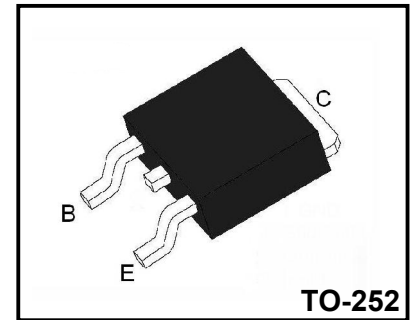


NPN Plastic-Encapsulate Transistors

Applications

- ◆DC-to-DC converters
- ◆Inverters
- ◆Motor control systems
- ◆High-frequency electronic lighting ballast applications



Features

- ◆Fast switching
- ◆Low thermal resistance
- ◆High voltage capability
- ◆Surface-mountable package

Absolute Maximum Rating (Ta=25°C)

Parameter	Symbol	Value	Unit
Collector-base voltage	BV_{CBO}	700	V
Collector-emitter voltage	BV_{CEO}	400	V
Emitter-base voltage	BV_{EBO}	9	V
Collector current (DC)	I_C	4	A
Peak collector current	I_{CM}	8	A
Base current	I_B	2	A
Total power dissipation ($T_{mb} \leq 25^\circ\text{C}$)	P_{tot}	80	W
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	-55~150	°C

Thermal characteristics

Parameter	Symbol	Min	Typ	Max	Unit
Thermal resistance, Junction to mounting base	$R_{\theta JA}$		60		°C/W
Thermal resistance, Junction to case	$R_{\theta JMB}$			1.56	°C/W

Electrical Characteristics (Ta=25°C)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	BV_{CBO}	$I_C = 100\mu A, I_B = 0$	700			V
Collector-emitter breakdown voltage	BV_{CEO}	$I_E = 10mA, I_C = 0$	400			V
Emitter-base breakdown voltage	BV_{EBO}	$I_E = 100\mu A, I_C = 0$	9			V
Collector-base current	I_{CBO}	$V_{CB} = 700V, I_B = 0$			10	μA
Collector-emitter current	I_{CEO}	$V_{CB} = 400V, I_B = 0$			10	mA
Collector cut-off current	I_{EBO}	$V_{CE} = 9V, I_B = 0$			10	μA
DC current gain *	h_{FE}	$V_{CE} = 5V, I_C = 0.1A$ $V_{CE} = 3V, I_C = 0.8A$	30 20		40	
Collector-emitter saturation voltage*	$V_{CE(sat)}$	$I_C = 1.0A, I_B = 0.2A$ $I_C = 3.5A, I_B = 1A$			0.5 1.5	V
Base -emitter saturation voltage*	$V_{BE(sat)}$	$I_C = 3.5A, I_B = 1A$			1.5	V
Transition frequency	f_T	$V_{CE} = 10V, I_B = 0.5A$	4			MHz
Output capacitance	C_{ob}	$V_{CB} = 10V, I_E = 0, f = 1MHz$		65		pF
Storage Time	t_s	$I_C = 2.5A, I_{Bon} = 0.5A, I_{Boff} = -0.5A$ $R_L = 60\Omega, V_{BB} = -5V, T_{mb} = 25^\circ C$ resistive load; $t_p = 300\mu s$			3.5	μs
Fall Time	t_f				0.5	μs

* Pulse test: pulse duration $\leq 300 \mu s$, duty cycle $\leq 2 \%$

Typical Characteristics

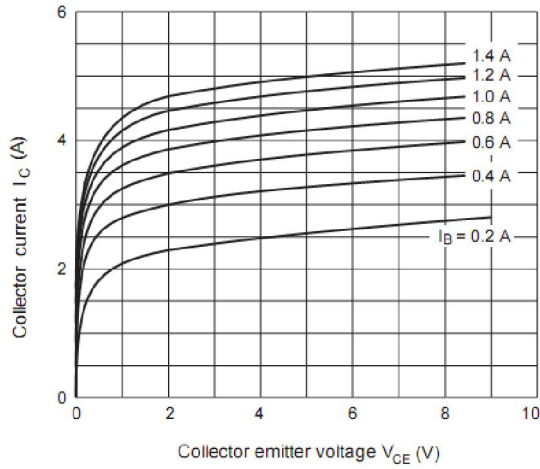


Figure 1. Static Characteristic

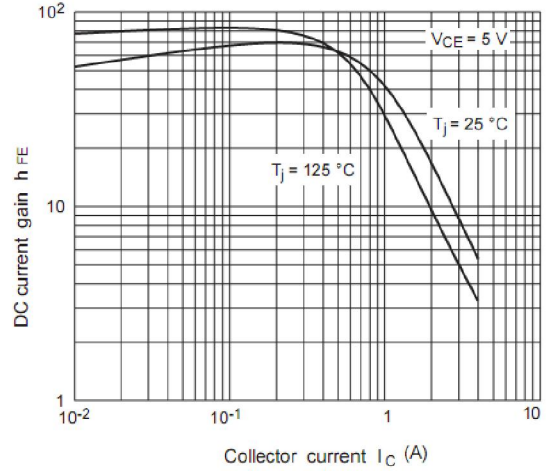


Figure 2. DC current Gain

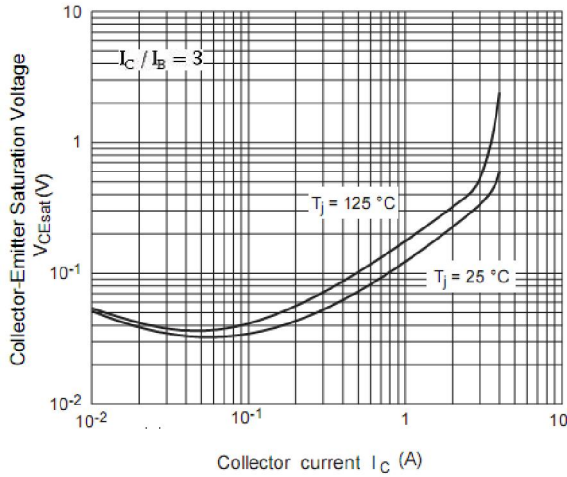


Figure 3. Collector-Emitter Saturation Voltage

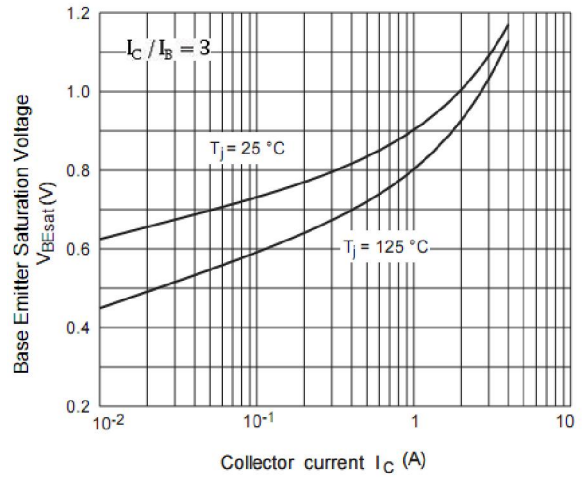


Figure 4. Base-Emitter Saturation Voltage

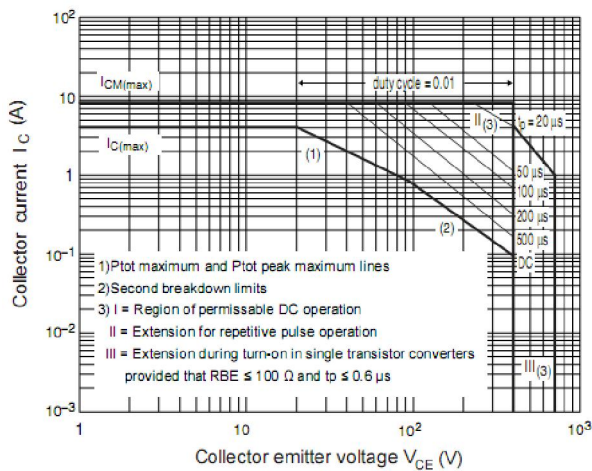


Figure 5. Safe operating area

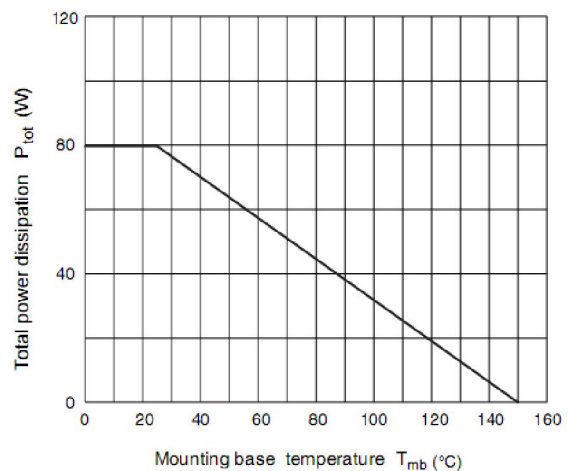


Figure 6. Power Derating

Package Dimensions

TO-252

Dim	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	2.20	2.50	0.087	0.098
A1	0.00	0.12	0.000	0.005
A2	2.20	2.40	0.087	0.094
B	1.20	1.60	0.047	0.063
b	0.50	0.70	0.020	0.028
b1	0.70	0.90	0.028	0.035
c	0.40	0.60	0.016	0.024
c1	0.40	0.60	0.016	0.024
D	6.35	6.65	0.250	0.262
D1	5.20	5.40	0.205	0.213
E	5.40	5.70	0.213	0.224
e	2.20	2.40	0.087	0.094
e1	4.40	4.80	0.173	0.189
L	9.60	10.20	0.378	0.402
L1	2.70	3.10	0.106	0.122
L2	1.40	1.80	0.055	0.071
L3	0.90	1.50	0.035	0.059
θ	0°	8°	0°	8°

Product Specification Classification

Part Number	Package	Marking	Pack
YFW13005AD	TO-252	YFW 13005AD XXXXX	2500PCS/Tape