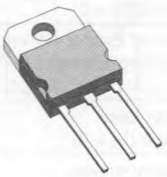
SGS-THOMSON
MICROELECTRONICS

2N6931
2N6932

NPN HIGH VOLTAGE POWER TRANSISTORS

- OFF-LINE POWER SUPPLIES
- HIGH-VOLTAGE INVERTERS
- SWITCHING REGULATORS



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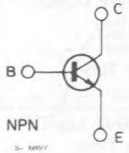
INTERNAL SCHEMATIC DIAGRAM



DESCRIPTION

High-voltage, high-speed, switching power transistors suited for use on medium voltage supply.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		2N6931	2N6932	Unit
V_{CEV}	Collector-emitter Voltage	V_{BE} = – 1.5V	450	650	V
V_{CEX}	Collector-emitter Voltage		350	450	V
V_{CEO}	Collector-emitter Voltage	I_B = 0	300	400	V
V_{EBO}	Emitter-base Voltage	I_C = 0	8		V
I_C	Collector Current		10		A
I_{CM}	Collector Peak Current		15		A
I_B	Base Current		5		A
I_{BM}	Base Peak Current		7		A
I_E	Emitter Current		15		A
I_{EM}	Emitter Peak Current		22		A
P_{tot}	Total Dissipation at T_c < 25°C		150		W
T_{stg}	Storage Temperature		– 65 to 150		°C
T_j	Max. Operating Junction Temperature		150		°C

THERMAL DATA

$R_{th\ j\text{-}case}$	Thermal Resistance Junction-case	Max	0.83	°C/W
T_L	Maximum Lead Temperature for Soldering Purpose		235	°C

ELECTRICAL CHARACTERISTICS (T_{case} = 25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CEV}	Collector Cutoff Current	$V_{CE} = V_{CEV}$ $V_{BE} = -1.5V$			0.1	mA
		$V_{CE} = V_{CEV}$ $V_{BE} = -1.5V$ $T_c = 100°C$			1	mA
I_{EBO}	Emitter Cutoff Current (I_C = 0)	V_{EB} = 8V			2	mA
$V_{CEO(sus)}$*	Collector Emitter Sustaining Voltage	I_C = 0.2A L = 25mH for **2N6931**	300			V
		for **2N6932**	400			V
V_{EBO}	Emitter-base Voltage (I_C = 0)	I_E = 50mA	8			V
$V_{CE(sat)}$*	Collector-emitter Saturation Voltage	I_C = 10A I_B = 2A			1	V
		I_C = 10A I_B = 2A T_c = 100°C			2	V
$V_{BE(sat)}$*	Base-emitter saturation Voltage	I_C = 10A I_B = 2A			1.5	V
		I_C = 10A I_B = 2A T_c = 100°C			1.5	V
h_{FE}*	DC Current Gain	I_C = 10A V_{CE} = 3V	8		35	
h_{fe}	Small Signal Current Gain	I_C = 1A V_{CE} = 10V f = 5 MHz	2		6	
C_{cbo}	Collector-base Capacitance	V_{CB} = 10V f = 1MHz	80		300	pF
	RESISTIVE LOAD					
t_d	Delay Time	V_{CC} = 300V I_C = 10A			0.1	µs
t_r	Rise Time	R_C = 30Ω $I_{B1} = -I_{B2}$ = 2A			0.7	µs
t_s	Storage Time	V_{BB} = − 5V t_p = 30µs			2.5	µs
t_f	Fall Time	See fig. 1			0.5	µs
	INDUCTIVE LOAD					
t_s	Storage Time	V_{CC} = 50V I_C = 10A			3.5	µs
t_f	Fall Time	L_C = 150µH $I_{B1} = -I_{B2}$ = 2A			0.4	µs
t_c	Crossover Time	R_{BB} = 2.2Ω $V_{clamp} = V_{CEX}$			0.8	µs
		T_c = 100°C See fig. 1				
di_c/dt	Turn-on Current Slope	V_{CC} = 300V I_B = 3A	50			A/µs
		R_C = 0 t_p = 3µs				
		See fig. 2				
V_{CEX}	Collector-emitter Sustaining Voltage	V_{CC} = 50V I_C = 10A				
		L_C = 150µH $I_{B1} = -I_{B2}$ = 2A				
		R_{BB} = 2.2Ω $V_{clamp} = V_{CEX}$				
		T_c = 100°C See fig. 3				
		for **2N6931**	350			V
		for **2N6932**	450			V

* Pulsed : Pulse duration = 300µs, duty cycle = 2%

Figure 1 : Switching Time Measurements.

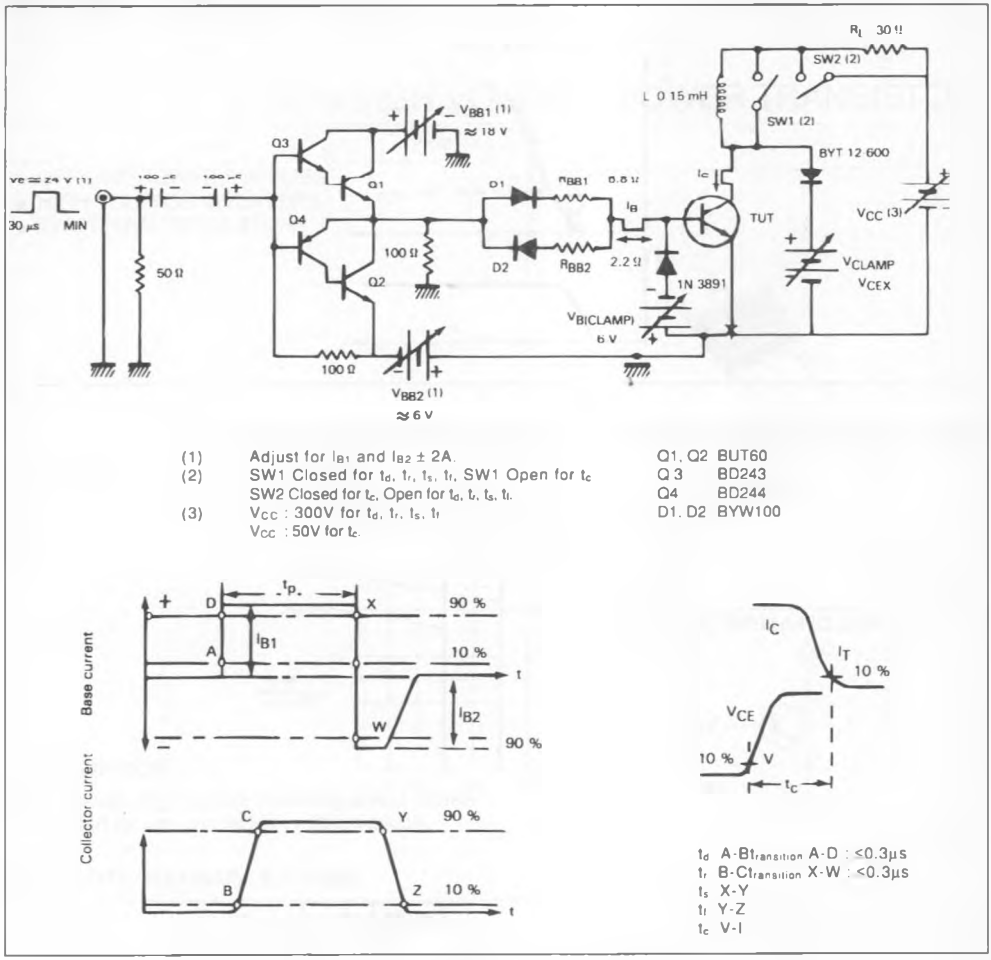


Figure 2 : Turn-on Switching Waveforms.

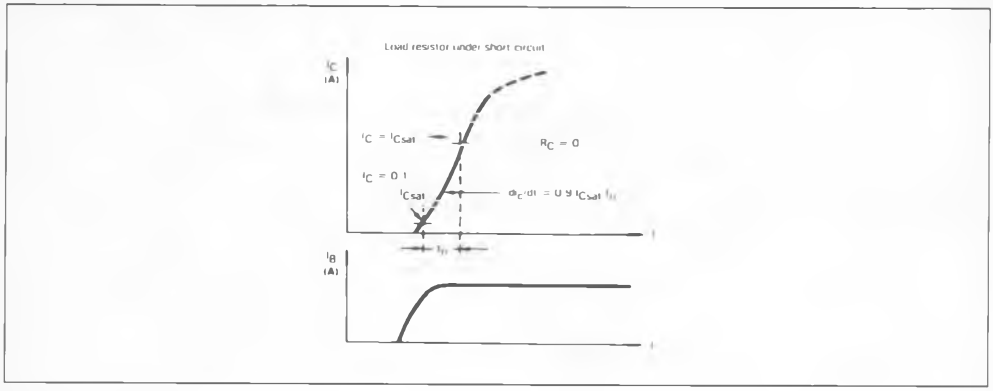
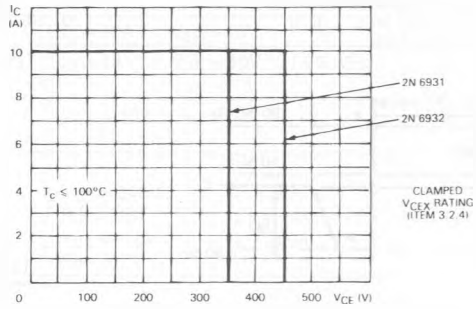
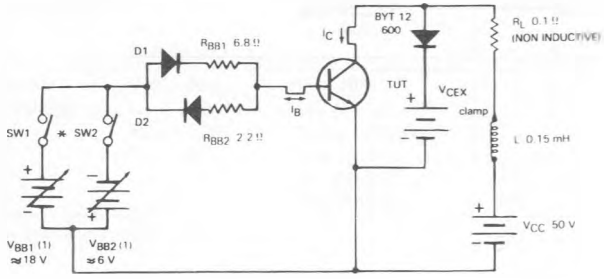


Figure 3 : Maximum Operating Conditions for Switching between Saturation and Cut off.





(1) Adjust for I_{B1} and $I_{B2} \pm 2A$
* SW1 and SW2 : Electronic Switches
D1-D2 = BYW100