



ELECTRONICS, INC.
 44 FARRAND STREET
 BLOOMFIELD, NJ 07003
 (973) 748-5089
<http://www.nteinc.com>

2N5686

Silicon NPN Transistor

High Power, High Current Switch

TO-3 Type Package

Description:

The 2N5686 is a NPN power transistor a TO-3 type case designed for use in high power amplifier and switching circuit applications.

Features:

- High Current Capability: $I_C = 50A$ (Continuous)
- DC Current Gain: $h_{FE} = 15$ to 60 @ $I_C = 25A_{dc}$
- Low Collector-Emitter Saturation Voltage: $V_{CE(sat)} = 1V$ Max @ $I_C = 25A_{dc}$

Absolute Maximum Ratings:

Collector-Emitter Voltage, V_{CEO}	80V
Collector-Base Voltage, V_{CB}	80V
Emitter-Base Voltage, V_{EB}	5V
Continuous Collector Current, I_C	50A
Base Current, I_B	15A
Total Device Dissipation ($T_C = +25^\circ C$), P_D	300W
Derate Above $25^\circ C$	1.715W/ $^\circ C$
Operating Junction Temperature Range, T_J	-65° to $+200^\circ C$
Storage Temperature Range, T_{stg}	-65° to $+200^\circ C$
Thermal Resistance, Junction-to-Case, R_{thJC}	0.584 $^\circ C/W$

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF Characteristics						
Collector-Emitter Sustaining Voltage	$V_{CEO(sus)}$	$I_C = 0.2A, I_B = 0,$	80	-	-	V
Collector Cutoff Current	I_{CEO}	$V_{CE} = 40V, I_B = 0$	-	-	1	mA
	I_{CEX}	$V_{CE} = 80V, V_{EB(off)} = 1.5V$	-	-	2	mA
		$V_{CE} = 80V, V_{EB(off)} = 1.5V, T_C = +150^\circ C$	-	-	10	mA
	I_{CBO}	$V_{CB} = 80V, I_E = 0$	-	-	2	mA
Emitter Cutoff Current	I_{EBO}	$V_{BE} = 5V, I_C = 0$	-	-	5	mA

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
ON Characteristics						
DC Current Gain	h_{FE}	$I_C = 25\text{A}, V_{CE} = 2\text{V}, \text{Note 1}$	15	-	60	
		$I_C = 50\text{A}, V_{CE} = 5\text{V}, \text{Note 1}$	5	-	-	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 25\text{A}, I_B = 2.5\text{A}, \text{Note 1}$	-	-	1	V
		$I_C = 50\text{A}, I_B = 10\text{A}, \text{Note 1}$	-	-	5	V
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 25\text{A}, I_B = 2.5\text{A}$	-	-	2	V
Base-Emitter ON Voltage	$V_{BE(on)}$	$I_C = 25\text{A}, V_{CE} = 2\text{V}$	-	-	2	V
Dynamic Characteristics						
Current Gain-Bandwidth Product	f_T	$I_C = 5\text{A}, V_{CE} = 10\text{V}, f = 1\text{MHz}$	2	-	-	MHz
Output Capacitance	C_{ob}	$V_{CB} = 10\text{V}, I_E = 0, f = 0.1\text{MHz}$	-	-	1200	pF
Small-Signal Current Gain	h_{fe}	$I_C = 10\text{A}, V_{CE} = 5\text{V}, f = 1\text{kHz}$	15	-	-	

Note 1. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.

