



Surface Mount Transistors

General Purpose Amplifiers and Switches—PNP

Type No.	Case Style	V <sub>CB0</sub> <sup>*</sup> (V) Min	V <sub>CEO</sub> (V) Min	V <sub>EB0</sub> (V) Min	I <sub>CS</sub> <sup>*</sup> I <sub>CB0</sub> (nA) Max	V <sub>CB</sub> (V)	h <sub>FE</sub> @ I <sub>C</sub> & V <sub>CE</sub> (V) Min Max	V <sub>CE(SAT)</sub> (V) Max	V <sub>BE(SAT)</sub> (V) @ I <sub>C</sub> (mA) Min Max	I <sub>C</sub> (mA) 150 100 50	C <sub>ob</sub> (pF) Max	f <sub>T</sub> (MHz) @ I <sub>C</sub> (mA) Min Max	t <sub>off</sub> (ns) Max	NF (dB) Max	Test Conditions	Process No.
MMBT 2904	TO-236 (49)	60	40	5	20	50	30 100 75 50 35	0.4	1.3	150 100 50	8	200				63
MMBT 2904A	TO-236 (49)	60	40	5	10	50	50 100 100 100 75	0.4	2.5	500 150 10 10 10 10 0.1	8	200	100		(Note 2)	63
MMBT 2905	TO-236 (49)	60	40	5	20	50	30 100 75 50 35	0.4	1.3	150 100 50	8	200				63
MMBT 2905A	TO-236 (49)	60	40	5	10	50	50 100 100 100 75	0.4	2.6	500 150 10 10 10 10 0.1	8	200	100		(Note 2)	63
MMBT 2906	TO-236 (49)	60	40	5	20	50	30 100 75 50 35	0.4	1.3	150 100 50	8	200				63
MMBT 2906A	TO-236 (49)	60	40	5	10	50	50 100 75 50 35	0.4	2.6	500 150 10 10 10 10 0.1	8	200	100		(Note 2)	63

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Type No.	Case Style	V <sub>CB0</sub> * (V) Min	V <sub>CEO</sub> (V) Min	V <sub>EB0</sub> (V) Min	ICES* I <sub>CB0</sub> @ (mA) Max	h <sub>FE</sub> @ I <sub>C</sub> & V <sub>CE</sub> (V) Min Max	V <sub>CE(SAT)</sub> (V) Max	V <sub>BE(SAT)</sub> (V) Min Max	I <sub>C</sub> (mA) Min Max	C <sub>ob</sub> (pF) Max	f <sub>T</sub> (MHz) Min Max	t <sub>off</sub> (ns) Max	NF (dB) Max	Test Conditions	Process No.
MMBT 2907	TO-236 (49)	60	40	5	20	30	0.4	1.3	150	8	200	50			63
								500	10						
MMBT 2907A	TO-236 (49)	60	40	5	10	100	0.4	1.3	150	8	200	50	100	(Note 2)	63
								300	10						
MMBT 3638	TO-236 (49)	25	25	4	35*	20	0.25	1.1	50	20	100	50		(Notes 1, 18)	63
								50	1						
MMBT 3638A	TO-236 (49)	25	25	4	35*	100	0.25	1.1	50	10	150	50		(Notes 1, 18)	63
								300	2						
MMBT 3644	TO-236 (49)	45	45	5	35*	40	0.25	1.0	50	35	200	20		(Notes 4, 18)	63
								0.1	10						
MMBT 3645	TO-236 (49)	60	60	5	35*	80	0.25	1.0	50	35	200	20		(Notes 4, 18)	63
								1	10						

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Type No.	Case Style	V <sub>CB0</sub> <sup>*</sup> (V) Min	V <sub>CE0</sub> <sup>*</sup> (V) Min	V <sub>EB0</sub> (V) Min	I <sub>CB0</sub> <sup>*</sup> (nA) Max	I <sub>CB0</sub> @ V <sub>CB</sub> (nA) Max	h <sub>FE</sub> @ I <sub>c</sub> & V <sub>CE</sub>		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) @ I <sub>c</sub>		t <sub>off</sub> (ns) Max	NF (dB) Max	Test Conditions	Process No.
							Min	Max		Min	Max			Min	Max				
MMBT 3702	TO-236 (49)	40	25	5	100	20 300 50 5	60 300 50 5	0.25	50	12	100	50							63
MMBT 3703	TO-236 (49)	50	30	5	100	30 150 50 5	30 150 50 5	0.25	50	12	100	50							63
MMBT 4402	TO-236 (49)	40	40	5		20 500 2 50 150 2 50 10 1 30 1 1	20 500 2 50 150 2 50 10 1 30 1 1	0.4	0.75 0.95 150 0.75 1.3 500	8.5	150	20	255					(Note 4)	63
MMBT 4403	TO-236 (49)	40	40	5		20 500 2 100 300 150 2 100 10 1 60 1 1 30 0.1 1	20 500 2 100 300 150 2 100 10 1 60 1 1 30 0.1 1	0.4	0.75 0.95 150 0.75 1.3 500	8.5	200	20	255					(Note 4)	63
MMBT 5142	TO-236 (49)	20	20	4	50*	15 300 10 30 50 1	15 300 10 30 50 1	0.5	1.5 50 2.0 2.5 300	10	100	50	200					(Note 1)	63
MMBT 5143	TO-236 (49)	20	20	4	50*	15 300 10 30 50 1	15 300 10 30 50 1	0.5	1.5 50 2.0 2.5 300	10	100	50	200					(Note 1)	63
MMBT 5226	TO-236 (49)	25	25	4	300	30 600 50 10 25 10 10	30 600 50 10 25 10 10	0.8	1.0 100	20	50	20							63
MMBT 6502	TO-236 (49)	60	40	5	20	35 0.1 10 50 1 10 75 10 10 100 300 150 10 30 500 10	35 0.1 10 50 1 10 75 10 10 100 300 150 10 30 500 10	0.4	150	8	200	50							63

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Type No.	Case Style	V <sub>CB0</sub> * (V) Min	V <sub>CEO</sub> (V) Min	V <sub>EB0</sub> (V) Min	I <sub>CB0</sub> * (nA) Max	I <sub>CB0</sub> (nA) Max	V <sub>CB</sub> (V)	I <sub>FE</sub> @ I <sub>C</sub> & V <sub>CE</sub> (mA) Min Max	V <sub>CE(SAT)</sub> (V) Max	V <sub>BE(SAT)</sub> (V) Min Max	I <sub>C</sub> (mA) Min Max	C <sub>ob</sub> (pF) Max	f <sub>T</sub> (MHz) @ I <sub>C</sub> Min Max	t <sub>off</sub> (ns) Max	NF (dB) Max	Test Conditions	Process No.
MMBT 3251	TO-236 (49)	50	40	5				30 50 100 300 80 0.1 90 0.001	0.25	0.6 0.9	10 10	6	300		6	(Note 6)	66
MMBT 3905	TO-236 (49)	40	40	5				30 0.1 40 1 50 150 30 50 15 100	0.25	0.65 0.85	10 10	4.5	200		5	(Note 8)	66
MMBT 3906	TO-236 (49)	40	40	5				60 0.1 80 1 100 300 60 50 30 100	0.25	0.65 0.85	10 10	4.5	200		4	(Note 8)	66
MMBT 4121	TO-236 (49)	40	40	5	25*	30		15 50 70 200 60 1 40 0.1	0.13 0.14	0.75 0.9 0.7 0.9	1 10	4.5	400	150	4	(Notes 8, 11)	66
MMBT 4122	TO-236 (49)	40	40	5	25*	30		30 50 150 300 150 1 100 0.1	0.13 0.14	0.75 1 0.7 0.9	1 10	4.5	200		5	(Note 8)	66

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Type No.	Case Style	V <sub>CB0</sub> <sup>*</sup> (V) Min	V <sub>CEO</sub> (V) Min	V <sub>EB0</sub> (V) Min	I <sub>CB0</sub> <sup>*</sup> (mA) Max	I <sub>CB0</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	f <sub>T</sub> (MHz) Max	t <sub>off</sub> (ns) Max	NF (dB) Max	Test Conditions	Process No.
MMBT 4125	TO-236 (49)	25	25	4	50	20	0.4	0.95	50	4.5	200	10		4	(Note 8)	66
MMBT 4126	TO-236 (49)	25	25	4	50	20	0.4	0.95	50	4.5	250	10		4	(Note 8)	66
MMBT 4916	TO-236 (49)	30	30	5	25*	15	0.13	0.75	1	4.5	400	10	150	4	(Notes 8, 13)	66
MMBT 4917	TO-236 (49)	30	30	5	25*	15	0.13	0.75	1	4.5	450	10	150	4	(Notes 8, 13)	66
MMBT 5138	TO-236 (49)	30	30	5	50*	20	0.2	0.7	1.0	5	300	10	200		(Note 13)	66
MMBT 5139	TO-236 (49)	20	20	5	50*	15	0.5	0.75	1.25	5	300	10	200		(Note 13)	66
MMBT 6518	TO-236 (49)	40	40	4	50	30	0.5		50	4						66
MMBT 4354	TO-236 (49)	60	60	5	50	5	0.15	0.9	150	30	100	500	400	3	(Notes 8, 14)	67

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## General Purpose Amplifiers and Switches—PNP (Continued)

Type No.	Case Style	V <sub>CB0</sub> * (V) Min	V <sub>CEO</sub> (V) Min	V <sub>EBO</sub> (V) Min	I <sub>CS</sub> * I <sub>CB0</sub> (nA) Max	I <sub>FE</sub> @ I <sub>C</sub> & V <sub>CE</sub> (V) Min Max	V <sub>CE(SAT)</sub> (V) Max	V <sub>BE(SAT)</sub> (V) Min Max	I <sub>C</sub> (mA) @ I <sub>C</sub> Min Max	C <sub>ob</sub> (pF) Max	f <sub>T</sub> (MHz) Min Max	I <sub>C</sub> (mA) Min Max	t <sub>off</sub> (ns) Max	NF (dB) Max	Test Conditions	Process No.
MMBT 4355	TO-236 (49)	60	60	5	50 50	75 500 10	0.15	0.9 150	100 500 50	30	100 500	50	400	3	(Notes 8, 14)	67
						75 100 10		1.1 500								
						75 1 10		1.2 1A								
MMBT 4356	TO-236 (49)	60	60	5	50 50	30 500 10	0.15	0.9 150	100 500 50	30	100 500	50	400	3	(Notes 8, 14)	67
						40 100 10										
						50 250 10										
MMBT 5855	TO-236 (49)	60	60	5	100 40	50 10 10	0.4	1.3 150		15						67
						50 300 150 10										
						50 500 10										
MMBT 5857	TO-236 (49)	80	80	5	100 60	50 10 10	0.4	1.3 150	100 50	15	100	50			T-37-01 T-29-01	67
						50 300 150 10										
						50 500 10										
MMBT 6562	TO-236 (49)	60	60	5	100 20	50 200 500 1	0.5		500 10	30	60	10				67
						50 100 1										
						35 10 1										
MMBT A55	TO-236 (49)	60	60	4	100 60	50 10 1	0.25		100		50	100				67
						50 100 1										
						50 100 1										
MMBT A56	TO-236 (49)	80	80	4	100 80	50 10 1	0.25		100		50	100				67
						50 100 1										
						50 100 1										
MMBT 200	TO-236 (49)	60	45	6	50 50	80 0.1 1	0.2	0.85 10	250 20	6	250	20		4	(Note 8)	68
						100 450 10 1										
						100 100 1										



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General Purpose Amplifiers and Switches—PNP (Continued)

Type No.	Case Style	V <sub>CB0</sub> <sup>*</sup> (V) Min	V <sub>CEO</sub> (V) Min	V <sub>EB0</sub> (V) Min	I <sub>CB0</sub> <sup>*</sup> (mA) Max	I <sub>CB0</sub> (mA) Max	V <sub>CB</sub> (V)	h <sub>FE</sub> @ I <sub>C</sub> & V <sub>CE</sub> (V) Min Max	V <sub>CE(SAT)</sub> (V) Max	V <sub>BE(SAT)</sub> (V) Min Max	I <sub>C</sub> (mA) Min Max	C <sub>ob</sub> (pF) Max	f <sub>T</sub> (MHz) @ I <sub>C</sub> Min Max	t <sub>off</sub> (ns) Max	NF (dB) Max	Test Conditions	Process No.
MMBT 200A	TO-236 (49)	60	45	6	50	50	50	300 600 10 1 100 100 1	0.2	0.85	10	6	250	20			68
MMBT 201	TO-236 (49)	100	80	6	50*	60	60	60 0.1 1 75 375 10 1 50 100 1	0.2	0.85	10	4.5	100	10	4	(Note 8)	68
MMBT 3962	TO-236 (49)	60		6	10*	50	50	100 10 5 90 50 5	0.4	0.95	50	6					68
MMBT 4143	TO-236 (49)	60	40	6			30 500 10 60 150 1 100 300 100 10 75 10 10 60 1 10 25 0.1 10	0.4	1.3	150	8	200	50	100		(Note 12)	68
MMBT 4291	TO-236 (49)	40	30	6	200	30	30	100 300 100 10 50 10 10 30 0.1 10	0.4	1.5	100	10	100	10			68
MMBT 5447	TO-236 (49)	40	25	5				50 300 50 5	0.25		50	12	100	50			68

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Type No.	Case Style	V <sub>CEO</sub> * (V) Min	V <sub>CEO</sub> (V) Min	V <sub>EB0</sub> (V) Min	I <sub>CEO</sub> * (mA) Max	V <sub>CB</sub> @ (V) Max	I <sub>FE</sub> @ (mA) Min Max	I <sub>C</sub> & V <sub>CE</sub> (V)	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	t <sub>off</sub> (ns) Max	NF (dB) Max	Test Conditions	Process No.
MMBT 3467	(TO-236) (49)	40	40	5	100	30	40 1 500 1	5 1	0.3	1.0	150	25	175	50	90		(Note 4)	70
MMBT 4898	(TO-236) (49)	150	150	6	50	100	30 1 10 10	10 10	0.5	0.8	500	4	30	160				74
MMBT 4889	(TO-236) (49)	150	150	6	10	100	60 0.1 10 10	10 10	0.5		10	4	40	160		4	(Note 19)	74
							70 1 10 10									10	(Note 20)	
							80 300 10 10									3	(Note 21)	
																4	(Note 22)	
																	(Note 23)	
MMBT 5400	(TO-236) (49)	130	120	5	100	100	40 50 5 5	5 5	0.2	1.0	10	6	100	400		8	(Note 9)	74
							40 180 10 5											
							30 1 5		0.5	1.0	50							
MMBT 5401	(TO-236) (49)	160	150	5	50	120	50 50 5 5	5 5	0.2	1.0	10	6	100	300		8	(Note 9)	74
							60 240 10 5											
							50 1 5		0.5	1.0	50							
MMBT L51	(TO-236) (49)	100	100	4	1 μA	50	40 250 50 5	5 5	0.25	1.2	10	8	60	10				74
							40 250 50 5		0.3	1.2	50							
MMBT H81	(TO-236) (49)	20	20	3	100	10	60 5 10		0.5		5	0.85	600	5				75
MMBT A92	(TO-236) (49)	300	300	5	250	200	25 1 10 10	10 10	0.5	0.9	20	6	50	10				76
							40 10 10											
							25 30 10											
MMBT A93	(TO-236) (49)	200	200	5	250	160	25 1 10 10	10 10	0.5	0.9	20	8	50	10				76
							40 10 10											
							25 150 30 10											

**TEST CONDITIONS:**

Note 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  
 Note 2: I<sub>C</sub> = 100 mA, V<sub>CC</sub> = 5V, I<sub>B</sub><sup>1</sup> = I<sub>B</sub><sup>2</sup> = 15 mA  
 Note 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  
 Note 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  
 Note 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  
 Note 6: I<sub>C</sub> = 100 μA, V<sub>CE</sub> = 5V, f = 100 Hz  
 Note 7: I<sub>C</sub> = 30 μA, V<sub>CE</sub> = 5V, f = 1 kHz  
 Note 8: I<sub>C</sub> = 100 μA, V<sub>CE</sub> = 5V, f = 1 kHz

Note 9: I<sub>C</sub> = 250 μA, V<sub>CE</sub> = 5V, f = 1 kHz  
 Note 10: I<sub>C</sub> = 10 μA, V<sub>CE</sub> = 5V, f = 1 kHz  
 Note 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  
 Note 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  
 Note 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  
 Note 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  
 Note 15: I<sub>C</sub> = 100 μA, V<sub>CE</sub> = 10V, f = 1 kHz  
 Note 16: I<sub>C</sub> = 200 μA, V<sub>CE</sub> = 5V, f = 1 kHz

Note 17: I<sub>C</sub>/I<sub>B</sub> = 40  
 Note 18: I<sub>C</sub>/I<sub>B</sub> = 20  
 Note 19: I<sub>C</sub> = 250 μA, V<sub>CE</sub> = 5V, f = 10 Hz–10 kHz  
 Note 20: I<sub>C</sub> = 250 μA, V<sub>CE</sub> = 5V, f = 100 Hz  
 Note 21: I<sub>C</sub> = 30 μA, V<sub>CE</sub> = 5V, f = 1 kHz  
 Note 22: I<sub>C</sub> = 250 μA, V<sub>CE</sub> = 5V, f = 10 kHz  
 Note 23: I<sub>C</sub> = 1 mA, V<sub>CE</sub> = 10V, f = 1 MHz

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