DATA SHEET

BSS83
MOSFET N-channel enhancement switching transistor

Product specification
File under Discrete Semiconductors, SC07

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Philips
Semiconductors

PHILIPS

MOSFET N-channel enhancement switching transistor BSS83

DESCRIPTION

Symmetrical insulated-gate silicon MOS field-effect transistor of the N-channel enhancement mode type. The transistor is sealed in a SOT143 envelope and features a low ON resistance and low capacitances. The transistor is protected against excessive input voltages by integrated back-to-back diodes between gate and substrate.

APPLICATIONS

- analog and/or digital switch
- switch driver

PINNING

1 = substrate (b)
2 = source
3 = drain
4 = gate

Note

1. Drain and source are interchangeable.

Marking code:

BSS83 = M74

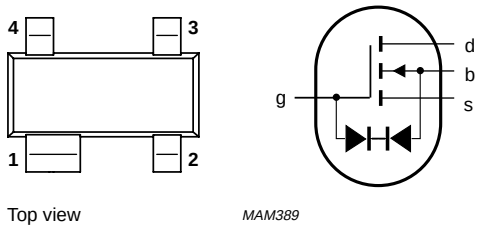

Fig.1 Simplified outline and symbol.

QUICK REFERENCE DATA

Drain-source voltage	V_{DS}	max.	10	V
Source-drain voltage	V_{SD}	max.	10	V
Drain-substrate voltage	V_{DB}	max.	15	V
Source-substrate voltage	V_{SB}	max.	15	V
Drain current (DC)	I_D	max.	50	mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.	230	mW
Gate-source threshold voltage				
$V_{DS} = V_{GS}$; $V_{SB} = 0$;	$V_{GS(th)}$	>	0.1	V
I_D = 1 µA		<	2.0	V
Drain-source ON-resistance				
V_{GS} = 10 V; V_{SB} = 0; I_D = 0.1 mA	R_{DSon}	<	45	Ω
Feed-back capacitance				
$V_{GS} = V_{BS}$ = –15 V;				
V_{DS} = 10 V; f = 1 MHz	C_{rss}	typ.	0.6	pF

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RATINGS

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

Drain-source voltage	V_{DS}	max.	10	V
Source-drain voltage	V_{SD}	max.	10	V
Drain-substrate voltage	V_{DB}	max.	15	V
Source-substrate voltage	V_{SB}	max.	15	V
Drain current (DC)	I_D	max.	50	mA
Total power dissipation up to T_{amb} = 25 °C(1)	P_{tot}	max.	230	mW
Storage temperature range	T_{stg}	−65 to +	150	°C
Junction temperature	T_j	max.	125	°C

THERMAL RESISTANCE

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

CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified

Drain-source breakdown voltage				
$V_{GS} = V_{BS} = -5$ V; I_D = 10 nA	$V_{(BR)DSX}$	>	10	V
Source-drain breakdown voltage				
$V_{GD} = V_{BD} = -5$ V; I_D = 10 nA	$V_{(BR)SDX}$	>	10	V
Drain-substrate breakdown voltage				
V_{GB} = 0; I_D = 10 nA; open source	$V_{(BR)DBO}$	>	15	V
Source-substrate breakdown voltage				
V_{GB} = 0; I_D = 10 nA; open drain	$V_{(BR)SBO}$	>	15	V
Drain-source leakage current				
$V_{GS} = V_{BS} = -2$ V; V_{DS} = 6,6 V	I_{DSoff}	<	10	nA
Source-drain leakage current				
$V_{GD} = V_{BD} = -2$ V; V_{SD} = 6,6 V	I_{SDoff}	<	10	nA
Forward transconductance at f = 1 kHz				
V_{DS} = 10 V; V_{SB} = 0; I_D = 20 mA	g_{fs}	>	10	mS
		typ.	15	mS
Gate-source threshold voltage				
$V_{DS} = V_{GS}$; V_{SB} = 0; I_D = 1 μA	$V_{GS(th)}$	>	0,1	V
		<	2,0	V
Drain-source ON-resistance				
I_D = 0,1 mA;				
V_{GS} = 5 V; V_{SB} = 0	R_{DSon}	<	70	Ω
V_{GS} = 10 V; V_{SB} = 0	R_{DSon}	<	45	Ω
V_{GS} = 3,2 V; V_{SB} = 6,8 V (see Fig.4)	R_{DSon}	typ.	80	Ω
		<	120	Ω
Gate-substrate zener voltages				
$V_{DB} = V_{SB}$ = 0; $-I_G$ = 10 μA	$V_{Z(1)}$	>	12,5	V
$V_{DB} = V_{SB}$ = 0; $+I_G$ = 10 μA	$V_{Z(2)}$	>	12,5	V
Capacitances at f = 1 MHz				
$V_{GS} = V_{BS} = -15$ V; V_{DS} = 10 V				
Feed-back capacitance	C_{rss}	typ.	0,6	pF
Input capacitance	C_{iss}	typ.	1,5	pF
Output capacitance	C_{oss}	typ.	1,0	pF
Switching times (see Fig.2)				
V_{DD} = 10 V; V_i = 5 V	t_{on}	typ.	1,0	ns
	t_{off}	typ.	5,0	ns

Note

1. Device mounted on a ceramic substrate of 8 mm × 10 mm × 0,7 mm.

Pulse generator:

R_i	=	50 Ω
t_r	<	0,5 ns
t_f	<	1,0 ns
t_p	=	20 ns
δ	<	0,01

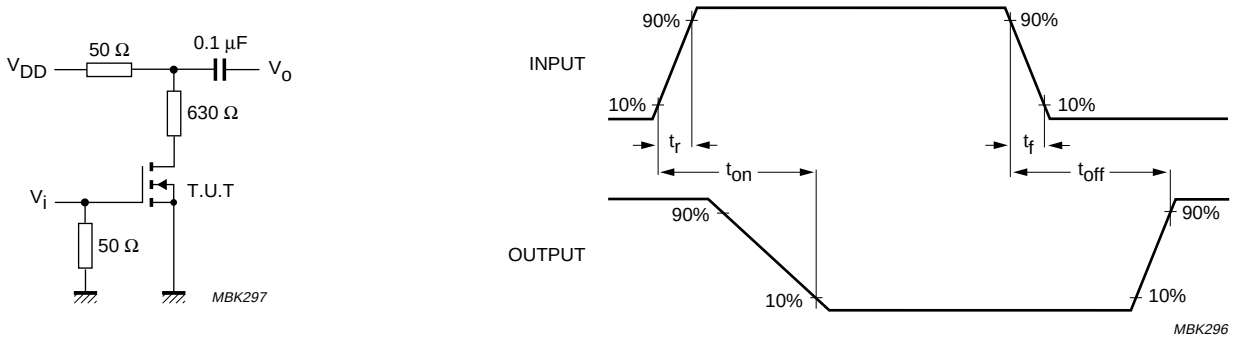
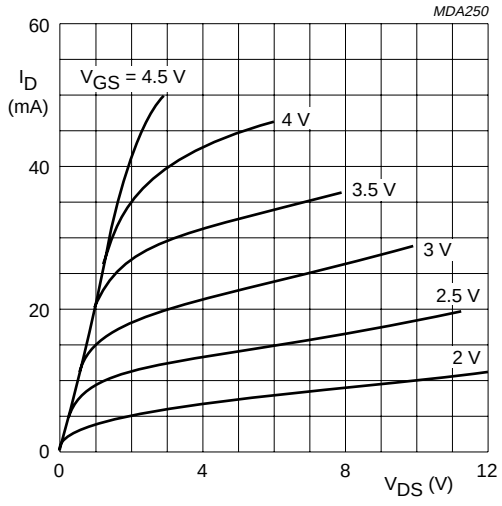
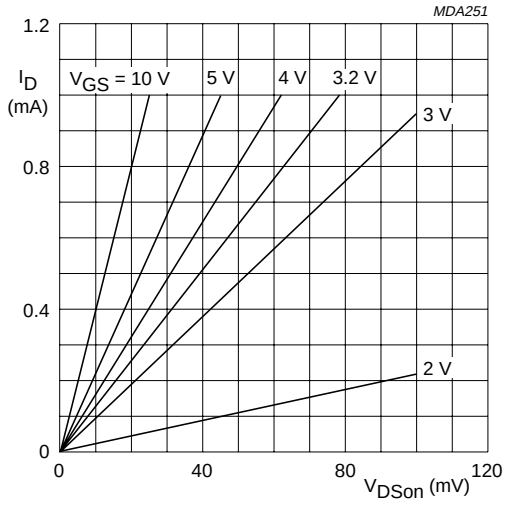


Fig.2 Switching times test circuit and input and output waveforms.



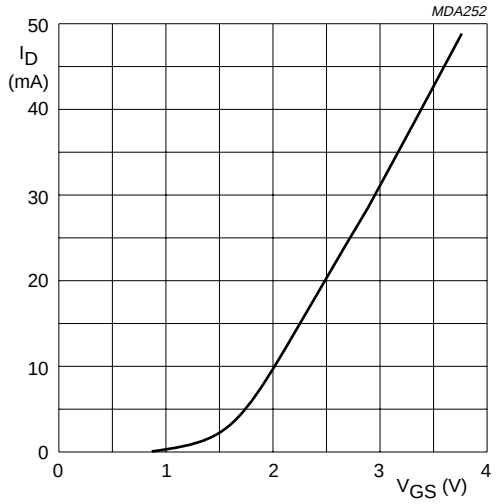
T_j = 25 °C.

Fig.3 V_{SB} = 0; typical values.



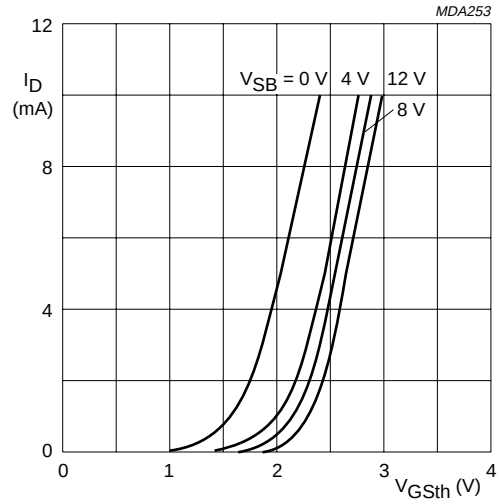
T_j = 25 °C.

Fig.4 V_{SB} = 6,8 V; typical values.



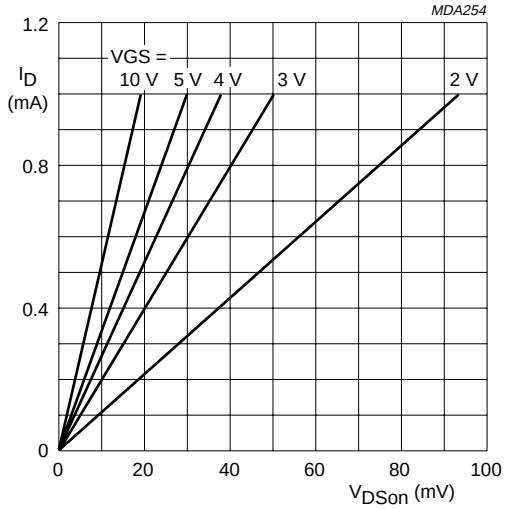
T_j = 25 °C.

Fig.5 V_{DS} = 10 V; V_{BS} = 0; typical values.



T_j = 25 °C.

Fig.6 V_{DS} = V_{GS} = $V_{GS(th)}$.

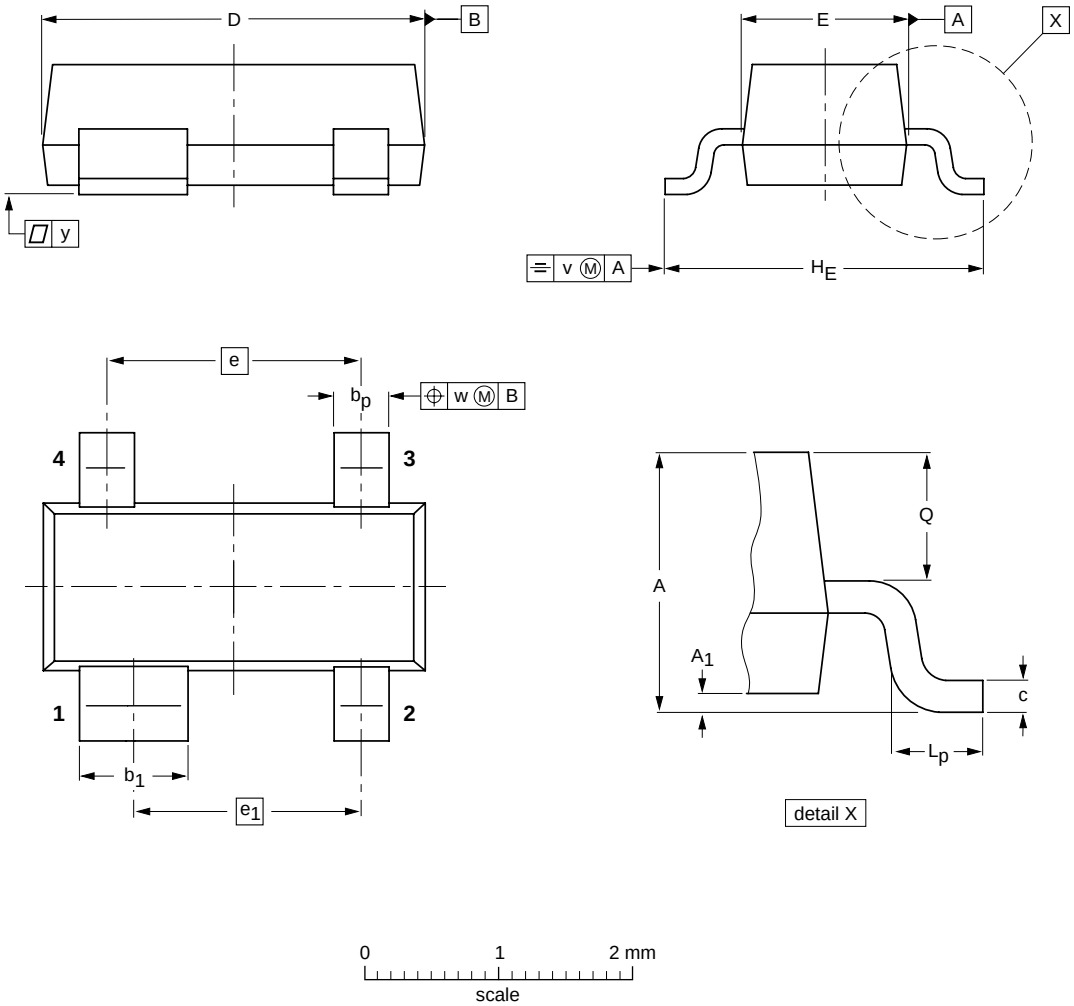


T_j = 25 °C.

Fig.7 V_{SB} = 0; typical values.

PACKAGE OUTLINE

Plastic surface mounted package; 4 leads **SOT143B**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1 max	b_p	b_1	c	D	E	e	e_1	H_E	L_p	Q	v	w	y
mm	1.1 0.9	0.1	0.48 0.38	0.88 0.78	0.15 0.09	3.0 2.8	1.4 1.2	1.9	1.7	2.5 2.1	0.45 0.15	0.55 0.45	0.2	0.1	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT143B						97-02-28

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 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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