SGS-THOMSON MICROELECTRONICS

T-35-09

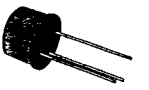
2N2369A

S G S-THOMSON

HIGH-SPEED SATURATED SWITCH

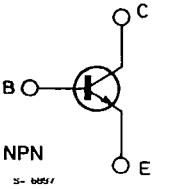
DESCRIPTION

The 2N2369A is a silicon planar epitaxial NPN transistor in Jedec TO-18 metal case. It is designed specifically for high-speed saturated switching applications at current levels from 100 µA to 100 mA.



TO-18

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-base Voltage ($I_E = 0$)	40	V
V_{CES}	Collector-emitter Voltage ($V_{BE} = 0$)	40	V
V_{CEO}	Collector-emitter Voltage ($I_B = 0$)	15	V
V_{EBO}	Emitter-base Voltage ($I_C = 0$)	4.5	V
I_C	Collector Current	0.2	A
I_{CM}	Collector Current (10 µs pulse)	0.5	A
P_{tot}	Total Power Dissipation at $T_{amb} \leq 25$ °C at $T_{case} \leq 25$ °C at $T_{case} \leq 100$ °C	0.36 1.2 0.68	W W W
T_{stg}, T_j	Storage and Junction Temperature	– 65 to 200	°C

THERMAL DATA

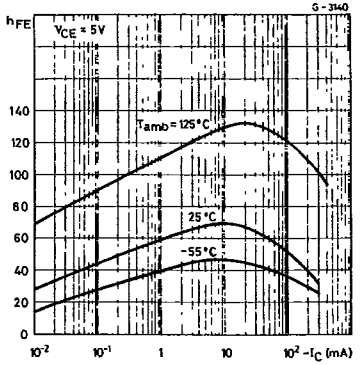
$R_{th\ j\text{-}case}$	Thermal Resistance Junction-case	Max	146	°C/W
$R_{th\ j\text{-}amb}$	Thermal Resistance Junction-ambient	Max	486	°C/W

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

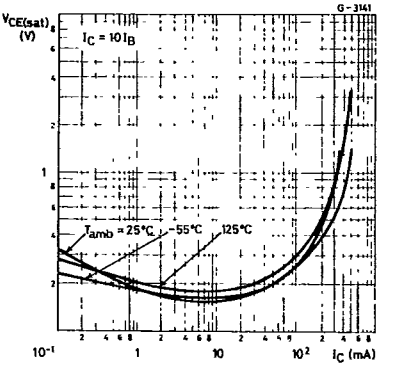
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cutoff Current (I_E = 0)	V_{CB} = 20 V T_{amb} = 150 °C			30	µA
I_{CES}	Collector Cutoff Current (V_{BE} = 0)	V_{CE} = 20 V			0.4	µA
$V_{(BR)\ CBO}$	Collector-base Breakdown Voltage (I_E = 0)	I_C = 10 µA	40			V
$V_{(BR)CES}$	Collector-emitter Breakdown Voltage (V_{BE} = 0)	I_C = 10 µA	40			V
$V_{(BR)CEO}$*	Collector-emitter Breakdown Voltage (I_B = 0)	I_C = 10 mA	15			V
$V_{(BR)\ EBO}$	Emitter-base Breakdown Voltage (I_C = 0)	I_E = 10 µA	4.5			V
$V_{CE\ (sat)}$*	Collector-emitter Saturation Voltage	I_C = 10 mA I_B = 1 mA I_C = 30 mA I_B = 3 mA I_C = 100 mA I_B = 10 mA I_C = 10 mA I_B = 1 mA T_{amb} = 125 °C		0.14 0.17 0.28 0.19	0.2 0.25 0.5 0.3	V V V V
$V_{BE\ (sat)}$ *	Base-emitter Saturation Voltage	I_C = 10 mA I_B = 1 mA I_B = 30 mA I_B = 3 mA I_C = 100 mA I_B = 10 mA I_C = 10 mA I_B = 1 mA T_{amb} = − 55 to 125 °C	0.7 0.59	0.8 0.9 1.1 	0.85 1.15 1.6 1.02	V V V V
h_{FE}*	DC Current Gain	I_C = 10 mA V_{CE} = 0.35 V I_C = 10 mA V_{CE} = 1 V I_C = 30 mA V_{CE} = 0.4 V I_C = 100 mA V_{CE} = 1 V	40 40 30 20	63 66 71 	120 120 	
h_{FE}*	DC Current Gain	I_C = 10 mA V_{CE} = 0.35 V T_{amb} = − 55 °C	20	50		
f_T	Transition Frequency	I_C = 10 mA V_{CE} = 10 V f = 100 MHz	500	675		MHz
C_{CBO}	Collector-base Capacitance	I_E = 0 V_{CB} = 5 V f = 1 MHz		2.3	4	pF
t_s **	Storage Time	I_C = 10 mA V_{CC} = 10 V I_{B1} = − I_{B2} = 10 mA		6	13	ns
t_{on} **	Turn-on Time	I_C = 10 mA V_{CC} = 3 V I_{B1} = 3 mA		9	12	ns
t_{off}**	Turn-off Time	I_C = 10 mA V_{CC} = 3 V I_{B1} = 3 mA I_{B2} = − 1.5 mA		13	18	ns

* Pulsed : pulse duration = 300 µs, duty cycle = 1 %.
** See test circuit.

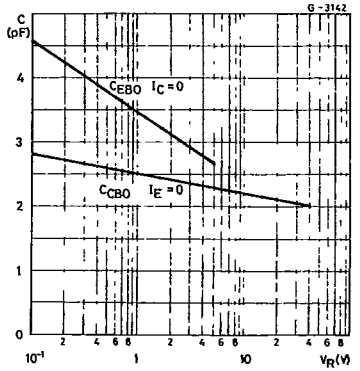
DC Current Gain.



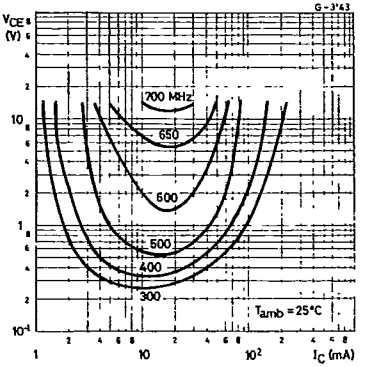
Collector-emitter Saturation Voltage.



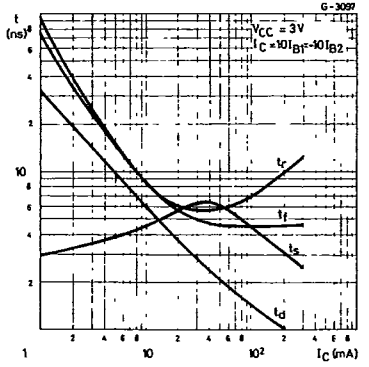
Collector-base and Emitter-base capacitances.



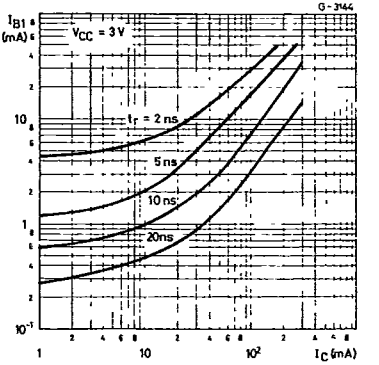
Contours of Constant Transition Frequency.



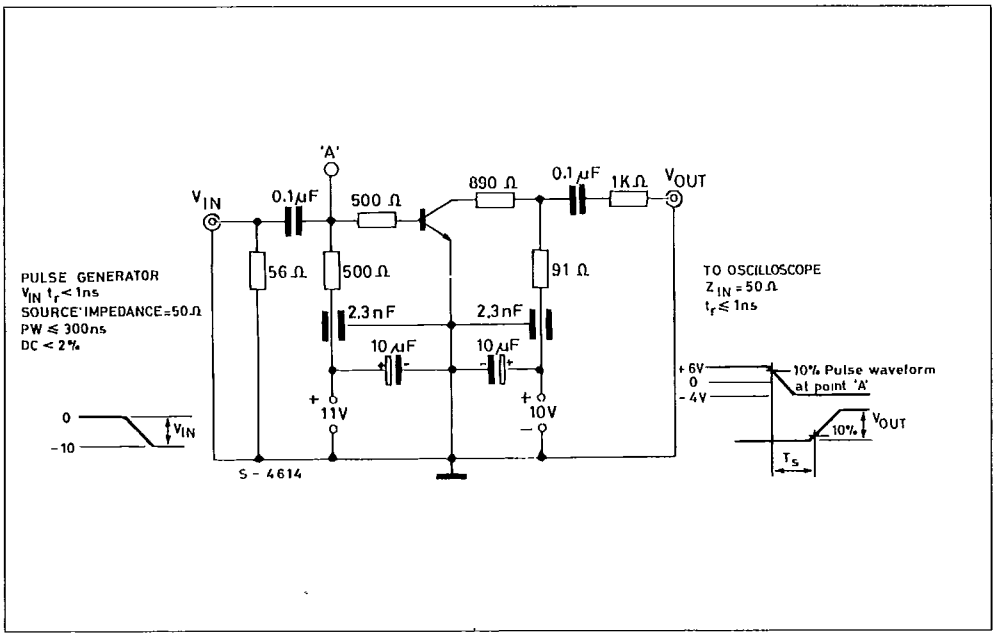
Switching Characteristics.



Switching Characteristics.



Test Circuit for t_s



Test Circuit for t_{on}, t_{off}