National Semiconductor

General Purpose Amplifiers and Switches

Type No.	Case Style	V_{CBO} (V) Min	V_{CEO} (V) Min	V_{EBO} (V) Min	I_{CBO} (nA) Min @ V_{CB} (V)	h_{FE} Min	h_{FE} Max @ I_C (mA) & V_{CE} (V)	$V_{CE(SAT)}$ (V) Max & $V_{BE(SAT)}$ (V) Min Max @ I_C (mA)	C_{ob} (pF) Max	f_T (MHz) Min Max @ I_C (mA)	t_{off} (ns) Max	NF (dB) Max	Test Conditions	Process No.
2N2712	TO-92 (94)	18	18	5	500 @ 18	75	225 @ 2 & 4.5		12	90 300 @ 2				10
2N2714	TO-92 (94)	18	18	5	500 @ 18	75	225 @ 2 & 4.5	0.3 0.6 1.2 @ 50						10
2N2923	TO-92 (94)	25	25	5	100 @ 25	90	180 @ 2 & 10 (1 kHz)		10					10
2N2924	TO-92 (94)	25	25	5	100 @ 25	150	300 @ 2 & 10 (1 kHz)		10					10
2N2925	TO-92 (94)	25	25	5	100 @ 25	235	470 @ 2 & 10 (1 kHz)		10					10
2N2926	TO-92 (94)	18	18	5	500 @ 18	35	470 @ 2 & 10 (1 kHz)		10					10
2N3390	TO-92 (94)	25	25	5	100 @ 18	400	800 @ 2 & 4.5		10					10
2N3391	TO-92 (94)	25	25	5	100 @ 18	250	500 @ 2 & 4.5		10			5	(Note 5)	10
2N3392	TO-92 (94)	25	25	5	100 @ 18	150	300 @ 2 & 4.5		10					10
2N3393	TO-92 (94)	25	25	5	100 @ 18	90	180 @ 2 & 4.5		10					10
2N3394	TO-92 (94)	25	25	5	100 @ 18	55	110 @ 2 & 4.5		10					10
2N3395	TO-92 (94)	25	25	5	100 @ 18	150	500 @ 2 & 4.5		10					10

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General Purpose Amplifiers and Switches (Continued)

Type No.	Case Style	V_{CBO} (V) Min	V_{CEO} (V) Min	V_{EBO} (V) Min	I_{CBO} (nA) Min @	V_{CB} (V)	h_{FE} Min	h_{FE} Max @	I_C (mA) &	V_{CE} (V)	$V_{CE(SAT)}$ (V) Max &	$V_{BE(SAT)}$ (V) Min	$V_{BE(SAT)}$ (V) Max @	I_C (mA)	C_{ob} (pF) Max	f_T (MHz) Min	f_T (MHz) Max @	I_C (mA)	t_{off} (ns) Max	NF (dB) Max	Test Conditions	Process No.
2N3396	TO-92 (94)	25	25	5	100	18	90	500	2	4.5					10							10
2N3397	TO-92 (94)	25	25	5	100	18	55	500	2	4.5					10							10
2N3398	TO-92 (94)	25	25	5	100	18	55	800	2	4.5					10							10
2N3414	TO-92 (94)	25	25	5	100	25	75	225	2	4.5	0.3	0.6	1.3	50								10
2N3415	TO-92 (94)	25	25	5	100	25	180	540	2	4.5	0.3	0.6	1.3	50								10
2N3416	TO-92 (94)	50	50	5	100	25	75	225	2	4.5	0.3	0.6	1.3	50								10
2N3417	TO-92 (94)	50	50	5	100	25	180	540	2	4.5	0.3	0.6	1.3	50								10
2N3641		Same as PN3641																				10
2N3642		Same as PN3642																				10
2N3643		Same as PN3643																				10
2N3693		Same as PN3693																				10
2N3694		Same as PN3694																				10
2N3721	TO-92 (94)	18	18	5	500	18	60	660 (1 kHz)	2	10					12							10
2N3859	TO-92 (94)	30	30	4	500	18	100	200	2	4.5					4	90	250	2				10
2N3860	TO-92 (94)	30	30	4	500	18	150	300	2	4.5					4	90	250	2				10
2N4140		Same as PN4140																				10
2N4141		Same as PN4141																				10
2N4424	TO-92 (94)	40	40	5	100	25	180	540	2	4.5	0.3	0.6	1.3	50								10
2N4969		Same as PN2221																				10

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General Purpose Amplifiers and Switches (Continued)

Type No.	Case Style	V_{CBO} (V) Min	V_{CEO} (V) Min	V_{EBO} (V) Min	I_{CBO} (nA) @ V_{CB} (V) Min	h_{FE} Min	h_{FE} Max	@ I_C (mA)	& V_{CE} (V)	$V_{CE(SAT)}$ (V) Max	& $V_{BE(SAT)}$ (V) Min	$V_{BE(SAT)}$ (V) Max	@ I_C (mA)	C_{ob} (pF) Max	f_T (MHz) Min	f_T (MHz) Max	@ I_C (mA)	t_{off} (ns) Max	NF (dB) Max	Test Conditions	Process No.
2N4970	TO-92 (92)	50	30	5		100	350	150	10	0.4	0.6	1.2	150	8	200		20				10
						70		10	10												
						50		150	1												
2N5127		Same as PN5127																			10
2N5128		Same as PN5128																			10
2N5129		Same as PN5129																			10
2N5131		Same as PN5131																			10
2N5132		Same as PN5132																			10
2N5135		Same as PN5135																			10
2N5136		Same as PN5136																			10
2N5137		Same as PN5137																			10
2N5172	TO-92 (94)	25	25	5	100	25	100	500	10	10	0.25			10	10						10
2N5219	TO-92 (94)	20	15	3	100	10	35	500	2	10	0.4		1.0	10	4	150	10				10
2N5223	TO-92 (92)	25	20	3	100	10	50	500	2	10	0.7		1.2	10	4	150	10				10
MPQ100	TO-116 (39)	75	45	6	50	60	80		0.1	1	0.2		0.85	10	4.5	250	20		4	(Note 12)	10
							100	450	10	1											
							100		100	1	0.4		1.0	200							
							100	350	150	1											
MPQ2222	TO-116 (39)	60	40	5	50	50	75		10	10	0.4		1.3	150	8	200	20				10
							100		150	10											
							30		300	10	1.6		2.6	300							
MPS2923	TO-92 (92)	25	25	5	500	25	90	180	2	10					12						10
MPS2924	TO-92 (92)	25	25	5	500	25	150	300	2	10					12						10
MPS2925	TO-92 (92)	25	25	5	500	25	235	470	2	10					12						10

General Purpose Amplifiers and Switches (Continued)

Type No.	Case Style	V_{CBO} (V) Min	V_{CEO} (V) Min	V_{EBO} (V) Min	I_{CBO} (nA) Min @ V_{CB} (V)	h_{FE} Min	h_{FE} Max	@ I_C (mA)	& V_{CE} (V)	$V_{CE(SAT)}$ (V) Max	& $V_{BE(SAT)}$ (V) Min	$V_{BE(SAT)}$ (V) Max	@ I_C (mA)	C_{ob} (pF) Max	f_T (MHz) Min	f_T (MHz) Max	@ I_C (mA)	t_{off} (ns) Max	NF (dB) Max	Test Conditions	Process No.
MPS2926	TO-92 (92)	25	25	5	500	18	35	470	2	10				12							10
							(1 kHz) (5 Groups)														
MPS3392	TO-92 (92)	25	25	5	100	18	150	300	2	4.5				10							10
MPS3393	TO-92 (92)		25		100	18	90	180	2	4.5				10							10
MPS3394	TO-92 (92)		25		100	18	55	110	2	4.5				10							10
MPS3395	TO-92 (92)		25		100	18	150	500	2	4.5				10							10
MPS3396	TO-92 (92)		25		100	18	90	500	2	4.5				10							10
MPS3397	TO-92 (92)		25		100	18	55	500	2	4.5				10							10
MPS3398	TO-92 (92)		25		100	18	55	800	2	4.5				10							10
MPS3693	TO-92 (92)	45	45	4	50	35	40	160	10	10				10	200		10		4	(Note 9)	10
MPS3694	TO-92 (92)	45	45	4	50	35	100	400	10	10				10	200		10		4	(Note 9)	10
MPS3903	TO-92 (92)	60	40	6			20		0.1	1	0.2	0.65	0.85	4	200		10		5	(Note 8)	10
							35		1	1											
							50	150	10	1											
							30		50	1											
							15		100	1	0.3		1.0								
MPS3904	TO-92 (92)	60	40	6			40		0.1		0.2	0.65	0.85	4	200		10		5	(Note 8)	10
							70		1	1											
							100	300	10	1											
							60		50	1											
							10		100	1	0.3		1.0								
MPS5172	TO-92 (92)	25	25	5	100	25	100	500	10	10	0.25			10	10						10

General Purpose Amplifiers and Switches (Continued)

Type No.	Case Style	V_{CBO} (V) Min	V_{CEO} (V) Min	V_{EBO} (V) Min	I_{CBO} (nA) Min	@ V_{CB} (V)	h_{FE} Min	h_{FE} Max	@ I_C (mA)	& V_{CE} (V)	$V_{CE(SAT)}$ (V) Max	& $V_{BE(SAT)}$ (V) Min	$V_{BE(SAT)}$ (V) Max	@ I_C (mA)	C_{ob} (pF) Max	f_T (MHz) Min	f_T (MHz) Max	@ I_C (mA)	t_{off} (ns) Max	NF (dB) Max	Test Conditions	Process No.
MPS6520	TO-92 (92)		25	4	50	30	200 100	400	2 100 μA	10 10	0.5			50	4					3	(Note 10)	10
MPS6521	TO-92 (92)		25	4	50	30	200 150	600	2 100 μA	10 10	0.5			50	4					3	(Note 10)	10
MPS6566	TO-92 (92)	60	45	4	100	30	100	400	2	10	0.4			10	4	200		10				10
MPS6573	TO-92 (92)		35		100	35	100 200	500	100 μA 10	5 5	0.5			10	12	100	300	10				10
MPS6574	TO-92 (92)		35		100	35	100 (4 Groups)	300	1	5	0.5			10	12	100	300	10				10
MPS6575	TO-92 (92)		45		100	45	100 200	500	100 μA 10	5 5	0.5			10	12	100	300	10				10
MPS6576	TO-92 (92)		45		100	45	100 (4 Groups)	300	1	5	0.5			10	12	100	300	10				10
MPS8098	TO-92 (92)	60	60	6	100	60	100 100 75	300	1 10 100	5 5 5	0.3			100	6	150		10				10
MPS8099	TO-92 (92)	80	80	6	100	60	100 100 75	300	1 10 100	5 5 5	0.3			100	6	150		10				10
MPSA10	TO-92 (92)		40	4	100	30	40	400	5	10					4	50		5				10
MPSA20	TO-92 (92)		40	4	100	30	40	400	5	10					4	125		5				10
PN100	TO-92 (92)	75	45	6	50	60	80 100 100 100	450 350	0.1 10 100 150	1 1 1 5	0.2 0.4		0.85 1.0	10 200	4.5	250		20		4	(Note 12)	10
PN100A	TO-92 (92)	75	45	6	50	60	300 100 220	600	10 100 0.1	1 1 5	0.2 0.4		0.85 1.0		4.5	250		20		4	(Note 12)	10

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General Purpose Amplifiers and Switches (Continued)

Type No.	Case Style	V_{CBO} (V) Min	V_{CEO} (V) Min	V_{EBO} (V) Min	I_{CBO} (nA) Min	@ V_{CB} (V)	h_{FE} Min	h_{FE} Max	@ I_C (mA)	& V_{CE} (V)	$V_{CE(SAT)}$ (V) Max	& $V_{BE(SAT)}$ (V) Min	$V_{BE(SAT)}$ (V) Max	@ I_C (mA)	C_{ob} (pF) Max	f_T (MHz) Min	f_T (MHz) Max	@ I_C (mA)	t_{off} (ns) Max	NF (dB) Max	Test Conditions	Process No.
PN101	TO-92 (92)		65	6	50										4	150		20				10
PN2221	TO-92 (92)	60	30	5	10	50	20		500	10	0.4		1.3	150	8	250		20	285		(Note 2)	10
							20		150	1												
							40	120	150	10	1.6		2.6	500								
							35		10	10												
							25		1	10												
							20		100 μA	10												
PN2221A	TO-92 (92)	75	40	6	10	60	25		500	10	0.3	0.6	1.2	150	8	250		20	285		(Note 2)	10
							20		150	1												
							40	120	150	10	1.0		2.0	500								
							35		10	10												
							25		1	10												
							20		100 μA	10												
PN2222	TO-92 (92)	60	30	5	10	50	30		500	10	0.4		1.3	150	8	250		20				10
							50		150	1												
							100	300	150	10	1.6		2.6	500								
							75		10	1												
							50		1	1												
							35		100 μA	1												
PN3641	TO-92 (92)	60	30	5	50*	50	15		500	10	0.22			150	8	250		50				10
							40	120	150	10												
PN3642	TO-92 (92)	60	45	5	50*	50	15		500	10	0.22			150	8	250		50				10
							40	120	150	10												
PN3643	TO-92 (92)	60	30	5	50*	50	20		500	10	0.22			150	8	250		50				10
							100	300	150	10												
PN3694	TO-92 (92)	45	45	4	50	30	100	400	10	1					6	200		10				10
PN4140	TO-92 (92)	60	30	5			20		500	10	0.4		1.3	150	8	250		20	310		(Note 2)	10
							20		150	1												
							40	120	150	10	1.6		2.6	500								
							35		10	10												
							25		1	10												
							20		100 μA	10												

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General Purpose Amps and Switches (Continued)

Type No.	Case Style	V_{CBO} (V) Min	V_{CEO} (V) Min	V_{EBO} (V) Min	I_{CBO} (nA) Min	@ V_{CB} (V)	h_{FE} Min	h_{FE} Max	@ I_C (mA)	& V_{CE} (V)	$V_{CE(SAT)}$ (V) Max	& $V_{BE(SAT)}$ (V) Min	$V_{BE(SAT)}$ (V) Max	@ I_C (mA)	C_{ob} (pF) Max	f_T (MHz) Min	f_T (MHz) Max	@ I_C (mA)	t_{off} (ns) Max	NF (dB) Max	Test Conditions	Process No.
PN4141	TO-92 (92)	60	30	5			30		500	10	0.4		1.3	150	8	250		20	310		(Note 2)	10
							50		150	1												
							100	300	150	10	1.6		2.6	500								
							75		10	10												
							50		1	10												
							35		100 μA	10												
PN5127	TO-92 (92)	20	12	3	50	10	15	300	2	10	0.3		1.0	10	4	150		2				10
PN5128	TO-92 (92)	15	12	3	50	10	35	350	50	10	0.25		1.1	150	10	200	800	50				10
							20		10	10												
PN5129	TO-92 (92)	15	12	3	50	10	35	350	50	10	0.25		1.1	150	10	200	800	50				10
							20		10	10												
PN5131	TO-92 (92)	20	15	3	50	10	35	500	10	1	1.0			10	6	100		10				10
PN5132	TO-92 (92)	20	20	3	50	10	30	400	10	10	2.0		0.9	10	4	200		10				10
PN5135	TO-92 (92)	30	25	4	300	15	50	60*	10	10	1.0		1.0	100	25	40	500	30				10
							15		2	10												
PN5136	TO-92 (92)	30	20	3	100	20	20	400	150	1	0.25		1.1	150	35	40	400	50				10
							20		30	1												
PN5137	TO-92 (92)	30	20	3	100	20	20	400	150	1	0.25		1.1	150	35	40	400	50				10
							20		30	1												
TIS90	TO-92 (94)	40	40	5	100	20	100	300	50	2	0.25	0.6	1	50								10
TIS92	TO-92 (97)	40	40	5	100	20	100	300	50	2	0.25	0.6	1	50								10
TIS97	TO-92 (97)		40		10	40	250	700	0.1	5										3	(Note 7)	10
TIS98	TO-92 (97)		60		10	40	100	300	1	5	0.5			100		2		10				10
TIS99	TO-92 (97)		65		10	40	55	300	100	5	0.5			100		2		10				10

General Purpose Amplifers and Switches (Continued)

Type No.	Case Style	V_{CBO} (V) Min	V_{CEO} (V) Min	V_{EBO} (V) Min	I_{CBO} (nA) Min	@ V_{CB} (V)	h_{FE} Min	h_{FE} Max	@ I_C (mA)	& V_{CE} (V)	$V_{CE(SAT)}$ (V) Max	& $V_{BE(SAT)}$ (V) Min	$V_{BE(SAT)}$ (V) Max	@ I_C (mA)	C_{ob} (pF) Max	f_T (MHz) Min	f_T (MHz) Max	@ I_C (mA)	t_{off} (ns) Max	NF (dB) Max	Test Conditions	Process No.
TN2218A	TO-237 (91)	75	40	6	10	60	25		500	10	0.3	0.6	1.2	150	8	250		20	285		(Note 2)	10
							20		150	1												
							40	120	150	10												
							35		10	10												
							25		1	10												
							20		100 μA	10												
TN2219	TO-237 (91)	60	30	5	10	50	30		500	10	0.4		1.3	150	8	250		20				10
							50		150	1												
							100	300	150	10	1.6		2.6	500								
							75		10	10												
							50		1	10												
							35		0.1	10												
TN2219A	TO-237 (91)	75	40	6	10	60	40		500	10	0.3	0.6	1.2	150	8	250		20		4	(Note 3)	10
							50		150	1												
							100	300	150	10	1.0		2.0	500								
							75		10	10												
							50		1	10												
							35		0.1	10												
2N3704	TO-92 (94)	50	30	5	100	20	100	300	50	2	0.6			100	12	100		50				13
2N3705	TO-92 (94)	50	30	5	100	20	50	150	50	2	0.8			100	12	100		50				13
2N3706	TO-92 (94)	40	20	5	100	20	30	600	50	2	1.0			100	12	100		50				13
2N3794	TO-92 (94)	40	20	5	500	15	100		100	10	0.4			10	10	100	600	10				13
							100	600	10	10												
							35		1	10												
2N4400	TO-92 (92)	60	40	6			20		500	2	0.4	0.75	0.95	150	6.5	200		20	255		(Note 2)	13
							50	150	150	1												
							40		10	1	0.75		1.2	500								
							20		1	1												

General Purpose Amplifiers and Switches (Continued)

Type No.	Case Style	V_{CBO} (V) Min	V_{CEO} (V) Min	V_{EBO} (V) Min	I_{CBO} (nA) Min @ V_{CB} (V)	h_{FE} Min	h_{FE} Max	@ I_C (mA)	& V_{CE} (V)	$V_{CE(SAT)}$ (V) Max	& $V_{BE(SAT)}$ (V) Min	$V_{BE(SAT)}$ (V) Max	@ I_C (mA)	C_{ob} (pF) Max	f_T (MHz) Min	f_T (MHz) Max	@ I_C (mA)	t_{off} (ns) Max	NF (dB) Max	Test Conditions	Process No.
2N4401	TO-92 (92)	60	40	6		40		500	2	0.4	0.75	0.95	150	6.5	250		20	255		(Note 2)	13
						100	300	150	1												
						80		10	1	0.75		1.2	500								
						40		1	1												
						20		100 μA	1												
2N4944	TO-92 (92)	80	40	5	50	40	40	120	150	1	0.25			150		60	900	50				13
							40		30												
2N4946	TO-92 (92)	80	40	5	50	40	100	300	150	1	0.25			150		60	900	50				13
							100		30												
2N4951	TO-92 (94)	60	30	5	50	40	60	200	150	10	0.3		1.3	150	8	250		20	400		(Note 2)	13
							40		10	10											
							20		1	10											
2N4952	TO-92 (94)	60	30	5	50	40	100	300	150	10	0.3		1.3	150	8	250		20	400		(Note 2)	13
							75		10	10											
							50		1	10											
2N4953	TO-92 (94)	60	30	5	50	40	200	600	150	10	0.3		1.3	150	8	250		20	400		(Note 2)	13
							150		10	10											
							75		1	10											
2N4954	TO-92 (94)	40	30	5	50	30	60	600	150	10	0.3		1.3	150	8	250		20	400		(Note 2)	13
							40		10	10											
							20		1	10											
2N5220	TO-92 (92)	15	15	3	100	10	30	600	50	10	0.5		1.1	150	10	100		20				13
							25		10	10											
2N5225	TO-92 (92)	25	25	4	300	15	30	600	50	10	0.8		1.0	100	20	50		20				13
							25		50	10											
MPS3704	TO-92 (92)	50	30	5	100	20	100	300	50	2	0.6			100	12	100		50				13
MPS3705	TO-92 (92)	50	30	5	100	20	50	150	50	2	0.8			100	12			50				13
MPS3706	TO-92 (92)	40	20	5	100	20	30	600	50	2	1.0			100	12	100		50				13
MPS6522	TO-92 (92)		25	4	50	20	100		0.1	10	0.5			50	4							13
							200	400	2	10											

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General Purpose Amplifiers and Switches (Continued)

Type No.	Case Style	V_{CBO} (V) Min	V_{CEO} (V) Min	V_{EBO} (V) Min	I_{CBO} (nA) Min	@ V_{CB} (V)	h_{FE} Min	h_{FE} Max	@ I_C (mA)	& V_{CE} (V)	$V_{CE(SAT)}$ (V) Max	& $V_{BE(SAT)}$ (V) Min	$V_{BE(SAT)}$ (V) Max	@ I_C (mA)	C_{ob} (pF) Max	f_T (MHz) Min	f_T (MHz) Max	@ I_C (mA)	t_{off} (ns) Max	NF (dB) Max	Test Conditions	Process No.
MPS6530	TO-92 (92)	60	40	5	50	40	25		500	10	0.5		1.0	100	5							13
							40	120	100	1												
							30		10	1												
MPS6531	TO-92 (92)	60	40	5	50	40	50		500	10	0.3		1.0	100	5							13
							90	270	100	1												
							60		10	1												
MPS6532	TO-92 (92)	50	30	5	100	30	30		100	1	0.5		1.2	100	5							13
PN5449	TO-92 (92)	50	30	5	100	20	100	300	50	2	0.6			100		100		50				13
PN5816	TO-92 (92)	50	40	5	100	25	100	200	2	2	0.75		1.2	500		100		50				13
2N5550	TO-92 (92)	160	140	6	100	100	20		50	5	0.15		1.0	10	6	100	300	10		10	(Note 8)	16
							60	250	10	5												
							60		1	5	0.25		1.2	50								
2N5551	TO-92 (92)	180	160	6	50	120	30		50	5	0.15		1.0	10	6	100	300	10		8	(Note 8)	16
							80	250	10	5												
							80		1	5	0.2		1.0	50								
2N5830	TO-92 (92)	120	100	5	50	100	60		1	5	0.15		0.8	1		100	500	10				16
							80	500	10	5	0.2		1	10								
							80		50	5	0.25		1	50								
2N5831	TO-92 (92)	160	140	5	50	120	60		1	5	0.15		0.8	1	4	100	500	10				16
							80	250	10	5	0.2		1.0	10								
							80		50	5	0.25		1.0	50								
2N5833	TO-92 (92)	200	180	6	10	160	50		1	5	0.15		0.8	1	4	100	500	10				16
							50	250	10	5	0.2		1.0	10								
							50		50	5	0.25		1.0	50								
MPSL01	TO-92 (92)	140	120	6	1 μA	40	50	300	10	5	0.2		1.2	1.0	8	60		10				16
											0.2		1.4	50								
PN5965	TO-92 (92)	200	180	5	50	160	50		1	5	0.15		0.8		4							16
							50	250	10	5	0.2		1.0									
							50		50	5	0.25		1.0									
2N696	TO-5	60		5	1 μA	30	20	60	150	10	1.5		1.3	150	20	40		50				19

General Purpose Amplifiers and Switches (Continued)

Type No.	Case Style	V_{CBO} (V) Min	V_{CEO} (V) Min	V_{EBO} (V) Min	I_{CBO} (nA) Min @ V_{CB} (V)	h_{FE} Min	h_{FE} Max	@ I_C (mA)	& V_{CE} (V)	$V_{CE(SAT)}$ (V) Max &	$V_{BE(SAT)}$ (V) Min	$V_{BE(SAT)}$ (V) Max @	I_C (mA)	C_{ob} (pF) Max	f_T (MHz) Min	f_T (MHz) Max @	I_C (mA)	t_{off} (ns) Max	NF (dB) Max	Test Conditions	Process No.
2N697	TO-5	60	45	5	1 μA	30	40	120	150	10	1.5		1.3	150	35	50	50				19
2N718	TO-18	60	30	5	1 μA	30	40	120	150	10	1.5		1.3	150	35	50	15				19
2N718A	TO-18	75		7	10	60	20		500	10	1.5		1.3	150	25	60	50		12	(Note 1)	19
							40	120	150	10											
							35		10	10											
							20		100 μA	10											
2N956	TO-18	75	35	7	10	60	40		500	10	1.5		1.3	150	25	70	50		8	(Note 1)	19
							100	300	150	10											
							75		10	10											
							35		100 μA	10											
							20		10 μA	10											
2N1420	TO-5	60	30	5	1 μA	30	100	300	150	10	1.5		1.3	150	35	50	50				19
2N1566	TO-5	80	60	5	1 μA	40	80 (1 kHz)	200	5	5	1.0			10	10	60	5				19
2N2218	TO-5	60	30	5	10	50	20		500	10	0.4		1.3	150	8	250	20			(Note 2)	19
							20		150	1											
							40	120	150	10	1.6		2.6	500							
							35		10	10											
							25		1	10											
							20		100 μA	10											
2N2218A	TO-5	75	40	6	10	60	25		500	10	0.3	0.6	1.2	150	8	250	20	285		(Note 2)	19
							20		150	1											
							40	120	150	10											
							35		10	10											
							25		1	10											
							20		100 μA	10											
2N2219	TO-5	60	30	5	10	50	30		500	10	0.4		1.3	150	8	250	20				19
							50		150	1											
							100	300	150	10	1.6		2.6	500							
							75		10	10											
							50		1	10											
							35		100 μA	10											

General Purpose Amplifiers and Switches (Continued)

Type No.	Case Style	V_{CBO} (V) Min	V_{CEO} (V) Min	V_{EBO} (V) Min	I_{CBO} (nA) @ V_{CB} (V) Min		h_{FE} Min	h_{FE} Max	@ I_C (mA) & V_{CE} (V)		$V_{CE(SAT)}$ (V) Max &	$V_{BE(SAT)}$ (V) Min	$V_{BE(SAT)}$ (V) Max @	I_C (mA)	C_{ob} (pF) Max	f_T (MHz) Min	f_T (MHz) Max @	I_C (mA)	t_{off} (ns) Max	NF (dB) Max	Test Conditions	Process No.
2N2219A also Avail. JAN/TX/V Versions	TO-5	75	40	6	10	60	40		500	10		0.6	1.2	150	8	300		20			(Note 2)	19
							50		150	1			2	500								
							100	300	150	10												
							75		10	10												
							50		1	10												
							35		100 μA	10												
2N2221	TO-18	60	30	5	10	50	20		500	10	0.4		1.3	150	8	250		20				19
							20		150	1												
							40	120	150	10	1.6		2.6	500								
							35		10	10												
							25		1	10												
							20		100 μA	10												
2N2221A	TO-18	75	40	6	10	60	25		500	10	0.3	0.6	1.2	150	8	250		20	285		(Note 2)	19
							40	120	150	10												
							35		10	10	1.0		2.0	500								
							25		1	10												
							20		100 μA	10												
2N2222	TO-18	60	30	5	10	50	30		500	10	0.4		1.3	150	8	250		20				19
							50		150	1												
							100	300	150	10	1.6		2.6	500								
							75		10	10												
							50		1	10												
							35		100 μA	10												
2N2222A also Avail JAN/TX/V Versions	TO-18	75	40	6	10	60	40		500	10	0.3	0.6	1.2	150	8	250		20	285	4	(Notes 2 & 3)	9
							50		150	1												
							100	300	150	10	1		2	500								
							75		10	10												
							50		1	10												
							35		100 μA	10												
2N3299	TO-5	60	30	5	10*	50	20		500	10	0.22		1.1	150	8	250		50	150		(Note 4)	19
							20		150	1												
							40	120	150	10												
							35		10	10	0.6		1.5	500								
							25		1	10												
							20		100 μA	10												

General Purpose Amplifiers and Switches (Continued)

Type No.	Case Style	V_{CBO} (V) Min	V_{CEO} (V) Min	V_{EBO} (V) Min	I_{CBO} (nA) Min @	V_{CB} (V)	h_{FE} Min	h_{FE} Max	@ I_C (mA)	& V_{CE} (V)	$V_{CE(SAT)}$ (V) Max &	$V_{BE(SAT)}$ (V) Min	$V_{BE(SAT)}$ (V) Max @	I_C (mA)	C_{ob} (pF) Max	f_T (MHz) Min	f_T (MHz) Max @	I_C (mA)	t_{off} (ns) Max	NF (dB) Max	Test Conditions	Process No.
2N3300	TO-5	60	30	5	10*	50	50		500	10	0.22		1.1	150	8	250	50		150		(Note 4)	19
							50		150	1												
							100	300	150	10												
							75		10	10	0.6		1.5	500								
							50		1	10												
							35		100 μA	10												
2N3301	TO-18	60	30	5	10*	50	20		500	10	0.22		1.1	150	8	250	50		150		(Note 4)	19
							20		150	1												
							40	120	150	10	0.6		1.5	500								
							35		10	10												
							25		1	10												
							20		100 μA	10												
2N3302	TO-18	60	30	5	10*	50	50		500	10	0.22		1.1	150	8	250	50		150		(Note 4)	19
							50		150	1												
							100	300	150	10	0.6		1.5	500								
							75		10	10												
							50		1	10												
							35		100 μA	10												
PN2222A	TO-92 (92)	75	40	6	10	60	40		500	10	0.3	0.6	1.2	150	8	300	20		285		(Note 2)	19
							50		150	1												
							100	300	150	10	1.0		2.0	500								
							75		10	1												
							50		1	1												
							35		100 μA	1												
2N915	TO-18	70	50	5	10	60	50	200	10	5	1.0		0.9	10	3.5	250	10					23
2N916	TO-18	45	25	5	10	30	50	200	10	1	0.5		0.9	10	6	300	10					23
2N3691		Same as PN3691																				23
2N3692		Same as PN3692																				23

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General Purpose Amplifiers and Switches (Continued)

Type No.	Case Style	V_{CBO} (V) Min	V_{CEO} (V) Min	V_{EBO} (V) Min	I_{CBO} (nA) @ Min	V_{CB} (V)	h_{FE} Min	h_{FE} Max	@ I_C (mA)	& V_{CE} (V)	$V_{CE(SAT)}$ (V) Max	& $V_{BE(SAT)}$ (V) Min	$V_{BE(SAT)}$ (V) Max	@ I_C (mA)	C_{ob} (pF) Max	f_T (MHz) Min	f_T (MHz) Max	@ I_C (mA)	t_{off} (ns) Max	NF (dB) Max	Test Conditions	Process No.
2N3903	TO-92 (92)	60	40	6			15		100	1	0.2	0.6	0.85	10	4	250		10	225	6	(Notes 6 & 7)	23
							30		50	1												
							50	150	10	1	0.3		0.95	50								
							35		1	1												
							20		100 μA	1												
2N3904	TO-92 (92)	60	40	6		30	30		100	1	0.2	0.65	0.85	10	4	300		10	250	5	(Notes 6 & 7)	23
							60		50	1												
							100	300	10	1	0.3		0.95	50								
							70		1	1												
							40		100 μA	1												
2N3946	TO-18	60	40	6			20		50	1	0.2	0.6	0.9	10	4	250		10	375	5	(Notes 6 & 7)	23
							50	150	10	1												
							45		1	1	0.3		1.0	50								
							30		100 μA	1												
2N3947	TO-18	60	40	6			40		50	1	0.2	0.6	0.9	10	4	300		10	450	5	(Notes 6 & 7)	23
							100	300	10	1												
							90		1	1	0.3		1.0	50								
							60		100 μA	1												
2N4123	TO-92 (92)	40	30	5	50	20	25		50	1	0.3		0.95	50	4	250		10		6	(Note 7)	23
							50	150	2	1												
2N4124	TO-92 (92)	30	25	5	50	20	60		50	1	0.3		0.95	50	4	300		10		5	(Note 7)	23
							120	360	2	1												
MPQ3904	TO-116 (39)	60	40	6	50	40	30		0.1	1	0.2		0.85	10	4	250		10				23
							50		1	1												
							75		10	1												
MPQ6700	TO-116 (39)	40	40	5	50	30	30		0.1	1	0.25		0.1	10	4.5	200		10				23/66
							50		1	1												
							70		10	1												
MPS2711	TO-92 (92)	18	18	5	500	18	30	90	2	4.5					4							23
MPS2712	TO-92 (92)	18	18	5	500	18	75	225	2	4.5					4							23

General Purpose Amplifiers and Switches (Continued)

Type No.	Case Style	V_{CBO} (V) Min	V_{CEO} (V) Min	V_{EBO} (V) Min	I_{CBO} (nA) Min @ V_{CB} (V)	h_{FE} Min	h_{FE} Max	@ I_C (mA)	& V_{CE} (V)	$V_{CE(SAT)}$ (V) Max & $V_{BE(SAT)}$ (V) Min	Max	@ I_C (mA)	C_{ob} (pF) Max	f_T (MHz) Min	Max	@ I_C (mA)	t_{off} (ns) Max	NF (dB) Max	Test Conditions	Process No.
MPS2716	TO-92 (92)	18	18	5	500 18	75	225	2	4.5				3.5							23
MPS3721	TO-92 (92)				500 18	60	660 (1 kHz)	2	10				3.5							23
MPS3826	TO-92 (92)	60	45	4	100 30	40	160	10	10				3.5	200	800	10				23
MPS3827	TO-92 (92)	60	45	4	100 30	100	400	10	10				3.5	200	800	10				23
MPS6512	TO-92 (92)	40	30	4	50 30	30 50	 100	100 2	10 10	0.5		50	3.5							23
MPS6513	TO-92 (92)	40	30	4	50 30	60 90	 180	100 2	10 10	0.5		50	3.5							23
MPS6514	TO-92 (92)	40	25	4	50 30	90 150	 300	100 2	10 10	0.5		50	3.5							23
MPS6515	TO-92 (92)	40	25	4	50 30	150 250	 500	100 2	10 10	0.5		50	3.5							23
MPS6564	TO-92 (92)		45	5	500 40	25		10	5	0.5		10	4							23
MPS6565	TO-92 (92)	60	45	4	100 30	40	160	10	10	0.4		10	3.5							23

General Purpose Amplifiers and Switches (Continued)

Type No.	Case Style	V_{CBO} (V) Min	V_{CEO} (V) Min	V_{EBO} (V) Min	I_{CBO} (nA) @ V_{CB} (V) Min	h_{FE} Min	h_{FE} Max	@ I_C (mA) & V_{CE} (V)	$V_{CE(SAT)}$ (V) Max	$V_{BE(SAT)}$ (V) Min	$V_{BE(SAT)}$ (V) Max	@ I_C (mA)	C_{ob} (pF) Max	f_T (MHz) Min	f_T (MHz) Max	@ I_C (mA)	t_{off} (ns) Max	NF (dB) Max	Test Conditions	Process No.
NS3903	TO-18	60	40	5		15		100 1	0.2	0.65	0.85	10	4	250		10	225		(Note 6)	23
						30		50 1												
						50	150	10 1	0.3		0.95	50								
						35		1 1												
						20		100 μA 1												
NS3904	TO-18	60	40	6		30		100 1	0.2	0.65	0.85	10	4	300		10	250		(Note 6)	23
						60		50 1												
						100	300	10 1	0.3		0.95	50								
						70		1 1												
						40		100 μA 1												
PN3691	TO-92 (92)	35	20	4	50	40	160	10 1	0.7		0.9	10	3.5	200	500	10				23
PN3692	TO-92 (92)	35	20	4	50	100	400	10 1	0.7		0.9	10	3.5	200	500	10				23
ST3904	TO-92 (92)	60	40	6		40		0.1 1	0.2	0.65	0.85	10	4	300		10	285	8	(Notes 6, 7)	23
						70		1 1												
						100	300	10 1												
						60		50 1												
						30		100 1	0.3		0.95	50								

TEST CONDITIONS:

Note 1: I_C = 300 μA, V_{CE} = 10V, f = 1 kHz.
Note 2: I_C = 150 mA, V_{CC} = 30V, I_{B1} = I_{B2} = 15 mA.
Note 3: I_C = 100 μA, V_{CE} = 10V, f = 1 kHz.
Note 4: I_C = 300 mA, V_{CC} = 25V, I_{B1} = I_{B2} = 30 mA.
Note 5: I_C = 100 μA, V_{CE} = 4.5V, f = 15.7 kHz.
Note 6: I_C = 10 mA, V_{CC} = 3V, I_{B1} = I_{B2} = 1 mA.
Note 7: I_C = 100 μA, V_{CE} = 5V, f = 15.7 kHz.
Note 8: I_C = 250 μA, V_{CE} = 5V, f = 10 Hz – 15.7 kHz.
Note 9: I_C = 3 mA, V_{CE} = 10V, f = 1 MHz.
Note 10: I_C = 10 μA, V_{CE} = 5V, f = 15.7 kHz.
Note 11: I_C/I_B = 20.
Note 12: I_C = 200 μA, V_{CE} = 5V, f = 1 kHz.