

NPN Transistors



Low Level Amplifiers

Type No.	Case Style	V <sub>CE0</sub> (V) Min	V <sub>CE0</sub> (V) Min	V <sub>BE0</sub> (V) Min	I <sub>CB0</sub> (mA) @ V <sub>CB</sub> (V) Max	f <sub>FE</sub> Min	f <sub>FE</sub> Max	I <sub>C</sub> @ V <sub>CE</sub> & V <sub>BE</sub> (mA) & (V)	V <sub>CE(SAT)</sub> (V) Max	V <sub>BE(SAT)</sub> (V) Min	I <sub>C</sub> (mA) Max	C <sub>ob</sub> (pF) Max	f <sub>T</sub> (MHz) Min	f <sub>T</sub> (MHz) Max	I <sub>C</sub> (mA) Max	NF (dB) Max	Test Conditions	Process No.	
2N929	TO-18	45	45	5	10	60	350	10	1.0	0.6	1.0	8	30	30	0.5	4	(Note 1)	07	
2N929A	TO-18	60	45	6	2	60	350	10	0.5	0.7	1.0	6	45	45	0.5	4		07	
2N930 Avail. JAN/TX/V Versions	TO-18	45	45	5	10	150	600	10	1.0	0.6	1.0	8	30	30	0.5	3	(Note 1)	07	
2N2484	TO-18	60	60	6	10	250	200	1	0.35		1	10	15	15	0.05	3	(Note 1)	07	
2N3117	TO-18	60	60	6	10	300	400	1	0.35		1	4.5	60	60	0.5	1.5	(Note 2)	07	
2N3246	TO-18	60	40	10	1	100	800	10	0.5	0.7	0.9	5	60	180	1	2	(Note 1)	07	
2N3565		Same as PN3565																	
2N3707	TO-92 (94)	30	30	6	100	200	100	100	1.0		10						5	(Note 1)	11
2N3708	TO-92 (94)	30	30	6	100	45	660	1	1.0		10								11

Low Level Amplifiers (Continued)

Type No.	Case Style	V <sub>CE0</sub> (V) Min	V <sub>CE0</sub> (V) Min	V <sub>BE0</sub> (V) Min	I <sub>CB0</sub> (mA) Max	I <sub>CB0</sub> (mA) @ V <sub>CE0</sub> (V)	h <sub>FE</sub> Min	h <sub>FE</sub> Max	I <sub>C</sub> (mA) @ V <sub>CE0</sub> (V)	V <sub>CE(SAT)</sub> (V) Max	V <sub>BE(SAT)</sub> (V) Min	I <sub>C</sub> (mA) Max	C <sub>ob</sub> (pF) Max	f <sub>T</sub> (MHz) Min	I <sub>C</sub> (mA) Max	NF (dB) Max	Test Conditions	Process No.
2N3709	TO-92 (94)	30	30		100	20	45	165	1	5	1.0	10						11
2N3710	TO-92 (94)	30	30	6	100	20	90	330	1	5	1.0	10						11
2N3711	TO-92 (94)	30	30	6	100	20	180	660	1	5	1.0	10						11
2N3858A	TO-92 (94)	60	60	6	500	18	60	120	10	1			4	90	250	2		11
2N3859A	TO-92 (94)	60	60	6	500	18	100	200	10	1			4	90	250	2		11
2N3877	TO-92 (94)	70	70	4	500	70	20	250	2	4.5	0.5	0.9	10					11
2N3877A	TO-92 (94)	85	85	4	500	70	20	250	2	4.5	0.5	0.9	10					11
2N3900A	TO-92 (94)	18	18	5	100	18	250	500	2	4.5			12			5	(Note 4)	11
2N3901	TO-92 (94)	18	18	5	100	15	350	700	2	4.5						5	(Note 4)	11
2N4286	TO-92 (94)	30	25	6	50	25	150	600	1	5	0.35	0.8	6	40	1			11*
2N4287	TO-92 (94)	45	45	7	10	30	150	600	1	5	0.35	0.8	6	40	1	5	(Note 1)	11
2N4409	TO-92 (92)	80	50	5	10	60	60	400	10	1	0.2	0.8	12	60	300	10		11
2N4410	TO-92 (92)	120	80	5	10	100	60	400	10	1	0.2	0.8	12	60	300	10		11
2N4966	TO-92 (92)	50	40	6	25	25	40	200	0.01	5	0.4	10	6	40	1			11
2N4967	TO-92 (92)	50	40	6	25	25	100	600	0.01	5	0.4	10	6	40	1			11
2N4968	TO-92 (92)	30	25	6	50	25	40	200	0.01	5	0.4	10	6	40	1			11

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Low Level Amplifiers (Continued)

Type No.	Case Style	V <sub>CE0</sub> (V) Min	V <sub>CE0</sub> (V) Min	V <sub>BE0</sub> (V) Min	I <sub>CBO</sub> (mA) Max	V <sub>CB</sub> (V)	I <sub>hFE</sub> Min	I <sub>hFE</sub> Max	I <sub>C</sub> (mA) @ V <sub>CE</sub> (V)	V <sub>CE(SAT)</sub> (V) Max	V <sub>BE(SAT)</sub> (V) Min	I <sub>C</sub> (mA) @ V <sub>BE(SAT)</sub> (V) Max	C <sub>ob</sub> (pF) Max	f <sub>T</sub> (MHz) Min	I <sub>C</sub> (mA) Max	NF (dB) Max	Test Conditions	Process No.	
																			V <sub>CE0</sub> (V) Min
2N5088	TO-92 (92)	35	30		50	20	300	10	5	0.5		10	4			3	(Note 3)	11	
							350	1	5										
							300	900	100 μA										
2N5089	TO-92 (92)	30	25		50	15	400	10	5	0.5		10	4			2	(Note 3)	11	
							450	1	5										
							400	1200	100 μA										
2N5133		Same as PN5133																	
2N5209	TO-92 (92)	50	50		50	35	150	10	5	0.7		10	4	30	0.5	4	(Note 5)	11	
							150	1	5										
							100	300	100 μA										
2N5210	TO-92 (92)	50	50		50	35	250	10	5	0.7		10	4	30	0.5	3	(Note 4)	11	
							250	1	5										
							200	600	100 μA										
2N5232	TO-92 (94)		50		30	50	250	500	2	0.125		10	4					11	
2N5961	TO-92 (92)	60	60	8	2	45	100	0.01	5	0.2		10	4	100	10	6	(Notes 7 & 11)	11	
							120	0.1	5										
							135	1	5										
							150	700	10										
2N5962	TO-92 (92)	45	45	8	2	30	450	0.01	5	0.2		10	4	100	10	6	(Note 7)	11	
							500	0.1	5							4	(Note 8)		
							550	1	5							8	(Note 9)		
							600	1400	10							3	(Note 10)		
																3	(Note 12)		
2N5232A	TO-92 (94)		50		30	50	250	500	2	0.125		10	4			5	(Note 2)	11	
MPS3707	TO-92 (92)		30		100	20	100	400	100 μA	1.0		10				5	(Note 4)	11	
							45	660	1	1.0									
MPS3708	TO-92 (92)		30		100	20	45	660	1	1.0		10						11	
							45	165	1	1.0									
MPS3709	TO-92 (92)		30		100	20	45	165	1	1.0		10						11	
							90	330	1	1.0									
MPS3710	TO-92 (92)		30		100	20	90	330	1	1.0		10						11	

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Low Level Amplifiers (Continued)

Type No.	Case Style	V <sub>CE0</sub> (V) Min	V <sub>BE0</sub> (V) Min	I <sub>CBO</sub> (nA) Max	V <sub>CB</sub> (V) Max	h <sub>FE</sub> Min	I <sub>C</sub> @ (mA) Max	V <sub>CE</sub> (V) Max	V <sub>CE(SAT)</sub> (V) Max	V <sub>BE(SAT)</sub> (V) Min	I <sub>C</sub> (mA) Max	C <sub>ob</sub> (pF) Max	f <sub>T</sub> (MHz) Min	I <sub>C</sub> (mA) Max	NF (dB) Max	Test Conditions	Process No.
MPS3711	TO-92 (92)	30		100	20	180	660	1	5	1.0	10						11
MPS6571	TO-92 (92)	25	3	50	20	250	1000	100	5	0.5	10	4.5	50	0.5			11
MPSA09	TO-92 (92)	50		100	25	100	600	100	5	0.9	10	5	600	0.5			11
MPSA18	TO-92 (92)	45	45	50	30	400	0.01	5	0.3		50	3	100	1	1.5	(Note 4)	11
PE4020	TO-92 (92)	60	60	2	45	150	950	10	5	0.3	50	4	100	800	6	(Note 9)	11
PN930	TO-92 (92)	45	45	5	10	135	1	5							3	(Note 7)	11
PN2484	TO-92 (92)	60	60	6	45	120	0.1	5							3	(Note 10)	11
PN3665	TO-92 (92)	30	25	6	50	100	600	10	5	1.0	10	8	30	0.5	3	(Note 1)	11
PN5133	TO-92 (92)	20	18	3	50	150	300	10	5	0.35	10	6					11

TEST CONDITIONS:

Note 1: I<sub>C</sub> = 10 μA, V<sub>CE</sub> = 5V, f = 10 Hz - 15.7 kHz.  
 Note 2: I<sub>C</sub> = 10 μA, V<sub>CE</sub> = 5V, f = 1 kHz.  
 Note 3: I<sub>C</sub> = 5 μA, V<sub>CE</sub> = 5V, f = 1 kHz.  
 Note 4: I<sub>C</sub> = 100 μA, V<sub>CE</sub> = 5V, f = 10 Hz - 15.7 kHz.

Note 5: I<sub>C</sub> = 10 μA, V<sub>CE</sub> = 5V, f = 10 kHz.  
 Note 6: I<sub>C</sub> = 100 μA, V<sub>CE</sub> = 5V, f = 5 kHz.  
 Note 7: I<sub>C</sub> = 100 μA, V<sub>CE</sub> = 5V, f = 1 kHz, R<sub>S</sub> = 1 kΩ.  
 Note 8: I<sub>C</sub> = 100 μA, V<sub>CE</sub> = 5V, f = 1 kHz, R<sub>S</sub> = 10 kΩ.

Note 9: I<sub>C</sub> = 100 μA, V<sub>CE</sub> = 5V, f = 1 kHz, R<sub>S</sub> = 100 kΩ.  
 Note 10: I<sub>C</sub> = 10 μA, V<sub>CE</sub> = 5V, f = 1 kHz, R<sub>S</sub> = 10 kΩ.  
 Note 11: I<sub>C</sub>/I<sub>B</sub> = 20.  
 Note 12: I<sub>C</sub> = 10 μA, V<sub>CE</sub> = 5V, f = 10 Hz - 10 kHz, R<sub>S</sub> = 10 kΩ.

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