STW2040

High voltage fast-switching NPN power transistor

Features

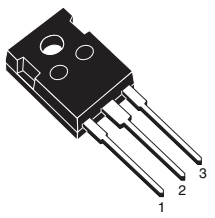
- High voltage capability
- High DC current gain
- Minimum lot to lot spread for reliable operation

Application

- Switching mode power supplies

Description

The STW2040 is manufactured using diffused collector in planar technology adopting base island layout.



TO-247

Figure 1. Internal schematic diagram

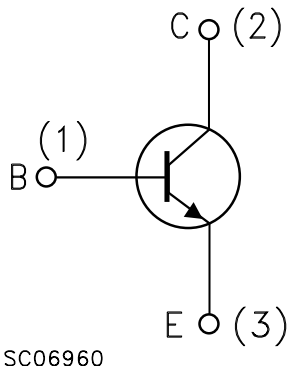


Table 1. Device summary

Order code	Marking	Package	Packaging
STW2040	W2040	TO-247	Tube

1 Absolute maximum ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CES}	Collector-emitter voltage (V_{CE} = 0)	700	V
V_{CEO}	Collector-emitter voltage (I_B = 0)	500	V
V_{EBO}	Emitter-base voltage (I_C = 0)	9	V
I_C	Collector current	20	A
I_{CM}	Collector peak current	30	A
I_B	Base current	7	A
I_{BM}	Base peak current	10	A
P_{TOT}	Total dissipation at T_c = 25 °C	125	W
T_{stg}	Storage temperature	-65 to 150	°C
T_J	Max. operating junction temperature	150	°C

Table 3. Thermal data

Symbol	Parameter	Value	Unit
R_{thJC}	Thermal resistance junction-case max	1	°C/W

2 Electrical characteristics

(T_{case} = 25 °C; unless otherwise specified)

Table 4. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector cut-off current (V_{BE} = 0)	V_{CE} = 700 V			250	µA
I_{EBO}	Emitter cut-off current (I_C = 0)	V_{EB} = 9 V			1	mA
$V_{(BR)CEO}$	Collector-emitter breakdown voltage (I_B = 0)	I_C = 10 mA	500			V
$V_{CE(sat)}$(1)	Collector-emitter saturation voltage	I_C = 6 A I_B = 1.2 A I_C = 12 A I_B = 2.4 A I_C = 20 A I_B = 4 A		0.2 0.3 0.6	0.5	V V V
$V_{BE(sat)}$(1)	Base-emitter saturation voltage	I_C = 6 A I_B = 1.2 A I_C = 12 A I_B = 2.4 A			1.2 1.5	V V
h_{FE}(1)	DC current gain	I_C = 10 mA V_{CE} = 5 V I_C = 6 A V_{CE} = 5 V I_C = 12 A V_{CE} = 5 V	8 15 10	21	27	
t_{on} t_f t_s	Resistive load Turn-on time Fall time Storage time	V_{CC} = 200 V $V_{BE(off)}$ = -5 V I_C = 7.5 A $I_{B(on)}$ = 1.5 A $I_{B(off)}$ = -3 A		140 100 1.6		ns ns µs
t_s t_f	Inductive load Storage time Fall time	V_{CL} = 250 V $V_{BE(off)}$ = -5 V I_C = 7.5 A $I_{B(on)}$ = 1.5 A $I_{B(off)}$ = -3 A		1.8 30		µs ns

1. Pulsed duration = 300 µs, duty cycle ≤ 1.5 %

2.1 Electrical characteristic (curves)

Figure 2. Safe operating area

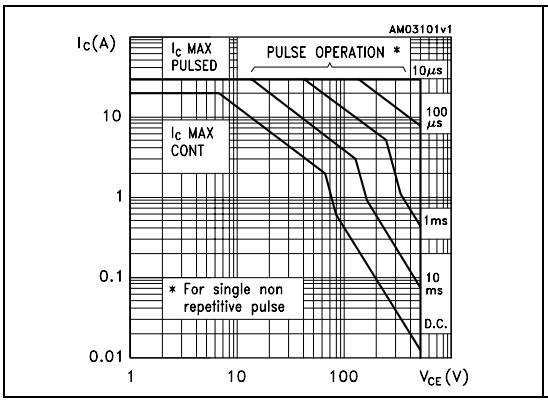


Figure 3. Derating curve

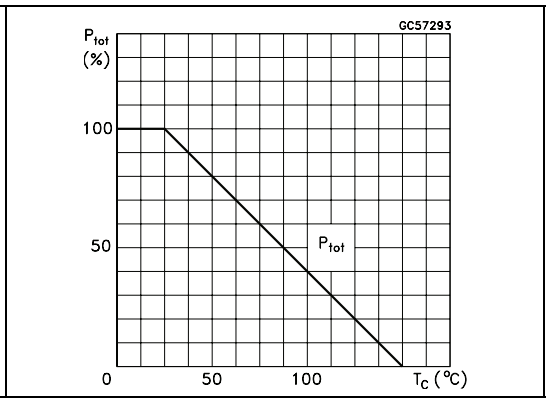


Figure 4. Reverse biased safe operating area

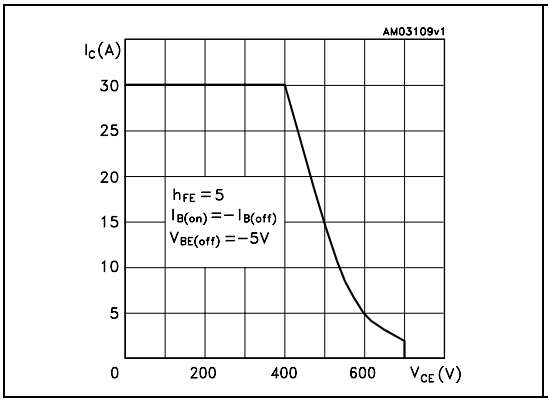


Figure 5. Output characteristics

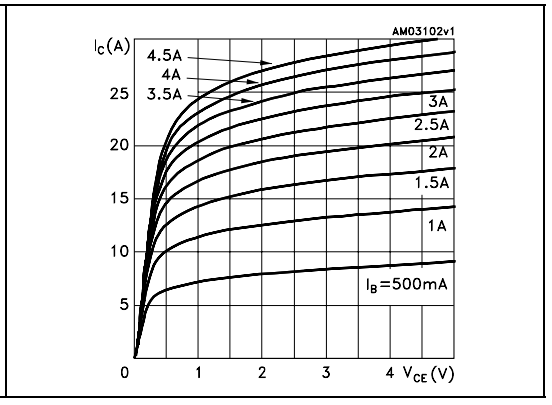


Figure 6. DC current gain (V_{CE} = 1 V)

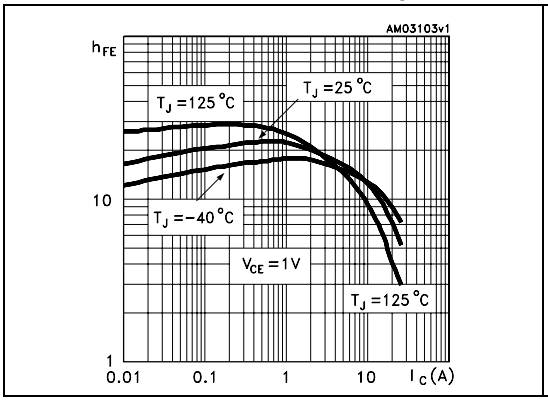


Figure 7. DC current gain (V_{CE} = 5 V)