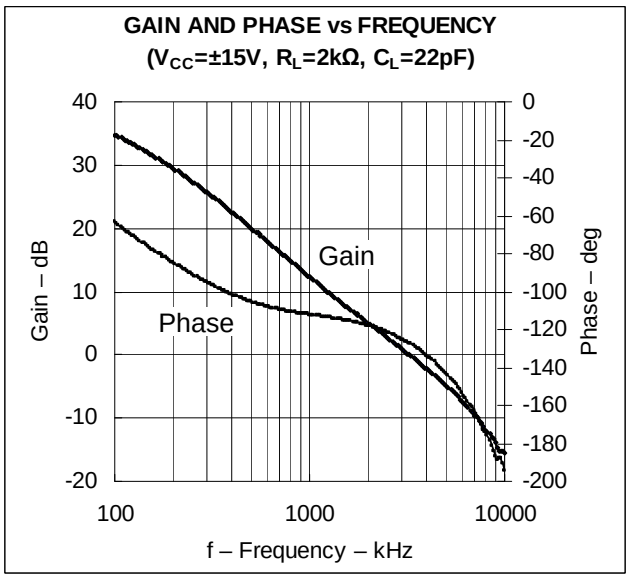
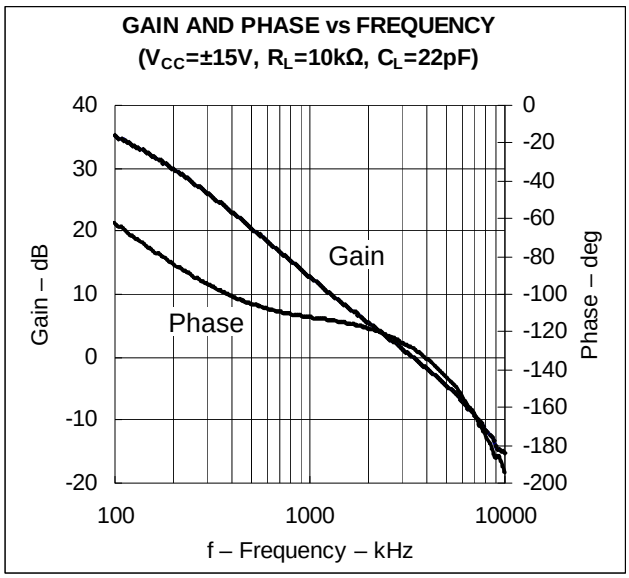
Typical Performance Characteristics



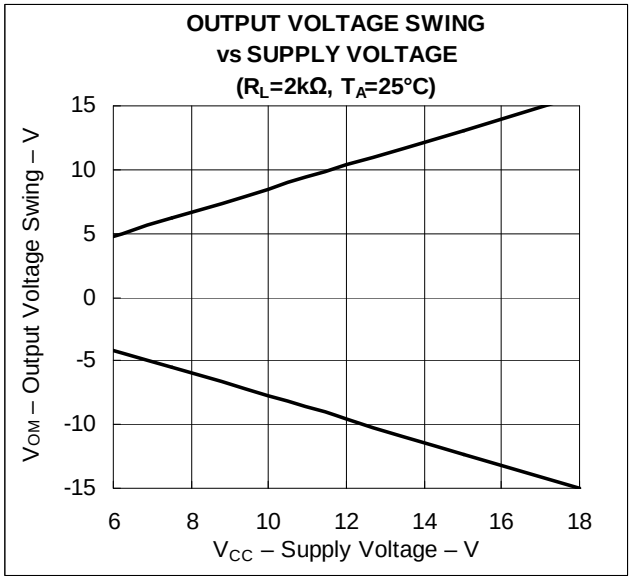


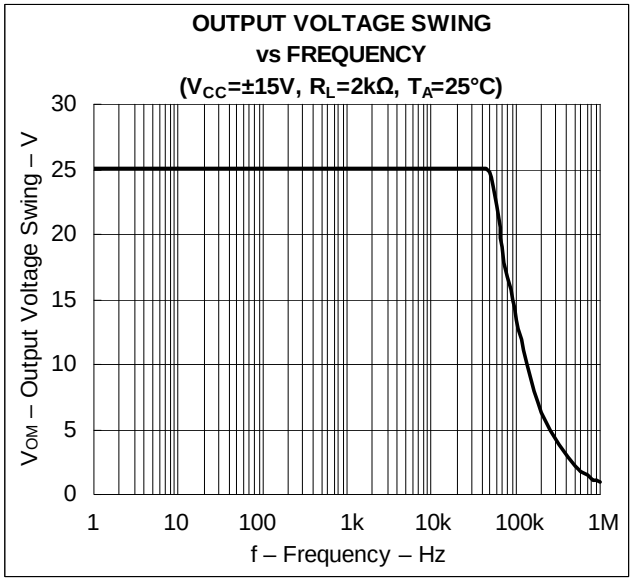


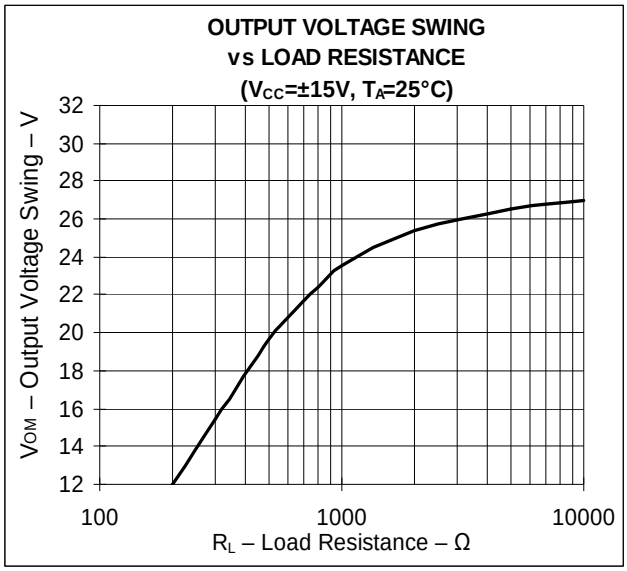


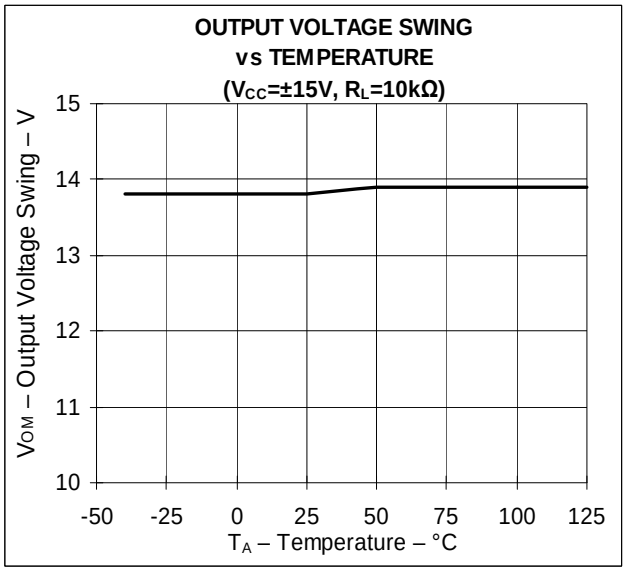
NEW PRODUCT

Typical Performance Characteristics (Continued)



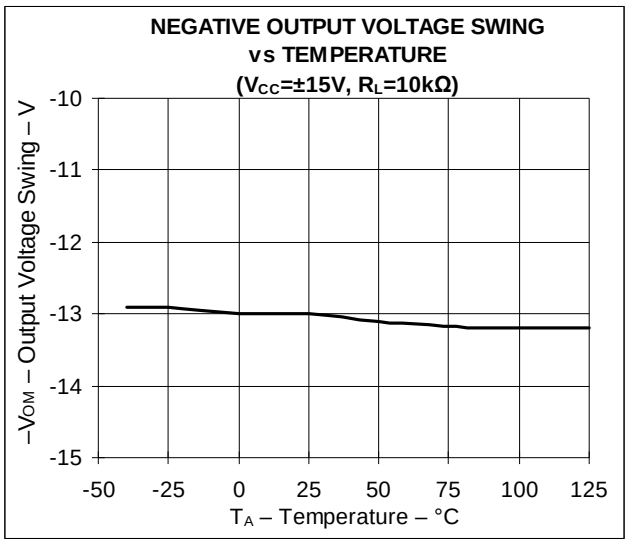


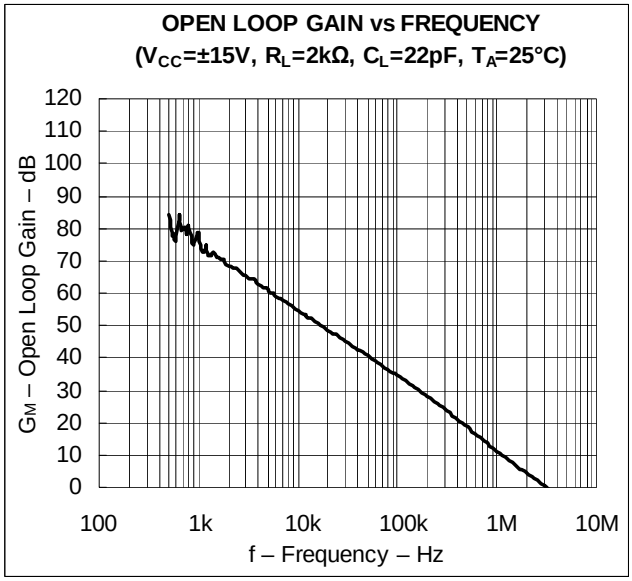


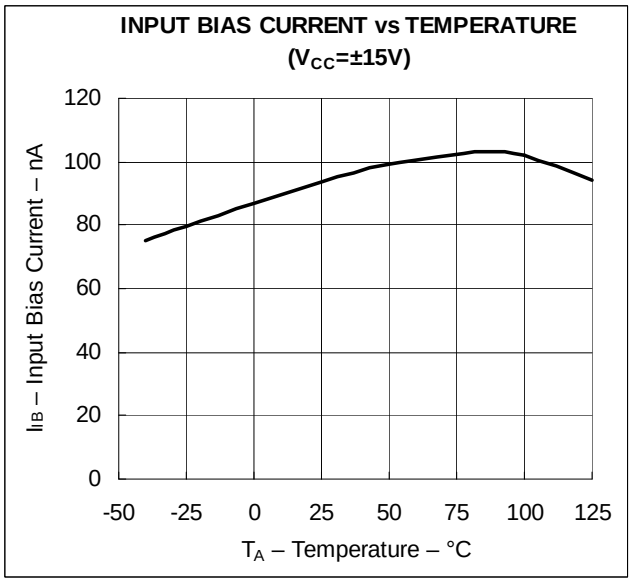


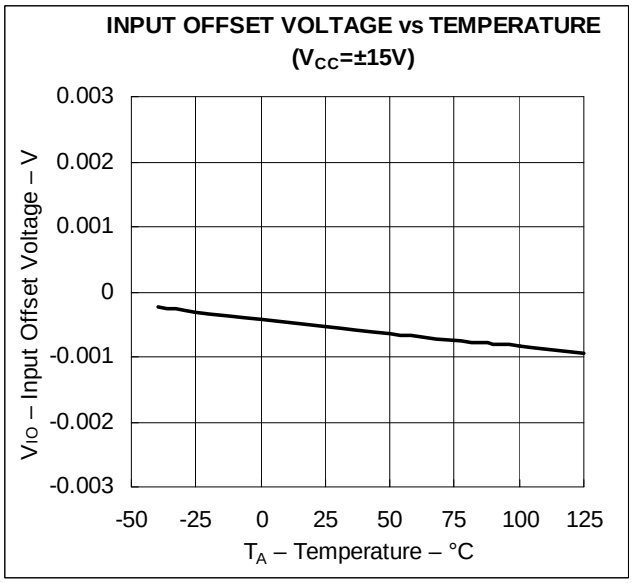
NEW PRODUCT

Typical Performance Characteristics (Continued)



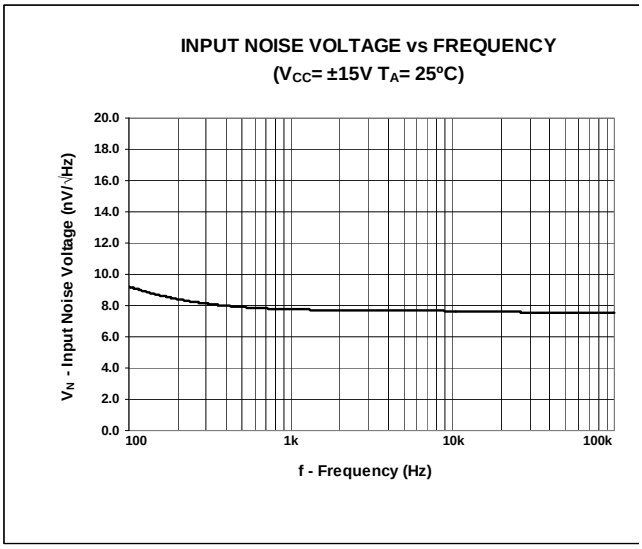






NEW PRODUCT

Typical Performance Characteristics (Continued)



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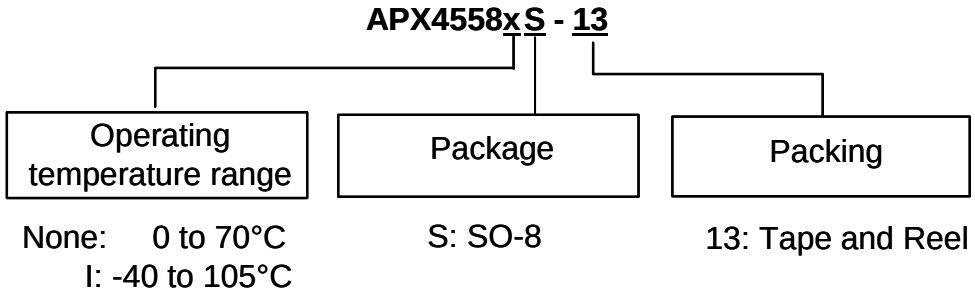
Ordering Information

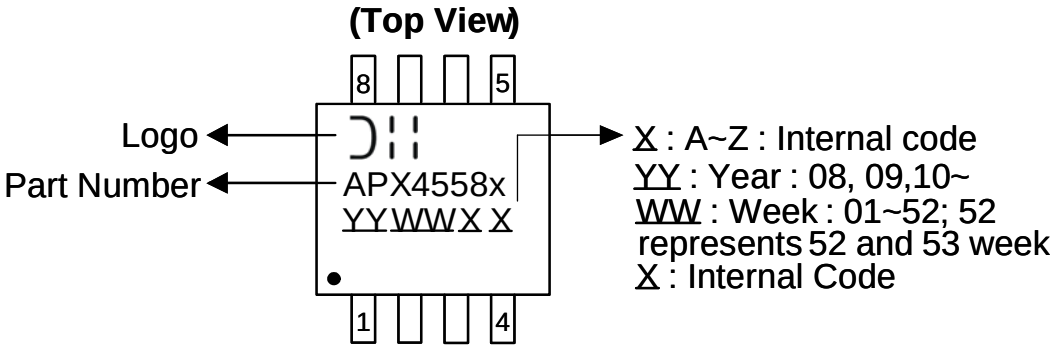


Device	Package Code	Packaging (Note 10)	13" Tape and Reel	
			Quantity	Part Number Suffix
APX4558S-13	S	SO-8	2500/Tape & Reel	-13
APX4558IS-13	S	SO-8	2500/Tape & Reel	-13

Notes: 10. Pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at http://www.diodes.com/datasheets/ap02001.pdf.

Marking Information

SO-8



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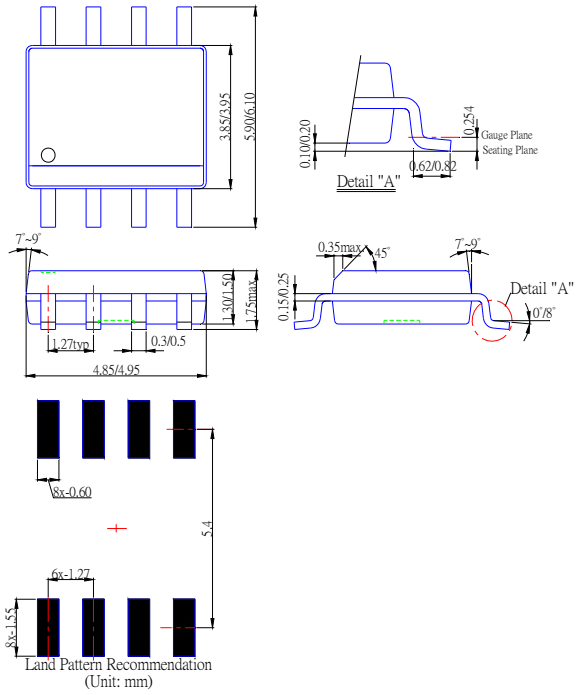
Package Outline Dimensions (All Dimensions in mm)

SO-8



NEW PRODUCT

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