Ordering number : EN3196A

SANYO Semiconductors
DATA SHEET

2SD2176 — NPN Epitaxial Planar Silicon Transistor
Motor Driver Applications

Features

- Darlington connection.
- On-chip Zener diode of 60±10V between collector and base.
- High inductive load handling capability.
- Small-sized package.

Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}	On-chip Zener diode (60±10V)	50	V
Collector-to-Emitter Voltage	V_{CEO}	On-chip Zener diode (60±10V)	50	V
Emitter-to-Base Voltage	V_{EBO}		6	V
Collector Current	I_C		1.2	A
Collector Current (Pulse)	I_{CP}		2.5	A
Base Current	I_B		0.2	A
Collector Dissipation	P_C	Mounted on a ceramic board (250mm²×0.8mm)	1.3	W
Junction Temperature	Tj		150	°C
Storage Temperature	Tstg		−55 to +150	°C

Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=40V, I_E=0A			10	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=5V, I_C=0A			2	mA
DC Current Gain	h_{FE}	V_{CE}=3V, I_C=500mA	1000		20000	
Collector-to-Emitter Saturation Voltage	V_{CE}(sat)	I_C=500mA, I_B=1mA		1.0	1.5	V
Base-to-Emitter Saturation Voltage	V_{BE}(sat)	I_C=500mA, I_B=1mA		1.5	2	V

Marking : DQ

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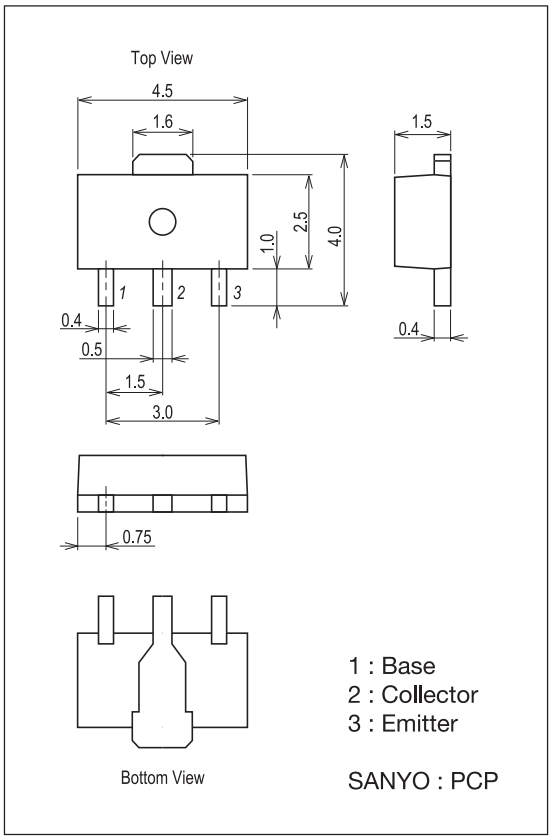
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=100μA, I_E=0A	50		70	V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=1mA, R_{BE}=∞	50		70	V
Inductive Load Handling Capability	Es/b	L=300mH, R_{BE}=100Ω	15			mJ

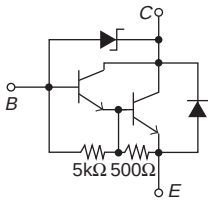
Package Dimensions

unit : mm (typ)

7007B-004

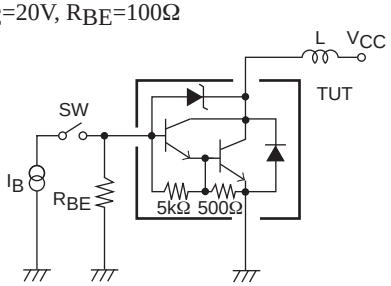


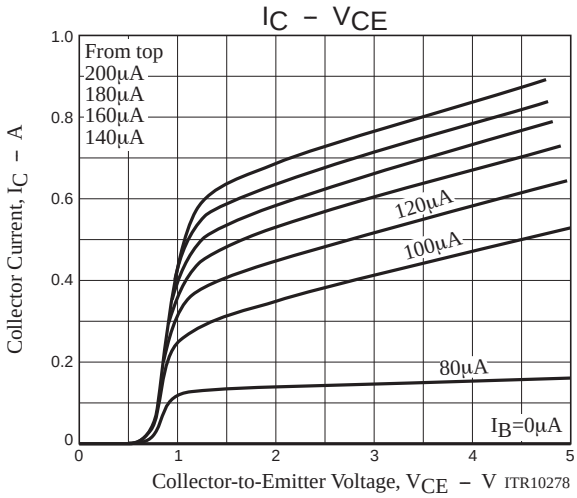
Electrical Connection

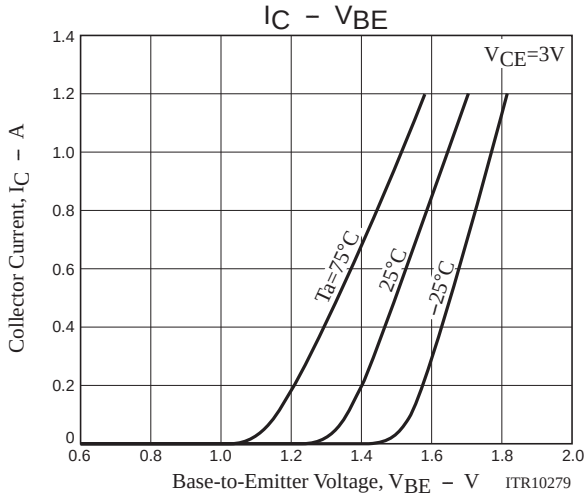


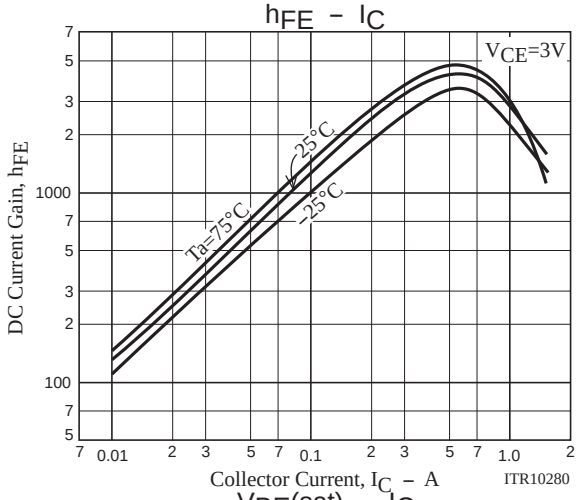
Es/b Test Circuit

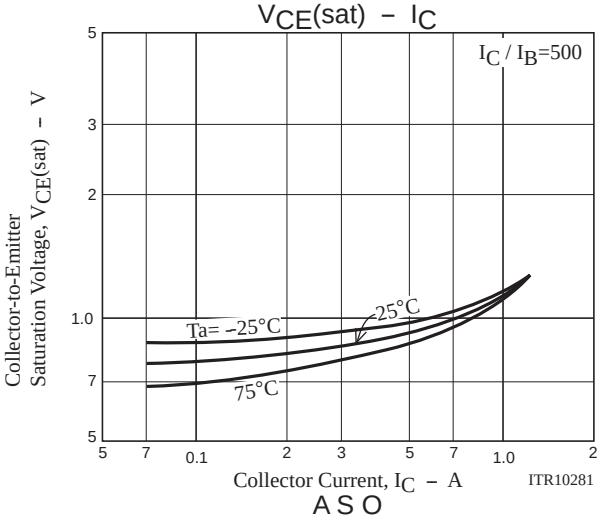
V_{CC}=20V, R_{BE}=100Ω

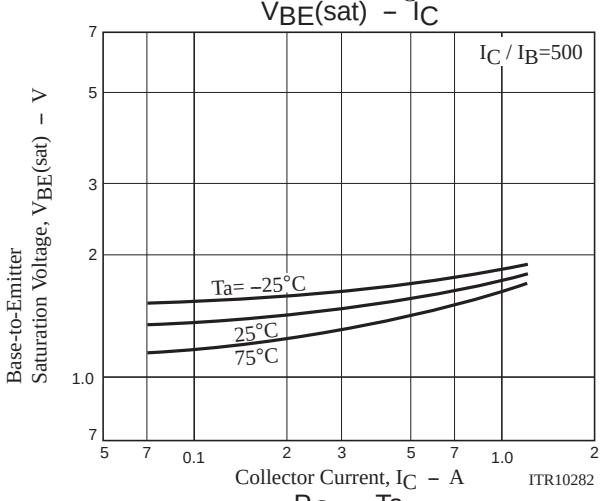


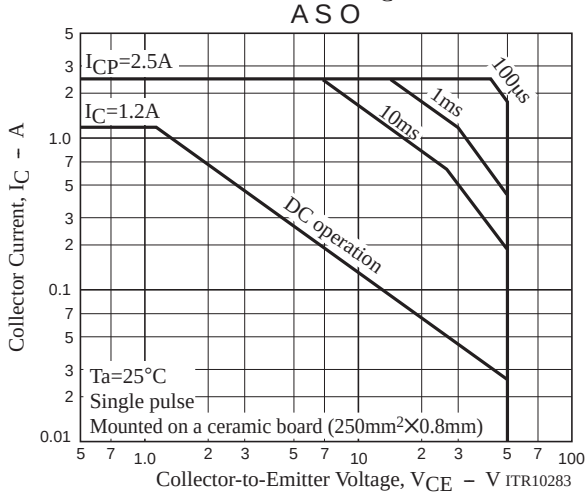

IC – VCE
From top
200μA
180μA
160μA
140μA
120μA
100μA
80μA
IB=0μA
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
ITR10278

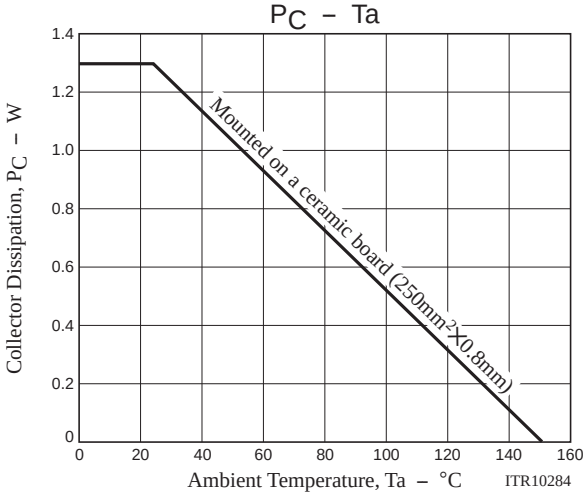

IC – VBE
VCE=3V
Ta=75°C
25°C
–25°C
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V
ITR10279


hFE – IC
VCE=3V
Ta=75°C
25°C
–25°C
DC Current Gain, hFE
Collector Current, IC – A
ITR10280


VCE(sat) – IC
IC / IB=500
Ta= –25°C
25°C
75°C
Collector-to-Emitter
Saturation Voltage, VCE(sat) – V
Collector Current, IC – A
ITR10281


VBE(sat) – IC
IC / IB=500
Ta= –25°C
25°C
75°C
Base-to-Emitter
Saturation Voltage, VBE(sat) – V
Collector Current, IC – A
ITR10282


A S O
ICP=2.5A
IC=1.2A
100μs
1ms
10ms
DC operation
Ta=25°C
Single pulse
Mounted on a ceramic board (250mm2×0.8mm)
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
ITR10283


PC – Ta
Mounted on a ceramic board (250mm2×0.8mm)
Collector Dissipation, PC – W
Ambient Temperature, Ta – °C
ITR10284