SGS-THOMSON MICROELECTRONICS

SGSF663

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 DYNAMIC SATURATION

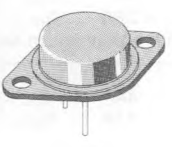
APPLICATIONS

- 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 can operate up to 70kHz with simple drive circuits which helps to simplify design and improve reliability. The superior switching performance reduces dissipation and consequently lowers the equipment operating temperature. This transistor is suitable for applications in half bridge and full bridge high power converters, 1000W to 2000W. When used in conjunction with a low voltage Power MOSFET in emitter switch configuration, 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	SGSF663	Unit
V_{CES}	Collector - Emitter Voltage (V_{BE} = 0)	1000	V
V_{CEO}	Collector - Emitter Voltage (I_B = 0)	450	V
V_{EBO}	Emitter - Base Voltage (I_C = 0)	7	V
I_C	Collector Current	24	A
I_{CM}	Collector Peak Current (t_p < 5ms)	40	A
I_B	Base Current	14	A
I_{BM}	Base Peak Current (t_p < 5ms)	24	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} = 25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector Cutoff Current (V_{BE} = 0)	V_{CE} = 1000V			400	µA
I_{CEO}	Collector Cutoff Current (I_B = 0)	V_{CE} = 380V V_{CE} = 450V			400 4	µA 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	450			V
$V_{CE(sat)}$*	Collector Emitter Saturation Voltage	I_C = 14A I_B = 2.8A I_C = 8A I_B = 1.2A			1.5 1.5	V V
$V_{BE(sat)}$*	Base Emitter Saturation Voltage	I_C = 14A I_B = 2.8A I_C = 8A I_B = 1.2A			1.5 1.5	V V

RESISTIVE LOAD

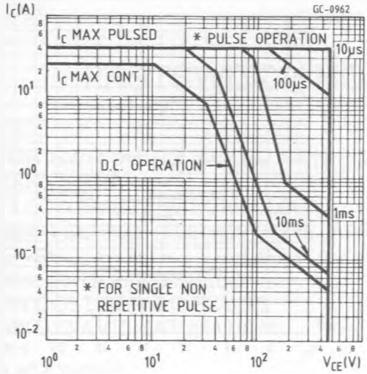
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t_{on}	Turn-on Time	I_C = 14A V_{CC} = 250V I_{B1} = 2.8A I_{B2} = − 2I_{B1}		1	1.7	µs
t_s	Storage Time			1.4	2.3	µs
t_f	Fall Time			0.25	0.5	µs
t_{on}	Turn-on Time	I_C = 14A V_{CC} = 250V I_{B1} = 2.8A I_{B2} = − 2I_{B1} With Antisaturation Network		1		µs
t_s	Storage Time			1		µs
t_f	Fall Time			0.15		µs
t_{on}	Turn-on Time	I_C = 14A V_{CC} = 250V I_{B1} = 2.8A $V_{BE(off)}$ = − 5V		1		µs
t_s	Storage Time			1		µs
t_f	Fall Time			0.06		µs

INDUCTIVE LOAD

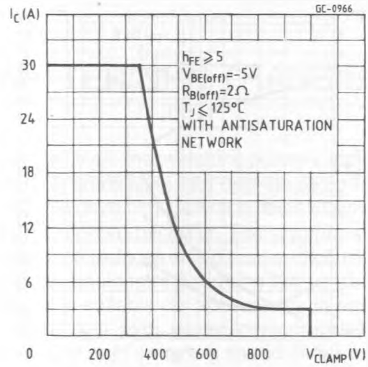
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t_s	Storage Time	I_C = 14A h_{FE} = 5 V_{CL} = 350V $V_{BE(off)}$ = − 5V L = 300µH $R_{B(off)}$ = 1Ω		1.5	3.2	µs
t_f	Fall Time			0.12	0.25	µs
t_s	Storage Time	I_C = 14A h_{FE} = 5 V_{CL} = 350V $V_{BE(off)}$ = − 5V L = 300µH $R_{B(off)}$ = 1Ω T_C = 100°C			4.3	µs
t_f	Fall Time				0.35	µs

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

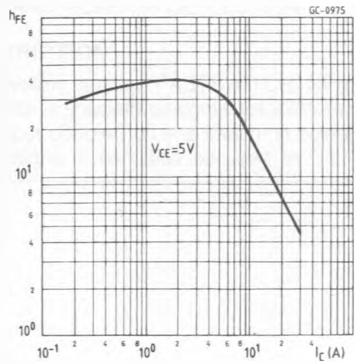
Safe Operating Areas



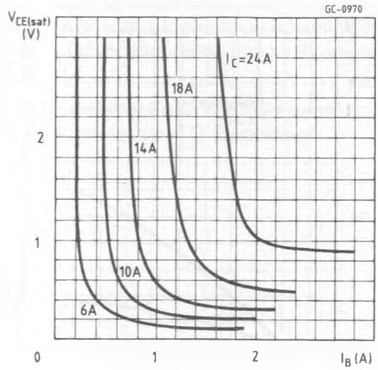
Reverse Biased Safe Operating Area



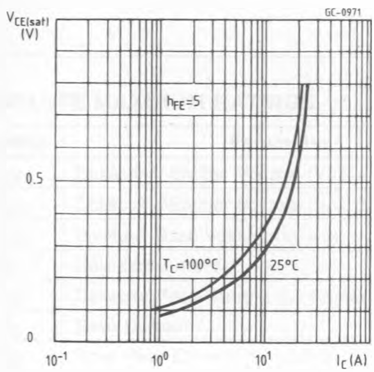
DC Current Gain



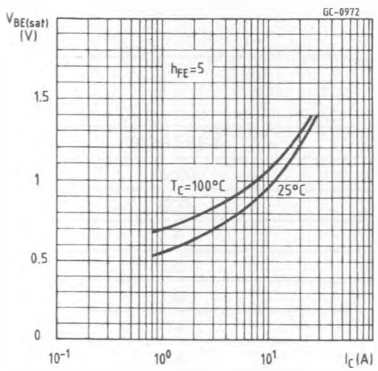
Collector-emitter Saturation Voltage



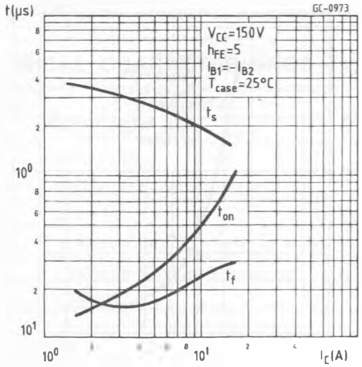
Collector-emitter Saturation Voltage



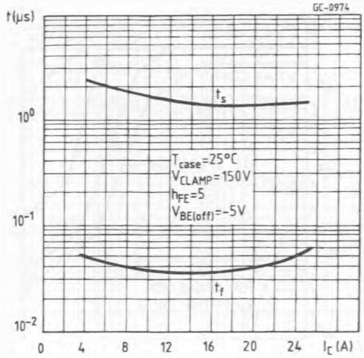
Base-emitter Saturation Voltage



Resistive Load Switching Times



Inductive Load Switching Times



Switching Times Percentance Variation