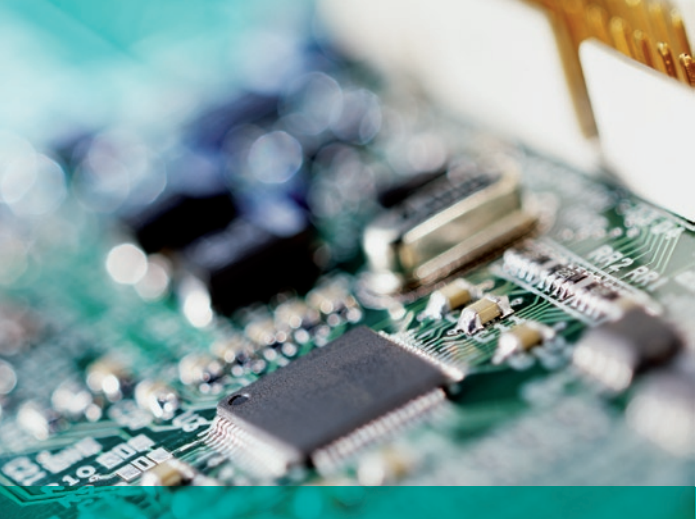




Single BISS transistors
Double BISS transistors
BISS loadswitches

Low V_{CEsat} (BISS) transistors selection guide

Key features

- ▶ Extensive range of BISS transistors
- ▶ Low collector-emitter saturation voltage V_{CEsat} , e.g. 235 mV @ 5.8 A
- ▶ Up to 5.8 A collector current capability I_C
- ▶ Up to 15 A peak collector current I_{CM}
- ▶ High current gain h_{FE} , even at high I_C
- ▶ High performance/boardspace ratio

Key benefits

- ▶ Reduced heat generation of applications
- ▶ Cost reduction potential
- ▶ Higher circuit efficiency
- ▶ Higher PCB function density
- ▶ Enables miniaturization of end products

Key examples

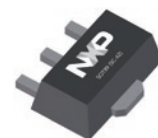
- ▶ Switch for vibrate, input-power in portable equipment
- ▶ Medium power peripheral drivers, e.g. fan, motor
- ▶ Strobe flash units for DSC and mobile phones
- ▶ Power switch for LAN and ADSL systems
- ▶ Inverter applications, e.g. TFT displays
- ▶ Medium power DC/DC conversion
- ▶ Battery chargers

Product highlights

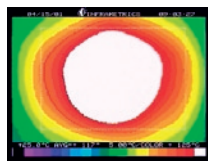
4 A, 20 V solution in small SOT457 (SC-74) package, e.g. PBSS301ND, $2.9 \times 1.5 \times 1.0$ mm

5.3 A series with $27 \text{ m}\Omega$ R_{CEsat} typ in SOT89 (SC-62) package for DC/DC converter and power management functions, e.g. PBSS301NX, $4.5 \times 2.5 \times 1.5$ mm

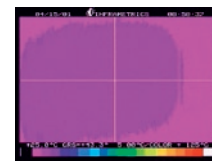
3rd generation 5.8 A, 12 V solution in medium power SOT223 (SC-73) package, e.g. PBSS301NZ, $6.5 \times 3.5 \times 1.65$ mm



65 % heat reduction by BISS transistors



General purpose transistor $T_{case} = 110^\circ\text{C}$



3rd generation BISS transistor $T_{case} = 40^\circ\text{C}$

Temperature profile of device surface (T_{case}). Comparison of a general purpose transistor and a 3rd generation BISS transistor.

Single low V_{CEsat} (BISS) transistors – NPN

V_{CEO} (V)	I_C (A)	I_{CM} (A)	Type	h_{FE} (min/typ)	@ I_C (A)	@ V_{CE} (V)	R_{CEsat} typ (m Ω) @ I_C max; $I_C/I_B=10$	V_{CEsat} typ (mV) @ $I_C = 0.5$ A; $I_B = 0.05$ A	V_{CEsat} max (mV)	@ I_C max (A)	@ I_B (A)	Package	Size (mm)	P_{tot} (mW)
40	1.0	2.0	PBSS4140S	300/-	0.5	5	230	120	500	1	0.1	SOT54 (TO-92)	3.9 x 4.6 x 5.1	830 ¹⁾
50	3.0	5.0	PBSS4350S	200/-	0.5	2	100	-	290	2	0.2			
100	1.0	3.0	PBSS8110S/AS	150/-	0.25	10	165	< 110	200	1	0.1			
15	0.5	1.0	PBSS2515M	200/-	0.01	2	360	-	250	0.5	0.05	SOT883 (SC-101)	1.0 x 0.6 x 0.5	250 ²⁾
40	0.5	1.0	PBSS2540M	200/-	0.01	2	380	-	250	0.5	0.05			
20	2.0	4.0	PBSS4220V	220/-	0.5	2	150	70	400	2	0.2	SOT666	1.6 x 1.2 x 0.55	500 ²⁾
40	1.0	3.0	PBSS4140V	300/-	0.5	5	150	70	190	1	0.1			
40	2.0	3.0	PBSS4240V	300/-	0.5	5	150	70	400	2	0.2			
60	1.0	2.0	PBSS4160V	200/-	0.5	5	200	110	250	1	0.1			
15	0.5	1.0	PBSS2515E	150/-	0.1	2	300	205	250	0.5	0.05	SOT416 (SC-75)	1.6 x 0.8 x 0.77	250 ²⁾
40	0.5	1.0	PBSS2540E	100/-	0.1	2	380	305	250	0.5	0.05			
40	2.0	3.0	PBSS4240Y	300/-	0.5	2	120	70	320	2	0.2	SOT363 (SC-88)	2.0 x 1.25 x 0.95	430 ²⁾
100	1.0	3.0	PBSS8110Y	150/-	0.25	10	160	300	200	1	0.1			
40	1.0	2.0	PBSS4140U	300/-	0.5	5	240	120	500	1	0.1	SOT323 (SC-70)	2.0 x 1.25 x 0.95	350 ²⁾
60	1.0	2.0	PBSS4160U	200/420	0.5	5	230	120	280	1	0.1			
60	1.0	2.0	PBSS4160K	200/420	0.5	5	230	120	280	1	0.1	SOT346 (SC-59)	2.9 x 1.5 x 1.15	350 ²⁾
20	1.0	3.0	PBSS4120T	350/470	0.1	2	-	-	250	1	0.05	SOT23	2.9 x 1.3 x 1.0	480 ²⁾
20	2.0	5.0	PBSS4320T	220/-	0.5	2	80	45	310	3	0.3			
30	1.0	3.0	PBSS4130T	300/450	0.5	2	-	-	270	1	0.05			
30	2.0	3.0	PBSS4230T	300/450	0.5	2	120	70	320	2	0.2			
40	1.0	2.0	PMMT491A	300/-	0.5	5	230	120	500	1	0.1			
40	1.0	2.0	PBSS4140T	300/-	0.5	5	240	130	500	1	0.1			
40	2.0	3.0	PBSS4240T	300/450	0.5	2	120	70	320	2	0.2			
50	2.0	5.0	PBSS4350T	300/-	0.5	2	100	60	260	2	0.2			
60	1.0	2.0	PBSS4160T	200/350	0.5	5	200	110	250	1	0.1			
100	1.0	3.0	PBSS8110T	150/-	0.25	10	165	-	200	1	0.1			
20	4.0	15.0	PBSS301ND	300/-	0.5	2	50	30	280	4	0.4	SOT457 (SC-74)	2.9 x 1.5 x 1.0	750 ³⁾
40	4.0	15.0	PBSS302ND	300/-	0.5	2	55	35	300	4	0.4			
50	3.0	5.0	PBSS4350D	200/-	0.5	2	110	65	290	2	0.2			
60	3.0	6.0	PBSS303ND	345/-	0.5	2	65	40	260	3	0.3			
80	3.0	6.0	PBSS304ND	240/-	0.5	2	67	40	255	3	0.3			
100	1.0	3.0	PBSS8110D	150/-	0.25	10	160	75	200	1	0.1			
100	3.0	4.0	PBSS305ND	170/-	0.5	2	72	45	360	4	0.4	SOT89 (SC-62)	4.5 x 2.5 x 1.5	1650 ³⁾
12	5.3	10.6	PBSS301NX	300/-	0.5	2	27*	18	200	5.3	0.265			
20	3.0	5.0	PBSS4320X	220/-	0.5	2	85	45	310	3	0.3			
20	5.0	10.0	PBSS4520X	300/-	0.5	2	32	35	220	5	0.5			
20	5.3	10.6	PBSS302NX	300/570	0.5	2	27*	20	200	5.3	0.265			
30	3.0	5.0	PBSS4330X	300/-	0.5	2	80	45	300	3	0.3			
30	5.1	10.2	PBSS303NX	300/480	0.5	2	30*	20	220	5.1	0.255			
40	4.0	10.0	PBSS4540X	300/-	0.5	2	40	21	355	5	0.5			
50	2.0	5.0	PBSS4250X	300/-	0.5	2	-	< 90	320	2	0.2			
50	3.0	5.0	PBSS4350X	300/-	0.5	2	75	50	370	3	0.3			
60	4.7	9.4	PBSS304NX	300/-	0.5	2	37*	25	245	4.7	0.235			
80	4.0	10.0	PBSS4480X	250/-	0.5	2	43*	25	230	4	0.2			
80	4.6	9.2	PBSS305NX	300/-	0.5	2	37*	25	240	4.6	0.23			
100	1.0	3.0	PBSS8110X	150/-	0.25	10	165	40	200	1	0.1			
100	4.5	9.0	PBSS306NX	200/-	0.5	2	38*	27	245	4.5	0.225			
12	5.8	11.6	PBSS301NZ	300/530	0.5	2	29*	18	235	5.8	0.29	SOT223 (SC-73)	6.5 x 3.5 x 1.65	1700 ³⁾
20	5.8	10.2	PBSS302NZ	300/570	0.5	2	30*	20	250	5.8	0.29			
30	5.5	11.0	PBSS303NZ	300/480	0.5	2	31*	275	240	5.5	0.275			
40	5.0	10.0	PBSS4540Z	300/500	0.5	2	42	50	355	5	0.5			
50	3.0	5.0	PBSS4350Z	200/-	0.5	2	110	-	290	2	0.2			
60	5.2	10.4	PBSS304NZ	300/520	0.5	2	39*	200	280	5.2	0.26			
80	5.1	10.2	PBSS305NZ	300/470	0.5	2	38*	190	270	5.1	0.255			
100	1.0	3.0	PBSS8110Z	150/-	0.25	10	160	73	200	1	0.1			
100	5.1	10.2	PBSS306NZ	200/330	0.5	2	43*	215	300	5.1	0.255			

bold = NEW! 3rd generation BISS

* $I_C/I_B = 20$

¹⁾ Device mounted on a PCB, single-sided copper, tin-plated and standard footprint

²⁾ Device mounted on a PCB, single-sided copper, tin-plated, mounting pad for collector 1 cm²

³⁾ Device mounted on a PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm²

Single low V_{CEsat} (BISS) transistors – PNP

V_{CEO} (V)	I_C (A)	I_{CM} (A)	Type	h_{FE} (min/typ)	@ I_C (A)	@ V_{CE} (V)	R_{CEsat} typ (mΩ) @ I_C max	V_{CEsat} typ (mV) @ $I_C = 0.5$ A; $I_B = 0.05$ A	V_{CEsat} max (mV)	@ I_C max (A)	@ I_B (A)	Package	Size (mm)	P_{tot} (mW)
40	1.0	2.0	PBSS5140S	250/-	0.5	5	150	150	500	1	0.1	SOT54 (TO-92)	3.9 x 4.6 x 5.1	830 ¹⁾
50	3.0	5.0	PBSS5350S	200/-	0.5	2	120	80	300	2	0.2			
100	1.0	3.0	PBSS9110S/AS	150/-	0.25	5	170	100	320	1	0.1			
15	0.5	1.0	PBSS3515M	200/-	0.01	2	300	150	250	0.5	0.05	SOT883 (SC-101)	1.0 x 0.6 x 0.5	250 ²⁾
40	0.5	1.0	PBSS3540M	200/-	0.01	2	440	220	350	0.5	0.05			
20	2.0	4.0	PBSS5220V	220/440	0.1	2	135	75	390	2	0.2	SOT666	1.6 x 1.2 x 0.55	500 ²⁾
40	1.0	2.0	PBSS5140V	300/-	0.1	5	200	120	310	1	0.1			
40	1.8	3.0	PBSS5240V	300/-	0.1	5	185	100	530	2	0.2			
60	1.0	2.0	PBSS5160V	150/250	0.5	5	220	120	330	1	0.1			
15	0.5	1.0	PBSS3515E	200/-	0.01	2	300	130	250	0.5	0.05	SOT416 (SC-75)	1.6 x 0.8 x 0.77	250 ²⁾
40	0.5	1.0	PBSS3540E	200/-	0.01	2	440	230	350	0.5	0.05			
40	2.0	3.0	PBSS5240Y	300/-	0.1	2	-	-	350	2	0.2	SOT363 (SC-88)	2.0 x 1.25 x 0.95	430 ²⁾
100	1.0	3.0	PBSS9110Y	150/-	0.25	5	170	93	320	1	0.1			
40	1.0	2.0	PBSS5140U	300/-	0.1	5	230	130	500	1	0.1	SOT323 (SC-70)	2.0 x 1.25 x 0.95	350 ²⁾
60	1.0	2.0	PBSS5160U	150/250	0.5	5	255	135	340	1	0.1			
60	1.0	2.0	PBSS5160K	150/250	0.5	5	255	135	340	1	0.1	SOT346 (SC-59)	2.9 x 1.5 x 1.15	350 ²⁾
20	1.0	2.0	PBSS5120T	300/450	0.1	2	-	< 125	250	1	0.05	SOT23	2.9 x 1.3 x 1.0	480 ²⁾
20	2.0	3.0	PBSS5220T	225/-	0.5	2	-	< 80	225	2	0.2			
20	2.0	5.0	PBSS5320T	220/-	0.5	2	75	50	210	2	0.2			
30	1.0	3.0	PBSS5130T	260/350	0.5	2	-	< 110	225	1	0.05			
30	2.0	3.0	PBSS5230T	300/450	0.1	2	-	80	350	2	0.2			
40	1.0	2.0	PMMT591A	300/800	0.1	5	250	130	500	1	0.1			
40	1.0	2.0	PBSS5140T	300/-	0.1	5	230	150	500	1	0.1			
40	2.0	3.0	PBSS5240T	300/450	0.1	2	150	80	350	2	0.2			
50	2.0	3.0	PBSS5250T	200/-	0.5	2	-	< 90	300	2	0.1			
50	2.0	5.0	PBSS5350T	200/-	0.5	2	90	55	270	2	0.2			
60	1.0	2.0	PBSS5160T	150/250	0.5	5	220	120	330	1	0.1			
100	1.0	3.0	PBSS9110T	150/-	0.5	5	170	95	320	1	0.1			
20	4.0	15.0	PBSS301PD	250/400	0.5	2	50	35	280	4	0.4	SOT457 (SC-74)	2.9 x 1.5 x 1.0	750 ³⁾
20	3.0	5.0	PBSS5320D	200/-	0.5	2	85	< 80	400	3	0.3			
40	4.0	15.0	PBSS302PD	200/-	0.5	2	55	46	300	4	0.4			
50	3.0	5.0	PBSS5350D	200/-	0.5	2	120	70	300	2	0.2			
60	3.0	6.0	PBSS303PD	180/265	0.5	2	70	55	290	3	0.3			
80	3.0	5.0	PBSS304PD	155/225	0.5	2	71	55	290	3	0.3			
100	1.0	3.0	PBSS9110D	150/-	0.5	5	170	100	320	1	0.1			
100	2.0	3.0	PBSS305PD	175/275	0.5	2	88	65	250	2	0.2	SOT89 (SC-62)	4.5 x 2.5 x 1.5	1650 ³⁾
12	5.3	10.6	PBSS301PX	250/400	0.5	2	28*	20	210	5.3	0.265			
20	3.0	5.0	PBSS5320X	220/-	0.5	2	90	50	300	3	0.3			
20	5.0	10.0	PBSS5520X	300/430	0.5	2	34	45	270	5	0.5			
20	5.1	10.2	PBSS302PX	250/370	0.5	2	32*	25	230	5.1	0.255			
30	3.0	5.0	PBSS5330X	200/-	0.5	2	80	40	320	3	0.3			
30	5.1	10.2	PBSS303PX	250/400	0.5	2	32*	25	230	5.1	0.255			
40	4.0	10.0	PBSS5540X	250/-	0.5	2	45	33	375	5	0.5			
50	2.0	5.0	PBSS5250X	200/-	0.5	2	-	< 90	320	2	0.2			
50	3.0	5.0	PBSS5350X	200/-	0.5	2	120	60	390	3	0.3			
60	4.2	8.4	PBSS304PX	200/295	0.5	2	53*	35	310	4.2	0.21			
80	4.0	10.0	PBSS5480X	200/300	0.5	2	50	35	380	5	0.5			
80	4.0	8.0	PBSS305PX	200/280	0.5	2	43	36	240	4	0.4			
100	1.0	3.0	PBSS9110X	150/-	0.5	5	170	90	320	1	0.1			
100	3.7	7.4	PBSS306PX	200/300	0.5	2	52	45	300	4	0.4	SOT223 (SC-73)	6.5 x 3.5 x 1.65	1700 ³⁾
12	5.7	11.4	PBSS301PZ	250/400	0.5	2	30*	20	245	5.7	0.285			
20	5.5	11.0	PBSS302PZ	250/370	0.5	2	34*	25	265	5.5	0.275			
30	5.3	10.6	PBSS303PZ	250/400	0.5	2	35*	25	265	5.3	0.265			
40	5.0	10.0	PBSS5540Z	250/350	0.5	2	55	80	160	2	0.2			
50	3.0	5.0	PBSS5350Z	200/-	0.5	2	120	70	300	2	0.2			
60	4.5	9.0	PBSS304PZ	200/295	0.5	2	59*	35	375	4.5	0.225			
80	4.5	9.0	PBSS305PZ	200/280	0.5	2	69*	36	450	4.5	0.225			
100	1.0	3.0	PBSS9110Z	150/-	0.5	5	170	90	320	1	0.1			
100	4.1	8.2	PBSS306PZ	200/300	0.5	5	57	45	325	4.1	0.41			

bold = NEW! 3rd generation BISS

* $I_C/I_B = 20$

¹⁾ Device mounted on a PCB, single-sided copper, tin-plated and standard footprint

²⁾ Device mounted on a PCB, single-sided copper, tin-plated, mounting pad for collector 1 cm²

³⁾ Device mounted on a PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm²

Double low V_{CEsat} (BISS) transistors

V_{CEO} (V)	I_C (A)	Polarity	Type	h_{FE} (min/typ)	@ I_C (A)	@ V_{CE} (V)	V_{CEsat} typ (mV) @ $I_C = 0.5$ A; $I_B = 0.025$ A	V_{CEsat} max (mV)	@ I_C (A)	@ I_B (A)	Package	Size (mm)	P_{tot} (mW)
15	0.5	2 x PNP	PBSS3515VS	200/-	0.01	2	< 150	< 250	0.5	0.05	SOT666	1.6 x 1.2 x 0.55	500 ¹⁾
15	0.5	NPN/PNP	PBSS2515VPN	200/-	0.01	2	< 150	< 250	0.5	0.05			
15	0.5	2 x NPN	PBSS2515VS	200/-	0.01	2	< 150	< 250	0.5	0.05			
15	0.5	NPN/PNP	PBSS2515YPN	200/-	0.01	2	<150	< 250	0.5	0.05	SOT363 (SC-88)	2.0 x 1.25 x 0.95	430 ¹⁾
40	1.0	NPN/PNP	PBSS4140DPN	300/-	0.001	5	130*	< 500	1	0.1	SOT457 (SC-74)	2.9 x 1.5 x 1.0	750 ²⁾
40	2.0	NPN/PNP	PBSS4240DPN	300/-	0.001	5	80*/100*	< 400/530	2	0.2			
60	1.0	2 x NPN	PBSS4160DS	250/500	0.001	5	115*	< 250	1	0.1			
60	1.0	2 x PNP	PBSS5160DS	200/350	0.001	5	120*	< 330	1	0.1			
60	1.0	NPN/PNP	PBSS4160DPN	250/500 200/350	0.001	5	115*/120*	< 250/330	1	0.1			
50	2.5	2 x NPN	PBSS4350SS	tbd							SO8	4.9 x 3.9 x 1.75	tbd
50	2.5	2 x PNP	PBSS5350SS										
50	2.5	NPN/PNP	PBSS4350SPN										

under development

*@ $I_C = 0.5$ A; $I_B = 0.05$ A

¹⁾ Device mounted on a PCB, single-sided copper, tin-plated, mounting pad for collector 1 cm²

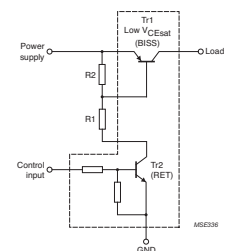
²⁾ Device mounted on a PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm²

BISS loadswitches

V _{CEO} (V)	I _C (A)	Type	R1, R2 (kΩ)	R _{CEsat} typ (mΩ) @ I _C	V _{CEsat} typ (mV) @ I _C = 0.5 A	V _{CEsat} max (mV) @ I _C	Package	Size (mm)	P _{tot} (mW)
15	0.5	PBLS1501V	2.2	300	150	250	SOT666	1.6 × 1.2 × 0.55	300 ²⁾
		PBLS1502V	4.7	300	150	250			
		PBLS1503V	10	300	150	250			
		PBLS1504V	22	300	150	250			
PBLS4001V		2.2	440	220	350				
PBLS4002V		4.7	440	220	350				
PBLS4003V		10	440	220	350				
PBLS4004V		22	440	220	350				
40	PBLS4005V	47	440	220	350				
	0.5	PBLS1501Y	2.2	300	150	250	SOT363 (SC-88)	2.0 × 1.25 × 0.95	300 ²⁾
		PBLS1502Y	4.7	300	150	250			
		PBLS1503Y	10	300	150	250			
PBLS1504Y		22	300	150	250				
PBLS4001Y		2.2	440	220	350				
PBLS4002Y		4.7	440	220	350				
PBLS4003Y		10	440	220	350				
PBLS4004Y		22	440	220	350				
20	1	PBLS4005Y	47	440	220	350	SOT457 (SC-74)	2.9 × 1.5 × 1.0	600 ¹⁾
		PBLS2001D	2.2	185	100	280			
		PBLS2002D	4.7	185	100	280			
		PBLS2003D	10	185	100	280			
PBLS2004D		22	185	100	280				
PBLS4001D		2.2	220	120	310				
PBLS4002D		4.7	220	120	310				
PBLS4003D		10	220	120	310				
PBLS4004D		22	220	120	310				
PBLS4005D		47	220	120	310				
40		PBLS6001D	2.2	255	135	340			
		PBLS6002D	4.7	255	135	340			
	PBLS6003D	10	255	135	340				
	PBLS6004D	22	255	135	340				
60	PBLS6005D	47	255	135	340				
	3	PBLS2001S	2.2	75	45	355	SO8	4.9 × 3.9 × 1.75	1500 ¹⁾
		PBLS2002S	4.7	75	45	355			
		PBLS2003S	10	75	45	355			

¹⁾ Device mounted on a ceramic PCB, AL2O3 standard footprint

²⁾ Device mounted on a FR4 PCB, single-sided copper, tin-plated and standard footprint



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Date of release: October 2006

Document order number: 9397 750 15665

Printed in the Netherlands