EPITAXIAL-BASE N-P-N & P-N-P POWER TYPES

I_C to 15 A . . . P_T to 200 W . . . V_{CE} to 125 V

I_c = −3.5 max. P_T = 10 W max. (TO-39)	I_c = 6 A max. P_T = 40 W max. (TO-66)**	I_c = −6 A max. P_T = 40 W max. (TO-66)**	I_c = 7 A max. P_T = 40 W max. VERSAWATT (TO-220)	I_c = −7 A max. P_T = 40 W max. VERSAWATT (TO-220)	I_c = 15 A max. P_T = 125 W max. (TO-3)	I_c = −15 A max. P_T = 125 W max. (TO-3)	I_c = 15 A max. P_T = 75 W max. VERSAWATT (TO-220)	I_c = −15 A max. P_T = 75 W max. VERSAWATT (TO-220)
90 x 90▲	90 x 90	90 x 90	90 x 90	90 x 90	150 x 150	150 x 150	150 x 150	150 x 150
Family Designation								
2N5781 [P-N-P]	**2N6372** [N-P-N]	**2N5954** [P-N-P]	**2N6292** [N-P-N]	**2N6107** [P-N-P]	**2N6472** [N-P-N]	**2N6248** [P-N-P]	**2N6488** [N-P-N]	**2N6491** [P-N-P]
2N5783 $V_{CER(SUS)}$ = −45 V h_{FE} = 20-100 @ −1.6 A f_T = 8 MHz min. CT File No. 413E	**2N6374** $V_{CER(SUS)}$ = 45 V h_{FE} = 20-100 @ 3 A f_T = 4 MHz min. File No.675	**2N5956** $V_{CER(SUS)}$ = −45 V h_{FE} = 20-100 @ −3 A f_T = 5 MHz min. CT File No.675	**2N6288** **2N6289** $V_{CER(SUS)}$ = 40 V h_{FE} = 30-150 @ 3 A f_T = 4 MHz min. File No.676	**2N6110** **2N6111** $V_{CER(SUS)}$ = −40 V h_{FE} = 30-150 @ −3 A f_T = 10 MHz min. CT File No.676	**2N6470** $V_{CER(sus)}$=45V h_{FE}=20-150 @ 5 A f_T=5 MHz typ. File No. 677	**2N6469** $V_{CER(sus)}$= −45V h_{FE}=20-150 @ −5 A f_T=6 MHz min. CT File No. 677	**2N6486** $V_{CER(sus)}$=50V h_{FE}=20-150 @ 5 A f_T=5 MHz typ. File No. 678	**2N6489** $V_{CER(sus)}$= −50V h_{FE}=20-150 @ −5A f_T= 5 MHz typ. File No. 678
2N5782 $V_{CER(SUS)}$ = −65 V h_{FE} = 20-100 @ −1.2 A f_T = 8 MHz min. CT 413E	**2N6373** $V_{CER(SUS)}$ = 65 V h_{FE} = 20-100 @ 2.5 A f_T = 4 MHz min. 675	**2N5955** $V_{CER(SUS)}$ = −65 V h_{FE} = 20-100 @ −2.5 A f_T = 5 MHz min. CT 675	**2N6290** **2N6291** $V_{CER(SUS)}$ = 60 V h_{FE} = 30-150 @ 2.5 A f_T = 4 MHz min. 676	**2N6108** **2N6109** $V_{CER(SUS)}$ = −60 V h_{FE} = 30-150 @ −2.5 A f_T = 10 MHz min. CT 676	**2N6471** $V_{CER(sus)}$=65V h_{FE}=20-150 @ 5A f_T= 5MHz typ. 677	**2N6246** $V_{CER(SUS)}$ = −65 V h_{FE} = 20-150 @ −5 A f_T = 6 MHz min. 677	**2N6487** $V_{CER(sus)}$=70V h_{FE}=20-150 @ 5A f_T= 5 MHz typ. 678	**2N6490** $V_{CER(sus)}$= −70V h_{FE}=20-150 @ −5A f_T= 5 MHz typ. 678
2N5781 $V_{CER(SUS)}$ = −80 V h_{FE} = 20-100 @ −1 A f_T = 8 MHz min. CT 413E	**2N6372** $V_{CER(SUS)}$ = 85 V h_{FE} = 20-100 @ 2 A f_T = 4 MHz min. 675	**2N5954** $V_{CER(SUS)}$ = −85 V h_{FE} = 20-100 @ −2 A f_T = 5 MHz min. 675	**2N6292** **2N6293** $V_{CER(SUS)}$ = 80 V h_{FE} = 30-150 @ 2 A f_T = 4 MHz min. 676	**2N6106** **2N6107** $V_{CER(SUS)}$ = −80 V h_{FE} = 30-150 @ −2 A f_T = 10 MHz min. CT 676	**2N6472** $V_{CER(sus)}$=85V h_{FE}=20-150 @ 5A f_T= 5 MHz typ. 677	**2N6247** $V_{CER(SUS)}$ = −85 V h_{FE} = 20-150 @ 5 A f_T = 6 MHz min. CT 677	**2N6488** $V_{CER(sus)}$=90V h_{FE}=20-150 @ 5A f_T= 5 MHz typ. 678	**2N6491** $V_{CER(sus)}$= −90V h_{FE}= 20-150 @ −5A f_T= 5 MHz typ. 678
			2N6473 $V_{CER(sus)}$=110V h_{FE}=30-150 @ 1.5A f_T=5 MHz typ. 676	**2N6475** $V_{CER(sus)}$=110V h_{FE}=30-150 @ −1.5A f_T=5 MHz typ. 676		**2N6248** $V_{CER(SUS)}$ = −105 V h_{FE} = 20-100 @ −5 A f_T = 6 MHz min. CT 677		
			2N6474 $V_{CER(sus)}$=130V h_{FE}=30-150 @ 1A f_T= 5 MHz typ. 676	**2N6476** $V_{CER(sus)}$=130V h_{FE}=30-150 @ −1A f_T= 5 MHz typ. 676				

▲Pellet size—values shown are edge dimensions in thousands-of-an-inch (mils).

**Available with free-air radiator $R_{\theta JA}$ = 30° C/W

"TA" designations (e.g. TA8662) in this booklet are Developmental-type devices.

File No. (e.g. File No.413E), where shown, relates to the data bulletin.

CT—Complementary Type available, see matrix on Complementary-Pair Power Types.

COMPLEMENTARY-PAIR POWER TYPES

Hometaxial-Base/Epitaxial-Base

I_C 1.5 to 2 A		I_C = 2.5 A		I_C 3 to 3.5 A		I_C 4 to 6 A		I_C 12 to 17 A	
N-P-N	**P-N-P**	**N-P-N**	**P-N-P**	**N-P-N**	**P-N-P**	**N-P-N**	**P-N-P**	**N-P-N**	**P-N-P**
2N5293 **2N5294** $V_{CER}(SUS)$ = 75 V I_C = 1.5 A VERSAWATT (TO-220) **File No. 322**	**2N6106** **2N6107** $V_{CER}(SUS)$ = −80 V I_C = −1.5 A VERSAWATT (TO-220) File No.676	**2N5786** $V_{CER}(SUS)$ = 45 V I_C = 2.5 A (TO-39) File No.413E	**2N5783** $V_{CER}(SUS)$ = −45 V I_C = −2.5 A (TO-39) 413E	**2N3054** $V_{CER}(SUS)$ = 60 V I_C = 3 A (TO-66) **File No. 527**	**2N5955** $V_{CER}(SUS)$ = −65 V I_C = −3 A (TO-66) 675	**2N5495** **2N5494** $V_{CER}(SUS)$ = 50 V I_C = 4 A VERSAWATT (TO-220) **File No. 353**	**2N6110** **2N6111** $V_{CER}(SUS)$ = −40 V I_C = −4 A VERSAWATT TO-220) File No.676	**2N3055** $V_{CER}(SUS)$ = 70 V I_C = 12 A (TO-3) **File No. 524**	**2N6247** $V_{CER}(SUS)$ = −90V I_C = −12 A (TO-3) File No.677
2N5295 **2N5296** $V_{CER}(SUS)$ = 50 V I_C = 2 A VERSAWATT (TO-220) **322**	**2N6106** **2N6107** $V_{CER}(SUS)$ = −80 V I_C = −2 A VERSAWATT (TO-220) 676	**2N5297** **2N5298** $V_{CER}(SUS)$ = 70 V I_C = 2.5 A VERSAWATT (TO-220) **322**	**2N6106** **2N6107** $V_{CER}(SUS)$ = −80 V I_C = −2.5 A VERSAWATT (TO-220) 676	**2N5491** **2N5490** $V_{CER}(SUS)$ = 50 V I_C = 3 A VERSAWATT (TO-220) **353**	**2N6106** **2N6107** $V_{CER}(SUS)$ = −80 V I_C = −3 A VERSAWATT (TO-220) 676	**2N4347** $V_{CEV}(SUS)$ = 140 V I_C = 4 A (TO-3) **528**	**2N5954*** $V_{CER}(SUS)$ = −85 V I_C = −4 A (TO-66) 675	**2N4348** $V_{CEV}(SUS)$ = 140 V I_C = 14 A (TO-3) **526**	**2N6248** $V_{CER}(SUS)$ = −110 V I_C = −14 A (TO-3) 677
2N3441 $V_{CER}(SUS)$ = 150 V I_C = 2 A (TO-66) **529**	**(2N6468)†** $V_{CER}(SUS)$ = −125 V I_C = −2 A (TO-66)	**2N5785** $V_{CER}(SUS)$ = 65 V I_C = 2.5 A (TO-39) **413 E**	**2N5782** $V_{CER}(SUS)$ = −65 V I_C = −2.5 A (TO-39) **413 E**	**40250** $V_{CER}(SUS)$ = 50 V I_C = 3.5 A (TO-66) **112**	**2N5956** $V_{CER}(SUS)$ = −45 V I_C = −3.5 A (TO-66) **435**	**2N6371** $V_{CEV}(SUS)$ = 50 V I_C = 6 A (TO-3) **607**	**2N5956** $V_{CER}(SUS)$ = −45 V I_C = −6 A (TO-66) 675	**2N3772** $V_{CER}(SUS)$ = 70 V I_C = 17 A (TO-3) **525**	**2N6247** $V_{CER}(SUS)$ = −90 V I_C = −17 A (TO-3) 677
		2N5784 $V_{CER}(SUS)$ = 80 V I_C = 2.5 A (TO-39) **413 E**	**2N5781** $V_{CER}(SUS)$ = −80 V I_C = −2.5 A (TO-39) **413 E**	**2N5493** **2N5492** $V_{CER}(SUS)$ = 65 V I_C = 3.5 A VERSAWATT (TO-220) **353**	**2N6108** **2N6109** $V_{CER}(SUS)$ = −60 V I_C = −3.5 A VERSAWATT (TO-220) 676	**2N3055** $V_{CER}(SUS)$ = 70 V I_C = 6 A (TO-3) **524**	**2N5955** $V_{CER}(SUS)$ = −65 V I_C = −6 A (TO-66) 675		

* Or higher voltage type 2N6248.

High-Voltage

I_C = 0.2 A		I_C = 2 A	
N-P-N	**P-N-P**	**N-P-N**	**P-N-P**
2N3440 $V_{CEO}(SUS)$ = 250 V I_C = 0.2 A (TO-39) File No.64E	**2N5415** $V_{CEO}(SUS)$ = −200 V I_C = −0.2 A (TO-39) File No.336E	**2N3584** $V_{CER}(SUS)$ = 350 V I_C = 2 A (TO-66) **File No. 138**	**2N6212** $V_{CER}(SUS)$ = −325 V I_C = −2 A (TO-66) **File No. 507**
2N6175 $V_{CER}(SUS)$ = 300 V I_C = 0.2 A (Plastic TO-5) 508 E	**BFT19A** $V_{CER}(sus)$ = −300 V I_C = −0.2 A (TO-39) 683	**2N3585** $V_{CER}(SUS)$ = 400 V I_C = 2 A (TO-66) 138	**2N6213** $V_{CER}(SUS)$ = −375 V I_C = −2 A (TO-66) 507
2N3439 $V_{CEO}(SUS)$ = 350 V I_C = 0.2 A (TO-39) 64 E	**2N5416** $V_{CER}(SUS)$ = −350 V I_C = −0.2 A (TO-39) 336	**BUX67** $V_{CER}(sus)$ = 175V I_C = 2A (TO−66) 871	**BUX66** $V_{CER}(sus)$ = −175V I_C = −2A (TO−66) 870
2N6176 $V_{CER}(SUS)$ = 350 V I_C = 0.2 A (Plastic TO-5) 508 E	**BFT19B** $V_{CER}(SUS)$ = −400V I_C = −0.2 A (TO-39) 683	**BUX67A** $V_{CER}(sus)$ = 275V I_C = 2A (TO−66) 871	**BUX66A** $V_{CER}(sus)$ = −275V I_C = −2A (TO−66) 870
		BUX67B $V_{CER}(sus)$ = 350V I_C = 2A (TO−66) 871	**BUX66B** $V_{CER}(sus)$ = −350V I_C = −2A (TO−66) 870
		BUX67C $V_{CER}(sus)$ = 400V I_C = 2A (TO−66) 871	**BUX66C** $V_{CER}(sus)$ = −400V I_C = −2A (TO−66) 870

Note: The collector current (I_C) value shown is for h_{FE} of 10 min.

High-Speed

I_C = 1 A			
N-P-N	**P-N-P**	**N-P-N**	**P-N-P**
2N3053 $V_{CER}(SUS)$ = 50 V I_C = 1 A (TO-39) **File No. 432 E**	**2N4037** $V_{CER}(SUS)$ = −60 V I_C = −1 A (TO-39) File No.216E	**2N6179** $V_{CER}(SUS)$ = 65 V I_C = 1 A (Plastic TO-5) **File No. 562**	**2N6181** $V_{CER}(SUS)$ = −65 V I_C = −1 A (Plastic TO-5) 562
2N2102 $V_{CER}(SUS)$ = 80 V I_C = 1 A (TO-39) 106E	**2N4036** $V_{CER}(SUS)$ = −85 V I_C = −1 A (TO-39) 216 E	**2N6178** $V_{CER}(SUS)$ = 90 V I_C = 1 A (Plastic TO-5) 562	**2N6180** $V_{CER}(SUS)$ = −90 V I_C = −1 A (Plastic TO-5) 562
2N5321 $V_{CER}(SUS)$ = 65 V I_C = 1 A (TO-39) 325 E	**2N5323** $V_{CER}(SUS)$ = −65 V I_C = −1 A (TO-39) 325 E		
2N5320 $V_{CER}(SUS)$ = 90 V I_C = 1 A (TO-39) 325 E	**2N5322** $V_{CER}(SUS)$ = −90 V I_C = −1A (TO-39) 325 E		

File No. (e.g. File No. 322), where shown, relates to data bulletin.

See Epitaxial-Base and Monolithic Darlington Matrices for additional Complementary-Pair Power Types.

APPLICATION INFORMATION . . .

Power Types [N-P-N & P-N-P] as Pass Transistors for Series Regulator Service

Pass Transistor Conditions	Peak Output Voltage (V)	Regulator Output Current (I_o) — A				
		Up to 0.2	0.2 to 1	1 to 4	4 to 20	> 20
With preregulator $I_c = I_o$ V_{CE} = constant or $\approx 4[V_{CE(sat)}]$ $P_{MAX} \approx 4(I_o)[V_{CE(sat)}]$	10 to 60	[2N2102, 2N4036] 2N1482	[2N5321, 2N5323, 2N6179, 2N6181]	[2N3054, 2N5955, 2N5497, 2N6106]	[2N3055, 2N6247, 2N3771]	2N3772 2N5575
	60 to 150	40349	2N3441	2N3442 2N4347 2N5293	2N3772 2N4348	2N5578
	150 to 400	[2N3440, BFT 19,A,B,C, BFT 28,A,B,C, 2N5415]	[2N3585, 2N6212]	2N5240 BUX 16,A,B,C	2N5805 2N6251	-

Bracket signifies a complementary pair (n-p-n, 2N2102; p-n-p, 2N4036) suitable for symmetrical power-supply circuits.

Power Types for Electrostatic Deflection and Video Output

Bandwidth > 1MHz	
Output Voltage < 60V (Peak-to-Peak)	Output Voltage 60 to 400V (Peak-to-Peak)
2N2102 2N3878 2N4036 2N5320 2N5322*	2N3439 BF 257 BF 258 BF 259 2N3585 2N5416 BFT 19,A,B,C. BFT 28,A,B,C. 2N6177 2N6213 BUX 66,A,B,C BUX 67,A,B,C

* P-N-P Type

MILITARY SPECIFICATION TYPES

Power Transistors

RCA (JAN) Type No.	MIL-Spec. 19500/	RCA(JAN) Type No.	MIL-Spec. 19500/	RCA(JAN) Type No.	MIL-Spec. 19500/	RCA(JAN) Type No.	MIL-Spec 19500/	RCA(JAN) Type No.	MIL-Spec 19500/
2N1479	207	TX2N1485	180	2N3055	407	TX2N3584	384	2N5039	439
2N1480	207	2N1486	180	TX2N3055	407	2N3585	384	TX2N5039	439
2N1481	207	TX2N1486	180	2N3439	368	TX2N3585	384	2N6211	461
2N1482	207	2N1487	208	TX2N3439	368	2N3771	413	TX2N6211	461
2N1483	180	2N1488	208	2N3440	368	TX2N3771	413	2N6212	461
TX2N1483	180	2N1489	208	TX2N3440	368	2N3772	413	TX2N6212	461
2N1484	180	2N1490	208	2N3441	369	TX2N3772	413	2N6213	461
TX2N1484	180	2N2015	248	2N3442	370	2N5038	439	TX2N6213	461
2N1485	180	2N2016	248	2N3584	384	TX2N5038	439		

2N5786 FAMILY [n-p-n] (silicon) [cont'd]

f_T = 1 MHz min; P_T = 10 W max

DESCRIPTION	$V_{CEO(sus)}$ V	$V_{CER(sus)}$ V	$V_{CEV(sus)}$ V	h_{FE}	I_C A	V_{CE} V	I_{CER}–mA Temp.–°C 25	150	V_{CE} V	$V_{CE(sat)}$–V I_C A	I_B A	V_{BE}–V I_C A
AUDIO TYPES												
40610 Output, 3-W Audio Ampli.	25	–	–	20-100	1.2	1	1▲	–	25	–	–	–	–	–
40615 Output, 5-W Audio Ampli.	30	–	–	20-100	1.2	1	1▲	–	25	–	–	–	–	–
40620 Output, 7-W Audio Ampli.	32	–	–	20-100	1.5	1	1▲	–	25	–	–	–	–	–

▲I_{CER}–μA

TO-39

2N5840 FAMILY [n-p-n] (silicon)

f_T = 5 MHz min; P_T = 100 W max

2N TYPES													
2N5838 High Voltage, Fast Switch	250	275	275	8-40	3	2	5●	8■	265	1	3	0.375	2	3
2N5839 High Voltage, Fast Switch	275	300	300	10-50	2	3	2●	5■	290	1.5	2	0.2	2	2
2N5840 High Voltage, Fast Switch	350	375	375	10-50	2	3	2●	5■	360	1.5	2	0.2	2	2
AUDIO TYPES													
41016 Output, 70-W Amplifier	**100**	**120**	-	**10-50**	**4**	**4**	**1**	–	**90**	**2**	**4**	**0.8**	**2**	**4**
OTHER TYPES													
410 † High Voltage, Inverter Applications	200	–	–	**30-90**	1	5	0.25*	0.5▲	200	0.8	1	0.1	1.5	1
411 † High Voltage, Inverter Applications	300	–	–	**30-90**	1	5	0.25	0.5▲	300	0.8	1	0.1	1.5	1
413 † High Voltage, Inverter Applications	325	–	–	20-80	0.5	5	0.25	0.5▲	400	0.8	0.5	0.05	1.5	0.5
423 † High Voltage, Inverter Applications	325	–	–	30-90	1	5	0.25	0.5▲	400	0.8	1	0.1	1.5	1
431 † High Voltage, Inverter Applications	325	–	–	15-35	2.5	5	2.5	5▲	400	0.7	2.5	0.5	1.5	2.5
40852 Off-Line Switching-Regulator for Power Supplies	350	375	–	12 min.	1.2	1	0.5●	5▲	450	3	4	0.8	2	4

●I_{CEV} ■I_{CEV} @ 100°C *I_{CEO} ▲I_{CEV} @ 125°C † Not recommended as replacement types.

TO-3

2N5954 FAMILY [p-n-p] (silicon)

f_T = 5 MHz min; P_T = 40 W max

2N TYPES													
2N5956 General Purpose, Medium Power	-40	-45	-50▲	20-100	-3	-4	-100●		-35	-1	-3	-0.3	-2	-3
2N5955 General Purpose, Medium Power	-60	-65	-70▲	20-100	-2.5	-4	-100●		-55	-1	-2.5	-0.25	-2	-2.5
2N5954 General Purpose, Medium Power	-80	-85	-90▲	20-100	-2	-4	-100●		-75	-1	-2	-0.2	-2	-2

▲$V_{CEX(sus)}$ ●I_{CER}–μA

TO-66