

High voltage fast-switching NPN power transistor

Features

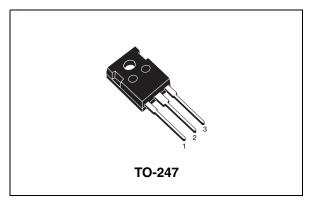
- High voltage capability
- High DC current gain
- Minimum lot to lot spread for reliable operation

Application

Switching mode power supplies

Description

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





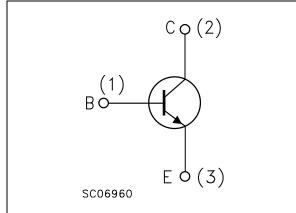


Table 1.	Device summary
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Order code	Marking	Package	Packaging
STW2040	W2040	TO-247	Tube

1 Absolute maximum ratings

Table 2.	Absolute maximum ratings	
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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
۱ _C	Collector current	20	А
I _{CM}	Collector peak current	30	А
Ι _Β	Base current	7	Α
I _{BM}	Base peak current	10	А
P _{TOT}	Total dissipation at $T_c = 25 \ ^{\circ}C$	125	W
T _{stg}	Storage temperature	-65 to 150	°C
TJ	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.	Тур.	Max.	Unit
ICES	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			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		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	$\begin{split} V_{CL} &= 250 \text{ V} \\ V_{BE(off)} &= -5 \text{ V} I_C = 7.5 \text{ A} \\ I_{B(on)} &= 1.5 \text{ A} \\ I_{B(off)} &= -3 \text{ A} \end{split}$		1.8 30		µs ns

1. Pulsed duration = 300 μ s, duty cycle \leq 1.5 %



GC57293

T_c (°C)

2.1 Electrical characteristic (curves)

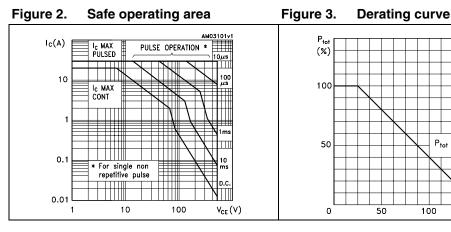
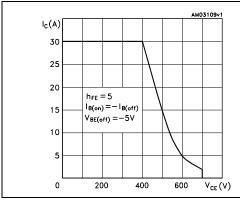
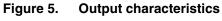


Figure 4. Reverse biased safe operating area





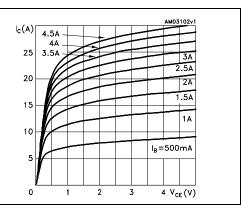
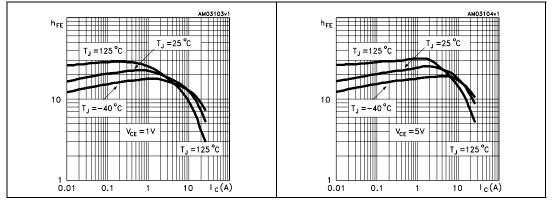


Figure 6. DC current gain ($V_{CE} = 1 V$) Figure 7. DC current gain ($V_{CE} = 5 V$)





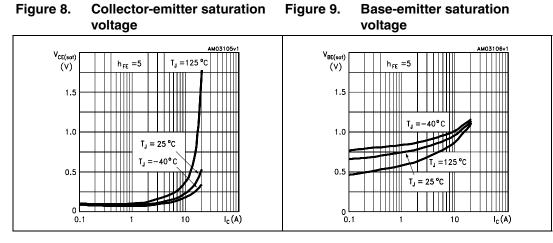
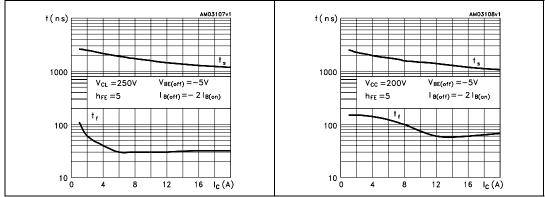
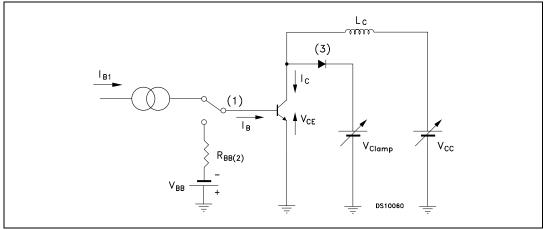


Figure 10. Inductive load switching time Figure 11. Resistive load switching time



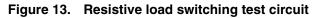
2.2 Test circuits

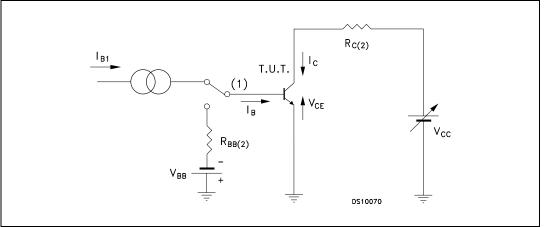
Figure 12. Inductive load switching test circuit



- 1. Fast electronic switch
- 2. Non-inductive resistor
- 3. Fast recovery rectifier







- 1. Fast electronic switch
- 2. Non-inductive resistor



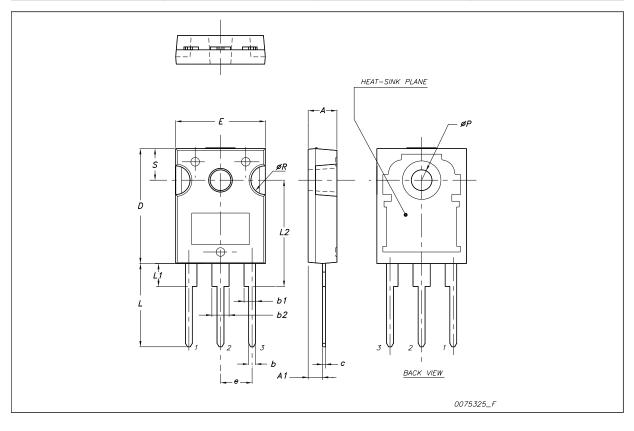
3 Package mechanical data

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TO-247 mechanical data

Dim		mm.	
	Min.	Тур.	Max.
А	4.85		5.15
A1	2.20		2.60
b	1.0		1.40
b1	2.0		2.40
b2	3.0		3.40
С	0.40		0.80
D	19.85		20.15
E	15.45		15.75
е		5.45	
L	14.20		14.80
L1	3.70		4.30
L2		18.50	
øP	3.55		3.65
øR	4.50		5.50
S		5.50	







4 Revision history

Table 5.Document revision history

Date	Revision	Changes	
07-Nov-2008	1	Initial release.	
10-Jun-2009	2	Document status promoted from preliminary data to datasheet.	



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