DISCRETE SEMICONDUCTORS

DATA SHEET

BSR56; BSR57; BSR58 N-channel FETs

Product specification File under Discrete Semiconductors, SC07 **April 1991**





N-channel FETs

BSR56; **BSR57**; **BSR58**

DESCRIPTION

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.

PINNING

1 = drain

2 = source

3 = gate

Note

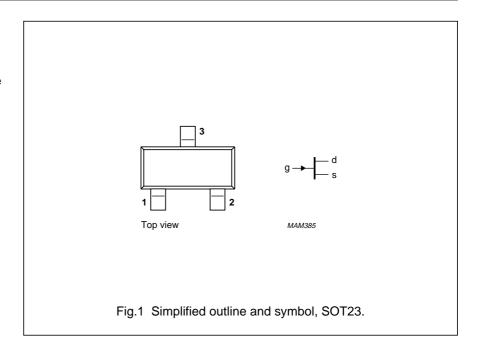
Drain and source are interchangeable.

Marking code

BSR56 = M4P

BSR57 = M5P

BSR58 = M6P



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 °C	P_{tot}	max.	250	250	250	mW	
Drain current							
$V_{DS} = 15 \text{ V}; V_{GS} = 0$		>	50	20	8	mA	
	I _{DSS}	<	-	100	80	mA	
Gate-source cut-off voltage							
$V_{DS} = 15 \text{ V}; I_D = 0.5 \text{ nA}$	M	>	4	2	0.8	V	
	$-V_{(P)GS}$	<	10	6	4	V	
Drain-source resistance (on) at f = 1 kHz							
$I_D = 0; V_{GS} = 0$	r _{ds on}	<	25	40	60	Ω	
Feedback capacitance at f = 1 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	
$I_D = 5 \text{ mA}; -V_{GSM} = 4 \text{ V}$	$t_{\rm off}$	<	-	_	100	ns	

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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	mΑ
Total power dissipation up to T _{amb} = 40 °C (note 1)	P_{tot}	max.	250	mW
Storage temperature range	T_{stg}	-65 to	+150	°C
Junction temperature	T _i	max.	150	°C

THERMAL RESISTANCE

From junction to ambient (note 1) $R_{th j-a} = 430 \text{ K/W}$

Notes

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

CHARACTERISTICS

 $T_j = 25$ °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
Drain cut-off current			
$V_{DS} = 15 \text{ V}; -V_{GS} = 10 \text{ V}$	I_{DSX}	max.	1.0 nA

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Drain current						•		
$V_{DS} = 15 \text{ V}; V_{GS} = 0$		>	50	20	8	mΑ		
	I _{DSS}	<	_	100	80	mA		
Gate-source breakdown voltage								
$-I_G = 1 \mu A; V_{DS} = 0$	$-V_{(BR)GSS}$	>	40	40	40	V		
Gate-source cut-off voltage								
$I_D = 0.5 \text{ nA}; V_{DS} = 15 \text{ V}$	V	>	4	2	0.8	V		
ID = 0.3 IIA, VDS = 13 V	$-V_{(P)GS}$	<	10	6	4	V		
Drain-source voltage (on)								
$I_D = 20 \text{ mA}; V_{GS} = 0$	V_{DSon}	<	750	_	_	mV		
$I_D = 10 \text{ mA}; V_{GS} = 0$	V_{DSon}	<	-	500	_	mV		
$I_D = 5 \text{ mA}; V_{GS} = 0$	V_{DSon}	<	_	_	400	mV		
Drain-source resistance (on) at f = 1 kHz								
$I_D = 0$; $V_{GS} = 0$; $T_a = 25 ^{\circ}C$	r _{ds on}	<	25	40	60	Ω		
Feedback capacitance at f = 1 MHz								
$-V_{GS} = 10 \text{ V}; V_{DS} = 0$	C_{rss}	<	5	5	5	pF		

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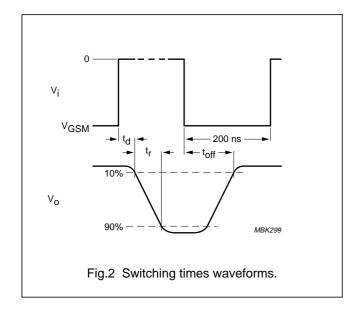
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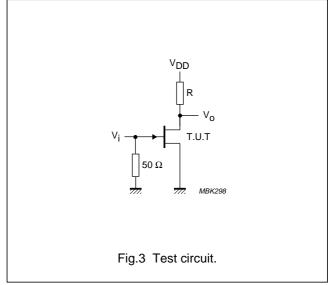
Switching times

Turn-off time

 V_{DD} = 10 V; V_{GS} = 0 Conditions I_D and $-V_{GSM}$ Delay time Rise time

		BSR56	BSR57	BSR58	
I_D	=	20	10	5	mΑ
$-V_{GSM}$	=	10	6	4	V
t_d	<	6	6	10	ns
t _r	<	3	4	10	ns
t_{off}	<	25	50	100	ns





BSR56; $R = 464 \Omega$

BSR57; $R = 953 \Omega$

BSR58; R = 1910 Ω

Pulse generator

 $t_r = t_f \le 1 \text{ ns}$

 δ = 0.02

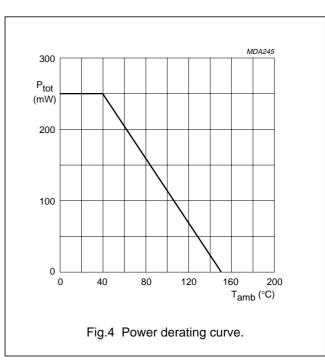
 $Z_o = 50 \Omega$

Oscilloscope

 $t_r \leq 0.75 \text{ ns}$

 $R_i \geq 1 M\Omega$

 $C_i \leq 2.5 pF$



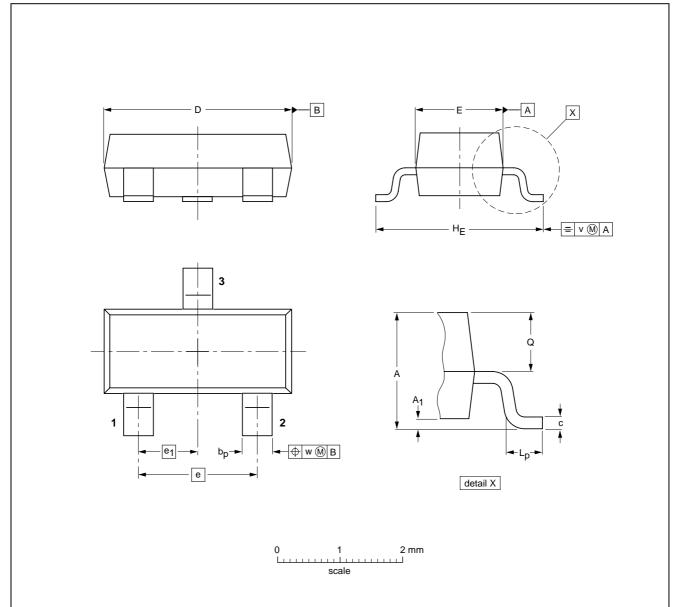
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PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT23



DIMENSIONS (mm are the original dimensions)

UNIT	Α	A ₁ max.	bp	С	D	E	е	e ₁	HE	Lp	Q	٧	w
mm	1.1 0.9	0.1	0.48 0.38	0.15 0.09	3.0 2.8	1.4 1.2	1.9	0.95	2.5 2.1	0.45 0.15	0.55 0.45	0.2	0.1

OUTLINE		REFERENCES			EUROPEAN ISSUE DATE		
VERSION	IEC	JEDEC	EIAJ		PROJECTION	ISSUE DATE	
SOT23						97-02-28	

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DEFINITIONS

Data sheet status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Short-form specification	The data in this specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.
Limiting values	

Limiting values

Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

Application information

Where application information is given, it is advisory and does not form part of the specification.

LIFE SUPPORT APPLICATIONS

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