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Please note: As part of the Fairchild Semiconductor integration, some of the Fairchild orderable part numbers will need to change in order to meet ON Semiconductor's system requirements. Since the ON Semiconductor product management systems do not have the ability to manage part nomenclature that utilizes an underscore (_), the underscore (_) in the Fairchild part numbers will be changed to a dash (-). This document may contain device numbers with an underscore (_). Please check the ON Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at www.onsemi.com. Please email any questions regarding the system integration to Fairchild_questions@onsemi.com.

KA258/KA258A, KA358/KA358A, KA2904

Dual Operational Amplifier

Features

- Internally Frequency Compensated for Unity Gain
- Large DC Voltage Gain: 100dB
- Wide Power Supply Range:
  KA258/KA258A, KA358/KA358A: 3V ~ 32V (or ±1.5V~ 16V)
  KA2904 : 3V~26V (or ±1.5V ~ 13V)
- Input Common Mode Voltage Range Includes Ground
- Large Output Voltage Swing: 0V DC to Vcc - 1.5V DC
- Power Drain Suitable for Battery Operation.

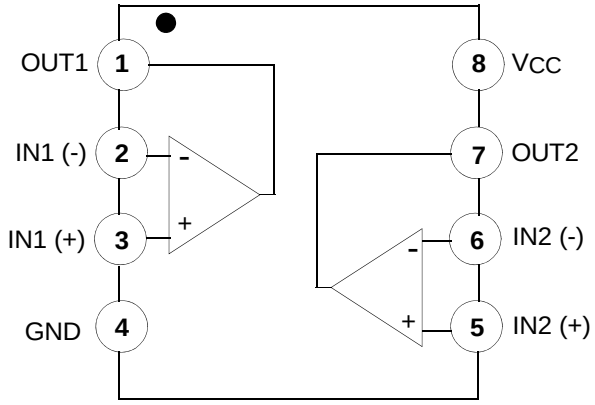
Description

The KA258 series consist of two independent, high gain, internally frequency compensated operational amplifiers which were designed specifically to operate from a single power supply over a wide range of voltage. Operation from split power supplies is also possible and the low power supply current drain is independent of the magnitude of the power supply voltage. Application areas include transducer amplifier, DC gain blocks and all the conventional OP-AMP circuits which now can be easily implemented in single power supply systems.

8-DIP

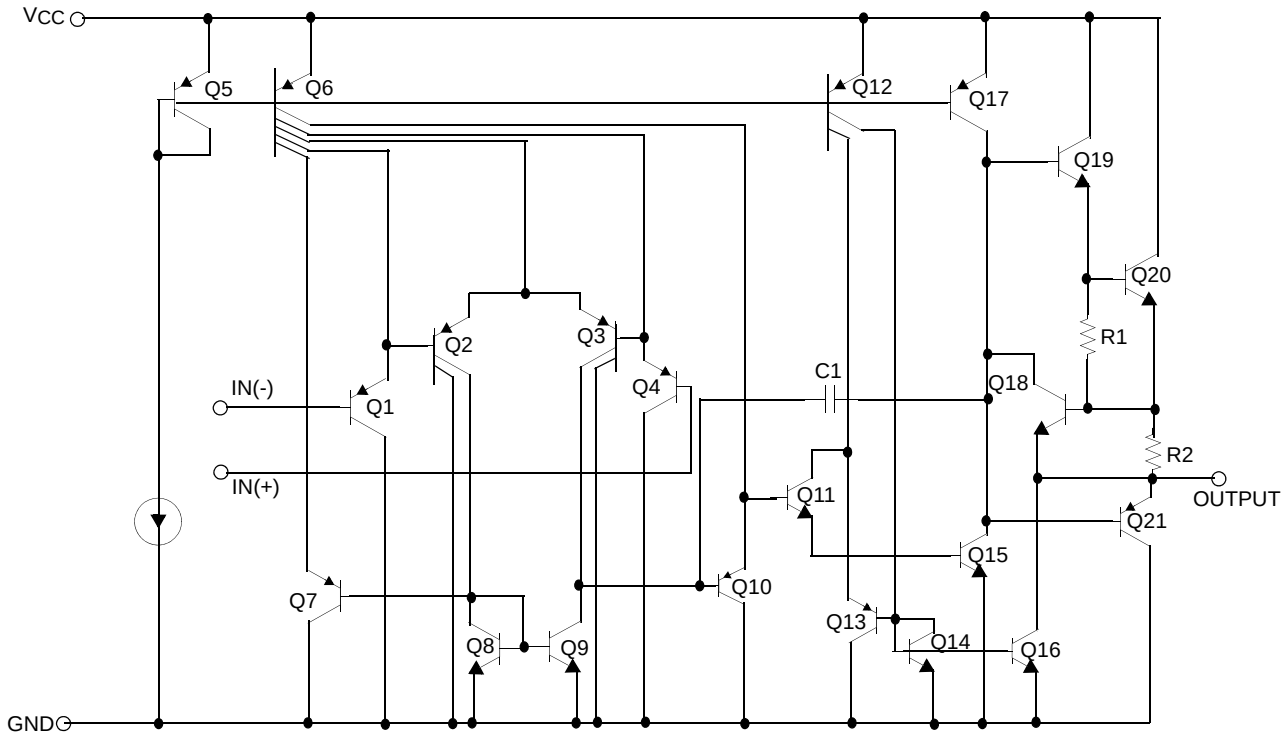
8-SOIC

Internal Block Diagram



Schematic Diagram

(One section only)



Absolute Maximum Ratings

Parameter	Symbol	KA258/KA258A	KA358/KA358A	KA2904	Unit
Supply Voltage	V_{CC}	±16 or 32	±16 or 32	±13 or 26	V
Differential Input Voltage	$V_{I(DIFF)}$	32	32	26	V
Input Voltage	V_I	-0.3 to +32	-0.3 to +32	-0.3 to +26	V
Output Short Circuit to GND V_{CC}≤15V, T_A = 25°C(One Amp)	-	Continuous	Continuous	Continuous	-
Operating Temperature Range	T_{OPR}	-25 ~ +85	0 ~ +70	-40 ~ +85	°C
Maximum Junction Temperature	$T_{J(MAX)}$	+150	+150	+150	°C
Storage Temperature Range	T_{STG}	-65 ~ +150	-65 ~ +150	-65 ~ +150	°C

Electrical Characteristics

(V_{CC} = 5.0V, V_{EE} = GND, T_A = 25°C, unless otherwise specified)

Parameter	Symbol	Conditions	KA258			KA358			KA2904			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
Input Offset Voltage	V_{IO}	V_{CM} = 0V to V_{CC} -1.5V $V_{O(P)}$ = 1.4V, R_S = 0Ω	-	2.9	5.0	-	2.9	7.0	-	2.9	7.0	mV
Input Offset Current	I_{IO}	-	-	3	30	-	5	50	-	5	50	nA
Input Bias Current	I_{BIAS}	-	-	45	150	-	45	250	-	45	250	nA
Input Voltage Range	$V_{I(R)}$	V_{CC} = 30V (KA2904, V_{CC} = 26V)	0	-	V_{CC} -1.5	0	-	V_{CC} -1.5	0	-	V_{CC} -1.5	V
Supply Current	I_{CC}	R_L = ∞, V_{CC} = 30V (KA2904, V_{CC} = 26V)	-	0.8	2.0	-	0.8	2.0	-	0.8	2.0	mA
		R_L = ∞, V_{CC} = 5V	-	0.5	1.2	-	0.5	1.2	-	0.5	1.2	mA
Large Signal Voltage Gain	G_V	V_{CC} = 15V, R_L = 2kΩ $V_{O(P)}$ = 1V to 11V	50	100	-	25	100	-	25	100	-	V/mV
Output Voltage Swing	$V_{O(H)}$	V_{CC} = 30V (V_{CC} = 26V for KA2904), R_L = 2kΩ	26	-	-	26	-	-	22	-	-	V
		V_{CC} = 30V (V_{CC} = 26V for KA2904), R_L = 10kΩ	27	28	-	27	28	-	23	24	-	V
	$V_{O(L)}$	V_{CC} = 5V, R_L = 10kΩ	-	5	20	-	5	20		5	20	mV
Common-Mode Rejection Ratio	CMRR	-	70	85	-	65	80	-	50	80	-	dB
Power Supply Rejection Ratio	PSRR	-	65	100	-	65	100	-	50	100	-	dB
Channel Separation	CS	f = 1kHz to 20kHz (Note1)	-	120	-	-	120	-	-	120	-	dB
Short Circuit to GND	I_{SC}	-	-	40	60	-	40	60	-	40	60	mA
Output Current	I_{SOURCE}	$V_{I(+)}$ = 1V, $V_{I(-)}$ = 0V V_{CC} = 15V, $V_{O(P)}$ = 2V	20	30	-	20	30	-	20	30	-	mA
	I_{SINK}	$V_{I(+)}$ = 0V, $V_{I(-)}$ = 1V V_{CC} = 15V, $V_{O(P)}$ = 2V	10	15	-	10	15	-	10	15	-	mA
		$V_{I(+)}$ = 0V, $V_{I(-)}$ = 1V V_{CC} = 15V, $V_{O(P)}$ = 200mV	12	100	-	12	100	-	-	-	-	μA
Differential Input Voltage	$V_{I(DIFF)}$	-	-	-	V_{CC}	-	-	V_{CC}	-	-	V_{CC}	V

Note:

1. This parameter, although guaranteed, is not 100% tested in production.

Electrical Characteristics (Continued)

(V_{CC} = 5.0V, V_{EE} = GND, unless otherwise specified)
The following specification apply over the range of -25°C ≤ T_A ≤ +85°C for the KA258; and the 0 °C ≤ T_A ≤ +70°C for the KA358; and the -40°C ≤ T_A ≤ +85°C for the KA2904

Parameter	Symbol	Conditions	KA258			KA358			KA2904			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
Input Offset Voltage	V_{IO}	V_{CM} = 0V to V_{CC} -1.5V $V_{O(P)}$ = 1.4V, R_S = 0Ω	-	-	7.0	-	-	9.0	-	-	10.0	mV
Input Offset Voltage Drift	$\Delta V_{IO}/\Delta T$	R_S = 0Ω	-	7.0	-	-	7.0	-	-	7.0	-	μV/°C
Input Offset Current	I_{IO}	-	-	-	100	-	-	150	-	45	200	nA
Input Offset Current Drift	$\Delta I_{IO}/\Delta T$	-	-	10	-	-	10	-	-	10	-	pA/°C
Input Bias Current	I_{BIAS}	-	-	40	300	-	40	500	-	40	500	nA
Input Voltage Range	$V_{I(R)}$	V_{CC} = 30V (KA2904,V_{CC} = 26V)	0	-	V_{CC} -2.0	0	-	V_{CC} -2.0	0	-	V_{CC} -2.0	V
Large Signal Voltage Gain	G_V	V_{CC} = 15V, R_L=2.0kΩ $V_{O(P)}$ = 1V to 11V	25	-	-	15	-	-	15	-	-	V/mV
Output Voltage Swing	$V_{O(H)}$	V_{CC} = 30V (V_{CC} = 26V for KA2904), R_L = 2kΩ	26	-	-	26	-	-	22	-	-	V
		V_{CC} = 30V (V_{CC} = 26V for KA2904), R_L = 10kΩ	27	28	-	27	28	-	23	24	-	V
	$V_{O(L)}$	V_{CC} = 5V, R_L=10kΩ	-	5	20	-	5	20	-	5	20	mV
Output Current	I_{SOURCE}	$V_{I(+)}$ = 1V, $V_{I(-)}$ = 0V V_{CC} = 15V, $V_{O(P)}$ = 2V	10	30	-	10	30	-	10	30	-	mA
	I_{SINK}	$V_{I(+)}$ = 0V, $V_{I(-)}$ = 1V V_{CC} = 15V, $V_{O(P)}$ = 2V	5	8	-	5	9	-	5	9	-	mA
Differential Input Voltage	$V_{I(DIFF)}$	-	-	-	V_{CC}	-	-	V_{CC}	-	-	V_{CC}	V

Electrical Characteristics (Continued)

(V_{CC} = 5.0V, V_{EE} = GND, T_A = 25°C, unless otherwise specified)

Parameter	Symbol	Conditions		KA258A			KA358A			Unit
				Min.	Typ.	Max.	MIn.	Typ.	Max.	
Input Offset Voltage	V_{IO}	V_{CM} = 0V to V_{CC} -1.5V $V_{O(P)}$ = 1.4V, R_S = 0Ω		-	1.0	3.0	-	2.0	3.0	mV
Input Offset Current	I_{IO}	-		-	2	15	-	5	30	nA
Input Bias Current	I_{BIAS}	-		-	40	80	-	45	100	nA
Input Voltage Range	$V_{I(R)}$	V_{CC} = 30V		0	-	V_{CC} -1.5	0	-	V_{CC} -1.5	V
Supply Current	I_{CC}	R_L = ∞,V_{CC} = 30V		-	0.8	2.0	-	0.8	2.0	mA
		RL = ∞, V_{CC} = 5V		-	0.5	1.2	-	0.5	1.2	mA
Large Signal Voltage Gain	G_V	V_{CC} = 15V, R_L=2kΩ V_O = 1V to 11V		50	100	-	25	100	-	V/mV
Output Voltage Swing	V_{OH}	V_{CC} = 30V	R_L = 2kΩ	26	-	-	26		-	V
			R_L = 10kΩ	27	28	-	27	28	-	V
	$V_{O(L)}$	V_{CC} = 5V, R_L=10kΩ		-	5	20	-	5	20	mV
Common-Mode Rejection Ratio	CMRR	-		70	85	-	65	85	-	dB
Power Supply Rejection Ratio	PSRR	-		65	100	-	65	100	-	dB
Channel Separation	CS	f = 1kHz to 20kHz (Note1)		-	120	-	-	120	-	dB
Short Circuit to GND	I_{SC}	-		-	40	60	-	40	60	mA
Output Current	I_{SOURCE}	$V_{I(+)}$ = 1V, $V_{I(-)}$ = 0V V_{CC} = 15V, $V_{O(P)}$ = 2V		20	30	-	20	30	-	mA
	I_{SINK}	$V_{I(+)}$ = 1V, $V_{I(-)}$ = 0V V_{CC} = 15V, $V_{O(P)}$ = 2V		10	15	-	10	15	-	mA
		$V_{in(+)}$ = 0V, $V_{in\ (-)}$ = 1V $V_{O(P)}$ = 200mV		12	100	-	12	100	-	μA
Differential Input Voltage	$V_{I(DIFF)}$	-		-	-	V_{CC}	-	-	V_{CC}	V

Note:

1. This parameter, although guaranteed, is not 100% tested in production.

Electrical Characteristics (Continued)

(V_{CC} = 5.0V, V_{EE} = GND, unless otherwise specified)
The following specification apply over the range of -25°C ≤ T_A ≤ +85°C for the KA258A; and the 0°C ≤ T_A ≤ +70°C for the KA358A

Parameter	Symbol	Conditions		KA258A			KA358A			Unit
				Min.	Typ.	Max.	Min.	Typ.	Max.	
Input Offset Voltage	V_{IO}	V_{CM} = 0V to V_{CC} -1.5V $V_{O(P)}$ = 1.4V, R_S = 0Ω		-	-	4.0	-	-	5.0	mV
Input Offset Voltage Drift	$\Delta V_{IO}/\Delta T$	-		-	7.0	15	-	7.0	20	μV/°C
Input Offset Current	I_{IO}	-		-	-	30	-	-	75	nA
Input Offset Current Drift	$\Delta I_{IO}/\Delta T$	-		-	10	200	-	10	300	pA/°C
Input Bias Current	I_{BIAS}	-		-	40	100	-	40	200	nA
Input Common-Mode Voltage Range	$V_{I(R)}$	V_{CC} = 30V		0	-	V_{CC} -2.0	0	-	V_{CC} -2.0	V
Output Voltage Swing	$V_{O(H)}$	V_{CC} = 30V	R_L = 2kΩ	26	-	-	26	-	-	V
			R_L = 10kΩ	27	28	-	27	28	-	V
	$V_{O(L)}$	V_{CC} = 5V, R_L=10kΩ		-	5	20	-	5	20	mV
Large Signal Voltage Gain	G_V	V_{CC} = 15V, R_L=2.0kΩ $V_{O(P)}$ = 1V to 11V		25	-	-	15	-	-	V/mV
Output Current	I_{SOURCE}	$V_{I(+)}$ = 1V, $V_{I(-)}$ = 0V V_{CC} = 15V, $V_{O(P)}$ = 2V		10	30	-	10	30	-	mA
	I_{SINK}	$V_{I(+)}$ = 1V, $V_{I(-)}$ = 0V V_{CC} = 15V, $V_{O(P)}$ = 2V		5	9	-	5	9	-	mA
Differential Input Voltage	$V_{I(DIFF)}$	-		-	-	V_{CC}	-	-	V_{CC}	V

Typical Performance Characteristics

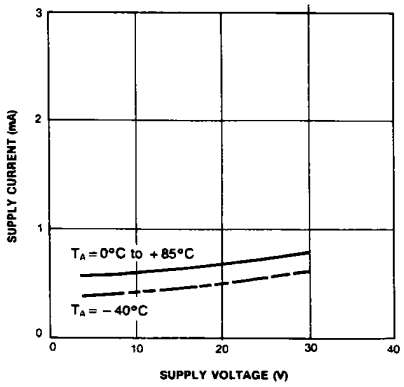


Figure 1. Supply Current vs Supply Voltage

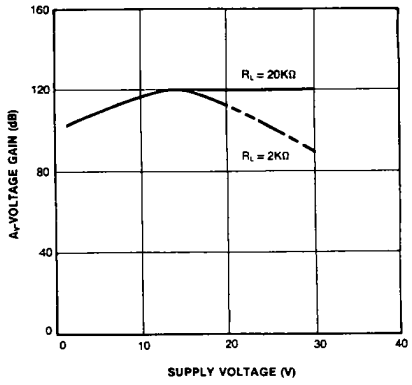


Figure 2. Voltage Gain vs Supply Voltage

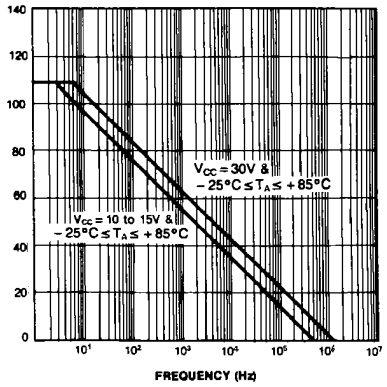


Figure 3. Open Loop Frequency Response

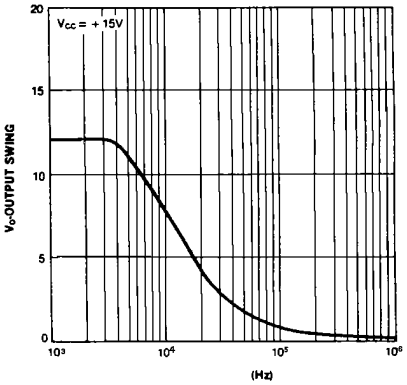


Figure 4. Large Signal Output Swing vs Frequency

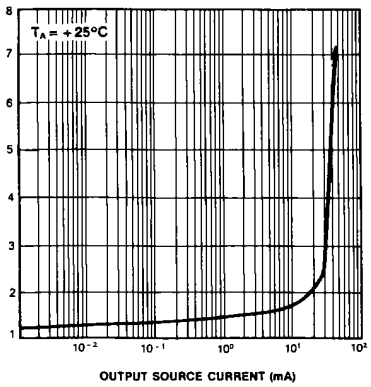


Figure 5. Output Characteristics vs Current Sourcing

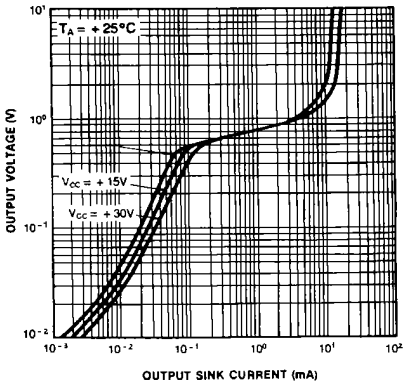


Figure 6. Output Characteristics vs Current Sinking

Typical Performance Characteristics (Continued)

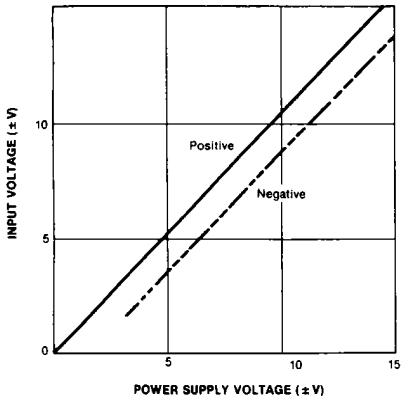


Figure 7. Input Voltage Range vs Supply Voltage

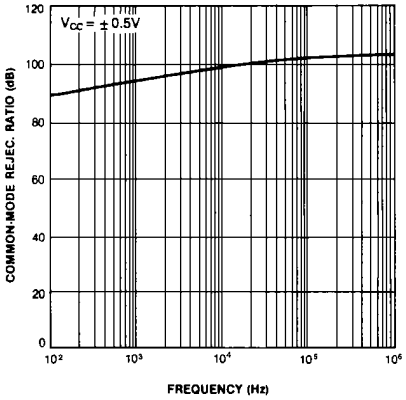


Figure 8. Common-Mode Rejection Ratio

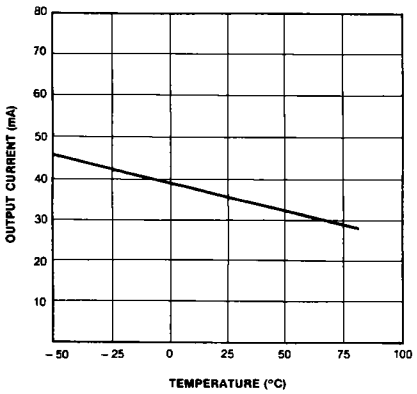


Figure 9. Output Current vs Temperature (Current Limiting)

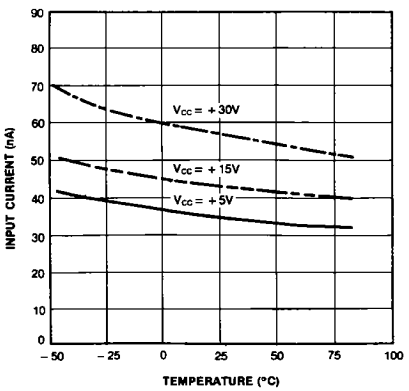


Figure 10. Input Current vs Temperature

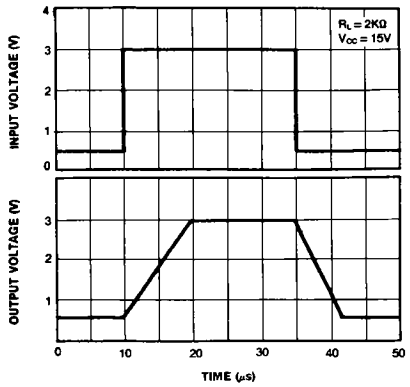


Figure 11. Voltage Follower Pulse Response

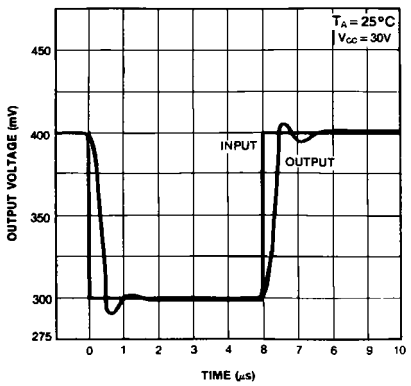


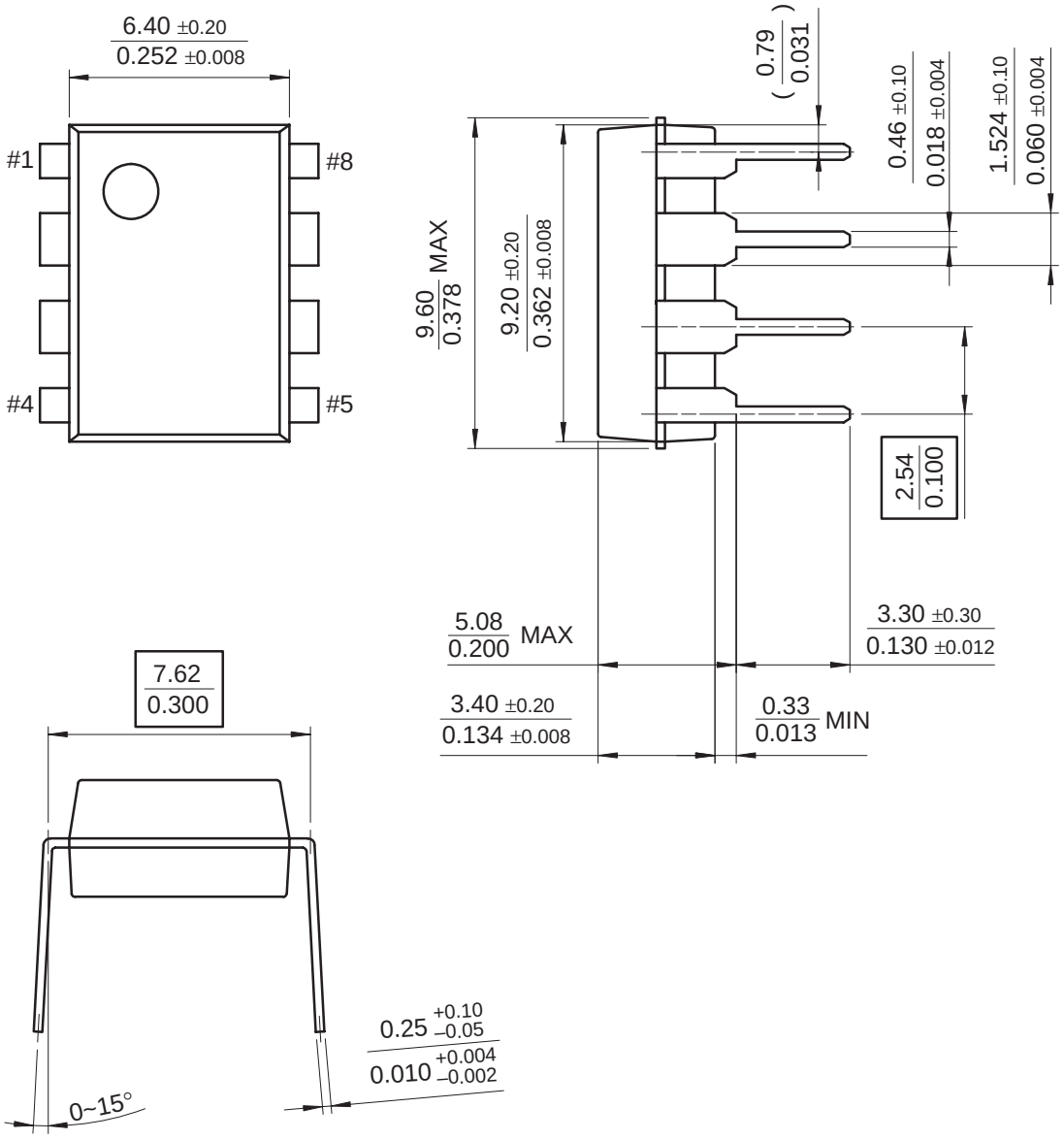
Figure 12. Voltage Follower Pulse Response (Small Signal)

Mechanical Dimensions

Package

Dimensions in millimeters

8-DIP

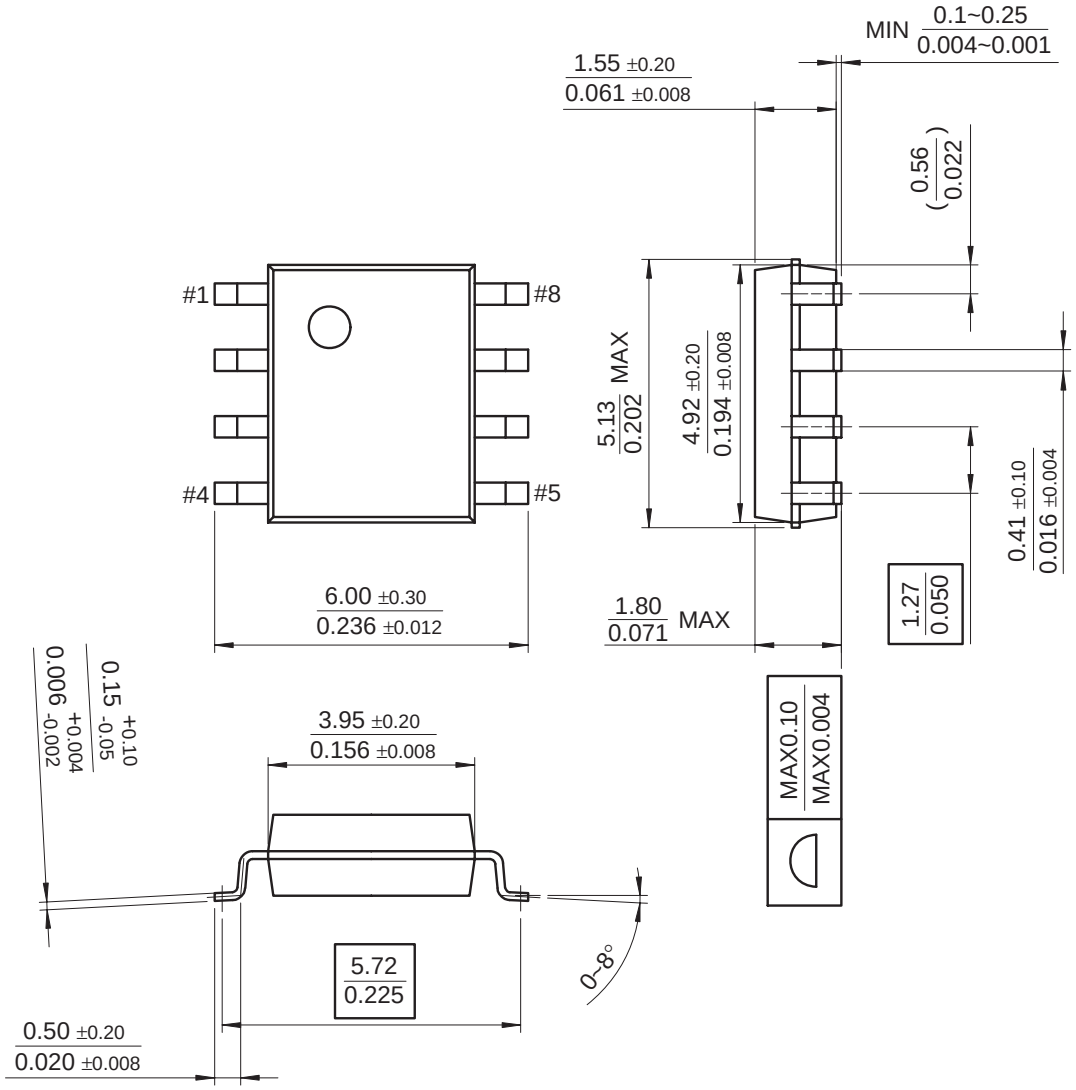


Mechanical Dimensions (Continued)

Package

Dimensions in millimeters

8-SOIC



Ordering Information

Product Number	Package	Operating Temperature
KA358	8-DIP	0 ~ +70°C
KA358A		
KA358D	8-SOIC	
KA358AD		
KA258D	8-SOIC	-25 ~ +85°C
KA258AD		
KA2904	8-DIP	-40 ~ +85°C
KA2904D	8-SOIC	

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KA358DTF KA358

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Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

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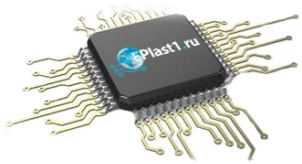
- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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