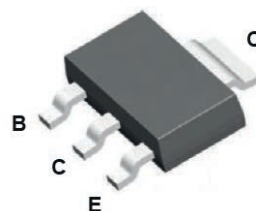


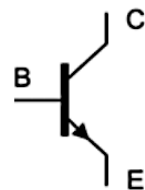
GSTL304NZ NPN Transistor

Features

- High collector current capability
- Low collector-emitter saturation voltage
- High efficiency due to less heat generation
- High collector current gain



SOT-223



Schematic Diagram

Applications

- High-voltage DC-to-DC conversion
- High-voltage MOSFET gate driving
- High-voltage motor control
- High-voltage power switches
- Automotive applications

Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Rating	Unit
Collector to Base Voltage	V_{CBO}	60	V
Collector to Emitter Voltage	V_{CEO}	60	V
Emitter to Base Voltage	V_{EBO}	5.0	V
Collector Current	I_C	5.2	A
Peak Collector Current ($t_p \leq 1\text{ms}$)	I_{CM}	10.4	A
Collector Power Dissipation	P_C	1.0	W
Typical Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	125.0	$^{\circ}\text{C/W}$
Typical Thermal Resistance, Junction to Case	$R_{\theta JC}$	30.0	$^{\circ}\text{C/W}$
Junction Temperature Range	T_J	-55 to +150	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-55 to +150	$^{\circ}\text{C}$

Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector to Emitter Breakdown Voltage	V_{CBO}	$I_C=100\mu\text{A}$, $I_E=0\text{mA}$	60	-	-	V
Collector to Base Breakdown Voltage	V_{CEO}	$I_C=1.0\text{mA}$, $I_B=0\text{mA}$	60	-	-	V
Emitter to Base Breakdown Voltage	V_{EBO}	$I_E=100\mu\text{A}$, $I_C=0\text{mA}$	5.3	-	-	V
Collector Cut-Off Current	I_{CBO}	$V_{CB}=60\text{V}$, $I_E=0\text{mA}$	-	-	0.1	μA
Collector Cut-Off Current	I_{CEO}	$V_{CE}=60\text{V}$, $I_B=0\text{mA}$	-	-	10	μA
Emitter Cut-Off Current	I_{EBO}	$V_{EB}=5.0\text{V}$, $I_C=0\text{mA}$	-	-	0.1	μA
DC Current Gain	h_{FE}	$V_{CE}=2\text{V}$, $I_C=0.5\text{A}$	300	520	-	-
		$V_{CE}=2\text{V}$, $I_C=1\text{A}$	300	500	-	
		$V_{CE}=2\text{V}$, $I_C=2\text{A}$	253	470	-	
		$V_{CE}=2\text{V}$, $I_C=4\text{A}$	153	250	-	
		$V_{CE}=2\text{V}$, $I_C=6\text{A}$	84	120	-	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=0.5\text{A}$, $I_B=50\text{mA}$	-	25	35	mV
		$I_C=1\text{A}$, $I_B=50\text{mA}$	-	50	70	
		$I_C=1\text{A}$, $I_B=10\text{mA}$	-	85	120	
		$I_C=2\text{A}$, $I_B=40\text{mA}$	-	105	150	
		$I_C=4\text{A}$, $I_B=200\text{mA}$	-	155	220	
		$I_C=4\text{A}$, $I_B=400\text{mA}$	-	145	210	
		$I_C=4\text{A}$, $I_B=80\text{mA}$	-	205	305	
		$I_C=5.2\text{A}$, $I_B=260\text{mA}$	-	200	280	
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=1\text{A}$, $I_B=100\text{mA}$	-	-	0.9	V
		$I_C=4\text{A}$, $I_B=400\text{mA}$	-	-	1.05	
Base-Emitter Turn-On Voltage	$V_{BE(on)}$	$V_{CB}=2\text{V}$, $I_C=2\text{A}$	-	-	0.82	V
Output Capacitance	C_{ob}	$V_{CE}=10\text{V}$, $I_E=0$, $f=1.0\text{MHz}$	-	-	60	pF
Transition Frequency	f_T	$V_{CE}=10\text{V}$, $I_C=100\text{mA}$, $f=100\text{MHz}$	100	-	-	MHz
Delay Time	t_d	$V_{CC}=12.5\text{V}$; $I_C=3\text{A}$; $I_{B(on)}=0.15\text{A}$; $I_{B(off)}=-0.15\text{A}$	-	15	-	nS
Rise Time	t_r		-	95	-	
Turn-On Time	t_{on}		-	110	-	
Storage Time	t_s		-	260	-	
Fall Time	t_f		-	195	-	
Turn-Off Time	t_{off}		-	554	-	

Electrical Characteristic Curves

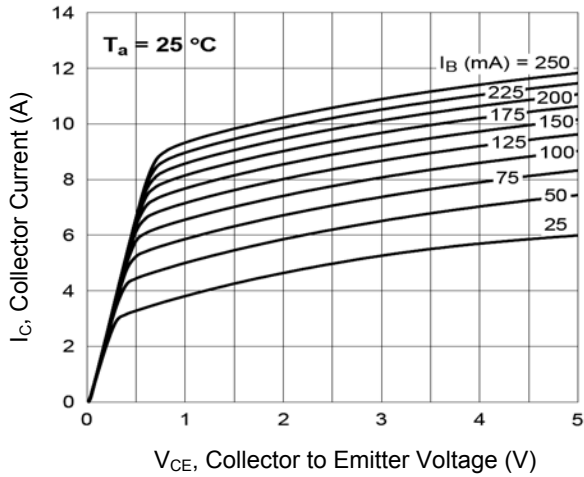


Figure 1. Static Characteristic

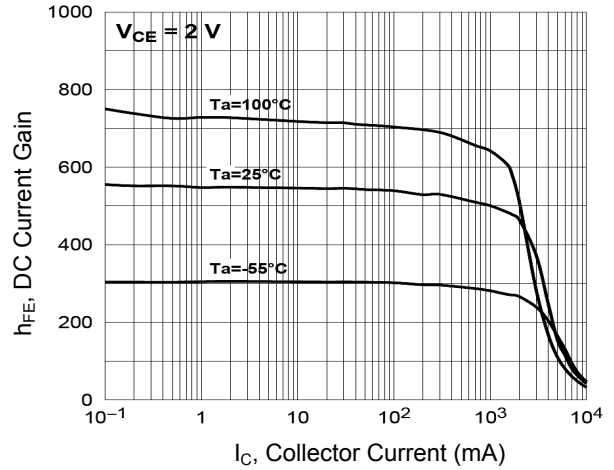


Figure 2. DC Current Gain

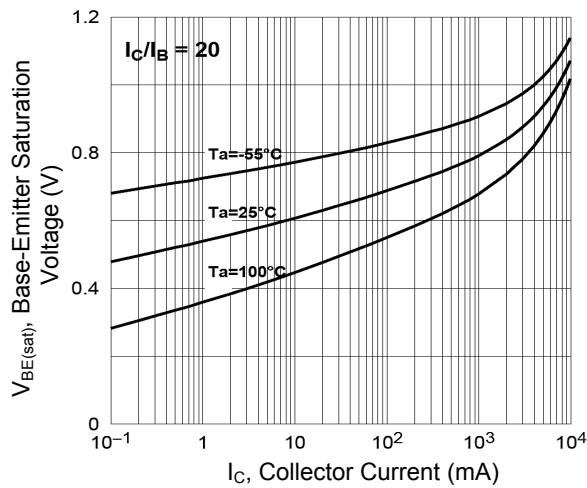


Figure 3. Base-Emitter Saturation Voltage vs. Collector Current

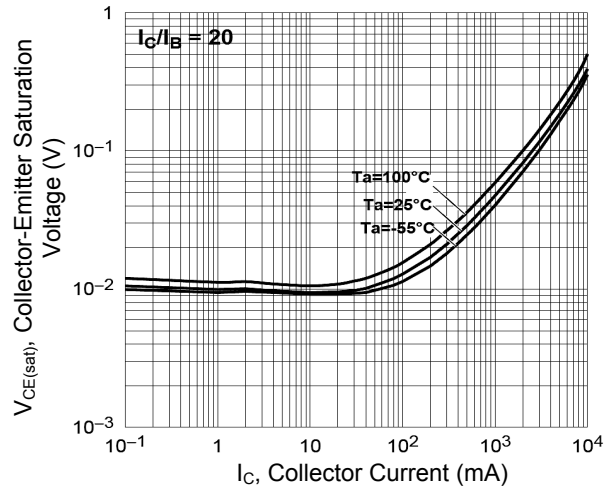


Figure 4. Collector-Emitter Saturation Voltage vs. Collector Current

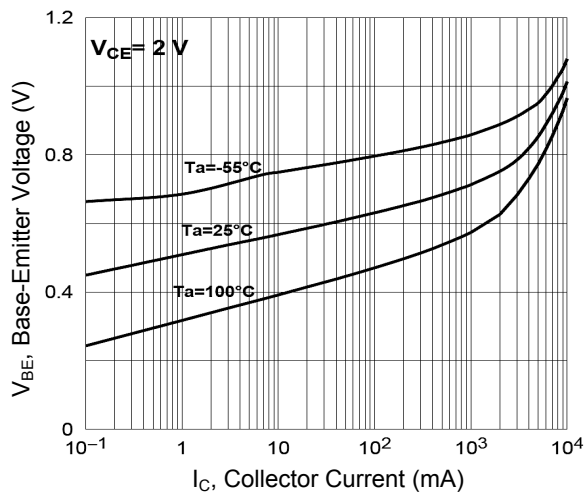


Figure 5. Base-Emitter Voltage vs. Collector Current

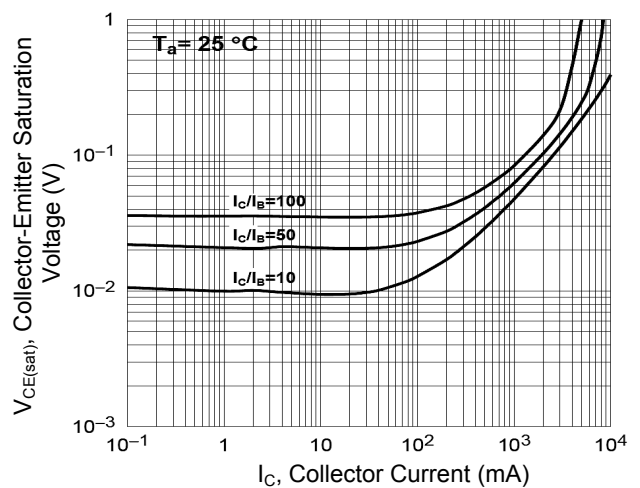
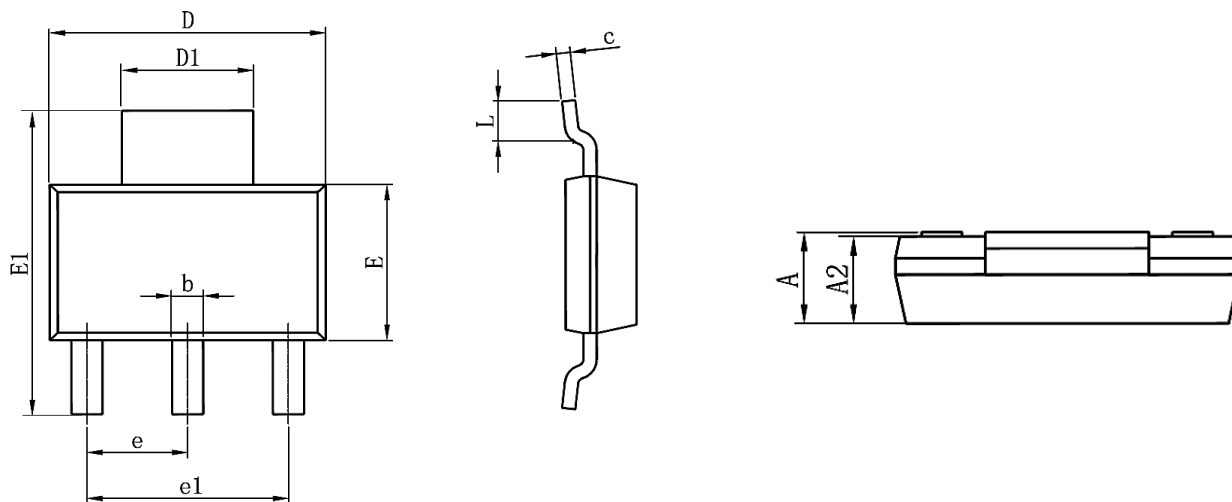


Figure 6. Collector-Emitter Saturation Voltage vs. Collector Current

Package Outline Dimensions (SOT-223)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.50	1.80	0.059	0.071
A2	1.45	1.80	0.057	0.071
b	0.60	0.84	0.024	0.033
c	0.20	0.35	0.008	0.014
D	6.20	6.70	0.244	0.264
D1	2.90	3.10	0.114	0.122
E	3.30	3.70	0.130	0.146
E1	6.70	7.30	0.264	0.287
e	2.30 TYP		0.091 TYP	
e1	4.40	4.70	0.173	0.185
L	0.70	1.10	0.028	0.043

Ordering Information

Device	Package	Marking	Carrier	Quantity
GSTL304NZ	SOT-223	L304NZ	Tape & Reel	3,000 Pcs / Reel