optimized microcircuits

Low Power, High Gain TP1323		−25 to +85°C TP132301		Premium (−55 to +125°C) TP132302		Low I_{Bias} TP1413		FET Input TP 1420	
Typical	Guaranteed	Typical	Guaranteed	Typical	Guaranteed	Typical	Guaranteed	Typical	Guaranteed
±13 V ±20 mA 2 M	±12 V ±10 mA 200 k	±13 V ±20 mA 2 M	±12 V ±10 mA 200 k	±13 V ±20 mA 2 M	±12 V ±10 mA 200 k	±12.5 V ±15 mA 40 k	±11 V ±5 mA 15 k	±14 V ±10 mA 50 k	±10 V ±5 mA 20 k
1 MHz 25 kHz 20V/μsec 10μsec	--- --- --- ---	1 MHz 25 KHz 20V/μsec 10μsec	--- --- --- ---	1 MHz 25 kHz 20V/μsec 10μsec	--- --- --- ---	0.5 MHz --- 0.6V/μsec 20μsec	--- 10 kHz --- ---	200 kHz --- 0.3V/μsec ---	100 kHz 2 kHz 0.25V/μsec ---
±11 V --- 200 k	±10 V --- ---	±11 V --- 200 k	±10 V --- ---	±11 V --- 200 k	±10 V --- ---	±13 V --- 20 k	±12 V --- 4 k	±15 V --- 10 k	±10V 30 V 4 k
±1 mV --- ±30μV/°C 10μV/V	±5 mV 1M Pot --- ---	--- --- ±30μV/°C 10μV/V	±3 mV 1M Pot --- ---	--- --- ±30μV/°C 10μV/V	±3 mV 1M Pot --- ---	±2 mV --- ±20μV/°C ---	--- 10k Pot --- ---	±3 mV --- ±5μV/°C 200μV/V	±15 mV 10k Pot ±50μV/°C ---
±5 nA 2.5 nA 0.5 nA/°C	±40 nA --- ---	±5 nA 2.5 nA 0.5 nA/°C	±20 nA --- ---	±5 nA 2.5 nA 0.5 nA/°C	±20 nA --- ---	+ 2 nA 0.5 nA 0.3 nA/°C	+ 10 nA 2.5 nA ---	−15 pA 10 pA ①	−50 pA --- ---
50 k ---	--- ---	50 k ---	--- ---	50 k ---	--- ---	10 M ---	--- ---	10^{12} ‖ 3pF 10^{12} ‖ 3pF	--- ---
10μV	---	10μV	---	10μV	---	5μV	---	1μV ---	--- ---
±15 V ±5.5 to ±20V --- ---	--- --- ±80μA ±5 mA	±15 V ±5.5 to ±20V --- ---	--- --- ±80μA ±5 mA	±15 V ±5.5 to ±20V --- ---	--- --- ±80μA ±5 mA	--- ±3 to ±18V ±1.5 mA ---	±15V --- ±3 mA ±8 mA	--- ±12 to ±18V --- ---	±15 V --- ±4 mA ±9 mA
0 to +70 −65 to +150		−25 to +85 −65 to +150		−55 to +125 −65 to +150		−25 to +85 −55 to +125		−25 to +85 −65 to +150	
TO−99		TO−99		TO−99		TO−99		TO−99	
No		No		No		No		No	
--- 132310		--- 132311		--- 132312		--- ---		--- ---	
								① Doubles each +10°C	

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m TP 133901	Premium (−55 to +125°C) TP 133902		Wideband, High Z_{in} TP 1321		Premium (−55 to +125°C) TP 132101		High Slew Rate TP 1322		Premium (−55 to +125°C) TP132201	
Guaranteed	Typical	Guaranteed	Typical	Guaranteed	Typical	Guaranteed	Typical	Guaranteed	Typical	Guaranteed
±10 V ±10 mA 40 k	±13 V ±15 mA 120 k	±10 V ±10 mA 50 k	±12 V ±20 mA 150 k	±10 V ±10 mA 80 k	±12 V ±20 mA 150 k	±10V ±10 mA 80 k	±12 V ±20 mA 15 k	±10 V ±10 mA 10 k	±12 V ±20 mA 15 k	±10 V ±10 mA 10 k
--- 10 kHz --- ---	1 MHz 50 kHz 34V/μsec ① ---	--- 10 kHz --- ---	100 MHz ① 600 kHz 35V/μsec ---	--- 320 kHz 20V/μsec ---	100 MHz ① 600 kHz 35V/μsec ---	--- 320 kHz 20V/μsec ---	20 MHz ① 1.6 MHz 120V/μsec 200 nsec	--- 1.2 MHz 80V/μsec ---	20 MHz ① 1 MHz 120V/μsec 200 nsec	--- 1.2 MHz 80V/μsec ---
±11 V 20 V 10 k	±12 V --- 100 k	±11 V 20 V 10 k	±15 V 12 V 100 k	±12 V --- ---	±15 V 12 V 100 k	±12 V --- ---	±12 V 15 V 30 k	±10 V --- ---	±12 V 15 V 30 k	±10 V --- ---
±7.5 mV 100k Pot --- ---	±1 mV --- ±5μV/°C ---	±3.0 mV 100k Pot --- ---	±3 mV --- ±30μV/°C 30μV/V	±5 mV 100k Pot --- ---	±3 mV --- ±30μV/°C 30μV/V	±5 mV 100k Pot --- ---	±5 mV --- ±30μV/°C 30μV/V	±10 mV 20k Pot --- ---	±5 mV --- ±30μV/°C 30μV/V	±10 mV 20k Pot --- ---
600 nA 60 nA 200 pA/°C	150 nA 20 nA 100 pA/°C	500 nA 60 nA 200 pA/°C	±5 nA 5 nA 0.5 nA/°C	±25 nA 25 nA 0.8 nA/°C	±5 nA 5 nA ± 0.5 nA/°C	±25 nA 25 nA ± 0.8 nA/°C	+ 50 nA 20 nA ±0.1 nA/°C	+250 nA 50 nA ±0.5 nA/°C	+50 nA 20 nA ±0.1 nA/°C	+250 nA 50 nA ±0.5nA/°C
100 k ---	300 k ---	150 k ---	300 M 1000 M	40 M ---	300 M 1000 M	40 M ---	100 M 1000 M	40 M ---	100 M 1000 M	40 M ---
---	2μV	---	1μV	---	1μV	---	1μV	---	1μV	---
±15 V --- ±7 mA ±12 mA	--- ±12 to ±18 V ±4 mA ---	±15 V --- ±7 mA ±12 mA	--- ±8 to ±22V ±3 mA ---	±15 V --- ±4 mA ±14 mA	--- ±8 to ±22V ±3 mA ---	±15 V --- ±4 mA ±14 mA	--- ±8 to ±20V ±4 mA ---	±15 V --- ±6 mA ±16 mA	--- ±8 to ±20V ±4 mA ---	±15 V --- ±6 mA ±16mA
+70 to +150	−55 to +125 −65 to +150		0 to +70 −65 to +150		−55 to +125 −65 to +150		0 to +70 −65 to +150		−55 to +125 −65 to +150	
99	TO−99		TO−99		TO−99		TO−99		TO−99	
Two)	Yes (Two)		Optional (Two)		Optional (Two)		Optional (One)		Optional (One)	
921 ---	133922 ---		--- 132110		--- 132111		--- ---		--- ---	
= 100, ec @ A = 1	① @ A = 100, 4.2 V/μsec @ A = 1		① G x BW @ A = 10		① G x BW @ A=10		① G x BW @ A = 10		① G x BW @ A = 10	

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	Typical 741		Low Drift TP 1319		Premium (−55 to +125°) TP 131901		General Purpose (MC1439 Replacement) TP 1339		Premi
Specifications	**Typical**	**Guaranteed**	**Typical**	**Guaranteed**	**Typical**	**Guaranteed**	**Typical**	**Guaranteed**	**Typical**
Output Range									
E_o	±13 V	±10 V	±13 V	±10 V	±13 V	±10 V	±13 V	±10 V	±13 V
I_o	±10 mA	±5 mA	±10 mA	±5 mA	±10 mA	±5 mA	±10 mA	±5 mA	±15 mA
A_o	100 k	20 k	300 k	50 k	300 k	50 k	100 k	15 k	100 k
Frequency Response									
f_t	1 MHz	---	1 MHz	---	1 MHz	---	1 MHz	---	1 MHz
f_p	---	---	10 kHz	8 kHz	10 kHz	8 kHz	50 kHz	10 kHz	50 kHz
sr	0.5V/μsec	---	0.6V/μsec	---	0.6V/μsec	---	34V/μsec ①	---	34V/μsec
t_s(to 0.1%)	---	---	---	---	---	---	---	---	---
Voltage Range									
E_{cm}	±15 V	±12	±15 V	±12 V	±15 V	±12 V	±12 V	±11 V	±12 V
E_d	30 V	---	30 V	24 V	30 V	24 V	---	20 V	---
CMRR	30 k	3 k	100 k	---	100 k	---	100 k	10 k	100 k
Voltage Offset									
E_{os}	±2 mV	±6 mV	±1 mV	±5 mV	±0.7 mV	±2 mV	±2 mV	±7.5 mV	±2 mV
Zero Adj.	10k Pot	---	---	10k Pot	---	10k Pot	---	100k Pot	---
E_{os}T.C.	---	---	±6μV/°C	±25μV/°C	±3μV/°C	±15μV/°C	±12μV/°C	---	±5μV/°C
PSRR	30μV/V	150μV/V	10μV/V	---	10μV/V	---	---	---	---
Bias Current									
I_B	200 nA	500 nA	70 nA	250 nA	30 nA	50 nA	150 nA	1 μA	150 nA
I_D	30 nA	200 nA	3 nA	50 nA	2 nA	5 nA	20 nA	100 nA	20 nA
I_DT.C.	---	1.5 nA/°C	±30 pA/°C	---	±30 pA/°C	---	100 pA/°C	200 pA/°C	100 pA/°C
Impedance									
Z_D (Ω)	1 M	0.3 M	2 M	0.5 M	2 M	0.5 M	300 k	100 k	300 k
Z_{cm} (Ω)	---	---	---	---	---	---	---	---	---
Noise									
e_n rms (10 Hz to 10 kHz)	---	---	1μV	---	1μV	---	2μV	---	2μV
Power Requirements									
$\pm V_{cc}$	±15V	---	---	±15 V	---	±15 V	---	±15 V	---
$\pm V_{cc}$ Range	±18 V	---	±8 to ±22 V	---	±8 to ±22V	---	±12 to ±18V	---	±12 to ±18
I_{cc}	---	±3 mA	---	±3 mA	---	±3 mA	±4 mA	±7 mA	±4 mA
$I_{F.L.}$	---	---	---	±8 mA	---	±8 mA	---	±12 mA	---
Temperature Range									
Operating (°C)	0 to +70		0 to +70		−55 to +125		0 to +70		0 to
Storage (°C)	−65 to +150		−65 to +150		−65 to +150		−65 to +150		−65
Case Style	TO−99		TO−99		TO−99		TO−99		TO-
External Components Req'd	No		No		No		Yes (Two)		Yes
Package Option									
Plastic DIP−Model No.	---		131910		131911		133920		13
Ceramic Dip−Model No	---		---		---		---		—
Notes							① @ A = 100, 4.2V/μsec @ A = 1		① @ A 4.2V/μ

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TELEDYNE PHILBRICK

Effective November 29, 1971

price list

OPTIMIZED MICROCIRCUITS
PACKAGES & PREMIUM VERSIONS PRESENTLY AVAILABLE

Item	Description	(1–9)	(10–24)	(25–49)	(50–99)	(100–249)
1319	Standard, Low Drift	$ 6.00	$ 5.75	$ 5.50	$ 5.25	$ 5.00
131901①	Premium 1319 (–55 °C to +125 °C)	8.75	8.25	8.00	7.50	7.00
131910	1319 in 14-Pin Plastic DIP	6.00	5.75	5.50	5.25	5.00
131911	131901 in 14-Pin Plastic DIP	8.75	8.25	8.00	7.50	7.00
1321	Standard, Wideband	10.00	9.25	8.75	8.50	8.00
132101	1321 (–55 °C to +125 °C)	16.50	15.75	15.00	14.25	13.50
132110	1321 in 14-Pin Ceramic DIP	10.00	9.25	8.75	8.50	8.00
132111	132101 in 14-Pin Ceramic DIP	16.50	15.75	15.00	14.25	13.50
1322	Standard, High Slew Rate	12.00	11.50	11.00	10.50	10.00
132201	1322 (–55 °C to +125 °C)	24.00	23.00	22.00	21.00	20.00
1323	Standard, Micropower	11.00	10.50	10.00	10.00	9.25
132301	1323 (–25 °C to +85 °C)	13.50	13.00	12.50	12.00	11.50
132302②	Premium 1323 (–55 °C to +125 °C)	29.50	28.00	26.50	25.00	24.00
132310	1323 in 14-Pin Ceramic DIP	11.00	10.50	10.00	10.00	9.25
132311	132301 in 14-Pin Ceramic DIP	13.50	13.00	12.50	12.00	11.50
132312	1323 in 14-Pin Ceramic DIP	29.50	28.00	26.50	25.00	24.00
1339	Economy General Purpose	2.75	2.75	2.25	2.25	1.75
133901①	Premium 1339	4.00	3.80	3.65	3.50	3.35
133902①	Premium 1339 (–55 °C to +125 °C)	6.75	6.50	6.25	6.00	5.75
133920	1339 in 8-Pin Plastic MINI DIP	2.75	2.75	2.25	2.25	1.75
133921	133901 in 8-Pin Plastic MINI DIP	4.00	3.80	3.65	3.50	3.35
133922	133902 in 8-Pin Plastic MINI DIP	6.75	6.50	6.25	6.00	5.75

① See data sheet for premium specifications

② 132302 premium specs, same as 132301 except –55 °C to +125 °C Temperature (see data sheet).

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