

TOSHIBA Transistor Silicon NPN Triple Diffused Type (PCT process)

2SC3138

High Voltage Amplifier Applications

High Voltage Switching Applications

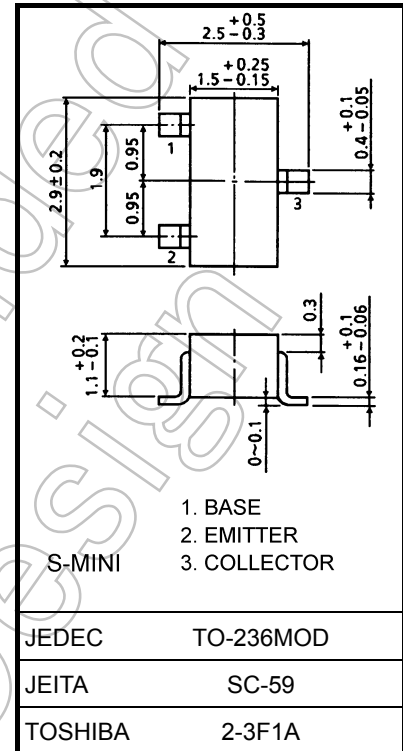
- High voltage: $V_{CBO} = 200\text{ V (max)}$
 $V_{CEO} = 200\text{ V (max)}$
- Small flat package
- Complementary to 2SA1255

Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Characteristics	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	200	V
Collector-emitter voltage	V_{CEO}	200	V
Emitter-base voltage	V_{EBO}	5	V
Collector current	I_C	50	mA
Base current	I_B	20	mA
Collector power dissipation	P_C	150	mW
Junction temperature	T_j	125	$^\circ\text{C}$
Storage temperature range	T_{stg}	-55 to 125	$^\circ\text{C}$

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings. Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

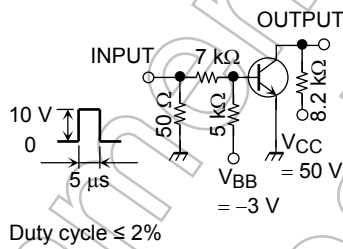
Unit: mm



Weight: 0.012 g (typ.)

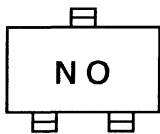
Start of commercial production
1982-10

Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	$V_{CB} = 200\text{ V}, I_E = 0$	—	—	0.1	μA
Emitter cut-off current		I_{EBO}	$V_{EB} = 5\text{ V}, I_C = 0$	—	—	0.1	μA
Collector-base breakdown voltage		$V_{(BR) CBO}$	$I_C = 0.1\text{ mA}, I_E = 0$	200	—	—	V
Collector-emitter breakdown voltage		$V_{(BR) CEO}$	$I_C = 1\text{ mA}, I_B = 0$	200	—	—	V
DC current gain		h_{FE} (Note)	$V_{CE} = 3\text{ V}, I_C = 10\text{ mA}$	70	—	240	—
Collector-emitter saturation voltage		$V_{CE(sat)}$	$I_C = 10\text{ mA}, I_B = 1\text{ mA}$	—	0.1	0.5	V
Base-emitter saturation voltage		$V_{BE(sat)}$	$I_C = 10\text{ mA}, I_B = 1\text{ mA}$	—	0.75	1.5	V
Transition frequency		f_T	$V_{CE} = 10\text{ V}, I_C = 2\text{ mA}$	50	100	—	MHz
Collector output capacitance		C_{ob}	$V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	2	4	pF
Switching time	Turn-on time	t_{on}	 <p>Duty cycle $\leq 2\%$</p>	—	0.3	—	μs
	Storage time	t_{stg}		—	2	—	
	Fall time	t_f		—	0.4	—	

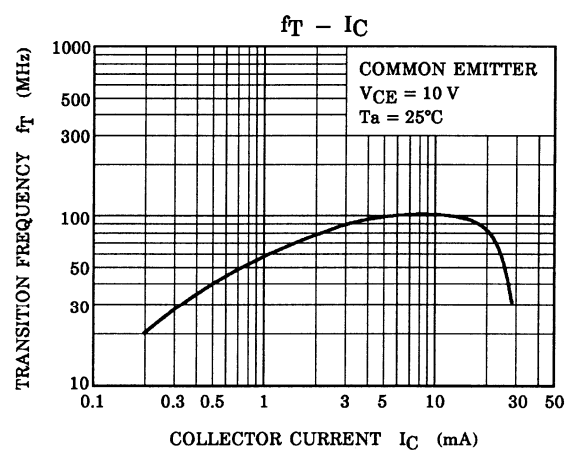
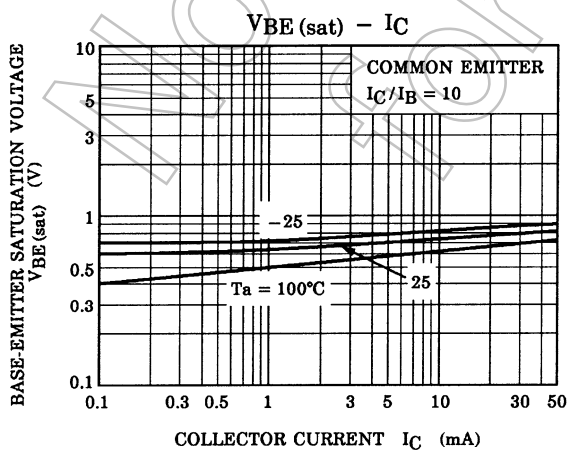
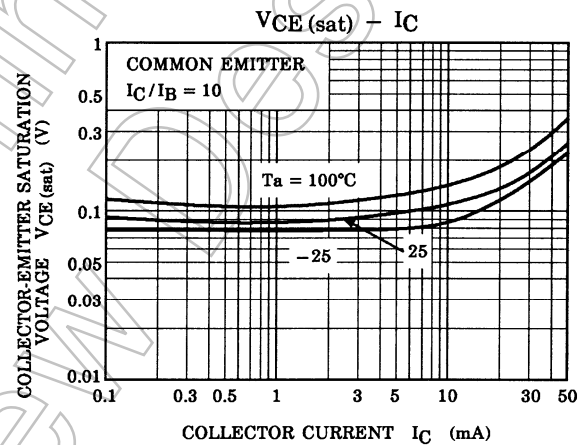
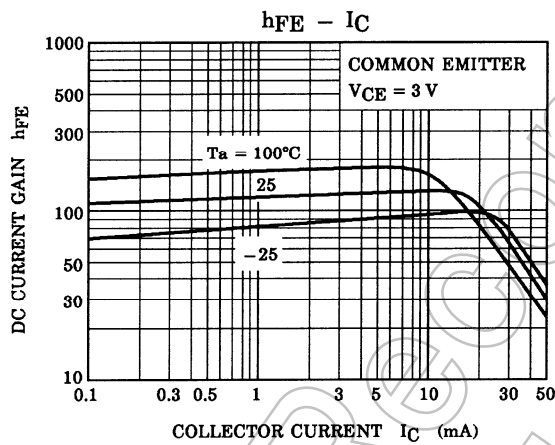
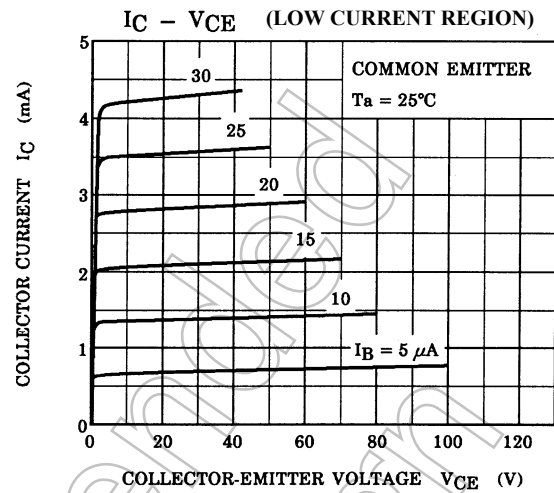
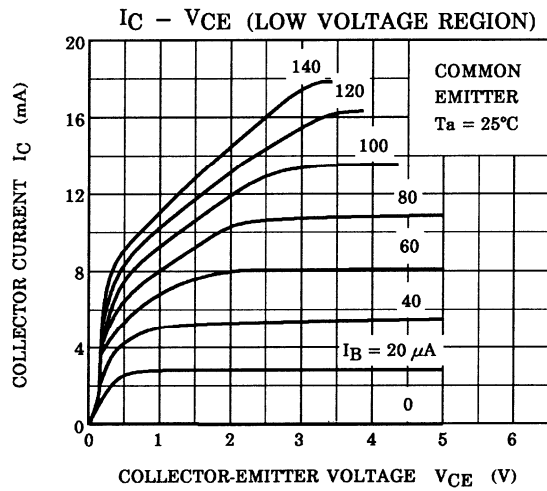
Note: h_{FE} classification O: 70 to 140, Y: 120 to 240

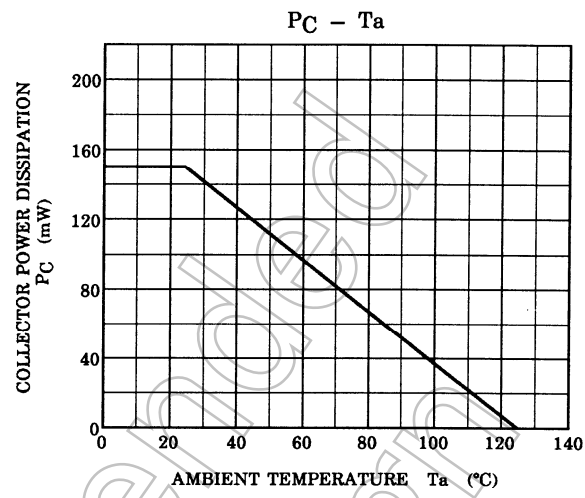
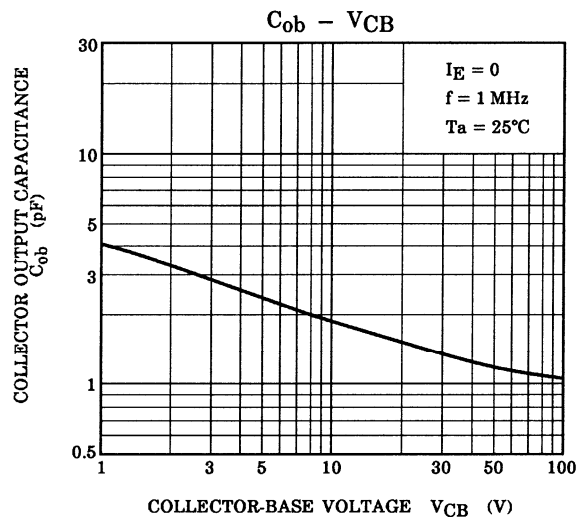
Marking



N: Type Name

O: h_{FE} Rank





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