



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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NPN POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/464

Devices

2N5685

2N5686

Qualified Level

JAN
JANTX
JANTXV

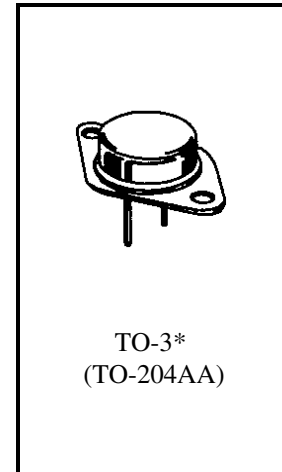
MAXIMUM RATINGS

Ratings	Symbol	2N5685	2N5686	Units
Collector-Emitter Voltage	V_{CEO}	60	80	Vdc
Collector-Base Voltage	V_{CBO}	60	80	Vdc
Emitter-Base Voltage	V_{EBO}	5.0		Vdc
Base Current	I_B	15		Adc
Collector Current	I_C	50		Adc
Total Power Dissipation	@ $T_C = +25^{\circ}\text{C}$ ⁽¹⁾	300		W
	@ $T_C = +100^{\circ}\text{C}$ ⁽¹⁾	171		W
Operating & Storage Junction Temperature Range	T_J, T_{stg}	-55 to +200		$^{\circ}\text{C}$

THERMAL CHARACTERISTICS

Characteristics	Symbol	Max.	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$.0584	$^{\circ}\text{C}/\text{W}$

1) Derate linearly 1.715 W/ $^{\circ}\text{C}$ between $T_C = 25^{\circ}\text{C}$ and $T_C = 200^{\circ}\text{C}$



*See appendix A for package outline

ELECTRICAL CHARACTERISTICS ($T_C = 25^{\circ}\text{C}$ unless otherwise noted)

Characteristics	Symbol	Min.	Max.	Unit
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OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage $I_C = 100 \text{ mAdc}$	2N5685 2N5686	$V_{(BR)CEO}$	60 80	Vdc
Collector-Emitter Cutoff Current $V_{CE} = 30 \text{ Vdc}$ $V_{CE} = 40 \text{ Vdc}$	2N5685 2N5686	I_{CEO}	500 500	μAdc
Collector-Emitter Cutoff Current $V_{CE} = 60 \text{ Vdc}, V_{BE} = 1.5 \text{ Vdc}$ $V_{CE} = 80 \text{ Vdc}, V_{BE} = 1.5 \text{ Vdc}$	2N5685 2N5686	I_{CEX}	500 500	μAdc
Collector-Base Cutoff Current $V_{CB} = 60 \text{ Vdc}$ $V_{CB} = 80 \text{ Vdc}$	2N5685 2N5686	I_{CBO}	2.0 2.0	mAdc

ELECTRICAL CHARACTERISTICS (con't)

Characteristics	Symbol	Min.	Max.	Unit
Emitter-Base Cutoff Current $V_{EB} = 5.0 \text{ Vdc}$	I_{EBO}		1.0	mAdc

ON CHARACTERISTICS ⁽²⁾

Forward-Current Transfer Ratio $I_C = 5.0 \text{ Adc}, V_{CE} = 2.0 \text{ Vdc}$ $I_C = 25 \text{ Adc}, V_{CE} = 2.0 \text{ Vdc}$ $I_C = 50 \text{ Adc}, V_{CE} = 5.0 \text{ Vdc}$	h_{FE}	30 15 5.0	60	
Collector-Emitter Saturation Voltage $I_C = 25 \text{ Adc}, I_B = 2.5 \text{ Adc}$ $I_C = 50 \text{ Adc}, I_B = 10 \text{ Adc}$	$V_{CE(sat)}$		1.0 5.0	Vdc
Base-Emitter Saturation Voltage $I_C = 25 \text{ Adc}, I_B = 2.5 \text{ Adc}$	$V_{BE(sat)}$		2.0	Vdc
Base-Emitter Voltage $I_C = 25 \text{ Adc}, V_{CE} = 2.0 \text{ Vdc}$	$V_{BE(on)}$		2.0	Vdc

DYNAMIC CHARACTERISTICS

Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 5.0 \text{ Adc}, V_{CE} = 10 \text{ Vdc}, f = 1.0 \text{ MHz}$	$ h_{fe} $	2.0	20	
Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 10 \text{ Adc}, V_{CE} = 5.0 \text{ Vdc}, f = 1.0 \text{ kHz}$	h_{fe}	15		
Output Capacitance $V_{CB} = 10 \text{ Vdc}, I_E = 0, 0.1 \text{ MHz} \leq f \leq 1.0 \text{ MHz}$	C_{obo}		1200	pF

SWITCHING CHARACTERISTICS

Turn-On Time $V_{CC} = 30 \text{ Vdc}; I_C = 25 \text{ Adc}; I_{B1} = 2.5 \text{ Adc}$	t_{on}		1.5	μs
Turn-Off Time $V_{CC} = 30 \text{ Vdc}; I_C = 25 \text{ Adc}; I_{B1} = -I_{B2} = 2.5 \text{ Adc}$	t_{off}		3.0	μs

SAFE OPERATING AREA

DC Tests				
$T_C = +25^\circ\text{C}, 1 \text{ Cycle}, t = 1.0 \text{ s}$				
Test 1				
$V_{CE} = 6.0 \text{ Vdc}, I_C = 50 \text{ Adc}$				
Test 2				
$V_{CE} = 30 \text{ Vdc}, I_C = 10 \text{ Adc}$				
Test 3				
$V_{CE} = 50 \text{ Vdc}, I_C = 560 \text{ mAdc}$				2N5685
$V_{CE} = 60 \text{ Vdc}, I_C = 640 \text{ mAdc}$				2N5686

(2) Pulse Test: Pulse Width = 300 μs , Duty Cycle $\leq 2.0\%$.