FASTSWITCH HOLLOW–EMITTER NPN TRANSISTOR

- HIGH SWITCHING SPEED NPN POWER TRANSISTOR
- HOLLOW EMITTER TECHNOLOGY
- HIGH VOLTAGE FOR OFF-LINE APPLICATIONS
- 70kHz SWITCHING SPEED
- LOW COST DRIVE CIRCUITS
- LOW DYNAMC SATURATION

APPLICATIONS

- SMPS

DESCRIPTION

This hollow emitter FASTSWITCH NPN power transistor is specially designed for 220V (and 117V with input doubler) off-line switching power supply applications. It can also be used for 117V three phase mains off-line switching power supplies. Hollow emitter transistors can operate up to 70kHz with simple drive circuits which helps to simplify designs and improve reliability. The superior switching performance reduces dissipation and consequently lowers the equipment operating temperature. This transistor is suitable for application in half bridge and full bridge high power converters, 1500W to 3000W. When used in conjunction with a low vol-tage Power MOSFET in emitter switch configuration in flyback and forward converters, they can operate at up to 100kHz.

This hollow emitter FASTSWITCH transistor is available in the metal can TO-3 package.
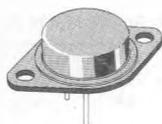
TO-3

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	SGSF661	Unit
V_{CES}	Collector - Emitter Voltage ($V_{BE} = 0$)	850	V
V_{CEO}	Collector - Emitter Voltage ($I_B = 0$)	400	V
V_{EBO}	Emitter - Base Voltage ($I_C = 0$)	7	V
I_C	Collector Current	30	A
I_{CM}	Collector Peak Current ($t_p < 5ms$)	50	A
I_B	Base Current	16	A
I_{BM}	Base Peak Current ($t_p < 5ms$)	30	A
P_{tot}	Total Dissipation at $T_c \leq 25°C$	250	W
T_{stg}	Storage Temperature – 65 to	175	°C
T_j	Junction Temperature	175	°C

THERMAL DATA

$R_{thj-case}$	Thermal Resistance Junction-case	Max	0.6	°C/W

ELECTRICAL CHARACTERISTICS (T_{case} = 45°C unless otherwise specified)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I_{CES}	Collector Cutoff Current (V_{BE} = 0)	V_{CE} = 700V				400	µA
I_{CEO}	Collector Cutoff Current (I_B = 0)	V_{CE} = 380V				400	µA
		V_{CE} = 400V				4	mA
I_{EBO}	Emitter Cutoff Current (I_C = 0)	V_{EB} = 7V				2	mA
$V_{CEO (sus)}$*	Collector Emitter Sustaining Voltage	I_C = 0.2A		400			V
$V_{CE (sat)}$*	Collector Emitter Saturation Voltage	I_C = 20A	I_B = 4A			1.5	V
		I_C = 11A	I_B = 1.6A			1.5	V
$V_{BE (sat)}$*	Base Emitter Saturation Voltage	I_C = 20A	I_B = 4A			1.5	V
		I_C = 11A	I_B = 1.6A			1.5	V

RESISTIVE LOAD

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
t_{on}	Turn-on Time	I_C = 20A	V_{CC} = 250V		1	1.7	µs
t_s	Storage Time	I_{B1} = 4A	I_{B2} = – 2 I_{B1}		1.4	2.3	µs
t_f	Fall Time				0.25	0.5	µs
t_{on}	Turn-on Time	I_C = 20A	V_{CC} = 250V		1		µs
t_s	Storage Time	I_{B1} = 4A	I_{B2} = – 2 I_{B1}		1		µs
t_f	Fall Time	with Antisaturation Network			0.15		µs
t_{on}	Turn-on Time	I_C = 20A	V_{CC} = 250V		1		µs
t_s	Storage Time	I_{B1} = 4A	$V_{BE(off)}$ = – 5V		1		µs
t_f	Fall Time				0.06		µs

INDUCTIVE LOAD

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
t_s	Storage Time	I_C = 20A V_{CL} = 350V	h_{FE} = 5 $V_{BE(off)}$ = – 5V		1.5	3.2	µs
t_f	Fall Time	L = 300µH	$R_{B(off)}$ = 1Ω		0.12	0.25	µs
t_s	Storage Time	I_C = 20A V_{CL} = 350V	n_{FE} = 5			4.5	µs
t_f	Fall Time	L = 300µH T_C = 100°C	$V_{BE(off)}$ = – 5V $R_{B(off)}$ = 1Ω			0.35	µs

* Pulsed : Pulse duration = 300µs, duty cycle = 1.5%

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Safe Operating Areas
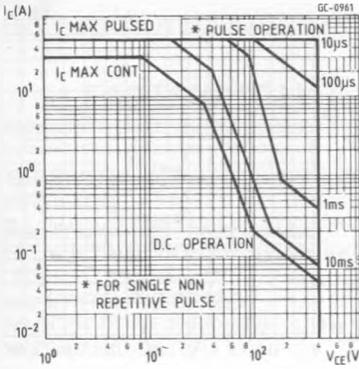
## Reverse Biased Safe Operating Area
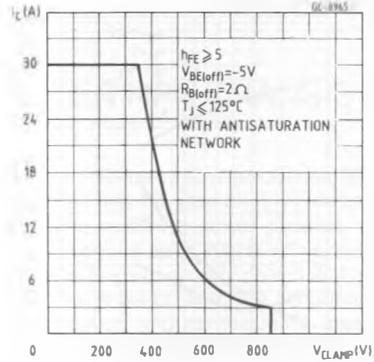
## DC Current Gain
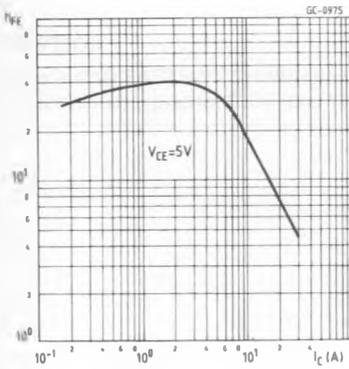
## Collector-emitter Saturation Voltage
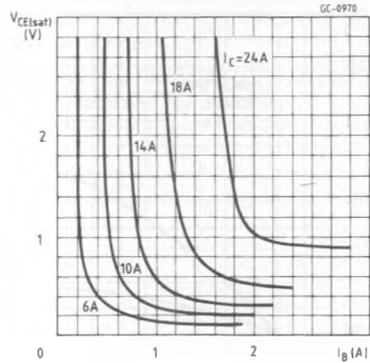
## Collector-emitter Saturation Voltage
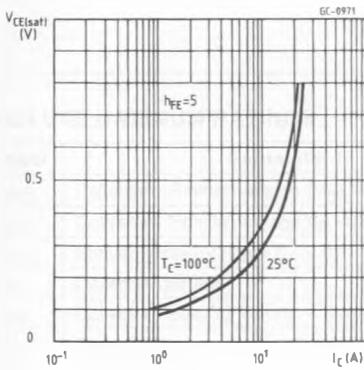
Base-emitter Saturation Voltage
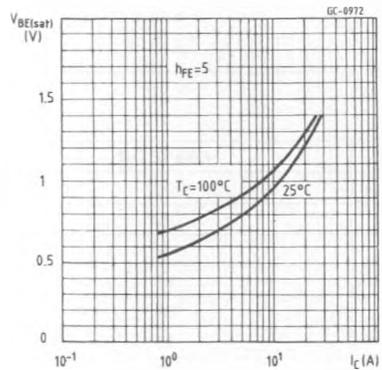
Resistive Load Switching Times
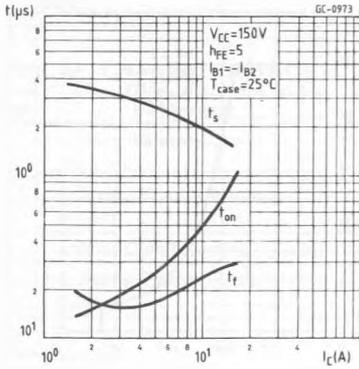
Inductive Load Switching Times
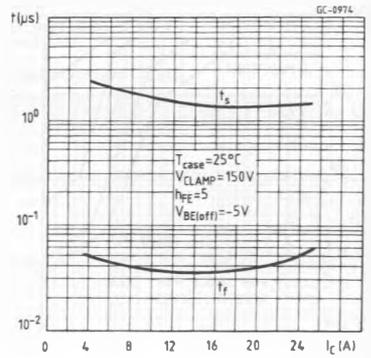
Switching Times Percentance Variation

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