

GENERAL PURPOSE APPLICATION.
SWITCHING APPLICATION.

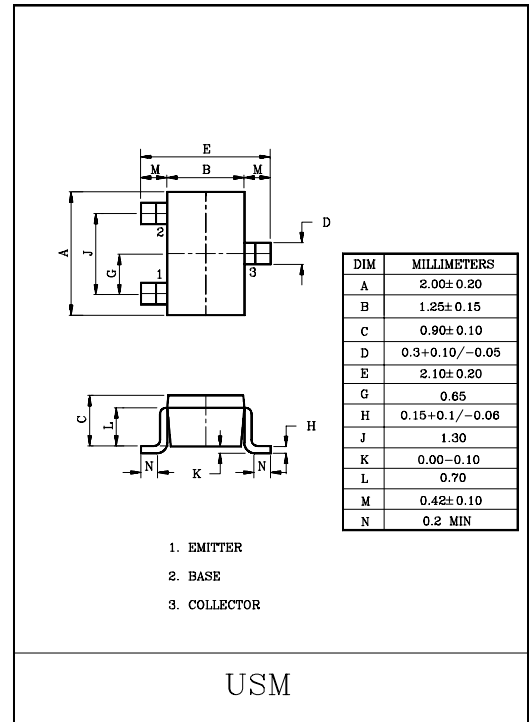
FEATURES

- Low Leakage Current
: $I_{CEX}=50nA(\text{Max.})$, $I_{BL}=50nA(\text{Max.})$
@ $V_{CE}=30V$, $V_{EB}=3V$.
- Excellent DC Current Gain Linearity.
- Low Saturation Voltage
: $V_{CE(sat)}=0.3V(\text{Max.})$ @ $I_C=50mA$, $I_B=5mA$.
- Low Collector Output Capacitance
: $C_{ob}=4pF(\text{Max.})$ @ $V_{CB}=5V$.
- Complementary to 2N3906U.

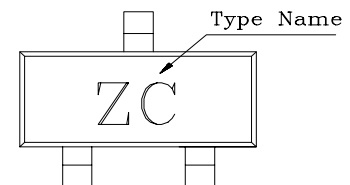
MAXIMUM RATINGS ($T_a=25^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Base Voltage	V_{CBO}	60	V
Collector-Emitter Voltage	V_{CEO}	40	V
Emitter-Base Voltage	V_{EBO}	6	V
Collector Current	I_C	200	mA
Base Current	I_B	50	mA
Collector Power Dissipation	P_C *	100	mW
Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-55~150	$^\circ\text{C}$

* P_C : Package Mounted On 99.5% Alumina 10x8x0.6mm



Marking



2N3904U

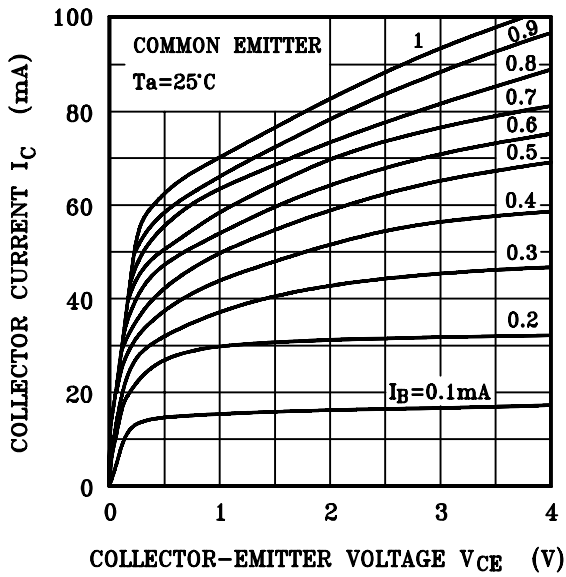
ELECTRICAL CHARACTERISTICS (Ta=25°C)

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	$V_{(BR)CBO}$	$I_C=10\mu A, I_E=0$	60	-	-	V			
Collector-Emitter Breakdown Voltage *	$V_{(BR)CEO}$	$I_C=1mA, I_B=0$	40	-	-	V			
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E=10\mu A, I_C=0$	6.0	-	-	V			
DC Current Gain *	$h_{FE(1)}$	$V_{CE}=1V, I_C=0.1mA$	40	-	-				
	$h_{FE(2)}$	$V_{CE}=1V, I_C=1mA$	70	-	-				
	$h_{FE(3)}$	$V_{CE}=1V, I_C=10mA$	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 *	$V_{CE(sat)1}$	$I_C=10mA, I_B=1mA$	-	-	0.2	V			
	$V_{CE(sat)2}$	$I_C=50mA, I_B=5mA$	-	-	0.3				
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	$V_{CE}=20V, I_C=10mA, f=100MHz$	300	-	-	MHz			
Collector Output Capacitance	C_{ob}	$V_{CB}=5V, I_E=0, f=1MHz$	-	-	4.0	pF			
Input Capacitance	C_{ib}	$V_{BE}=0.5V, I_C=0, f=1MHz$	-	-	8.0	pF			
Input Impedance	h_{ib}	$V_{CE}=10V, I_C=1mA, f=1kHz$	1.0	-	10	k Ω			
Voltage Feedback Ratio	h_{re}		0.5	-	8.0	x10			
Small-Signal Current Gain	h_{fe}		100	-	400				
Collector Output Admittance	h_{oe}		1.0	-	40	μS			
Noise Figure	NF		$V_{CE}=5V, I_C=0.1mA$ $R_g=1k\Omega, f=10Hz \sim 15.7kHz$	-	-	5.0	dB		
Switching Time	Delay Time	t_d				-	-	35	nS
	Rise Time	t_r				-	-	35	
	Storage Time	t_{stg}				-	-	200	
	Fall Time	t_f				-	-	50	

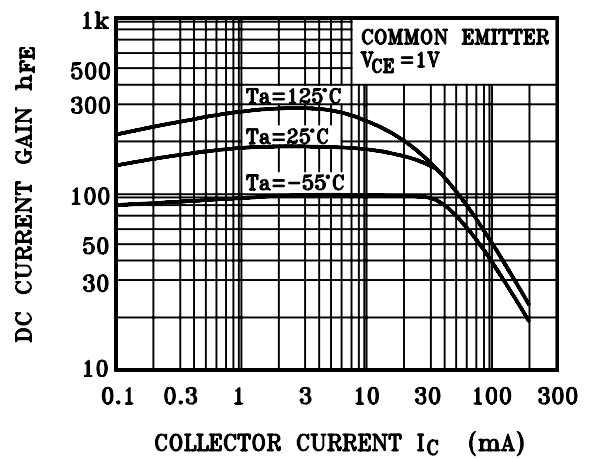
*Pulse Test : Pulse Width $\leq 300\mu S$, Duty Cycle $\leq 2\%$

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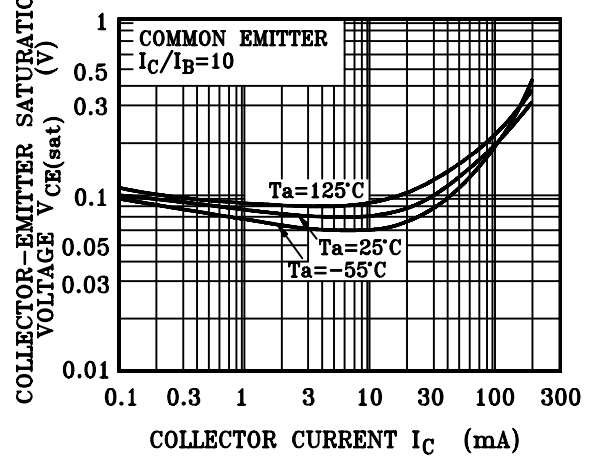
$I_C - V_{CE}$



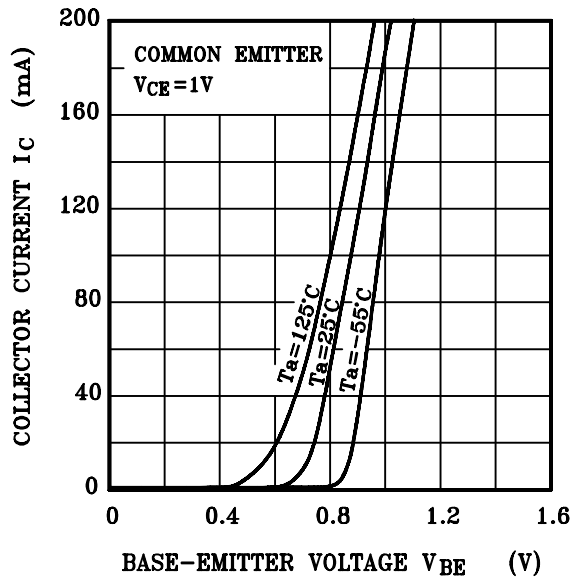
$h_{FE} - I_C$



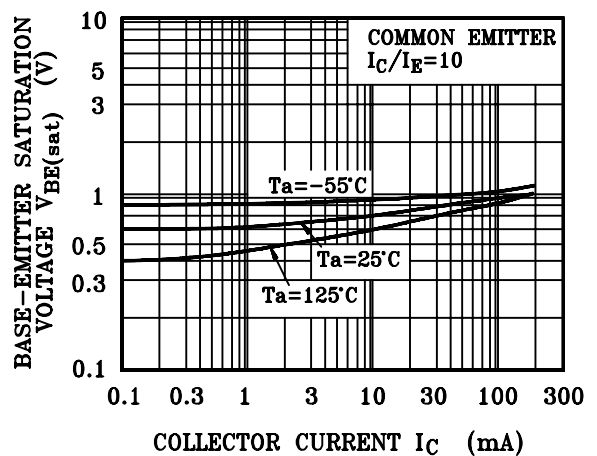
$V_{CE(sat)} - I_C$



$I_C - V_{BE}$



$V_{BE(sat)} - I_C$



2N3904U

