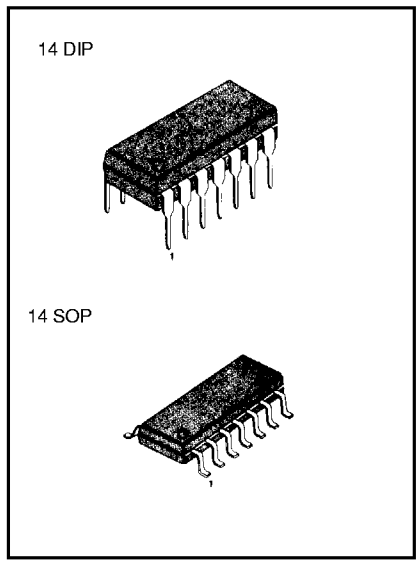
QUAD DIFFERENTIAL COMPARATOR

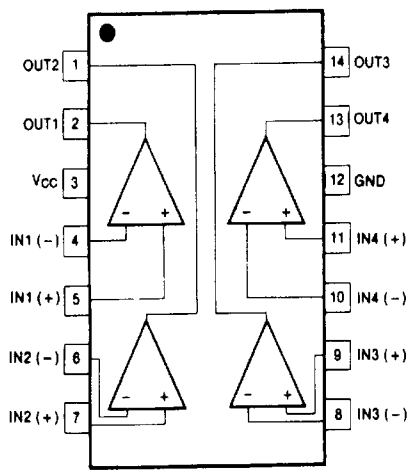
The KA239 series consists of four independent voltage comparators designed to operate from single power supply over a wide voltage range.



FEATURES

- Single or dual supply operation
- Wide range of supply voltage KA239/A, KA339/A: 2 ~ 36V
  KA2901 (or ±1 ~ ±18V)
  KA3302: 2 ~ 28V)
  (or ±1 ~±1 4V)
- Low supply current drain 800 μA Typ
- Open collector outputs for wired and connectors
- Low input bias current 25nA Typ
- Low Input offset current ±2.3nA Typ.
- Low input offset voltage ±1.4mV Typ.
- Common mode input voltage range includes ground.
- Low output saturation voltage
- Output compatible with TTL. DTL and MOS logic system

BLOCK DIAGRAM



ORDERING INFORMATION

Device	Package	Operating Temperature
KA339 KA339A	14 DIP	0 ~ +70℃
KA339D KA339AD	14 SOP	
KA239 KA239A	14 DIP	-25 ~ + 85℃
KA239D KA239AD	14 SOP	
KA2901 KA2901D KA3302 KA3302D	14 DIP 14 SOP 14 DIP 14 SOP	-40 ~ + 85℃

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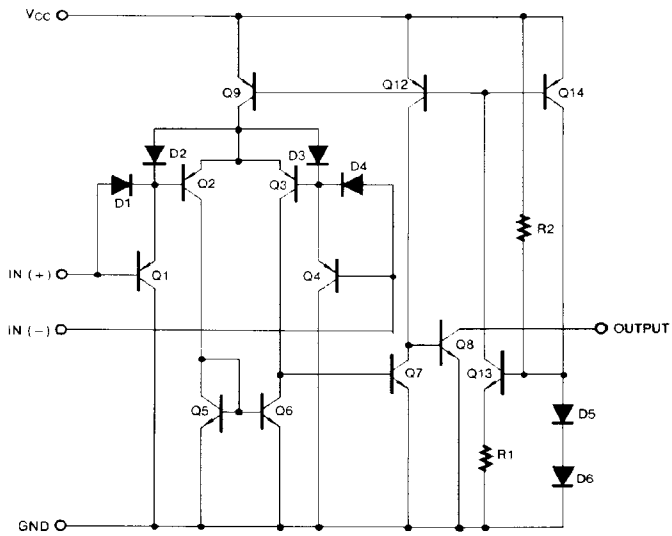
SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Value	Unit
Supply Voltage	V_{CC}	±18 or 36	V
Supply Voltage Only KA3302	V_{CC}	±14 or 28	V
Differential Input Voltage	$V_{I(DIFF)}$	36	V
Differential Input Voltage Only KA3302	$V_{I(DIFF)}$	28	V
Input Voltage	V_I	- 0.3 to +36	V
Input Voltage Only KA3302	V_I	- 0.3 to +28	V
Output Short Circuit to GND		Continuous	
Power Dissipation	P_D	570	mW
Operating Temperature KA339/KA339A		0 ~ + 70	℃
KA239/KA239A	T_{OPR}	- 25 ~ + 85	℃
KA2901/KA3302		- 40 ~ + 85	℃
Storage Temperature	T_{STG}	- 65 ~ + 150	℃

ELECTRICAL CHARACTERISTICS

(V_{CC} = 5V, T_A = 25℃, unless otherwise specified)

Characteristic	Symbol	Test Conditions		KA239A/KA339A			KA239/KA339			Unit
				Min	Typ	Max	Min	Typ	Max	
Input Offset Voltage	V_{IO}	V_{CM} =0V to V_{CC} =1.5V			±1	±2		±1.4	±5	mV
		$V_{O(P)}$ =1.4V, R_S =0Ω	NOTE 1			±4.0			±9.0	
Input Offset Current	I_{IO}				±2.3	±50		±2.3	±50	nA
			NOTE 1			±150			±150	
Input Bias Current	I_{BIAS}				57	250		57	250	nA
			NOTE 1			400			400	
Input Common Mode Voltage Range	$V_{I(R)}$			0		V_{CC}-1.5	0		V_{CC}-1.5	V
			NOTE 1	0		V_{CC}-2	0		V_{CC}-2	
Supply Current	I_{CC}		R_L = ∞		1.1	2.0		1.1	2.0	mA
Voltage Gain	G_V	V_{CC} =15V, R_L 15KΩ(for large swing)		50	200		50	200		V/mV
Large Signal Response Time	t_{RES}	V_I =TTL Logic Swing V_{REF} =1.4V, V_{RL} =5V, R_L =5.1KΩ			350			350		ns
Response Time	t_{RES}	V_{RL} =5V, R_L =5.1KΩ			1.4			1.4		μs
Output Sink Current	I_{SINK}	$V_{I(-)}$ 1V, $V_{I(+)}$ =0V, $V_{O(P)}$≤1.5V		6	18		6	18		mA
Output Saturation Voltage	V_{SAT}	$V_{I(-)}$ 1V, $V_{I(+)}$ =0V			140	400		140	400	mV
		I_{SINK} =4mA	NOTE 1			700			700	
Output Leakage Current	$I_{O(LKG)}$	$V_{I(-)}$ = 0V	$V_{O(P)}$ = 5V		0.1			0.1		nA
		$V_{I(+)}$ = 1V	$V_{O(P)}$ = 30V			1.0			1.0	μA
Differential Voltage	$V_{I(DIFF)}$		NOTE 1			36			36	V

Note 1.

KA339/A: 0≤T_A≤ +70℃

KA239/A: -25≤T_A≤ +85℃

KA2901/3302: -40≤T_A≤ +85℃

ELECTRICAL CHARACTERISTICS

(V_{CC} = 5V, T_A = 25℃, unless otherwise specified)

Characteristic	Symbol	Test Conditions		KA2901			KA3302			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			2	7		2	20	mV
			NOTE 1		9	15			40	
Input Offset Current	I_{IO}				2.3	50		3	100	nA
			NOTE 1		50	200			300	
Input Bias Current	I_{BIAS}				57	250		57	250	nA
			NOTE 1		200	500			1000	
Input Common Mode Voltage Range	$V_{I(R)}$			0		V_{CC}-1.5	0		V_{CC}-1.5	V
			NOTE 1	0		V_{CC}-2	0		V_{CC}-2	
Supply Current	I_{CC}		R_L = ∞		1.1	2.0		1.1	2.0	mA
			R_L =∞, V_{CC} =30V		1.6	2.5				
Voltage Gain	G_V	V_{CC} =15V, R_L 15KΩ(for large swing)		25	100		2	30		V/mV
Large Signal Response Time	t_{RES}	V_I =TTL Logic Swing V_{REF} =1.4V, V_{RL} =5V, R_L =5.1KΩ			350			350		ns
Response Time	t_{RES}	V_{RL} =5V, R_L =5.1KΩ			1.4			1.4		μs
Output Sink Current	I_{SINK}	$V_{I(-)}$ 1V, $V_{I(+)}$ =0V, $V_{O(P)}$≤1.5V		6	18		6	18		mA
Output Saturation Voltage	V_{SAT}	$V_{I(-)}$ 1V, $V_{I(+)}$ =0V			140	400		140	400	mV
		I_{SINK} =4mA	NOTE 1			700			700	
Output Leakage Current	$I_{O(LKG)}$	$V_{I(-)}$ = 0V $V_{I(+)}$ = 1V	$V_{O(P)}$ = 5V		0.1			0.1		nA
			$V_{O(P)}$ = 30V			1.0			1.0	μA
Differential Voltage	$V_{I(DIFF)}$		NOTE 1			36			36	V

Note 1.

KA339/A: 0≤T_A≤ +70℃

KA239/A: -25≤T_A≤ +85℃

KA2901/3302: -40≤T_A≤ +85℃

TYPICAL PERFORMANCE CHARACTERISTICS

Fig. 1 SUPPLY CURRENT

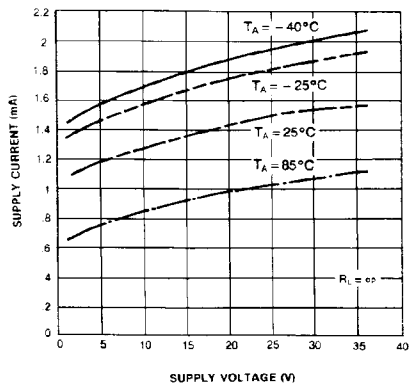


Fig. 2 INPUT CURRENT

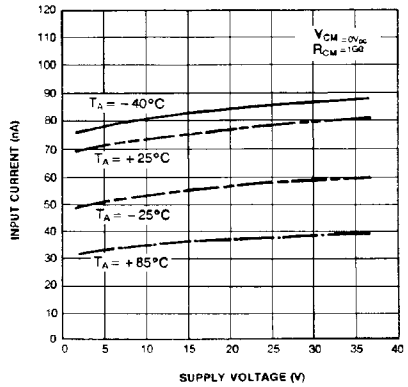


Fig. 3 OUTPUT SATURATION VOLTAGE

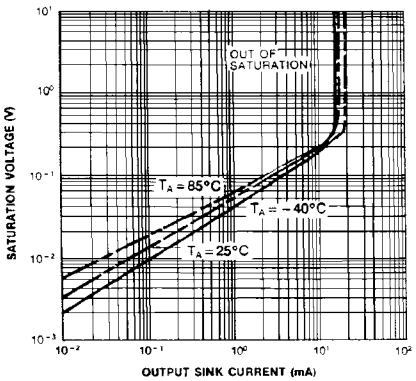


Fig. 4 RESPONSE TIME FOR VARIOUS INPUT OVERDRIVE-NEGATIVE TRANSITION

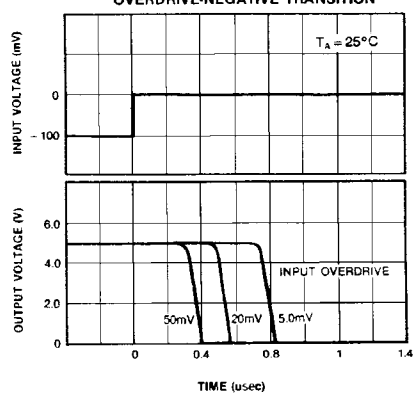
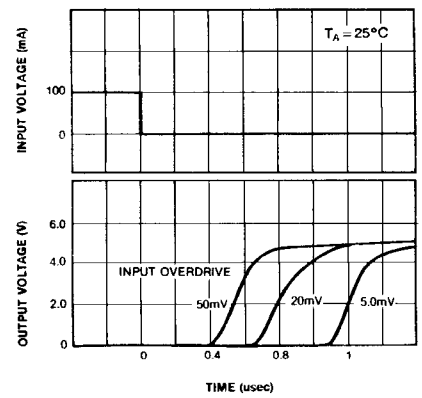


Fig. 5 RESPONSE TIME FOR VARIOUS INPUT OVERDRIVE-POSITIVE TRANSITION



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