

## FASTSWITCH HOLLOW-EMITTER NPN TRANSISTOR

- HIGH SWITCHING SPEED NPN POWER TRANSISTOR
- HOLLOW EMITTER TECHNOLOGY
- HIGH VOLTAGE FOR OFF-LINE APPLICATIONS
- 50kHz SWITCHING SPEED
- LOW COST DRIVE CIRCUITS
- LOW DYNAMIC SATURATION

### APPLICATIONS

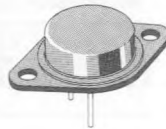
- SMPS
- TV AND MONITOR DEFLECTION

### 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. 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, 700W to 1500W. The high switching speed of this transistor, together with its high voltage and current rating, make it ideal for horizontal deflection circuits in large screen colour televisions and monitors. 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	SGSF665	Unit
$V_{CES}$	Collector - Emitter Voltage ( $V_{BE} = 0$ )	1300	V
$V_{CEO}$	Collector - Emitter Voltage ( $I_B = 0$ )	600	V
$V_{EBO}$	Emitter - Base Voltage ( $I_C = 0$ )	7	V
$I_C$	Collector Current	20	A
$I_{CM}$	Collector Peak Current ( $t_p < 5ms$ )	30	A
$I_B$	Base Current	14	A
$I_{BM}$	Base Peak Current ( $t_p < 5ms$ )	24	A
$P_{tot}$	Total Dissipation at $T \leq 25^\circ C$	250	W
$T_{stg}$	Storage Temperature - 65 to	175	$^\circ C$
$T_J$	Junction Temperature	175	$^\circ C$

## THERMAL DATA

$R_{thj\ case}$	Thermal Resistance Junction-case	Max	0.6	°C/W
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ELECTRICAL CHARACTERISTICS ( $T_{case} = 25^{\circ}\text{C}$  unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CES}$	Collector Cutoff Current ( $V_{BE} = 0$ )	$V_{CE} = 1300\text{V}$			400	$\mu\text{A}$
$I_{CEO}$	Collector Cutoff Current ( $I_B = 0$ )	$V_{CE} = 380\text{V}$ $V_{CE} = 600\text{V}$			400 4	$\mu\text{A}$ $\text{mA}$
$I_{EBO}$	Emitter Cutoff Current ( $I_C = 0$ )	$V_{EB} = 7\text{V}$			2	$\text{mA}$
$V_{CEO(sus)}$ *	Collector Emitter Sustaining Voltage	$I_C = 0.2\text{A}$	600			V
$V_{CE(sat)}$ *	Collector Emitter Saturation Voltage	$I_C = 10\text{A}$ $I_B = 2\text{A}$ $I_C = 6\text{A}$ $I_B = 0.9\text{A}$			1.5 1.5	V V
$V_{BE(sat)}$ *	Base Emitter Saturation Voltage	$I_C = 10\text{A}$ $I_B = 2\text{A}$ $I_C = 6\text{A}$ $I_B = 0.9\text{A}$			1.5 1.5	V V

## RESISTIVE LOAD

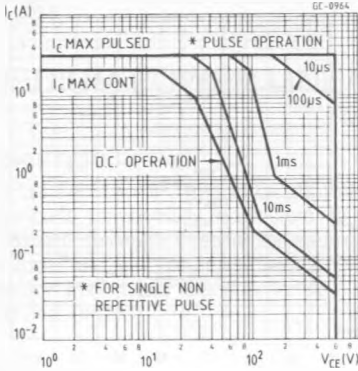
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{on}$	Turn-on Time	$I_C = 10\text{A}$ $V_{CC} = 250\text{V}$ $I_{B1} = 2\text{A}$ $I_{B2} = -2 I_{B1}$		0.6	1.2	$\mu\text{s}$
$t_s$	Storage Time			2.45	3.5	$\mu\text{s}$
$t_f$	Fall Time			0.12	0.4	$\mu\text{s}$
$t_{on}$	Turn-on Time	$I_C = 10\text{A}$ $V_{CC} = 250\text{V}$ $I_{B1} = 2\text{A}$ $I_{B2} = -2 I_{B1}$ With Antisaturation Network		0.6		$\mu\text{s}$
$t_s$	Storage Time			1.7		$\mu\text{s}$
$t_f$	Fall Time			0.12		$\mu\text{s}$
$t_{on}$	Turn-on Time	$I_C = 10\text{A}$ $V_{CC} = 250\text{V}$ $I_{B1} = 2\text{A}$ $V_{BE(off)} = -5\text{V}$		0.6		$\mu\text{s}$
$t_s$	Storage Time			1.3		$\mu\text{s}$
$t_f$	Fall Time			0.2		$\mu\text{s}$

## INDUCTIVE LOAD

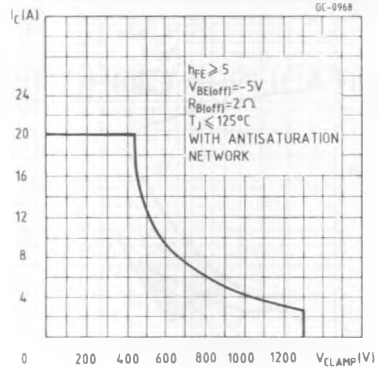
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_s$	Storage Time	$I_C = 10\text{A}$ $h_{FE} = 5$ $V_{CL} = 450\text{V}$ $V_{BE(off)} = -5\text{V}$ $L = 300\mu\text{H}$ $R_{B(off)} = 0.5\Omega$		1.5	3	$\mu\text{s}$
$t_f$	Fall Time			0.12	0.25	$\mu\text{s}$
$t_s$	Storage Time	$I_C = 10\text{A}$ $h_{FE} = 5$ $V_{CL} = 450\text{V}$ $V_{BE(off)} = -5\text{V}$ $L = 300\mu\text{H}$ $R_{B(off)} = 0.5\Omega$ $T_C = 100^{\circ}\text{C}$			4.3	$\mu\text{s}$
$t_f$	Fall Time				0.35	$\mu\text{s}$

\* Pulsed : Pulse duration = 300 $\mu\text{s}$ , duty cycle = 1.5%

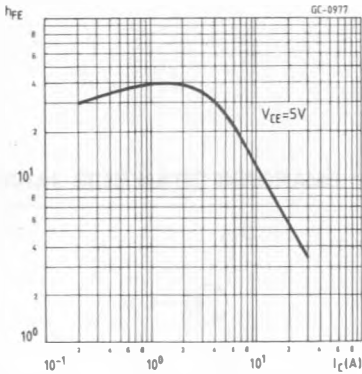
Safe Operating Areas



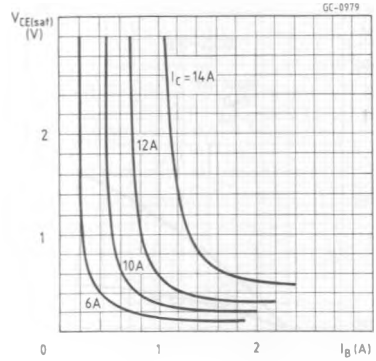
Reverse Biased Safe Operating Area



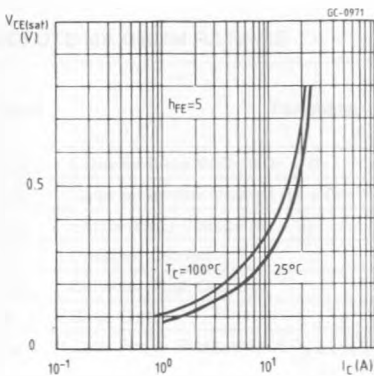
DC Current Gain



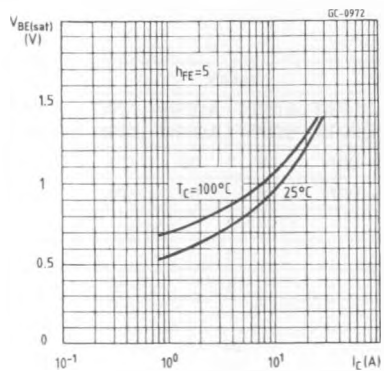
Collector-emitter Saturation Voltage



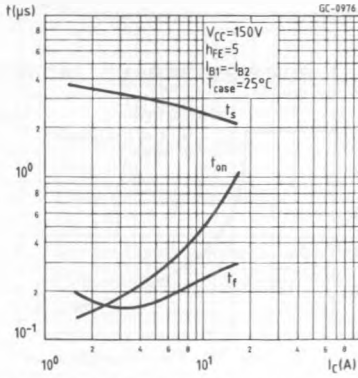
Collector-emitter Saturation Voltage



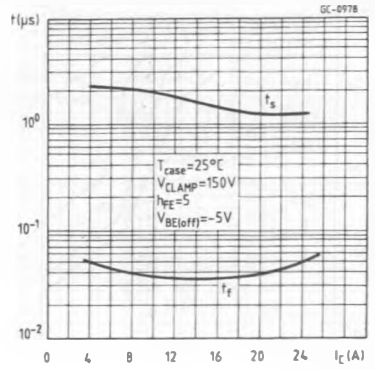
Base-emitter Saturation Voltage



Resistive Load Switching Times



Inductive Load Switching Times



Switching Times Percentage Variation

