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## 2N3036 (PNP) & 2N6039 (NPN) Silicon Complementary Transistors Darlington Power Amplifier TO-126 Type Package

**Description:**

The 2N3036 (PNP) and 2N6039 (NPN) are silicon complementary Darlington power transistors in a TO-126 type case designed for general-purpose amplifier and low-speed switching applications.

**Absolute Maximum Ratings:** (Note 1)

Collector-Emitter Voltage, $V_{CEO}$ .....	80V
Collector-Base Voltage, $V_{CBO}$ .....	80V
Emitter-Base Voltage, $V_{EBO}$ .....	5V
Collector Current, $I_C$	
Continuous .....	4A
Peak .....	8A
Base Current, $I_B$ .....	100mA
Total Power Dissipation ( $T_C = +25^\circ\text{C}$ ), $P_D$ .....	40W
Derate Above $25^\circ\text{C}$ .....	320mW/ $^\circ\text{C}$
Total Power Dissipation ( $T_A = +25^\circ\text{C}$ ), $P_D$ .....	1.5W
Derate Above $25^\circ\text{C}$ .....	12mW/ $^\circ\text{C}$
Operating Junction Temperature Range, $T_J$ .....	$-65^\circ$ to $+150^\circ\text{C}$
Storage Temperature Range, $T_{stg}$ .....	$-65^\circ$ to $+150^\circ\text{C}$
Thermal Resistance, Junction-to-Case, $R_{thJC}$ .....	3.12 $^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Ambient, $R_{thJA}$ .....	83.3 $^\circ\text{C}/\text{W}$

**Electrical Characteristics:** ( $T_C = +25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>OFF Characteristics</b>						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 100\text{mA}, I_B = 0$	80	-	-	V
Collector Cutoff Current	$I_{CEO}$	$V_{CE} = 80\text{V}, I_B = 0$	-	-	100	$\mu\text{A}$
	$I_{CBO}$	$V_{CB} = 80\text{V}, I_E = 0$	-	-	500	$\mu\text{A}$
	$I_{CEX}$	$V_{CE} = 80\text{V},$ $V_{BE(off)} = 1.5\text{V}$		-	-	100
$T_C = +125^\circ\text{C}$			-	-	500	$\mu\text{A}$
Emitter Cutoff Current	$I_{EBO}$	$V_{BE} = 5\text{V}, I_C = 0$	-	-	2.0	mA

Note 1. Stresses exceeding maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

**Electrical Characteristics (Cont'd):** ( $T_C = +25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>ON Characteristics</b>						
DC Current Gain	$h_{FE}$	$V_{CE} = 3\text{V}, I_C = 0.5\text{A}$	500	-	-	
		$V_{CE} = 3\text{V}, I_C = 2\text{A}$	750	-	15000	
		$V_{CE} = 3\text{V}, I_C = 4\text{A}$	100	-	-	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 2\text{A}, I_B = 8\text{mA}$	-	-	2.0	V
		$I_C = 4\text{A}, I_B = 40\text{mA}$	-	-	3.0	V
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 4\text{A}, I_B = 40\text{mA}$	-	-	4.0	V
Base-Emitter ON Voltage	$V_{BE(on)}$	$V_{CE} = 3\text{V}, I_C = 2\text{A}$	-	-	2.8	V
<b>Dynamic Characteristics</b>						
Small-Signal Current-Gain	$ h_{fe} $	$V_{CE} = 10\text{V}, I_C = 750\text{mA}, f = 1\text{MHz}$	25	-	-	
Output Capacitance 2N6036	$C_{ob}$	$V_{CB} = 10\text{V}, I_E = 0, f = 0.1\text{MHz}$	-	-	200	pF
2N6039			-	-	100	pF

