

TOSHIBA Transistor Silicon NPN Triple Diffused Type

# 2SD2440

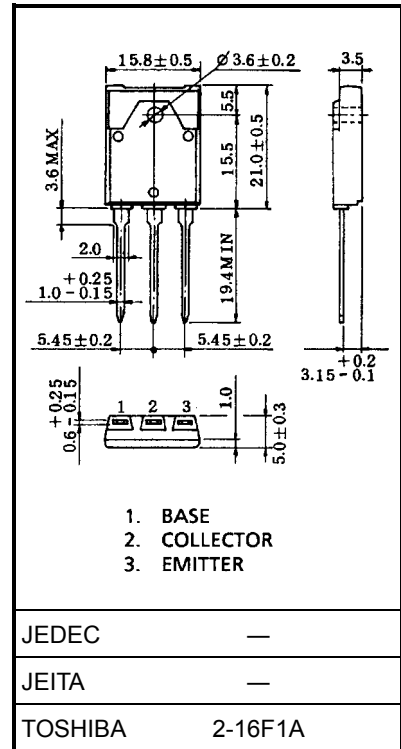
## Switching Application

- High breakdown voltage:  $V_{CBO} = 100\text{ V}$   
:  $V_{EBO} = 18\text{ V}$
- Low saturation voltage:  $V_{CE(sat)} = 1.2\text{ V (max)}$  ( $I_C = 5\text{ A}$ ,  $I_B = 1\text{ A}$ )
- High speed:  $t_f = 1\text{ }\mu\text{s (typ.)}$  ( $I_C = 5\text{ A}$ ,  $I_B = \pm 0.5\text{ A}$ )
- High DC current gain:  $h_{FE} = 200\text{ (min)}$  ( $V_{CE} = 5\text{ V}$ ,  $I_C = 0.5\text{ A}$ )

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

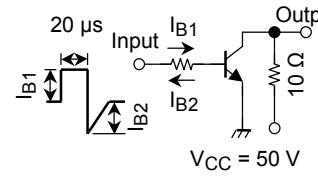
Characteristics		Symbol	Rating	Unit
Collector-base voltage		$V_{CBO}$	100	V
Collector-emitter voltage		$V_{CEO}$	60	V
Emitter-base voltage		$V_{EBO}$	18	V
Collector current	DC	$I_C$	6	A
	Pulse	$I_{CP}$	12	
Base current		$I_B$	2	A
Collector power dissipation ( $T_c = 25^\circ\text{C}$ )		$P_C$	40	W
Junction temperature		$T_j$	150	$^\circ\text{C}$
Storage temperature range		$T_{stg}$	-55 to 150	$^\circ\text{C}$

Unit: mm



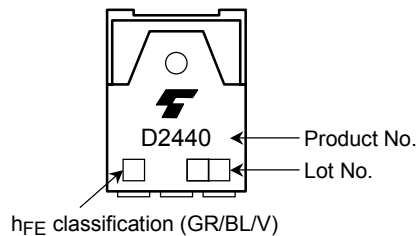
Weight: 5.8 g (typ.)

## Electrical Characteristics (Ta = 25°C)

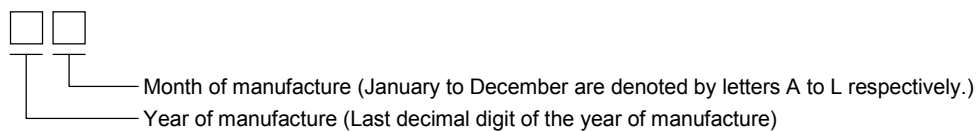
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		$I_{CBO}$	$V_{CB} = 100\text{ V}, I_E = 0$	—	—	10	$\mu\text{A}$
Collector cut-off current		$I_{CER}$	$V_{CE} = 80\text{ V}, R_{BE} = 50\ \Omega$	—	—	5	$\text{mA}$
Emitter cut-off current		$I_{EBO}$	$V_{EB} = 15\text{ V}, I_C = 0$	—	—	2	$\mu\text{A}$
Collector-emitter breakdown voltage		$V_{(BR)CEO}$	$I_C = 50\text{ mA}, I_B = 0$	60	—	—	$\text{V}$
DC current gain	$h_{FE(1)}$ (Note)		$V_{CE} = 5\text{ V}, I_C = 0.5\text{ A}$	200	—	900	
	$h_{FE(2)}$		$V_{CE} = 5\text{ V}, I_C = 5\text{ A}$	20	—	100	
Collector-emitter saturation voltage		$V_{CE(sat)}$	$I_C = 5\text{ A}, I_B = 1\text{ A}$	—	—	1.2	$\text{V}$
Base-emitter saturation voltage		$V_{BE(sat)}$	$I_C = 5\text{ A}, I_B = 1\text{ A}$	—	—	2.5	$\text{V}$
Transition frequency		$f_T$	$V_{CE} = 10\text{ V}, I_C = 0.5\text{ A}$	—	5	—	$\text{MHz}$
Collector output capacitance		$C_{ob}$	$V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	71	—	$\text{pF}$
Switching time	Turn-on time	$t_{on}$	 <p><math>I_{B1} = -I_{B2} = 0.5\text{ A}, \text{ duty cycle} \leq 1\%</math></p>	—	1	2	$\mu\text{s}$
	Storage time	$t_{stg}$		—	2	4	
	Fall time	$t_f$		—	1	3	

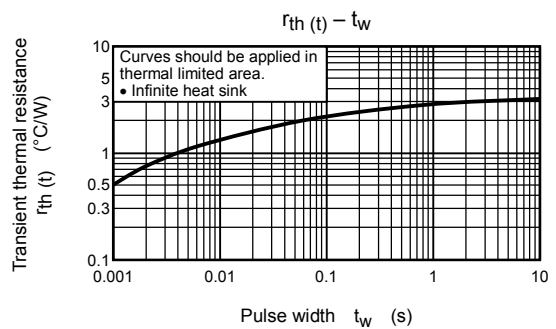
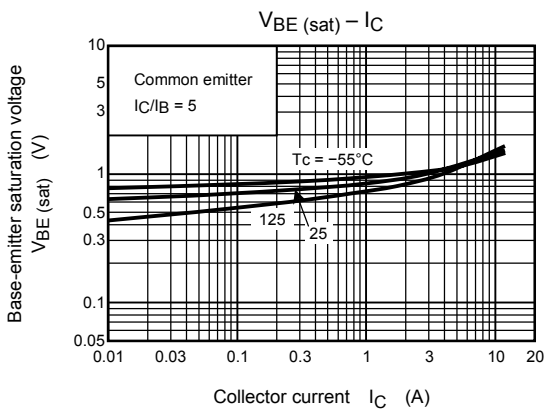
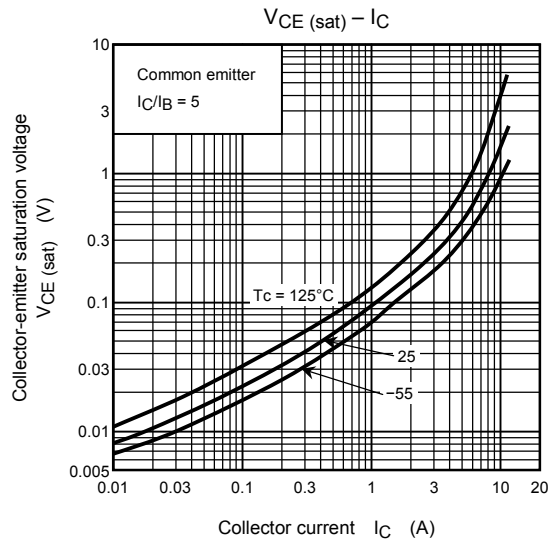
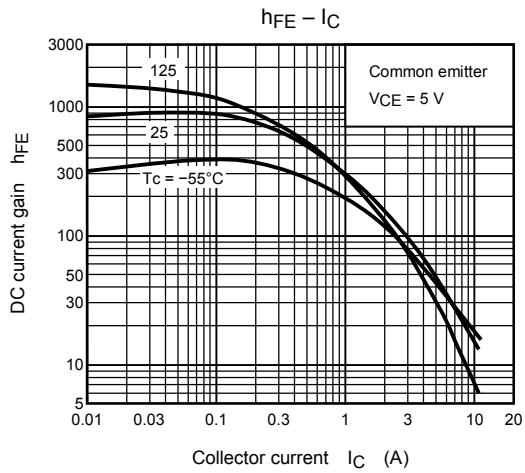
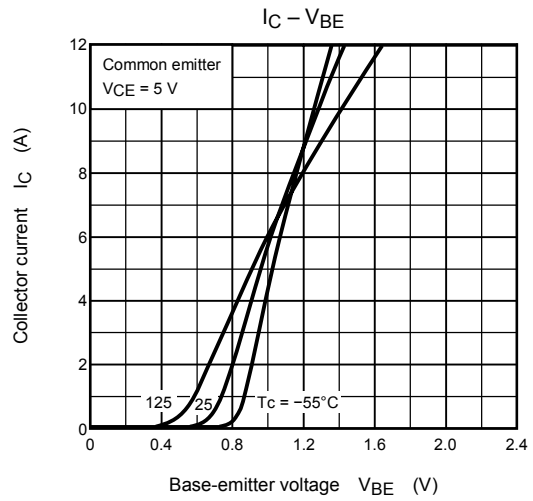
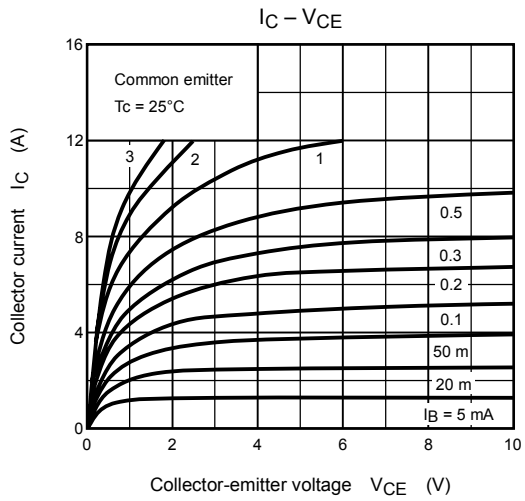
Note:  $h_{FE(1)}$  classification GR: 200 to 400, BL: 300 to 600, V: 450 to 900

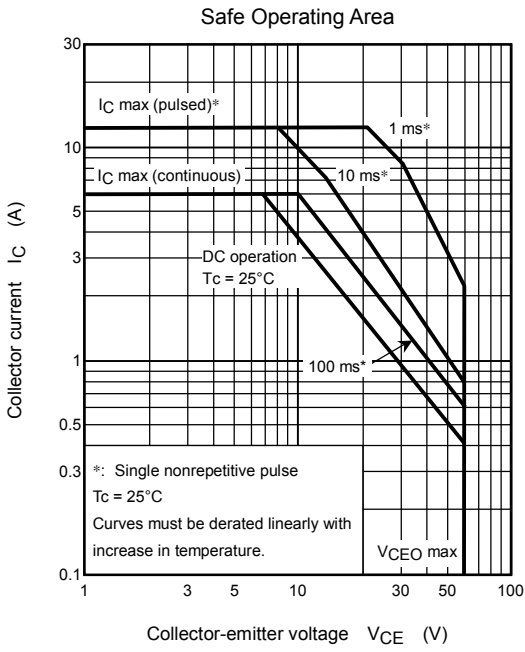
## Marking



## Explanation of Lot No.







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