

N-CHANNEL FETS

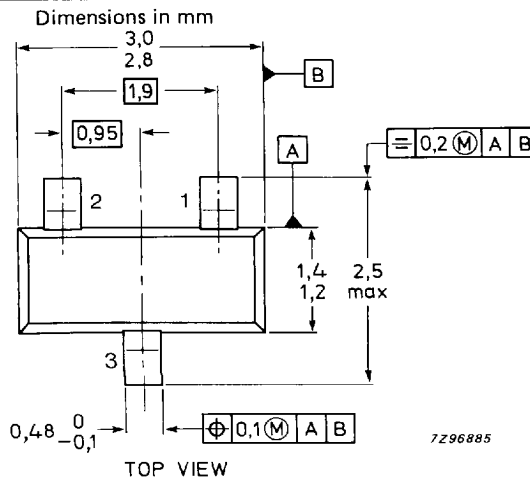
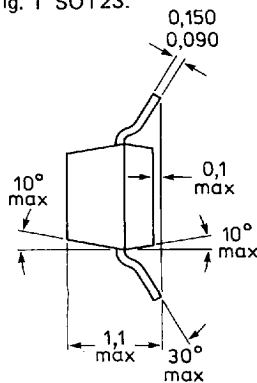
Symmetrical silicon n-channel depletion type junction field-effect transistors in a plastic microminiature envelope intended for application in thick and thin-film circuits. The transistors are intended for low-power, chopper or switching applications in industrial service.

QUICK REFERENCE DATA

			BSR56	BSR57	BSR58
Drain-source voltage	$\pm V_{DS}$	max.	40	40	40 V
Total power dissipation up to $T_{amb} = 40^\circ\text{C}$	P_{tot}	max.	250	250	250 mW
Drain current					
$V_{DS} = 15\text{ V}; V_{GS} = 0$	I_{DSS}	$>$	50	20	8 mA
		$<$	—	100	80 mA
Gate-source cut-off voltage					
$V_{DS} = 15\text{ V}; I_D = 0.5\text{ nA}$	$-V_{(P)GS}$	$>$	4	2	0.8 V
		$<$	10	6	4 V
Drain-source resistance (on) at $f = 1\text{ kHz}$					
$I_D = 0; V_{GS} = 0$	$r_{ds\text{ on}}$	$<$	25	40	60 Ω
Feedback capacitance at $f = 1\text{ MHz}$					
$-V_{GS} = 10\text{ V}; V_{DS} = 0$	C_{rs}	$<$	5	5	5 pF
Turn-off time					
$V_{DD} = 10\text{ V}; V_{GS} = 0$					
$I_D = 20\text{ mA}; -V_{GSM} = 10\text{ V}$	t_{off}	$<$	25	—	— ns
$I_D = 10\text{ mA}; -V_{GSM} = 6\text{ V}$	t_{off}	$<$	—	50	— ns
$I_D = 5\text{ mA}; -V_{GSM} = 4\text{ V}$	t_{off}	$<$	—	—	100 ns

MECHANICAL DATA

Fig. 1 SOT23.

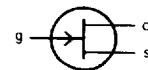


Marking code

BSR56 = M4p
BSR57 = M5p
BSR58 = M6p

Pinning

1 = drain
2 = source
3 = gate



Note: Drain and source are interchangeable.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Drain-source voltage	$\pm V_{DS}$	max.	40 V
Drain-gate voltage	V_{DGO}	max.	40 V
Gate-source voltage	$-V_{GSO}$	max.	40 V
Forward gate current	I_{GF}	max.	50 mA
Total power dissipation up to $T_{amb} = 40\text{ }^{\circ}\text{C}$ (note 1)	P_{tot}	max.	250 mW
Storage temperature range	T_{stg}		$-65\text{ to }+150\text{ }^{\circ}\text{C}$
Junction temperature	T_j	max.	150 $^{\circ}\text{C}$

THERMAL RESISTANCE

From junction to ambient (note 1)	$R_{th\ j-a}$	=	430 K/W
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CHARACTERISTICS $T_j = 25\text{ }^{\circ}\text{C}$ unless otherwise specified

Gate-source cut-off current

$V_{DS} = 0\text{ V}; -V_{GS} = 20\text{ V}$	$-I_{GSS}$	max.	1.0 nA
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Drain cut-off current

$V_{DS} = 15\text{ V}; -V_{GS} = 10\text{ V}$	I_{DSX}	max.	1.0 nA
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			BSR56	BSR57	BSR58
Drain current $V_{DS} = 15\text{ V}; V_{GS} = 0$	I_{DSS}	>	50	20	8 mA
		<	—	100	80 mA
Gate-source breakdown voltage $-I_G = 1\text{ }\mu\text{A}; V_{DS} = 0$	$-V_{(BR)GSS}$	>	40	40	40 V
Gate-source cut-off voltage $I_D = 0,5\text{ nA}; V_{DS} = 15\text{ V}$	$-V_{(P)GS}$	>	4	2	0,8 V
		<	10	6	4 V
Drain-source voltage (on) $I_D = 20\text{ mA}; V_{GS} = 0$ $I_D = 10\text{ mA}; V_{GS} = 0$ $I_D = 5\text{ mA}; V_{GS} = 0$	V_{DSon}	<	750	—	— mV
	V_{DSon}	<	—	500	— mV
	V_{DSon}	<	—	—	400 mV
Drain-source resistance (on) at $f = 1\text{ kHz}$ $I_D = 0; V_{GS} = 0; T_a = 25\text{ }^{\circ}\text{C}$	$r_{ds\ on}$	<	25	40	60 Ω
Feedback capacitance at $f = 1\text{ MHz}$ $-V_{GS} = 10\text{ V}; V_{DS} = 0$	C_{rss}	<	5	5	5 pF

Notes

1. Mounted on a ceramic substrate of 8 mm x 10 mm x 0.7 mm.

Switching times

$V_{DD} = 10\text{ V}$; $V_{GS} = 0$

Conditions I_D and $-V_{GSM}$

Delay time

Rise time

Turn-off time

		BSR56	BSR57	BSR58
I_D	=	20	10	5 mA
$-V_{GSM}$	=	10	6	4 V
Delay time	t_d	< 6	6	10 ns
Rise time	t_r	< 3	4	10 ns
Turn-off time	t_{off}	< 25	50	100 ns

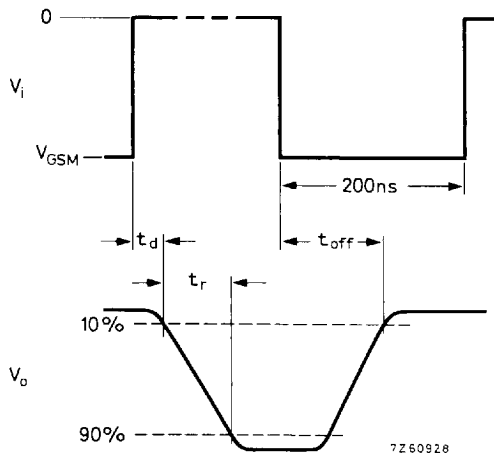


Fig. 2 Switching times waveforms.

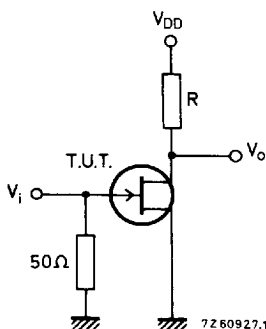


Fig. 3 Test circuit.

BSR56; $R = 464\ \Omega$
BSR57; $R = 953\ \Omega$
BSR58; $R = 1910\ \Omega$

Pulse generator

$t_r = t_f \leq 1\text{ ns}$
 $\delta = 0.02$
 $Z_o = 50\ \Omega$

Oscilloscope

$t_r \leq 0.75\text{ ns}$
 $R_i \geq 1\text{ M}\Omega$
 $C_i \leq 2.5\text{ pF}$

BSR56
BSR57
BSR58

7110826 0069568 704 PHIN

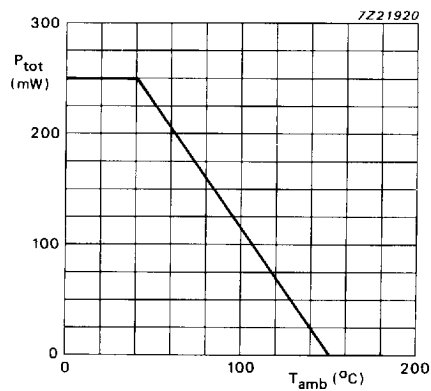


Fig.4 Power derating curve.