

GENERAL PURPOSE APPLICATION.  
SWITCHING APPLICATION.

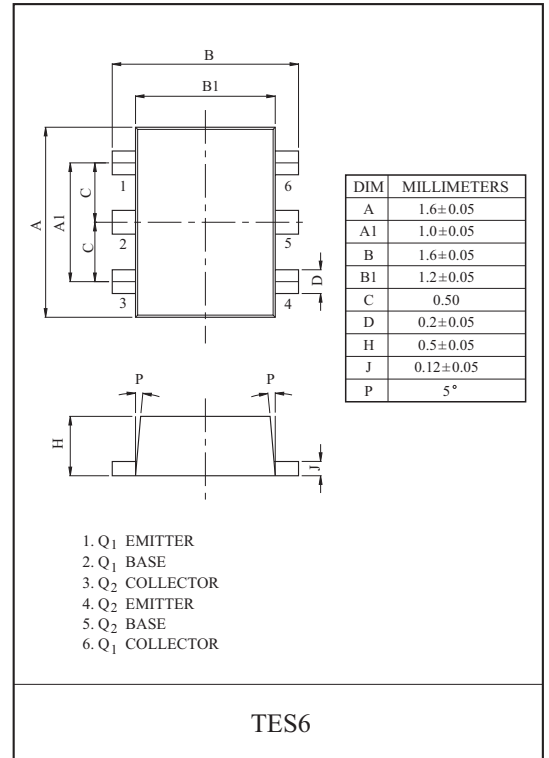
### FEATURES

- Low Leakage Current  
:  $I_{CEX} = -50\text{nA}(\text{Max.})$ ,  $I_{BL} = -50\text{nA}(\text{Max.})$   
@  $V_{CE} = -30\text{V}$ ,  $V_{EB} = -3\text{V}$ .
- Excellent DC Current Gain Linearity.
- Low Saturation Voltage  
:  $V_{CE(\text{sat})} = -0.4\text{V}(\text{Max.})$  @  $I_C = -50\text{mA}$ ,  $I_B = -5\text{mA}$ .
- Low Collector Output Capacitance  
:  $C_{ob} = 4.5\text{pF}(\text{Max.})$  @  $V_{CB} = 5\text{V}$ .

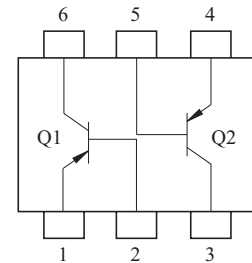
### MAXIMUM RATING (Ta=25 °C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Base Voltage	$V_{CBO}$	-40	V
Collector-Emitter Voltage	$V_{CEO}$	-40	V
Emitter-Base Voltage	$V_{EBO}$	-5	V
Collector Current	$I_C$	-200	mA
Base Current	$I_B$	-50	mA
Collector Power Dissipation	$P_C$	200	mW
Junction Temperature	$T_j$	150	°C
Storage Temperature Range	$T_{stg}$	-55 ~ 150	°C

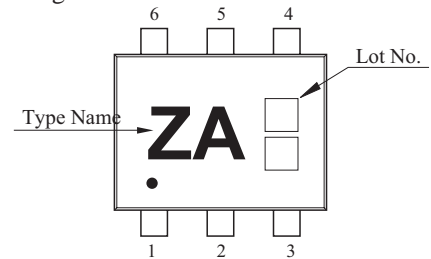
\* Total Rating



### EQUIVALENT CIRCUIT (TOP VIEW)



### Marking



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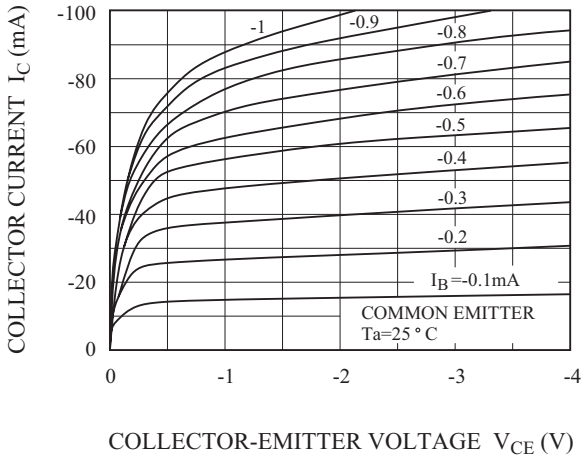
## ELECTRICAL CHARACTERISTICS (Ta=25 °C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current		$I_{CEX}$	$V_{CE}=-30V, V_{EB}=-3V$	-	-	-50	nA
Base Cut-off Current		$I_{BL}$	$V_{CE}=-30V, V_{EB}=-3V$	-	-	-50	nA
Collector-Base Breakdown Voltage		$V_{(BR)CBO}$	$I_C=-10\mu A, I_E=0$	-40	-	-	V
Collector-Emitter Breakdown Voltage *		$V_{(BR)CEO}$	$I_C=-1mA, I_B=0$	-40	-	-	V
Emitter-Base Breakdown Voltage		$V_{(BR)EBO}$	$I_E=-10\mu A, I_C=0$	-5.0	-	-	V
DC Current Gain	*	$h_{FE(1)}$	$V_{CE}=-1V, I_C=-0.1mA$	60	-	-	
		$h_{FE(2)}$	$V_{CE}=-1V, I_C=-1mA$	80	-	-	
		$h_{FE(3)}$	$V_{CE}=-1V, I_C=-10mA$	100	-	300	
		$h_{FE(4)}$	$V_{CE}=-1V, I_C=-50mA$	60	-	-	
		$h_{FE(5)}$	$V_{CE}=-1V, I_C=-100mA$	30	-	-	
Collector-Emitter Saturation Voltage *	*	$V_{CE(sat)1}$	$I_C=-10mA, I_B=-1mA$	-	-	-0.25	V
		$V_{CE(sat)2}$	$I_C=-50mA, I_B=-5mA$	-	-	-0.4	
Base-Emitter Saturation Voltage *	*	$V_{BE(sat)1}$	$I_C=-10mA, I_B=-1mA$	-0.65	-	-0.85	V
		$V_{BE(sat)2}$	$I_C=-50mA, I_B=-5mA$	-	-	-0.95	
Transition Frequency		$f_T$	$V_{CE}=-20V, I_C=-10mA, f=100MHz$	250	-	-	MHz
Collector Output Capacitance		$C_{ob}$	$V_{CB}=-5V, I_E=0, f=1MHz$	-	-	4.5	pF
Input Capacitance		$C_{ib}$	$V_{BE}=-0.5V, I_C=0, f=1MHz$	-	-	10	pF
Input Impedance		$h_{ie}$	$V_{CE}=-10V, I_C=-1mA, f=1kHz$	2.0	-	12	k $\Omega$
Voltage Feedback Ratio		$h_{re}$		1.0	-	10	$\times 10^{-4}$
Small-Signal Current Gain		$h_{fe}$		100	-	400	
Collector Output Admittance		$h_{oe}$		3.0	-	60	$\mu\Omega$
Noise Figure		NF		$V_{CE}=-5V, I_C=-0.1mA,$ $R_g=1k\Omega, f=10Hz \sim 15.7kHz$	-	-	4.0
Switching Time	Delay Time	$t_d$		-	-	35	nS
	Rise Time	$t_r$		-	-	35	
	Storage Time	$t_{stg}$		-	-	225	
	Fall Time	$t_f$		-	-	75	

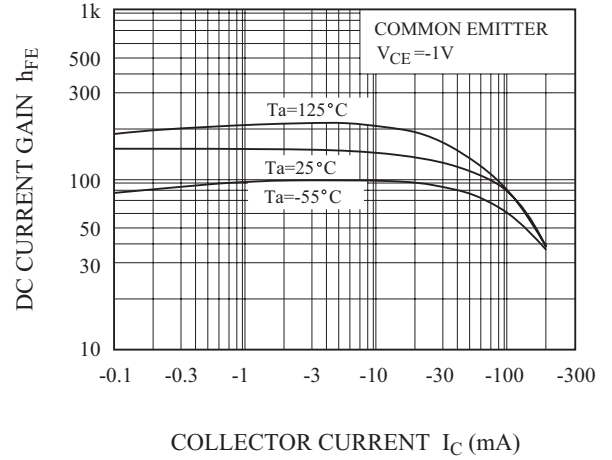
\* Pulse Test : Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .

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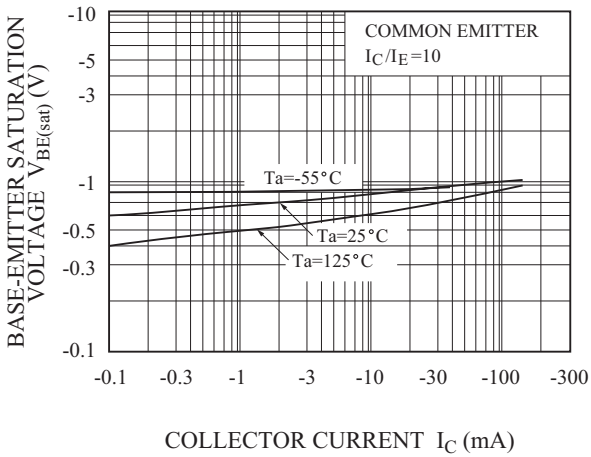
$I_C - V_{CE}$



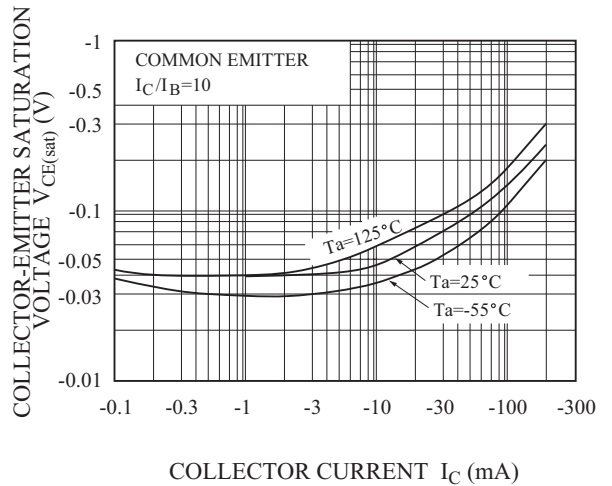
$h_{FE} - I_C$



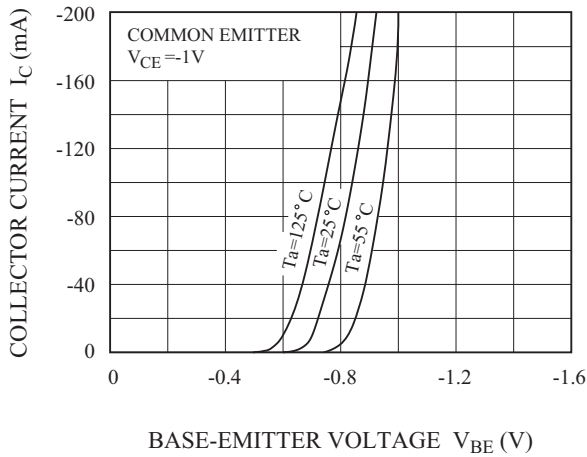
$V_{BE(sat)} - I_C$



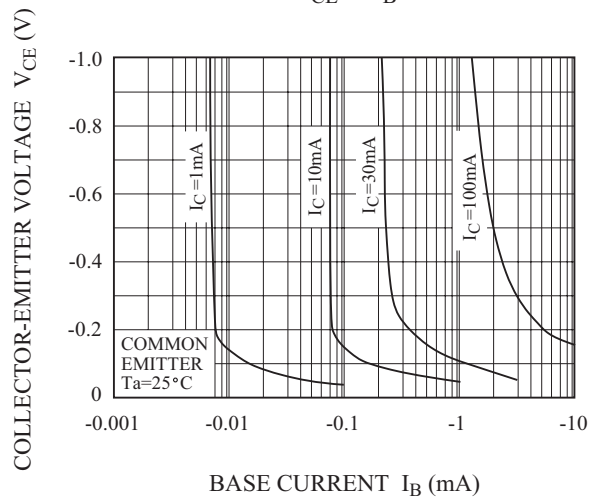
$V_{CE(sat)} - I_C$



$I_C - V_{BE}$

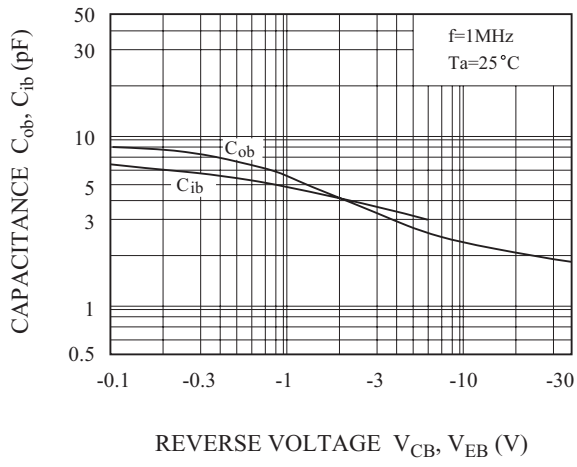


$V_{CE} - I_B$



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$C_{ob} - V_{CB}, C_{ib} - V_{EB}$



$P_c - T_a$

