

TOSHIBA Transistor Silicon NPN Triple Diffused Type (PCT process)

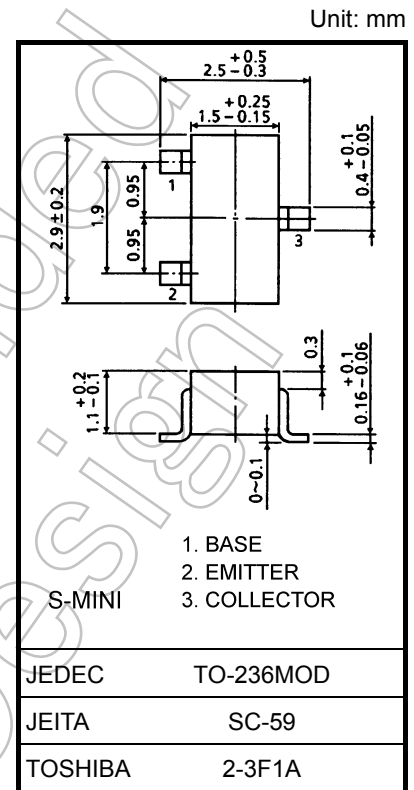
# 2SC3138

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 (Ta = 25°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	°C
Storage temperature range	$T_{stg}$	-55 to 125	°C



Weight: 0.012 g (typ.)

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).

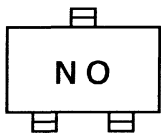
Start of commercial production  
1982-10

**Electrical Characteristics (Ta = 25°C)**

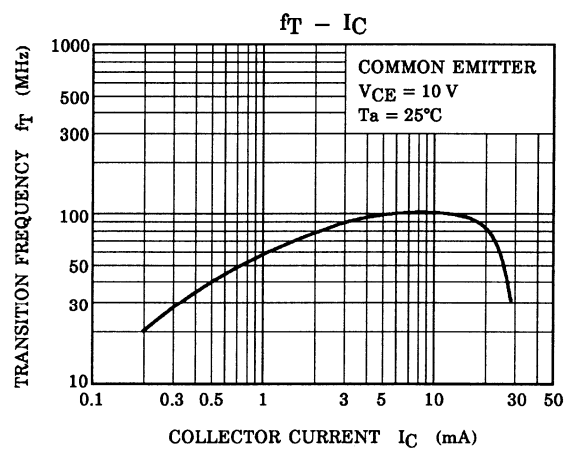
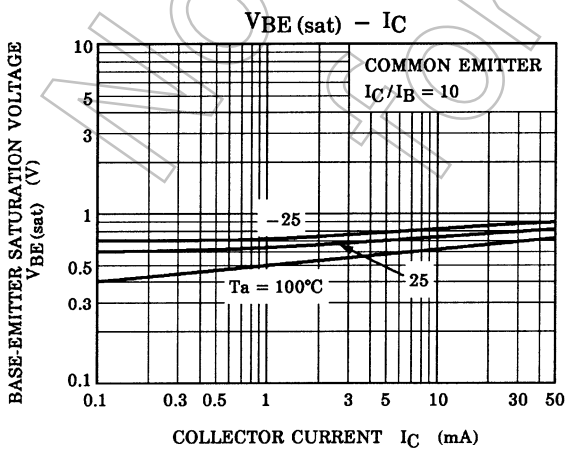
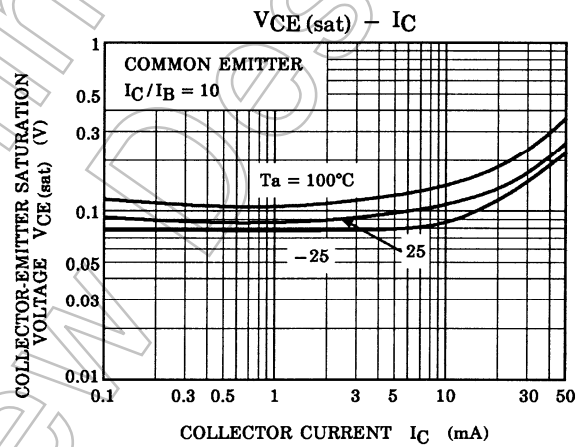
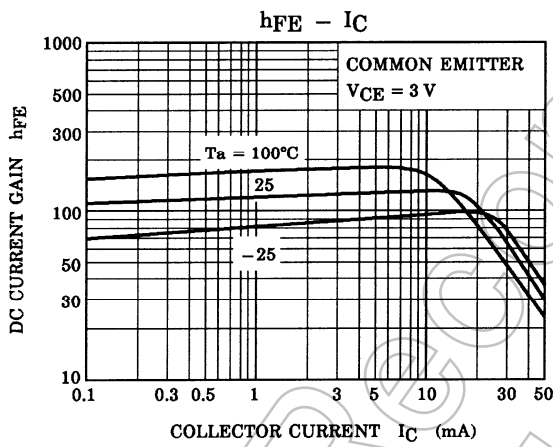
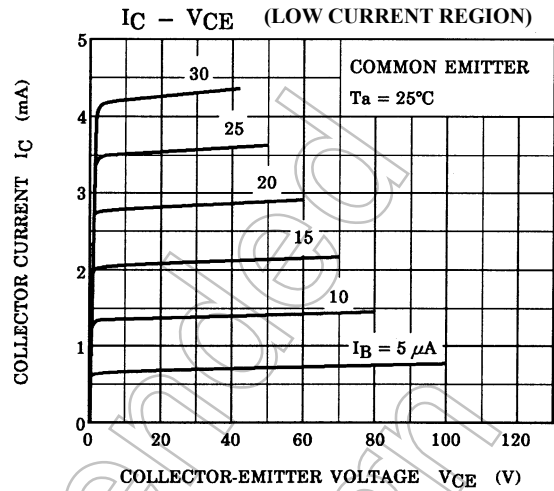
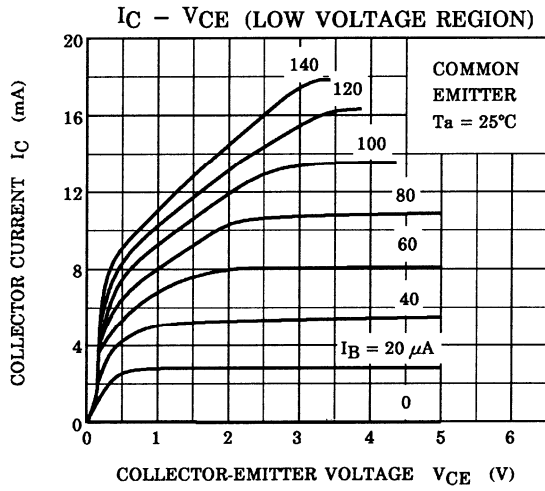
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		$I_{CBO}$	$V_{CB} = 200\text{ V}, I_E = 0$	—	—	0.1	$\mu\text{A}$
Emitter cut-off current		$I_{EBO}$	$V_{EB} = 5\text{ V}, I_C = 0$	—	—	0.1	$\mu\text{A}$
Collector-base breakdown voltage		$V_{(BR)CBO}$	$I_C = 0.1\text{ mA}, I_E = 0$	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 <math>\leq 2\%</math></p>	—	0.3	—	$\mu\text{s}$
	Storage time	$t_{stg}$		—	2	—	
	Fall time	$t_f$		—	0.4	—	

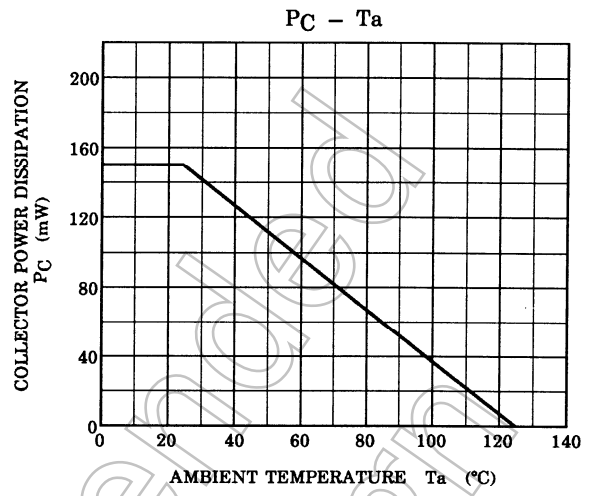
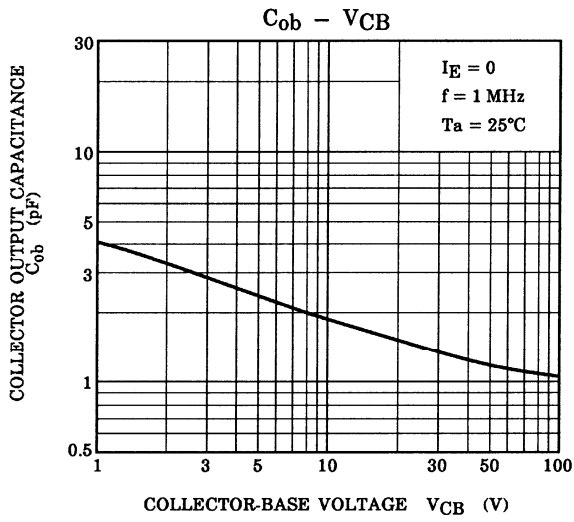
Note:  $h_{FE}$  classification O: 70 to 140, Y: 120 to 240

**Marking**



N: Type Name  
O:  $h_{FE}$  Rank





Not Recommended for New Designs

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