2SD1838 — NPN Triple Diffused Planar Silicon Darlington Transistor
Driver Applications

Applications

- Suitable for use in switching of L load (motor drivers, printer hammer drivers, relay drivers).

Features

- High DC current gain.
- Large current capacity.
- Wide ASO.
- On-chip Zener diode of 60±10V between collector and base.
- Uniformity in collector-to-base breakdown voltage due to adoption of accurate impurity diffusion process.
- High inductive load handling capability.
- Micaless package facilitating mounting.

Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		50*	V
Collector-to-Emitter Voltage	V_{CEO}		50*	V
Emitter-to-Base Voltage	V_{EBO}		6	V
Collector Current	I_C		5	A
Collector Current (Pulse)	I_{CP}		8	A
Base Current	I_B		0.5	A
Collector Dissipation	P_C		2.0	W
		Tc=25°C	25	W
Junction Temperature	Tj		150	°C
Storage Temperature	Tstg		-55 to +150	°C

* : With Zener diode of (60±10V).

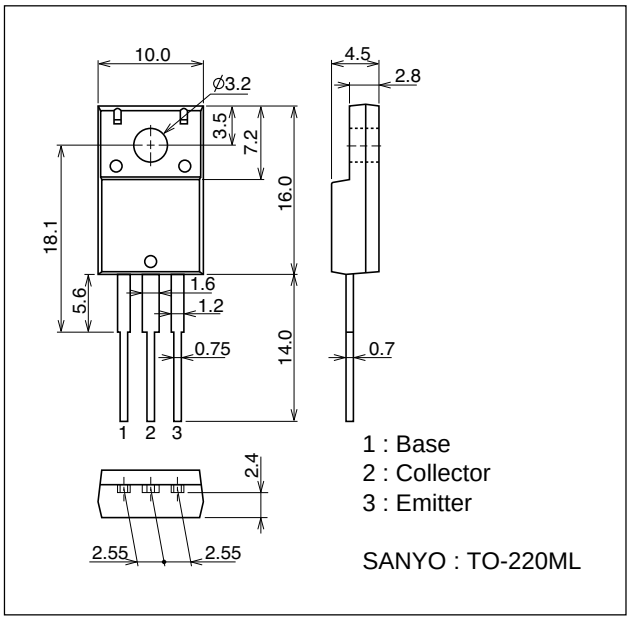
Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=40V, I_E=0A			100	μA
Emitter Cutoff Current	I_{EBO}	V_{BE}=5V, I_C=0A			3	mA
DC Current Gain	h_{FE}	V_{CE}=3V, I_C=2.5A	1000	4000		
Gain-Bandwidth Product	f_T	V_{CE}=5V, I_C=2.5A		20		MHz
Collector-to-Emitter Saturation Voltage	V_{CE}(sat)	I_C=2.5A, I_B=5mA		0.9	1.5	V
Base-to-Emitter Saturation Voltage	V_{BE}(sat)	I_C=2.5A, I_B=5mA			2.0	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=5mA, I_E=0A	50	60	70	V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=50mA, R_{BE}=∞	50	60	70	V
Inductive Load Handling Capability	Es/b	L=100mH, R_{BE}=100Ω	50			mJ
Turn-ON Time	t_{on}	See specified Test Circuit. V_{CC}=200V, I_C=3.0A, I_{B1}=−I_{B2}=6mA		0.6		μs
Storage Time	t_{stg}	See specified Test Circuit. V_{CC}=200V, I_C=3.0A, I_{B1}=−I_{B2}=6mA		4.0		μs
Fall Time	t_f	See specified Test Circuit. V_{CC}=200V, I_C=3.0A, I_{B1}=−I_{B2}=6mA		1.5		μs

Package Dimensions

unit : mm (typ)

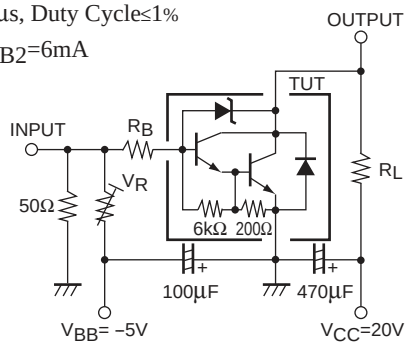
7508-002



Specified Test Circuit

PW=50μs, Duty Cycle≤1%

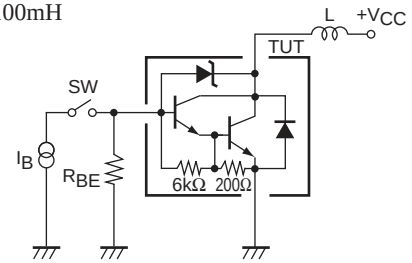
I_{B1}= −I_{B2}=6mA

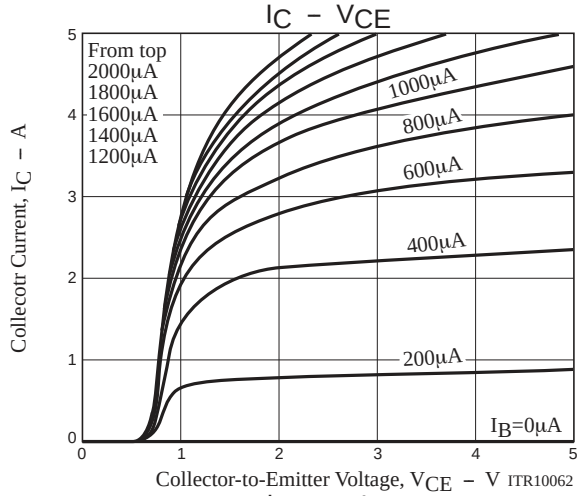


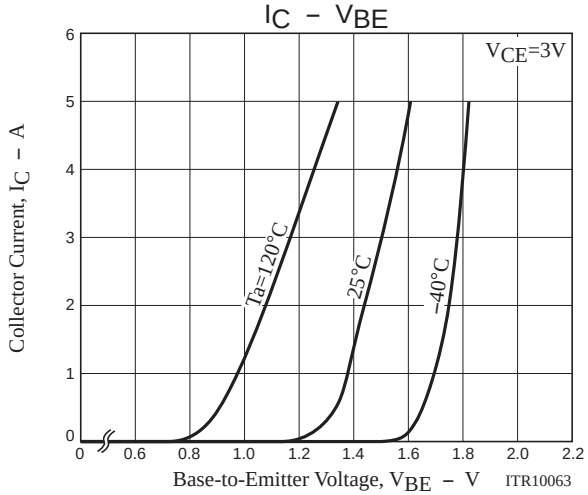
Es/b Test Circuit

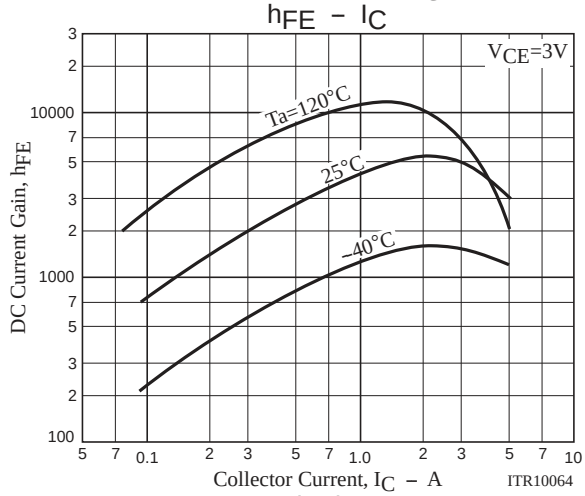
V_{CC}=20V, R_{BE}=100Ω

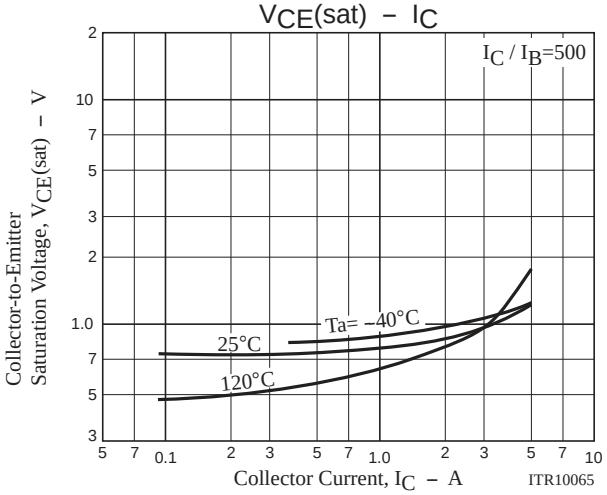
L=100mH

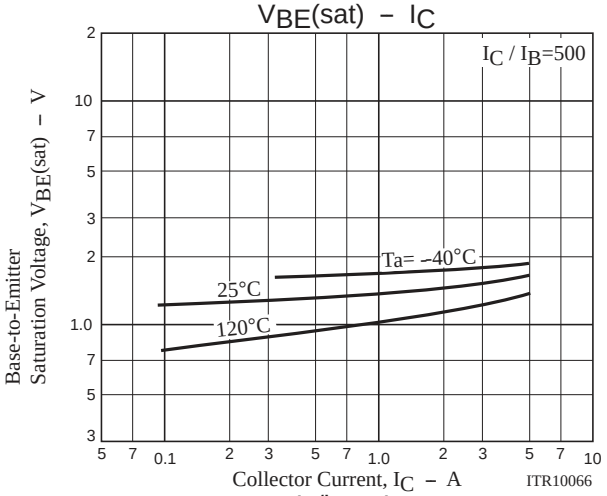


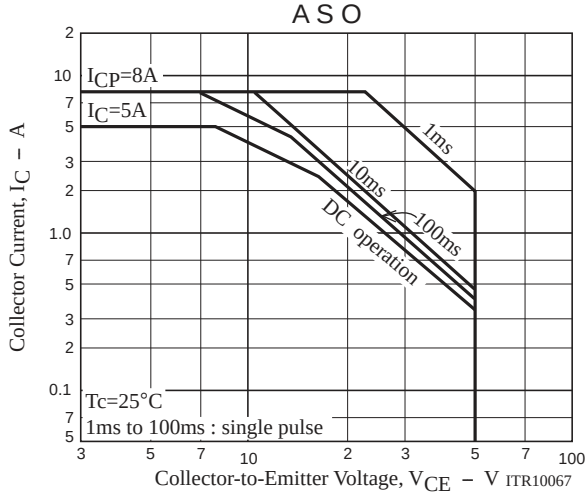

IC – VCE
From top
2000μA
1800μA
1600μA
1400μA
1200μA
1000μA
800μA
600μA
400μA
200μA
IB=0μA
Collecotr Current, IC – A
Collector-to-Emitter Voltage, VCE – V
ITR10062

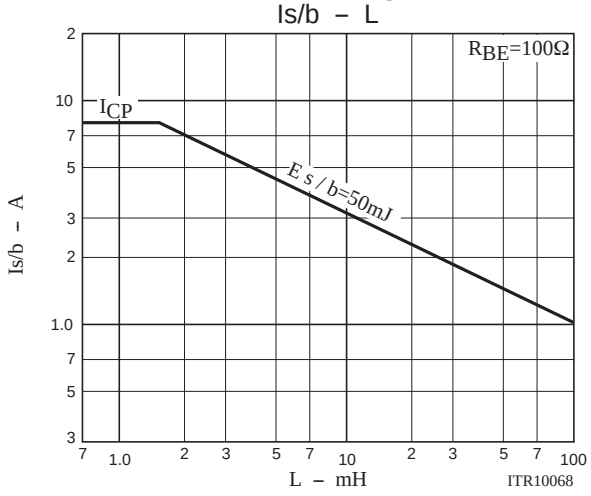

IC – VBE
VCE=3V
Ta=120°C
25°C
–40°C
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V
ITR10063

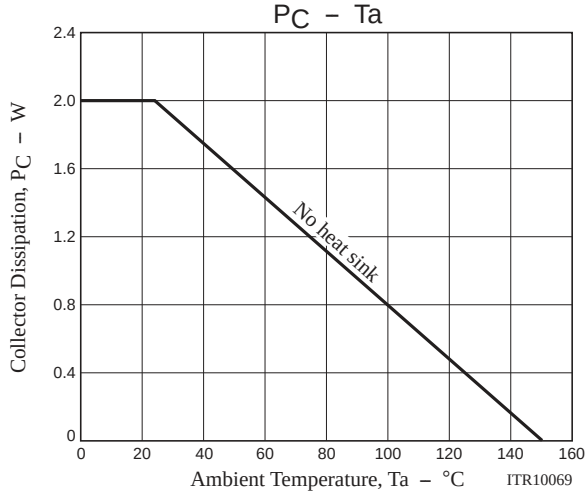

hFE – IC
VCE=3V
Ta=120°C
25°C
–40°C
DC Current Gain, hFE
Collector Current, IC – A
ITR10064


VCE(sat) – IC
IC / IB=500
Ta= –40°C
25°C
120°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – V
Collector Current, IC – A
ITR10065


VBE(sat) – IC
IC / IB=500
Ta= –40°C
25°C
120°C
Base-to-Emitter Saturation Voltage, VBE(sat) – V
Collector Current, IC – A
ITR10066


A S O
ICP=8A
IC=5A
1ms
10ms
100ms
DC operation
Tc=25°C
1ms to 100ms : single pulse
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
ITR10067


Is/b – L
RBE=100Ω
ICP
E s / b=50mJ
Is/b – A
L – mH
ITR10068


PC – Ta
No heat sink
Collector Dissipation, PC – W
Ambient Temperature, Ta – °C
ITR10069