

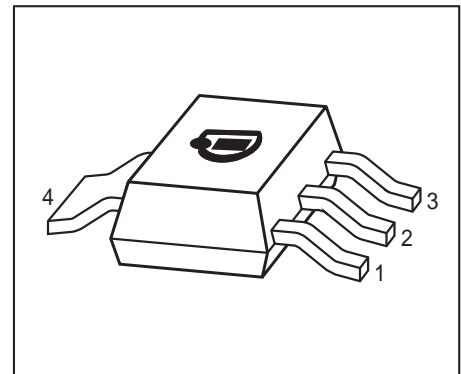


**THE DATASHEET OF  
BFG193 E6433**



**NPN Silicon RF Transistor\***

- For low noise, high-gain amplifiers up to 2 GHz
- For linear broadband amplifiers
- $f_T = 8$  GHz,  $F = 1$  dB at 900 MHz
- Pb-free (RoHS compliant) package<sup>1)</sup>
- Qualified according AEC Q101



\* Short term description



**ESD (Electrostatic discharge) sensitive device, observe handling precaution!**

Type	Marking	Pin Configuration						Package
BFG193	BFG193	1 = E	2 = B	3 = E	4 = C	-	-	SOT223

**Maximum Ratings**

Parameter	Symbol	Value	Unit
Collector-emitter voltage	$V_{CEO}$	12	V
Collector-emitter voltage	$V_{CES}$	20	
Collector-base voltage	$V_{CBO}$	20	
Emitter-base voltage	$V_{EBO}$	2	
Collector current	$I_C$	80	mA
Base current	$I_B$	10	
Total power dissipation <sup>2)</sup> $T_S \leq 87^\circ\text{C}$	$P_{tot}$	600	mW
Junction temperature	$T_j$	150	°C
Ambient temperature	$T_A$	-55 ... 150	
Storage temperature	$T_{stg}$	-55 ... 150	

**Thermal Resistance**

Parameter	Symbol	Value	Unit
Junction - soldering point <sup>3)</sup>	$R_{thJS}$	$\leq 105$	K/W

<sup>1)</sup>Pb-containing package may be available upon special request

<sup>2)</sup> $T_S$  is measured on the collector lead at the soldering point to the pcb

<sup>3)</sup>For calculation of  $R_{thJA}$  please refer to Application Note Thermal Resistance

**Electrical Characteristics** at  $T_A = 25^\circ\text{C}$ , unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>DC Characteristics</b>					
Collector-emitter breakdown voltage $I_C = 1 \text{ mA}, I_B = 0$	$V_{(BR)CEO}$	12	-	-	V
Collector-emitter cutoff current $V_{CE} = 20 \text{ V}, V_{BE} = 0$	$I_{CES}$	-	-	100	$\mu\text{A}$
Collector-base cutoff current $V_{CB} = 10 \text{ V}, I_E = 0$	$I_{CBO}$	-	-	100	nA
Emitter-base cutoff current $V_{EB} = 1 \text{ V}, I_C = 0$	$I_{EBO}$	-	-	1	$\mu\text{A}$
DC current gain- $I_C = 30 \text{ mA}, V_{CE} = 8 \text{ V}, \text{ pulse measured}$	$h_{FE}$	70	100	140	-

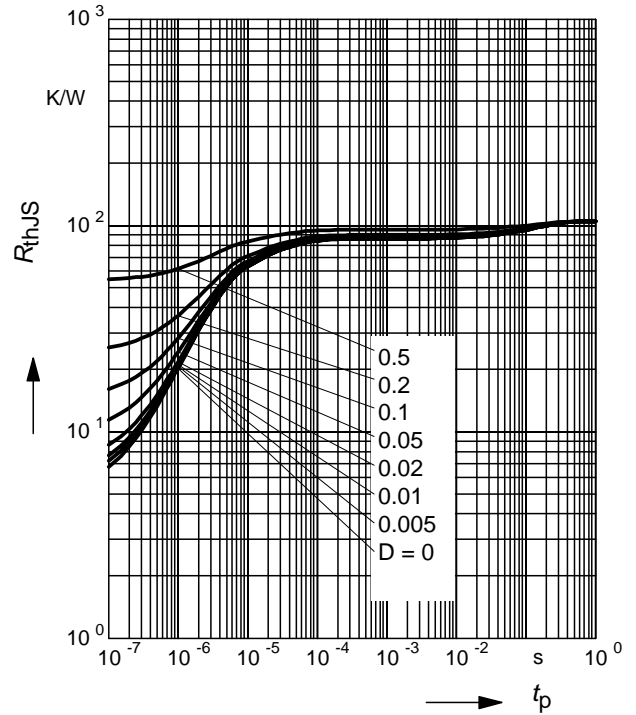
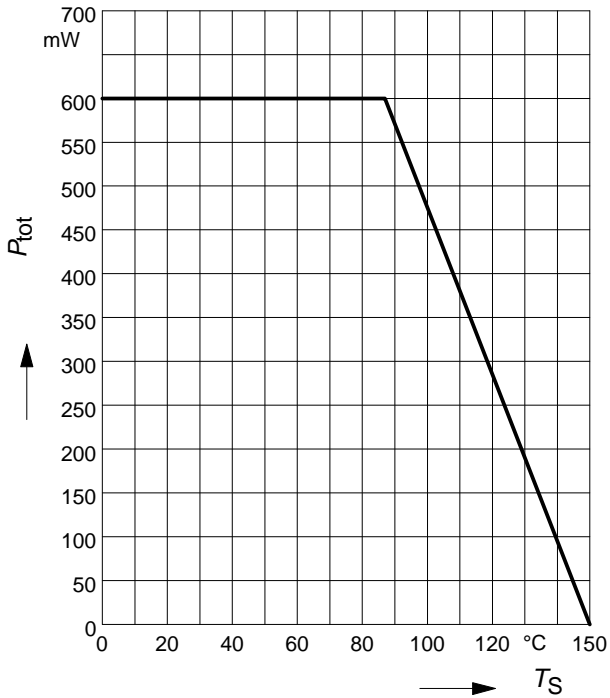
**Electrical Characteristics at  $T_A = 25^\circ\text{C}$ , unless otherwise specified**

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>AC Characteristics (verified by random sampling)</b>					
Transition frequency $I_C = 50 \text{ mA}$ , $V_{CE} = 8 \text{ V}$ , $f = 500 \text{ MHz}$	$f_T$	6	8	-	GHz
Collector-base capacitance $V_{CB} = 10 \text{ V}$ , $f = 1 \text{ MHz}$ , $V_{BE} = 0$ , emitter grounded	$C_{cb}$	-	0.59	0.9	pF
Collector emitter capacitance $V_{CE} = 10 \text{ V}$ , $f = 1 \text{ MHz}$ , $V_{BE} = 0$ , base grounded	$C_{ce}$	-	0.4	-	
Emitter-base capacitance $V_{EB} = 0.5 \text{ V}$ , $f = 1 \text{ MHz}$ , $V_{CB} = 0$ , collector grounded	$C_{eb}$	-	2.5	-	
Noise figure $I_C = 10 \text{ mA}$ , $V_{CE} = 8 \text{ V}$ , $Z_S = Z_{Sopt}$ , $f = 900 \text{ MHz}$ $I_C = 10 \text{ mA}$ , $V_{CE} = 8 \text{ V}$ , $Z_S = Z_{Sopt}$ , $f = 1.8 \text{ GHz}$	$F$	-	1	-	dB
		-	1.6	-	
Power gain, maximum available <sup>1)</sup> $I_C = 30 \text{ mA}$ , $V_{CE} = 8 \text{ V}$ , $Z_S = Z_{Sopt}$ , $Z_L = Z_{Lopt}$ , $f = 900 \text{ MHz}$ $I_C = 30 \text{ mA}$ , $V_{CE} = 8 \text{ V}$ , $Z_S = Z_{Sopt}$ , $Z_L = Z_{Lopt}$ , $f = 1.8 \text{ GHz}$	$G_{ma}$	-	16	-	
		-	10.5	-	
Transducer gain $I_C = 30 \text{ mA}$ , $V_{CE} = 8 \text{ V}$ , $Z_S = Z_L = 50\Omega$ , $f = 900 \text{ MHz}$ $I_C = 30 \text{ mA}$ , $V_{CE} = 8 \text{ V}$ , $Z_S = Z_L = 50\Omega$ , $f = 1.8 \text{ GHz}$	$ S_{21e} ^2$	-	13.5	-	dB
		-	8	-	

<sup>1)</sup>  $G_{ma} = |S_{21} / S_{12}| (k - (k^2 - 1)^{1/2})$

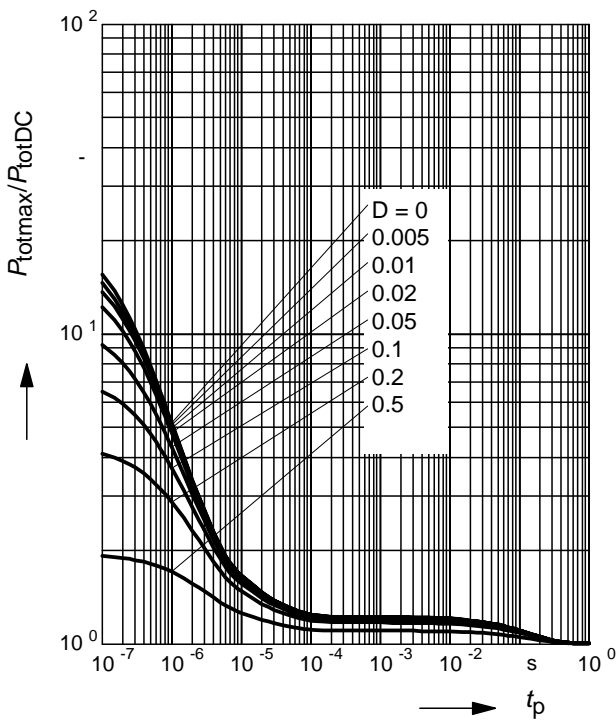
**Total power dissipation  $P_{tot} = f(T_S)$**

**Permissible Pulse Load  $R_{thJS} = f(t_p)$**

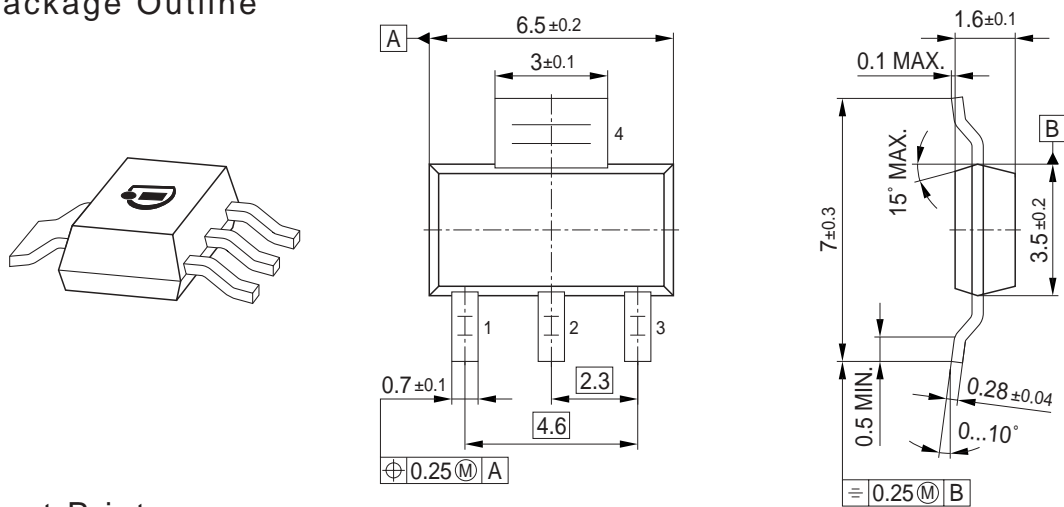


**Permissible Pulse Load**

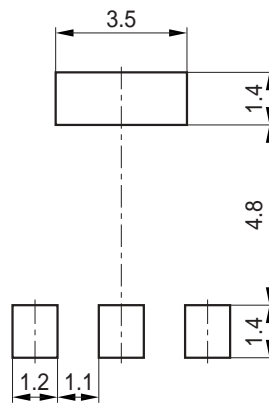
$P_{totmax}/P_{totDC} = f(t_p)$



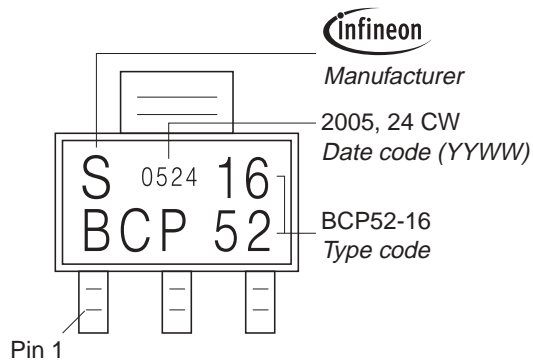
Package Outline



Foot Print

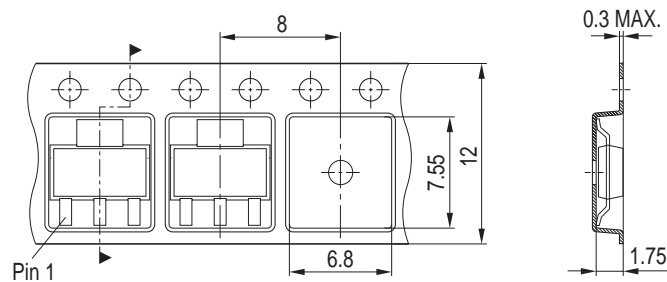


Marking Layout (Example)



Packing

Reel  $\varnothing 180 \text{ mm}$  = 1.000 Pieces/Reel  
 Reel  $\varnothing 330 \text{ mm}$  = 4.000 Pieces/Reel



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