

HIGH-SPEED SWITCHING N-P-N & P-N-P POWER TYPES

$f_T$  to 250 MHz ...  $I_C$  to 60 A ...  $P_T$  to 140 W

$I_C = 1$ A max. $P_T = 5$ W max. (TO-38) †	$I_C = -1$ A max. $P_T = 7$ W max. (TO-38) †	$I_C = 2$ A max. $P_T = 10$ W max. (TO-38) †	$I_C = -2$ A max. $P_T = 10$ W max. (TO-38) †	$I_C = 2$ A max. $P_T = 25$ W max. (Plastic TO-5)	$I_C = -2$ A max. $P_T = 25$ W max. (Plastic TO-5)	$I_C = 7$ A max. $P_T = 35$ W max. (TO-66) † †	$I_C = 15$ A max. $P_T = 85 - 117$ W max. (Radial)	$I_C = 20$ A max. $P_T = 140$ W max. (TO-3)	$I_C = 20$ A max. $P_T = 175$ W max. (TO-3)	$I_C = 25$ A max. $P_T = 80-125$ W max. (TO-63)	$I_C = 30$ A max. $P_T = 140$ W max. (TO-3)	$I_C = 50$ A max. $P_T = 140$ W max. (Modified TO-3)
30 x 30 <sup>A</sup>	30 x 30	42 x 42	42 x 42	42 x 42	42 x 42	103 x 103	155 x 155	180 x 180	146 x 183	215 x 222	220 x 220	220 x 220 [2 CHIPS]
Family Designation												
2N2102 [N-P-N]	2N4036 [P-N-P]	2N5320 [N-P-N]	2N5322 [P-N-P]	2N6178 [N-P-N]	2N6180 [P-N-P]	2N3879 [N-P-N]	2N6482 [N-P-N]	2N6354 2N5038 [N-P-N]	41012 [N-P-N]	2N3263 [N-P-N]	2N5672 [N-P-N]	2N6033 [N-P-N]
<b>2N3053</b> $V_{CE(SUS)} = 50$ V $h_{FE} = 50-250$ @ 150 mA $f_T = 100$ MHz min.  CT File No. 432E	<b>2N4037</b> $V_{CE(SUS)} = -60$ V $h_{FE} = 50-250$ @ -150 mA $f_T = 60$ MHz min.  CT File No. 216E	<b>2N5321</b> $V_{CE(SUS)} = 65$ V $h_{FE} = 40-250$ @ 500 mA $f_T = 50$ MHz min. $t_{on} = 80$ ns max. $t_{off} = 800$ ns max.  CT File No. 325E	<b>2N5323</b> $V_{CE(SUS)} = -65$ V $h_{FE} = 40-250$ @ -500 mA $f_T = 50$ MHz min.  CT File No. 325E	<b>2N6179</b> "Plastic 2N5321" $V_{CE(SUS)} = 65$ V $h_{FE} = 40-250$ @ 500 mA $f_T = 50$ MHz min. $t_{on} = 80$ ns max. $t_{off} = 800$ ns max.  CT File No. 562	<b>2N6181</b> "Plastic 2N5323" $V_{CE(SUS)} = -65$ V $h_{FE} = 40-250$ @ -500 mA $f_T = 50$ MHz min.  CT File No. 562	<b>2N3878†</b> $V_{CE(SUS)} = 60$ V $h_{FE} = 20$ min. @ 4 A $h_{FE} = 50-200$ @ 0.5 A $f_T = 60$ MHz min. $t_r = 400$ ns max. $t_f = 400$ ns max.  File No. 766	<b>2N6479</b> (Isolated Collector) <b>2N6481</b> (Non Isolated Coll.) $V_{CE(sus)} = 80$ V $h_{FE} = 20$ min. $f_T = 100$ MHz typ. Radiation Hard File No. 702	<b>2N5039</b> $V_{CE(SUS)} = 95$ V $h_{FE} = 20$ min. @ 10 A $h_{FE} = 30-250$ @ 2 A $f_T = 60$ MHz min. $t_{on} = 0.5$ $\mu$ s max. $t_{off} = 2$ $\mu$ s max.  File No. 698	<b>41012</b> $P_T = 175$ W $I_C = 30$ A peak $V_{CEO(sus)} = 80$ V $h_{FE} = 20-60$ @ 10 A  File No. 660	<b>2N3266</b> <b>2N3264</b> $V_{CE(SUS)} = 80$ V $h_{FE} = 20-80$ @ 15 A $f_T = 20$ MHz min. $t_{on} = 0.5$ $\mu$ s max. $t_{off} = 2$ $\mu$ s max.  File No. 54	<b>2N5671</b> $V_{CE(SUS)} = 110$ V $h_{FE} = 20$ min. @ 20 A $h_{FE} = 20-100$ @ 15 A $f_T = 50$ MHz min. $t_{on} = 0.5$ $\mu$ s max. $t_{off} = 2$ $\mu$ s max.  File No. 383	<b>2N6032</b> $V_{CE(SUS)} = 110$ V $h_{FE} = 10-50$ @ 50 A $f_T = 50$ MHz min. $t_r = 1$ $\mu$ s max. $t_f = 0.5$ $\mu$ s max.  File No. 462
<b>2N2102</b> $V_{CE(SUS)} = 80$ V $h_{FE} = 40-120$ @ 150 mA $f_T = 120$ MHz min.  CT 106E	<b>2N4036</b> $V_{CE(SUS)} = -85$ V $h_{FE} = 40-140$ @ 150 mA $f_T = 60$ MHz min.  CT 216E	<b>2N5320</b> $V_{CE(SUS)} = 90$ V $h_{FE} = 30-130$ @ 500 mA $f_T = 50$ MHz min. $t_{on} = 80$ ns max. $t_{off} = 800$ ns max.  CT 325E	<b>2N5322</b> $V_{CE(SUS)} = -90$ V $h_{FE} = 30-130$ @ -500 mA $h_{FE} = 10$ min. @ -1 A $f_T = 50$ MHz min.  CT 325E	<b>2N6178</b> "Plastic 2N5320" $V_{CE(SUS)} = 90$ V $h_{FE} = 30-130$ @ 500 mA $f_T = 50$ MHz min. $t_{on} = 80$ ns max. $t_{off} = 800$ ns max.  CT 562	<b>2N6180</b> "Plastic 2N5322" $V_{CE(SUS)} = -90$ V $h_{FE} = 30-130$ @ -500 mA $h_{FE} = 10$ min. @ -1 A $f_T = 50$ MHz min.  CT 562	<b>2N3879</b> $V_{CE(SUS)} = 90$ V $h_{FE} = 40$ min. @ 0.5 A $h_{FE} = 20-80$ @ 4 A $f_T = 60$ MHz min. $t_r = 400$ ns max. $t_f = 400$ ns max.  766	<b>2N6480</b> (Isolated Collector) <b>2N6482</b> (Non Isolated Coll.) $V_{CE(sus)} = 80$ V $h_{FE} = 20$ min. $f_T = 100$ MHz typ. Radiation Hard 702	<b>2N5038</b> $V_{CE(SUS)} = 110$ V $h_{FE} = 20$ min. @ 12 A $h_{FE} = 50-250$ @ 2 A $f_T = 60$ MHz min. $t_{on} = 0.5$ $\mu$ s max. $t_{off} = 2$ $\mu$ s max.  698	<b>41013</b> $P_T = 175$ W $I_C = 30$ A peak $V_{CEO(sus)} = 125$ V $h_{FE} = 20-60$ @ 10 A  660	<b>2N3265</b> <b>2N3263</b> $V_{CE(SUS)} = 110$ V $h_{FE} = 25-75$ @ 15 A $f_T = 20$ MHz min. $t_{on} = 0.5$ $\mu$ s max. $t_{off} = 2$ $\mu$ s max.  54	<b>2N5672</b> $V_{CE(SUS)} = 140$ V $h_{FE} = 20$ min. @ 20 A $h_{FE} = 20-100$ @ 15 A $f_T = 50$ MHz min. $t_{on} = 0.5$ $\mu$ s max. $t_{off} = 2$ $\mu$ s max.  383	<b>2N6033</b> $V_{CE(SUS)} = 140$ V $h_{FE} = 10-50$ @ 40 A $f_T = 50$ MHz min. $t_r = 1$ $\mu$ s max. $t_f = 0.5$ $\mu$ s max.  462
	<b>2N4314</b> $V_{CE(SUS)} = -85$ V $h_{FE} = 50-250$ @ -150 mA $f_T = 60$ MHz min.  216E					<b>2N5202</b> $V_{CE(SUS)} = 75$ V $h_{FE} = 10-100$ @ 4 A $f_T = 60$ MHz min. $t_r = 400$ ns max. $t_f = 400$ ns max.  766		<b>2N6354</b> $V_{CE(sus)} = 130$ V $h_{FE} = 20-150$ @ 5 A $h_{FE} = 10-100$ @ 10 A $f_T = 80$ MHz min. $t_r = 0.3$ $\mu$ s max. $t_f = 0.2$ $\mu$ s max. $I_C = 12$ A peak  582				
						<b>2N6500</b> $V_{CE(SUS)} = 110$ V $h_{FE} = 15-60$ @ 3 A $f_T = 60$ MHz min. $t_r = 400$ ns max. $t_f = 500$ ns max.  766		<b>2N6496</b> $V_{CE(sus)} = 130$ V $h_{FE} = 12-100$ @ 8 A $f_T = 50$ MHz min. $t_r = 0.5$ $\mu$ s max. $t_f = 0.5$ $\mu$ s max. $I_C = 30$ A peak  698				

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

\* Types available out of this family with a. flange for easy heat sinking  $R_{\theta JC} = 15^\circ \text{C/W}$  b. free-air radiator  $R_{\theta JA} = 50^\circ \text{C/W}$

Type available out of this family with free-air radiator  $R_{\theta JA} = 30^\circ \text{C/W}$

‡ Also available with heat radiator (40375).

■ Flat radial lead version.

File No. (e.g. File No. 432), where shown, relates to the data bulletin.

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

DESCRIPTION

**2N3771 FAMILY [n-p-n] (silicon)**  
 $f_T = 0.8 \text{ MHz min}; P_T \text{ up to } 250 \text{ W max}$

$V_{CE0(sus)}$ V	$V_{CER(sus)}$ V	$V_{CEV(sus)}$ V	$h_{FE}$		$I_{CEV-mA}$			$V_{CE(sat)-V}$			$V_{BE-V}$		
			$I_C$ A	$V_{CE}$ V	Temp. -°C	$V_{CE}$ V	$I_C$ A	$I_B$ A	$I_C$ A				
40	45	50	15-75	8	4	4	20	45	1.5	8	0.8	2.2	8
40	45	50	15-60	15	4	2	10 <sup>▲</sup>	50	2	15	1.5	2.7	15
60	70	80	15-60	10	4	5	10 <sup>▲</sup>	100	1.4	10	1	2.2	10
75	—	90	15-60	15	2	1 <sup>●</sup>	10 <sup>▲</sup>	100	1.2	15	1.5	3.5	30

▲ At  $V_{CE} = 30 \text{ V}$

—	90	—	35-100	4	4	0.5 <sup>●</sup>	2 <sup>●</sup>	80	0.8	4	0.4	1.2	4
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● JAN & JAN TX types available. ●  $I_{CER}$

**2N TYPES**

- 2N6257 High-Current, General Purpose
- 2N3771<sup>■</sup> High-Current, General Purpose
- 2N3772<sup>■</sup> High-Current, General Purpose
- BDY29 High-Current, General Purpose

**AUDIO TYPES**

- 40411 Output, 70-W Class AB Amplifier

**2N TYPES**

- 2N4348 High-Current High Voltage, General Purpose
- 2N3773 High-Current High Voltage, General Purpose
- 2N6259 High-Current High Voltage, General Purpose
- BDY37 High-Current High Voltage, General Purpose

**2N3773 FAMILY [n-p-n] (silicon)**  
 $f_T = 0.7 \text{ MHz typ}; P_T \text{ up to } 250 \text{ W max}$

120	140	140	15-60	5	4	2	10	120	1	5	0.5	2	5
140	150	160	15-60	8	4	2	10	140	1.4	8	0.8	2.2	8
150	160	170	15-60	8	2	0.2	4	150	1	8	0.8	2	8
140	—	160	15-60	8	4	2 <sup>●</sup>	10 <sup>●</sup>	140	1.4	8	0.8	2.2	8

**2N3879 FAMILY [n-p-n] (silicon)**  
 $f_T = 60 \text{ MHz min}; P_T = 35 \text{ W max}$

50	65	—	50-200	0.5	5	4	4	100	2	4	0.5	2.5	4
75	90	—	20-80	4	5	4	4	100	1.2	4	0.4	1.8	4
—	75	—	10-100	4	1.2	10	10	100	1.2	4	0.4	1.9	4
90	110	—	15-60	3	2	5	10	110	1.5	3	0.3	2.5	3

**2N TYPES**

- 2N3878 Audio, Ultrasonic Amplifiers and RF
- 2N3879 High-Current High-Speed Switch
- 2N5202 High-Current High-Speed Switch
- 2N6500 High-Current High-Speed Switch

**AUDIO TYPES**

- 40364 Output, 20-W Class AB Amplifier

**OTHER TYPES**

- 40375 2N3878 with Heat Radiator\*

—	70	—	35-175	0.5	5	0.5 <sup>●</sup>	2 <sup>●</sup>	50	2	2.5	0.25	1.8	2.5
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50	65	—	50-200	0.5	5	4	4	100	2	4	0.5	2.5	4
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\* Radiator improves  $R_{\theta JA}$  from 70°C/W to 30°C/W

**2N4036 FAMILY [p-n-p] (silicon)**  
 $f_T = 60 \text{ MHz min}; P_T \text{ up to } 7 \text{ W max}$

●  $I_{CER}$

**2N TYPES**

- 2N4036 PNP Complement of 2N2102
- 2N4037 PNP Complement of 2N3053
- 2N4314 Low Cost, High Voltage

-65	-85	-85	40-140	-0.15	-10	-0.02 <sup>●</sup>	—	-60	-0.65	-0.15	-0.015	-1.1	-0.15
-40	-60	-60	50-250	-0.15	-10	-0.25 <sup>●</sup>	—	-60	-1.4	-0.15	-0.015	-1.5	-0.15
-65	-85	-85	50-250	-0.15	-10	-0.25 <sup>●</sup>	—	-60	-1.4	-0.15	-0.015	-1.5	-0.15

