

PNP Transistor

6501130 NATL SEMICOND, (DISCRETE)

28C 35443 D

T-29-01

GENERAL PURPOSE AMPS AND SWITCHES



Type No.	Case Style	V <sub>CEO</sub> (V) Min	V <sub>CE0</sub> (V) Min	V <sub>BE0</sub> (V) Min	I <sub>CS*</sub> I <sub>CB0</sub> (mA) Max	h <sub>FE</sub> Min	I <sub>C</sub> @ I <sub>C</sub> (mA) Max	V <sub>CE</sub> & V <sub>BE</sub> (V)	V <sub>CE(SAT)</sub> & V <sub>BE(SAT)</sub> (V)		C <sub>ob</sub> (pF) Max	f <sub>T</sub> (MHz) Min	I <sub>C</sub> (mA) Max	t <sub>off</sub> (ns) Max	NF (dB) Max	Test Conditions	Process No.
									Max	Min							
2N722	TO-18	50	35	5	100	30	90	150	10	1.5	1.3	45	50				63
2N1132	TO-5	50	35	2	100	30	90	150	10	1.5	1.3	45	50				63
2N2696	TO-18	25	25		25	20	300	2	1	0.25	1.1	20	50	170		1	63
2N2904	TO-5	60	40	5	20	40	120	150	10	0.4	1.3	8	50	100		2	63
2N2904A	TO-5	60	60	5	10	40	500	10	10	0.4	1.3	8	50	100		2	63
2N2905	TO-5	60	40	5	20	30	500	10	10	0.4	1.3	8	50	100		2	63
2N2905A	TO-5	60	60	5	10	100	300	150	10	1.6	2.6	8	500	100		2	63
2N2906	TO-18	60	40	5	20	50	500	10	10	0.4	1.3	8	50	100		2	63
2N2906A	TO-18	60	60	5	10	40	120	150	10	0.4	1.3	8	50	100		2	63
2N2907	TO-18	60	40	5	20	35	500	10	10	0.4	1.3	8	50	100		2	63

6501130 NATL SEMICOND, (DISCRETE)

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GENERAL PURPOSE AMPS AND SWITCHES (Continued)



Type No.	Case Style	V <sub>CEO</sub> (V) Min	V <sub>CE0</sub> (V) Min	V <sub>BE0</sub> (V) Min	I <sub>CEO</sub> (mA) Max	I <sub>CB0</sub> (mA) Max	h <sub>FE</sub>		I <sub>C</sub> & V <sub>CE</sub> (V)	V <sub>CE(SAT)</sub> V <sub>BE(SAT)</sub> (V)		I <sub>C</sub> (mA)	C <sub>ob</sub> (pF) Max	f <sub>T</sub> (MHz) Min Max	I <sub>C</sub> (mA)	t <sub>off</sub> (ns) Max	NF (dB) Max	Test Conditions	Process No.
							Min	Max		Max	Min								
2N3072A	TO-18	60	60	5	10	50	500	10	10	0.4	1.3	150	8	200	50	100		2	63
2N3072	TO-5	60	60	4	10*	15	300	2	1	0.25	1.2	50	10	130	50	100		3	63
2N3073	TO-18	60	60	4	10*	15	300	2	1	0.25	1.2	50	10	130	50	100		3	63
2N3120	TO-5	45	45	4	10*	30	130	50	1	1.0	2.0	300	10	130	50	100		4	63
2N3121	TO-18	45	45	4	10*	15	300	2	1	0.25	1.2	50	10	130	50	100		4	63
2N3133	TO-5	50	35	4	50	10	150	1	10	0.6	1.5	150	10	200	50	150		2	63
2N3134	TO-5	50	35	4	50	50	150	1	10	0.6	1.5	150	10	200	50	150		2	63
2N3135	TO-18	50	35	4	50	25	150	1	10	0.6	1.5	150	10	200	50	150		2	63
2N3136	TO-18	50	35	4	50	10	150	1	10	0.6	1.5	150	10	200	50	157		2	63
2N3502	TO-5	45	45	5	10	50	500	10	10	0.25	1.0	50	8	200	50	100	4	4/7	63

TEST CONDITIONS:

(1) I<sub>C</sub> = 300 mA, V<sub>CC</sub> = 10V, I<sub>B</sub><sup>1</sup> = I<sub>B</sub><sup>2</sup> = 30 mA, (2) I<sub>C</sub> = 150 mA, V<sub>CC</sub> = 6V, I<sub>B</sub><sup>1</sup> = I<sub>B</sub><sup>2</sup> = 15 mA, (3) I<sub>C</sub> = 300 mA, V<sub>CC</sub> = 15V, I<sub>B</sub><sup>1</sup> = I<sub>B</sub><sup>2</sup> = 30 mA, (4) I<sub>C</sub> = 300 mA, V<sub>CC</sub> = 30V, I<sub>B</sub><sup>1</sup> = I<sub>B</sub><sup>2</sup> = 30 mA, (5) I<sub>C</sub> = 10 mA, V<sub>CC</sub> = 3V, I<sub>B</sub><sup>1</sup> = I<sub>B</sub><sup>2</sup> = 1 mA, (6) I<sub>C</sub> = 100 μA, V<sub>CE</sub> = 5V, f = 100 Hz, (7) I<sub>C</sub> = 30 μA, V<sub>CE</sub> = 5V, f = 1 kHz, (8) I<sub>C</sub> = 100 μA, V<sub>CE</sub> = 5V, f = 1 kHz, (9) I<sub>C</sub> = 250 μA, V<sub>CE</sub> = 5V, f = 1 kHz, (10) I<sub>C</sub> = 10 μA, V<sub>CE</sub> = 5V, f = 1 kHz, (11) I<sub>C</sub> = 50 mA, V<sub>CC</sub> = 30V, I<sub>B</sub><sup>1</sup> = I<sub>B</sub><sup>2</sup> = 5 mA, (12) I<sub>C</sub> = 150 mA, V<sub>CC</sub> = 30V, I<sub>B</sub><sup>1</sup> = I<sub>B</sub><sup>2</sup> = 15 mA, (13) I<sub>C</sub> = 50 mA, V<sub>CC</sub> = 10V, I<sub>B</sub><sup>1</sup> = I<sub>B</sub><sup>2</sup> = 5 mA.

PNP Transistors

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PNP Transistors

6501130 NATL SEMICOND, (DISCRETE)

28C 35445 D

GENERAL PURPOSE AMPS AND SWITCHES (Continued)



Type No.	Case Style	V <sub>CEO</sub> (V) Min	V <sub>CE0</sub> (V) Min	V <sub>EB0</sub> (V) Min	I <sub>CB0</sub> @ V <sub>CB</sub> (mA) Max	h <sub>FE</sub> Min	I <sub>C</sub> @ V <sub>CE</sub> & V <sub>CE</sub> (mA) 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	t <sub>off</sub> (ns) Max	NF (dB) Max	Test Conditions	Process No.
									Max	Min								
2N3503	TO-5	60	60	5	10	50	500	0.25	1	1.3	50	8	200	100	4	4/7	63	
							150		2	300								
							140		1	10								
2N3504	TO-18	45	45	5	10	50	500	0.25	1	1.3	50	8	200	100	4	4/7	63	
						100	10		10									
						140	1		10									
2N3505	TO-18	60	60	5	10	100	150	0.25	1	1.3	50	8	200	100	4	4/7	63	
						140	10		10									
						135	1		10									
2N3638	TO-92 (92)	Same as PN3638, see page 2-13 for explanation																
2N3638A	TO-92 (92)	Same as PN3638A, see page 2-13 for explanation																
2N3644	TO-92 (92)	Same as PN3644, see page 2-13 for explanation																
2N3645	TO-92 (92)	60	60	5	10	40	0.1	0.4	0.8	1.3	20	8	200	20	63			
						80	1		10									
						100	10		10									
2N3702	TO-92 (94)	40	25	5	100	60	300	0.25	50	50	50	12	100	50	63			
						80	240		50									
						20	300		2									
2N3703	TO-92 (94)	50	30	5	100	30	150	0.25	50	50	50	12	100	50	63			
						40	300		5									
						20	150		5									
2N4142	TO-92 (92)	Same as PN4142, see page 2-13 for explanation																
2N4143	TO-92 (92)	Same as PN4143, see page 2-13 for explanation																
2N4290	TO-92 (94)	30	20	5	500	50	300	0.4	1.5	100	10	10	100	10	63			
						40	10		10									
						20	0.1		10									

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6501130 NATL SEMICOND, (DISCRETE)

28C 35446

D

GENERAL PURPOSE AMPS AND SWITCHES (Continued)



Type No.	Case Style	V <sub>CEO</sub> (V) Min	V <sub>CE0</sub> (V) Min	V <sub>BE0</sub> (V) Min	I <sub>CBO</sub> (mA) Max	I <sub>CB0</sub> @ V <sub>CB</sub> (V) Max	h <sub>FE</sub> Min	I <sub>C</sub> @ V <sub>CE</sub> (mA) & V <sub>CE</sub> (V)	V <sub>CE(SAT)</sub> V <sub>BE(SAT)</sub> (V) & (V) @ I <sub>C</sub> (mA)		C <sub>ob</sub> (pF) Max	f <sub>T</sub> (MHz) Min	I <sub>C</sub> (mA) Max	t <sub>off</sub> (ns) Max	NF (dB) Max	Test Conditions	Process No.
									Max	Min							
2N4291	TO-92 (94)	40	30	6	200	30	100	100 300	0.4	1.5	10	100	10				63
2N4402	TO-92 (94)	40	40	5 *			20 50 30	500 150 10 1	0.4	0.7 0.95	10	150	20	255		4	63
2N4403	TO-92 (92)	40	40	5			20 100 60 30	500 150 10 1 0.1	0.4	0.75 0.95	10	200	20	255		4	63
2N4971	TO-92 (92)	Same as PN2906, see page 2-12 for explanation															
2N4972	TO-92 (92)	Same as PN2907, see page 2-12 for explanation															
2N5142	TO-92 (92)	Same as PN5142, see page 2-14 for explanation															
2N5143	TO-92 (92)	Same as PN5143, see page 2-14 for explanation															
2N5221	TO-92 (92)	15	15	3	100	10	30 30	600 10	0.5	1.1	15	100	20				63
2N5226	TO-92 (92)	25	25	4	300	15	30 25	600 10	0.8	1.0	20	50	20				63
2N5354	TO-92 (94)	25	25	4	100	25	40	120 50	0.25		8						63
2N5355	TO-92 (94)	25	25	4	100	25	100	300 50	0.25		8						63
2N5365	TO-92 (94)	40	40	4	100	40	20 40	300 50 1	0.25	1.1	8						63
2N5366	TO-92 (94)	40	40	4	100	40	40 100 80	300 50 1 2	0.25	1.1 2.0	8						63

TEST CONDITIONS:

(1) I<sub>C</sub> = 300 mA, V<sub>CC</sub> = 10V, I<sub>B</sub><sup>1</sup> = I<sub>B</sub><sup>2</sup> = 30 mA. (2) I<sub>C</sub> = 150 mA, V<sub>CC</sub> = 6V, I<sub>B</sub><sup>1</sup> = I<sub>B</sub><sup>2</sup> = 15 mA. (3) I<sub>C</sub> = 300 mA, V<sub>CC</sub> = 15V, I<sub>B</sub><sup>1</sup> = I<sub>B</sub><sup>2</sup> = 30 mA. (4) I<sub>C</sub> = 300 mA, V<sub>CC</sub> = 30V, I<sub>B</sub><sup>1</sup> = I<sub>B</sub><sup>2</sup> = 30 mA. (5) I<sub>C</sub> = 10 mA, V<sub>CC</sub> = 3V, I<sub>B</sub><sup>1</sup> = I<sub>B</sub><sup>2</sup> = 1 mA. (6) I<sub>C</sub> = 100 μA, V<sub>CE</sub> = 5V, f = 100 Hz. (7) I<sub>C</sub> = 30 μA, V<sub>CE</sub> = 5V, f = 1 kHz. (8) I<sub>C</sub> = 100 μA, V<sub>CE</sub> = 5V, f = 1 kHz. (9) I<sub>C</sub> = 250 μA, V<sub>CE</sub> = 5V, f = 1 kHz. (10) I<sub>C</sub> = 10 μA, V<sub>CE</sub> = 5V, f = 1 kHz. (11) I<sub>C</sub> = 50 mA, V<sub>CC</sub> = 30V, I<sub>B</sub><sup>1</sup> = I<sub>B</sub><sup>2</sup> = 5 mA. (12) I<sub>C</sub> = 150 mA, V<sub>CC</sub> = 30V, I<sub>B</sub><sup>1</sup> = I<sub>B</sub><sup>2</sup> = 15 mA. (13) I<sub>C</sub> = 50 mA, V<sub>CC</sub> = 10V, I<sub>B</sub><sup>1</sup> = I<sub>B</sub><sup>2</sup> = 5 mA.

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PNP Transistors

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6501130 NATL SEMICOND, (DISCRETE)

28C 35447 D

T-29-01

GENERAL PURPOSE AMPS AND SWITCHES (Continued)

Type No.	Case Style	V <sub>CEO</sub> (V) Min	V <sub>CEO</sub> (V) Max	V <sub>ES0</sub> (V) Min	V <sub>ES0</sub> (V) Max	I <sub>CB0</sub> * (mA) Min	I <sub>CB0</sub> * (mA) Max	V <sub>CB</sub> (V)	h <sub>FE</sub> Min	h <sub>FE</sub> Max	I <sub>C</sub> (mA) Min	I <sub>C</sub> (mA) Max	V <sub>CE(SAT)</sub> (V) Min	V <sub>CE(SAT)</sub> (V) Max	V <sub>BE(SAT)</sub> (V) Min	V <sub>BE(SAT)</sub> (V) Max	I <sub>C</sub> (mA) Min	I <sub>C</sub> (mA) Max	f <sub>T</sub> (MHz) Min	f <sub>T</sub> (MHz) Max	t <sub>off</sub> (ns) Max	NF (dB) Max	Test Conditions	Process No.
2N5447	TO-92 (97)	40	25	5	5				60	300	50	50	0.25	0.25			100	50	100	12				63
2N5817	TO-92 (97)	50	40	5	5	100	100	25	25	500	500	2	0.75	0.75	1.2	1.2	100	50	100	15				63
MPS3638	TO-92 (92)	Same as PN3638, see page 2-13 for explanation																						
MPS3638A	TO-92 (92)	Same as PN3638A, see page 2-13 for explanation																						
MPS3644	TO-92 (92)	Same as PN3644, see page 2-13 for explanation																						
MPS3645	TO-92 (92)	Same as PN3645, see page 2-13 for explanation																						
MPS3702	TO-92 (92)	40	25	5	5	100	100	20	60	300	50	5	0.25	0.25			100	50	100	12				63
MPS3703	TO-92 (92)	50	30	5	5	100	100	20	30	150	50	5	0.25	0.25			100	50	100	12				63
MPS6533	TO-92 (92)	40	40	4	4	50	50	30	25	500	500	10	0.5	0.5	1.0	1.0				6				63
MPS6534	TO-92 (92)	40	40	4	4	50	50	30	90	270	100	1	0.3	0.3	1.0	1.0				6				63
MPS6535	TO-92 (92)	30	30	4	4	100	100	20	30	100	100	1	0.5	0.5	1.2	1.2				6				63
PN2906	TO-92 (92)	60	40	5	5	20	20	50	20	40	500	10	0.4	0.4	1.3	1.3	200	50	200	8			2	63
PN2906A	TO-92 (92)	60	60	5	5	10	10	50	40	120	150	10	0.4	0.4	1.3	1.3	200	50	200	8			2	63
PN2907	TO-92 (92)	60	40	5	5	20	20	50	30	300	150	10	0.4	0.4	1.3	1.3	200	50	200	8			2	63

6501130 NATL SEMICOND, (DISCRETE)

28C 35448

T-29-01

GENERAL PURPOSE AMPS AND SWITCHES (Continued)

Type No.	Case Style	VCBO (V) Min	VCEO (V) Min	VEBO (V) Min	ICES* ICBO @ (mA) Max	VCE @ IC & VCE (V)	hFE @ IC (mA) Min Max	VCE(SAT) VBE(SAT) (V) & Min Max	IC (mA) @ Min Max	Cob (pF) Max	ft (MHz) Min Max	IC (mA) @ Min Max	toff (ns) Max	NF (dB) Max	Test Conditions	Process No.
PN2907A	TO-92 (92)	60	60	5	20	50	100 300	0.4	1.3 150	8	200	50	100		2	63
PN3638	TO-92 (92)	25	25	4	35*	15	20 300	0.25	1.1 50	20	100	50	170		1	63
PN3638A	TO-92 (92)	25	25	4	25*	15	20 300	0.25	1.1 50	10	150	50	170		1	63
PN3644	TO-92 (92)	45	45	5	35*	30	20 300	0.25	1.0 50	8	200	20	100		4	63
PN3645	TO-92 (92)	60	60	5	35*	50	20 300	0.25	1.0 50	8	200	20	100		4	63
PN4142	TO-92 (92)	60	40	5			20 500	0.4	1.3 150	8	200	50	100		12	63
PN4143	TO-92 (92)	60	40	5			20 500	0.4	1.3 150	8	200	50	100		12	63

TEST CONDITIONS:  
 (1) IC = 300 mA, VCC = 10V, IB1 = IB2 = 30 mA, VCE = 5V, f = 1 kHz. (2) IC = 150 mA, VCC = 6V, IB1 = IB2 = 15 mA. (3) IC = 300 mA, VCC = 15V, IB1 = IB2 = 30 mA. (4) IC = 300 mA, VCC = 30V, IB1 = IB2 = 30 mA.  
 (5) IC = 10 mA, VCC = 3V, IB1 = IB2 = 1 mA. (6) IC = 100 μA, VCE = 5V, f = 100 Hz. (7) IC = 30 μA, VCE = 5V, f = 1 kHz. (8) IC = 100 μA, VCE = 5V, f = 1 kHz. (9) IC = 250 μA, VCE = 5V, f = 1 kHz.  
 (10) IC = 10 μA, VCE = 5V, f = 1 kHz. (11) IC = 50 mA, VCC = 30V, IB1 = IB2 = 5 mA. (12) IC = 150 mA, VCC = 30V, IB1 = IB2 = 15 mA. (13) IC = 50 mA, VCC = 10V, IB1 = IB2 = 5 mA.

PNP Transistors

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6501130 NATL SEMICOND, (DISCRETE)

28C 35449 D

T-29-01

PNP Transistors

GENERAL PURPOSE AMPS AND SWITCHES (Continued)



Type No.	Case Style	V <sub>CB0</sub> (V) Min	V <sub>CE0</sub> (V) Min	V <sub>EB0</sub> (V) Min	I <sub>CB0</sub> (mA) Max	I <sub>CE0</sub> (mA) Max	I <sub>FE</sub> (mA) Min	I <sub>CE</sub> (mA) Max	V <sub>CE</sub> (V) Max	V <sub>CE(SAT)</sub> (V) & V <sub>BE(SAT)</sub> (V)		I <sub>C</sub> (mA) Max	C <sub>ob</sub> (pF) Max	f <sub>T</sub> (MHz) Min	I <sub>C</sub> (mA) Max	t <sub>off</sub> (ns) Max	NF (dB) Max	Test Conditions	Process No.
										Max	Min								
PN5142	TO-92 (92)	20	20	4	50*	12	15	300	10	0.5	1.5	50	10	100	50	200		1	63
PN5143	TO-92 (92)	20	20	4	50*	12	30	300	10	0.2	0.8	2.5	10	100	50	200		1	63
TIS91	TO-92 (94)	40	40	5	100	20	30	50	2	0.2	0.8	2.5							63
TIS93	TO-92 (97)	40	40	5	100	20	100	300	2	0.25	0.6	1.0							63
TIS93	TO-92 (97)	40	40	5	100	20	100	300	2	0.25	0.6	1.0							63
TN2904A	TO-237 (91)	60	60	5	10	50	40	0.1	10	0.4	1.3	150	8	200	50	100		2	63
TN2905	TO-237 (91)	60	60	5	20	50	30	500	10	0.4	1.3	150	8	200	50	100		2	63
TN2905A	TO-237 (91)	60	60	5	10	50	75	150	10	1.6	2.6	500							63
2N3250	TO-18	50	40	5			35	0.1	10	0.4	1.3	150	8	200	50	100		2	63
2N3251	TO-18	50	40	5			15	50	1	0.25	0.6	0.9	6	250	10	225	6	5/6	66
2N3905	TO-92 (92)	40	40	5			50	100	1	0.5	1.2	50	6	300	20	250	6	5/6	66
2N3905	TO-92 (92)	40	40	5			30	300	1	0.25	0.65	0.85	4.5	200	10	260	5	5/8	66

6501130 NATL SEMICOND, (DISCRETE)

28C 35450

T-29-01

GENERAL PURPOSE AMPS AND SWITCHES (Continued)

Type No.	Case Style	VCBO (V) Min	VCEO (V) Min	VEBO (V) Min	ICES <sup>*</sup> ICBO @ (mA) Max	VCE (V)	hFE @ IC & VCE (V)		VCE(SAT) (V) & VBE(SAT) (V)		IC (mA) @ IC Max	Cob (pF) Max	fT (MHz) Min	fT (MHz) Max	IC (mA) Max	toff (ns) Max	NF (dB) Max	Test Conditions	Process No.	
							Min	Max	Max	Min										Max
2N3906	TO-92 (92)	40	40	5			30 60 100 80	100 50 300 1	0.25 0.4	0.65 0.85	10 50	4.5	250	10	300		4	5/8	66	
2N4121	TO-92 (92)	Same as PN4121, see page 2-16 for explanation																		
2N4122	TO-92 (92)	Same as PN4122, see page 2-16 for explanation																		
2N4125	TO-92 (92)	30	30	4	50	20	25 50	50 150	0.4	0.95	50	4.5	200	10			5	8	66	
2N4126	TO-92 (92)	25	25	4	50	20	60	50	0.4	0.95	50	4.5	250	10			4	8	66	
2N4916	TO-92 (92)	Same as PN4916, see page 2-16 for explanation																		
2N4917	TO-92 (92)	Same as PN4917, see page 2-16 for explanation																		
2N5138	TO-92 (92)	Same as PN5138, see page 2-16 for explanation																		
2N5139	TO-92 (92)	Same as PN5139, see page 2-16 for explanation																		
MPS3905	TO-92 (92)	40	40	5			30 40 50 30	0.1 1 10 50	0.25	0.65	10	4.5	200	10			5	8	66	
MPS3906	TO-92 (92)	40	40	5			60 80 100 30	0.1 1 10 100	0.4	0.95	50	4.5	250	10			4	8	66	
MPS6516	TO-92 (92)	40	40	4	50	30	30 50	100 2	0.4	0.95	50	4							66	
MPS6517	TO-92 (92)	40	40	4	50	30	60 90	100 2	0.5		50	4							66	

TEST CONDITIONS:  
 (1) IC = 300 mA, VCC = 10V, IB<sup>1</sup> = IB<sup>2</sup> = 30 mA, VCE = 6V, IB<sup>1</sup> = IB<sup>2</sup> = 15 mA, (3) IC = 300 mA, VCC = 30V, IB<sup>1</sup> = IB<sup>2</sup> = 30 mA.  
 (5) IC = 10 mA, VCC = 3V, IB<sup>1</sup> = IB<sup>2</sup> = 1 mA, (6) IC = 100 μA, VCE = 5V, f = 100 Hz, (7) IC = 30 μA, VCE = 5V, f = 1 kHz, (8) IC = 100 μA, VCE = 5V, f = 1 kHz, (9) IC = 250 μA, VCE = 5V, f = 1 kHz.  
 (10) IC = 10 μA, VCE = 5V, f = 1 kHz, (11) IC = 50 mA, VCC = 30V, IB<sup>1</sup> = IB<sup>2</sup> = 5 mA, (12) IC = 150 mA, VCC = 30V, IB<sup>1</sup> = IB<sup>2</sup> = 15 mA, (13) IC = 50 mA, VCC = 10V, IB<sup>1</sup> = IB<sup>2</sup> = 5 mA.

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PNP Transistors

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PNP Transistors

6501130 NATL SEMICOND, (DISCRETE)

28C 35451 D

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GENERAL PURPOSE AMPS AND SWITCHES (Continued)



Type No.	Case Style	V <sub>CB0</sub> (V) Min	V <sub>CE0</sub> (V) Min	V <sub>EB0</sub> (V) Min	I <sub>CB0</sub> (mA) Max	I <sub>CB0</sub> (mA) Max	h <sub>FE</sub> Min Max	I <sub>C</sub> (mA) Max	V <sub>CE(SAT)</sub> (V) Max	V <sub>BE(SAT)</sub> (V) Min Max	I <sub>C</sub> (mA) Max	C <sub>ob</sub> (pF) Max	f <sub>T</sub> (MHz) Min Max	I <sub>C</sub> (mA) Max	f <sub>off</sub> (Incl) Max	NF (dB) Max	Test Conditions	Process No.
MPS6518	TO-92 (92)		40	4	500	30	90 150 300 2	100 2	0.5	50	50	4						66
NS3905	TO-18	40	40	5			15 30 50 40	100 50 10 1 0.1	0.25 0.4	0.65 0.85 0.95	10 50	4.5	200	10	200	5	5/8	66
NS3906	TO-18	40	40	5			30 60 100 80 60	100 50 10 1 0.1	0.25 0.4	0.65 0.85 0.95	10 50	4.5	250	10	300	4	5/8	66
PN4121	TO-92 (92)	40	40	5	25*	30	15 70 60 40	50 200 1 0.1	0.13 0.14 0.3	0.75 0.9 1.1	1 10 50	4.5	400	10	150	4	11/8	66
PN4122	TO-92 (92)	40	40	5	25*	30	30 150 150 100	50 10 1 0.1	0.13 0.14 0.3	0.75 0.9 1.1	1 10 50	4.5	450	10	150	4	11/8	66
PN4916	TO-92 (92)	30	30	5	25*	15	15 70 60 40	50 10 1 0.1	0.13 0.14 0.3	0.75 0.9 1.1	1 10 50	4.5	400	10	150	4	13/8	66
PN4917	TO-92 (92)	30	30	5	25*	15	30 150 150 100	50 10 1 0.1	0.13 0.14 0.3	0.75 0.9 1.1	1 10 50	4.5	450	10	150	4	13/8	66
PN5138	TO-92 (92)	30	30	5	50	20	50 50 50	10 1 0.1	0.3	1.0	10	7	30	0.5				66
PN5139	TO-92 (92)	20	20	5	50*	15	15 40 40 30	50 10 1 0.1	0.2	0.7 1.0	10 10	5	300	10	200		13	66
ST3906	TO-92 (92)	40	40	5			60 80 100 60 30	0.1 1 300 1 100	0.5 0.25 0.4	0.75 1.25 0.85 0.95	50 10 50	4.5	250	10				66

6501130 NATL SEMICOND, (DISCRETE)

28C 35452 D

GENERAL PURPOSE AMPS AND SWITCHES (Continued)

Type No.	Case Style	V <sub>CEO</sub> (V) Min	V <sub>CE0</sub> (V) Min	V <sub>EB0</sub> (V) Min	I <sub>CB0</sub> (mA) Max	I <sub>CB0</sub> (mA) Max	I <sub>CE</sub> (mA) & I <sub>CB</sub> (mA)	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	t <sub>off</sub> (ns) Max	NF (dB) Max	Test Conditions	Process No.		
2N4354	TO-92 (92)	Same as PN4354, see below for explanation																		67
2N4355	TO-92 (92)	Same as PN4355, see below for explanation																		67
2N4356	TO-92 (92)	Same as PN4356, see page 2-18 for explanation																		67
2N5448	TO-92 (97)	50	30	5	100	20	30	150	50	5	0.25	100	50	50					67	
MPSA55	TO-92 (92)		60	4	100	60	50	100	1	100	0.25	50	100						67	
MPSA56	TO-92 (92)		80	4	100	80	50	100	1	100	0.25	50	100						67	
MPS4354	TO-92 (92)	Same as PN4354, see below for explanation																		67
MPS4355	TO-92 (92)	Same as PN4355, see below for explanation																		67
MPS4356	TO-92 (92)	Same as PN4356, see page 2-18 for explanation																		67
MPS6562	TO-92 (92)			5	100	20	50	200	500	1	0.5	30	500	10					67	
NS4234	TO-39		40		100 μA	40	40	100	1	1.5	0.6	300	100						67	
PN4354	TO-92 (92)	60	60	5	50	50	30	500	10	0.9	0.15	100	500	50	400	3	14/15	67		
PN4355	TO-92 (92)	60	60	5	50	50	75	500	10	0.9	0.15	100	500	50	400	3	14/15	67		

TEST CONDITIONS:

(1) I<sub>C</sub> = 300 mA, V<sub>CC</sub> = 10V, I<sub>B</sub><sup>1</sup> = I<sub>B</sub><sup>2</sup> = 30 mA, V<sub>CE</sub> = 5V, f = 100 Hz. (2) I<sub>C</sub> = 150 mA, V<sub>CC</sub> = 6V, I<sub>B</sub><sup>1</sup> = I<sub>B</sub><sup>2</sup> = 15 mA. (3) I<sub>C</sub> = 300 mA, V<sub>CC</sub> = 15V, I<sub>B</sub><sup>1</sup> = I<sub>B</sub><sup>2</sup> = 30 mA. (4) I<sub>C</sub> = 300 mA, V<sub>CC</sub> = 30V, I<sub>B</sub><sup>1</sup> = I<sub>B</sub><sup>2</sup> = 30 mA. (5) I<sub>C</sub> = 10 mA, V<sub>CC</sub> = 3V, I<sub>B</sub><sup>1</sup> = I<sub>B</sub><sup>2</sup> = 1 mA. (6) I<sub>C</sub> = 100 μA, V<sub>CE</sub> = 5V, f = 1 kHz. (7) I<sub>C</sub> = 30 μA, V<sub>CE</sub> = 5V, f = 1 kHz. (8) I<sub>C</sub> = 100 μA, V<sub>CE</sub> = 5V, f = 1 kHz. (9) I<sub>C</sub> = 250 μA, V<sub>CE</sub> = 5V, f = 1 kHz. (10) I<sub>C</sub> = 10 μA, V<sub>CE</sub> = 5V, f = 1 kHz. (11) I<sub>C</sub> = 50 mA, V<sub>CC</sub> = 30V, I<sub>B</sub><sup>1</sup> = I<sub>B</sub><sup>2</sup> = 5 mA. (12) I<sub>C</sub> = 150 mA, V<sub>CC</sub> = 30V, I<sub>B</sub><sup>1</sup> = I<sub>B</sub><sup>2</sup> = 15 mA. (13) I<sub>C</sub> = 50 mA, V<sub>CC</sub> = 10V, I<sub>B</sub><sup>1</sup> = I<sub>B</sub><sup>2</sup> = 5 mA. (14) I<sub>C</sub> = 500 mA, V<sub>CC</sub> = 30V, I<sub>B</sub><sup>1</sup> = I<sub>B</sub><sup>2</sup> = 50 mA. (15) I<sub>C</sub> = 100 μA, V<sub>CC</sub> = 10V, f = 1 kHz.

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PNP Transistors

6501130 NATL SEMICOND, (DISCRETE)

28C 35453 D

**PNP Transistors**

**GENERAL PURPOSE AMPS AND SWITCHES (Continued)**

Type No.	Case Style	VCBO (V) Min	VCEO (V) Min	VEBO (V) Min	ICES* ICBO (mA) Max	VCB (V)	hFE @ IC & VCE		VBE(SAT) (V) & VCE(SAT) (V)		IC (mA) @ Min Max	Cob (pF) Max	fT (MHz)		IC (mA) @ Min Max	toff (ns) Max	NF (dB) Max	Test Conditions	Process No.	
							Min	Max	Min	Max			Min	Max						Min
PN4356	TO-92 (92)	80	80	5	50	50	30	500	10	0.15	0.9	150	30	100	500	50	400	3	14/15	67
PN5447	TO-92 (92)	40	25	5	100	20	60	300	5	0.25	1.1	500	12	100		50				67
TN4036	TO-237 (91)	90	65	7	20	60	20	140	10	0.65	1.4	150	30	60	50					67
TN4037	TO-237 (91)	60	40	7	250	60	15	250	10	1.4		150	30	60	200	50				67
MPS6563	TO-92 (92)			5	100	20	50	200	1	0.5		350	30	60	10					68
2N6076	TO-92 (94)	25	25	5	100	25	100	500	10	0.25	0.8	10								71
2N5400	TO-92 (92)	130	120	5	100	100	40	180	5	0.2	1.0	10	6	100	400	10		8	9	74
2N5401	TO-92 (92)	160	150	5	50	120	30	50	5	0.5	1.0	50	6	100	300	10		8	9	74
MPSL51	TO-92 (92)	100	100	4	1 μA	50	40	250	5	0.25	1.2	10	8	60		10				74

**TEST CONDITIONS:**  
 (1) IC = 300 mA, VCC = 10V, IB<sup>1</sup> = IB<sup>2</sup> = 30 mA, VCE = 6V, VCE = 15V, IB<sup>1</sup> = IB<sup>2</sup> = 15 mA, VCC = 30V, VCC = 30V, IB<sup>1</sup> = IB<sup>2</sup> = 30 mA.  
 (2) IC = 150 mA, VCC = 10V, IB<sup>1</sup> = IB<sup>2</sup> = 15 mA, VCE = 5V, VCE = 10V, IB<sup>1</sup> = IB<sup>2</sup> = 15 mA, VCC = 30V, VCC = 30V, IB<sup>1</sup> = IB<sup>2</sup> = 30 mA.  
 (3) IC = 300 mA, VCC = 15V, IB<sup>1</sup> = IB<sup>2</sup> = 30 mA, VCE = 5V, VCE = 10V, IB<sup>1</sup> = IB<sup>2</sup> = 30 mA, VCC = 30V, VCC = 30V, IB<sup>1</sup> = IB<sup>2</sup> = 30 mA.  
 (4) IC = 300 mA, VCC = 15V, IB<sup>1</sup> = IB<sup>2</sup> = 30 mA, VCE = 5V, VCE = 10V, IB<sup>1</sup> = IB<sup>2</sup> = 30 mA, VCC = 30V, VCC = 30V, IB<sup>1</sup> = IB<sup>2</sup> = 30 mA.  
 (5) IC = 10 mA, VCC = 3V, IB<sup>1</sup> = IB<sup>2</sup> = 1 mA, VCE = 5V, VCE = 10V, IB<sup>1</sup> = IB<sup>2</sup> = 1 mA, VCC = 5V, VCC = 5V, IB<sup>1</sup> = IB<sup>2</sup> = 1 mA, VCC = 5V, VCC = 5V, IB<sup>1</sup> = IB<sup>2</sup> = 1 mA.  
 (6) IC = 10 mA, VCC = 3V, IB<sup>1</sup> = IB<sup>2</sup> = 1 mA, VCE = 5V, VCE = 10V, IB<sup>1</sup> = IB<sup>2</sup> = 1 mA, VCC = 5V, VCC = 5V, IB<sup>1</sup> = IB<sup>2</sup> = 1 mA, VCC = 5V, VCC = 5V, IB<sup>1</sup> = IB<sup>2</sup> = 1 mA.  
 (7) IC = 100 Hz, VCE = 5V, VCE = 10V, IB<sup>1</sup> = IB<sup>2</sup> = 100 Hz, VCC = 5V, VCC = 5V, IB<sup>1</sup> = IB<sup>2</sup> = 100 Hz, VCC = 5V, VCC = 5V, IB<sup>1</sup> = IB<sup>2</sup> = 100 Hz.  
 (8) IC = 100 Hz, VCE = 5V, VCE = 10V, IB<sup>1</sup> = IB<sup>2</sup> = 100 Hz, VCC = 5V, VCC = 5V, IB<sup>1</sup> = IB<sup>2</sup> = 100 Hz, VCC = 5V, VCC = 5V, IB<sup>1</sup> = IB<sup>2</sup> = 100 Hz.  
 (9) IC = 250 μA, VCE = 5V, VCE = 10V, IB<sup>1</sup> = IB<sup>2</sup> = 250 μA, VCC = 5V, VCC = 5V, IB<sup>1</sup> = IB<sup>2</sup> = 250 μA, VCC = 5V, VCC = 5V, IB<sup>1</sup> = IB<sup>2</sup> = 250 μA.  
 (10) IC = 10 μA, VCE = 5V, VCE = 10V, IB<sup>1</sup> = IB<sup>2</sup> = 10 μA, VCC = 5V, VCC = 5V, IB<sup>1</sup> = IB<sup>2</sup> = 10 μA, VCC = 5V, VCC = 5V, IB<sup>1</sup> = IB<sup>2</sup> = 10 μA.  
 (11) IC = 50 mA, VCC = 30V, IB<sup>1</sup> = IB<sup>2</sup> = 50 mA, VCE = 10V, VCC = 30V, IB<sup>1</sup> = IB<sup>2</sup> = 50 mA, VCC = 30V, VCC = 30V, IB<sup>1</sup> = IB<sup>2</sup> = 50 mA.  
 (12) IC = 150 mA, VCC = 30V, IB<sup>1</sup> = IB<sup>2</sup> = 150 mA, VCE = 10V, VCC = 30V, IB<sup>1</sup> = IB<sup>2</sup> = 150 mA, VCC = 30V, VCC = 30V, IB<sup>1</sup> = IB<sup>2</sup> = 150 mA.  
 (13) IC = 50 mA, VCC = 10V, IB<sup>1</sup> = IB<sup>2</sup> = 50 mA, VCE = 10V, VCC = 10V, IB<sup>1</sup> = IB<sup>2</sup> = 50 mA, VCC = 10V, VCC = 10V, IB<sup>1</sup> = IB<sup>2</sup> = 50 mA.  
 (14) IC = 500 mA, VCC = 30V, IB<sup>1</sup> = IB<sup>2</sup> = 500 mA, VCE = 10V, VCC = 30V, IB<sup>1</sup> = IB<sup>2</sup> = 500 mA, VCE = 10V, VCC = 30V, IB<sup>1</sup> = IB<sup>2</sup> = 500 mA.  
 (15) IC = 100 μA, VCC = 10V, f = 1 kHz.

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