

2N5685, 2N5686

FEATURES

- JAN, JANTX and JANTXV Qualified to MIL-PRF-19500/464
- Ideal for Military, & other High Reliability Applications
- TO-3 (TO-204AA) Package Style



ELECTRICAL PERFORMANCE

PARAMETER	TEST CONDITION	SYMBOL	UNITS	MIN	MAX
OFF CHARACTERISTICS					
Collector – Emitter Breakdown Voltage	$I_C = 100 \text{ mA dc}$ 2N5685 $I_C = 100 \text{ mA dc}$ 2N5686	$V_{(BR)CEO}$	V dc	60 80	—
Collector – Emitter Cutoff Current	$V_{CE} = 30 \text{ V dc}$ 2N5685 $V_{CE} = 40 \text{ V dc}$ 2N5686	I_{CEO}	$\mu\text{A dc}$	—	500
Emitter – Base Cutoff Current	$V_{BE} = 5.0 \text{ V dc}$, $I_C = 0$	I_{EBO}	mA dc	—	1.0
Collector – Emitter Cutoff Current	$V_{BE} = 1.5\text{V}$, $V_{CE} = 60 \text{ V dc}$ 2N5685 $V_{BE} = 1.5\text{V}$, $V_{CE} = 80 \text{ V dc}$ 2N5686	I_{CEX}	$\mu\text{A dc}$	—	10.0
Collector – Emitter Cutoff Current	$V_{CE} = 60 \text{ V dc}$ 2N5685 $V_{CE} = 80 \text{ V dc}$ 2N5686	I_{CBO}	mA dc	—	2.0
ON CHARACTERISTICS⁽²⁾					
Forward Current Transfer Ratio	$I_C = 5.0 \text{ A dc}$, $V_{CE} = 2.0 \text{ V dc}$ $I_C = 25 \text{ A dc}$, $V_{CE} = 2.0 \text{ V dc}$ $I_C = 50 \text{ A dc}$, $V_{CE} = 5.0 \text{ V dc}$	h_{FE}	—	30 15 5.0	60
Collector - Emitter Saturation Voltage	$I_C = 25 \text{ A dc}$, $I_B = 2.5 \text{ A dc}$ $I_C = 50 \text{ A dc}$, $I_B = 10 \text{ A dc}$	$V_{CE(sat)}$	V dc	—	1.0 5.0
Base - Emitter Saturation Voltage	$I_C = 25 \text{ A dc}$, $I_B = 2.5 \text{ A dc}$	$V_{BE(sat)}$	V dc	—	2.0

DYNAMIC CHARACTERISTICS

Small-Signal Short-Circuit Forward Current Transfer Ratio	$I_C = 10 \text{ A dc}, V_{CE} = 5 \text{ V dc}, f = 1.0 \text{ kHz}$	h_{fe}	15	—
Magnitude of Small-Signal Short-Circuit Forward Current Transfer Ratio	$I_C = 5.0 \text{ A dc}, V_{CE} = 10 \text{ V dc}, f = 1.0 \text{ MHz}$	$ h_{fe} $	2.0	20
Output Capacitance	$V_{CB} = 10 \text{ V dc}, I_E = 0, 0.1\text{MHz} \leq f \leq 1.0 \text{ MHz}$	Cobo	pF	1200

SAFE OPERATING AREA

DC Tests:	$T_C = +25 \text{ }^\circ\text{C}, 1 \text{ Cycle}, t = 1.0 \text{ S}$
Test 1:	$V_{CE} = 6.0 \text{ V dc}, I_C = 50 \text{ A dc}$
Test 2:	$V_{CE} = 30 \text{ V dc}, I_C = 10 \text{ A dc}$
Test 3:	$V_{CE} = 50 \text{ V dc}, I_C = 560 \text{ mA dc}$ 2N5685
Test 3:	$V_{CE} = 60 \text{ V dc}, I_C = 640 \text{ mA dc}$ 2N5686

ABSOLUTE MAXIMUM RATINGS

RATING	SYMBOL	VALUE
Collector, Emitter Voltage	V_{CEO}	60 V dc
	2N5685 2N5686	80 V dc
Collector, Base Voltage	V_{CBO}	60 V dc
	2N5685 2N5686	80 V dc
Emitter, Base Voltage	V_{EBO}	5.0 V dc
Base Current	I_B	15 A dc
Collector Current	I_C	50 A dc
Total Power Dissipation @ $T_C = 25 \text{ }^\circ\text{C}^1$ @ $T_C = 100 \text{ }^\circ\text{C}^1$	P_T	300 W
		171 W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 °C to +200 °C

NOTES:

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

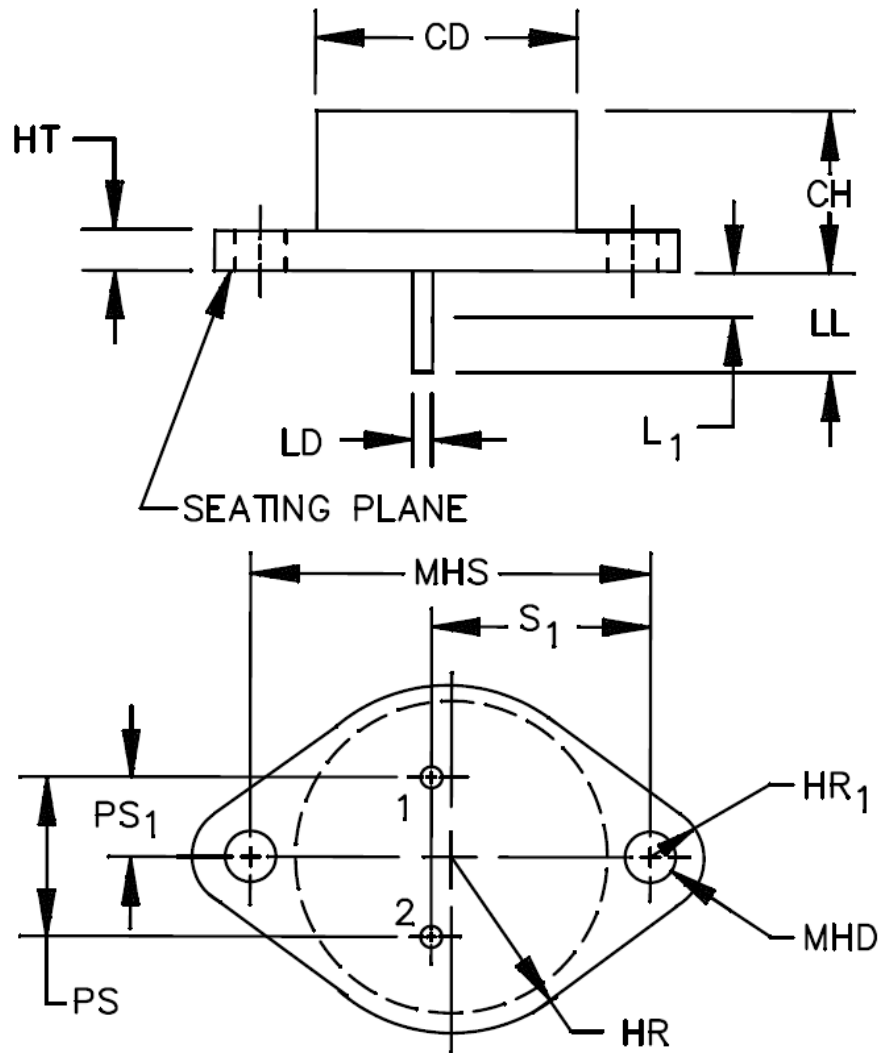
THERMAL CHARACTERISTICS

CHARACTERISTICS	SYMBOL	MAXIMUM VALUE
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.584 °C/W

SWITCHING CHARACTERISTICS

CHARACTERISTICS	SYMBOL	MAXIMUM VALUE
$V_{CC} = 30V$ dc; $I_C = 25$ A dc; $I_B = 2.5$ A dc	t_{on}	1.5 μs
$V_{CC} = 30V$ dc; $I_C = 25$ A dc; $I_{B1} = -I_{B2} = 2.5$ A dc	t_{off}	3.0 μs

MECHANICAL OUTLINE (TO-3)



SYMBOL	INCHES		MILLIMETER		NOTES
	Min.	Max	Min	Max	
CD	-	.875	-	22.22	3
CH	.250	.450	6.35	11.43	
HR	.495	.525	12.57	13.34	
HR ₁	.131	.188	3.33	4.78	6
HT	.060	.135	1.52	3.43	
LD	.057	.063	1.45	1.60	4, 5, 9
LL	.312	.500	7.92	12.70	4, 5, 9
L ₁	-	.050	-	1.27	5, 9
MHD	.151	.165	3.84	4.19	7
MHS	1.177	1.197	29.90	30.40	
PS	.420	.440	10.67	11.18	
PS ₁	.205	.225	5.21	5.72	5
S1	.655	.675	16.64	17.15	

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Body contour is optional within zone defined by dimension CD.
4. These dimensions shall be measured at points .050 inch (1.27 mm) to .055 inch (1.40 mm) below seating plane. When gauge is not used, measurement shall be made at seating plane.
5. Both terminals.
6. At both ends.
7. Two holes.
8. The collector shall be electrically connected to the case
9. LD applies between L₁ and LL. Lead diameter shall not exceed twice LD within L₁.
10. In accordance with ASME Y14.5M, diameters are equivalent to ϕx symbology.
11. Terminal 1 is emitter; terminal 2 is base; case is collector.

MECHANICAL OUTLINES CONTINUED, (TO-46) 2N3057 ONLY**VPT COMPONENTS. ALL RIGHTS RESERVED.**

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