DATA SHEET

BSP145
N-channel enhancement mode vertical D-MOS transistor

Product specification
File under Discrete Semiconductors, SC07

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Philips Semiconductors

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N-channel enhancement mode vertical D-MOS transistor

BSP145

FEATURES

- Direct interface to C-MOS, TTL, etc.
- High speed switching
- No secondary breakdown.

APPLICATIONS

- Intended for applications in relay, high speed and line transformer drivers.

DESCRIPTION

N-channel enhancement mode vertical D-MOS transistor in a SOT223 plastic SMD package.

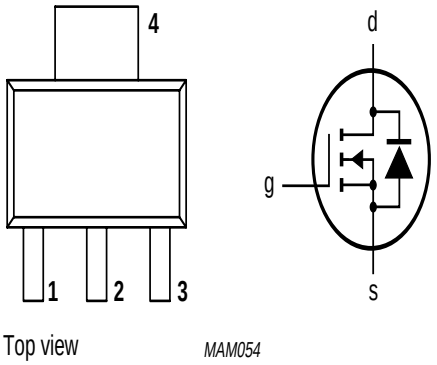


Fig.1 Simplified outline and symbol.

PINNING - SOT223

PIN	SYMBOL	DESCRIPTION
1	g	gate
2	d	drain
3	s	source
4	d	drain

CAUTION
The device is supplied in an antistatic package. The gate-source input must be protected against static discharge during transport or handling.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
V_{DS}	drain-source voltage		–	450	V
V_{GSO}	gate-source voltage	open drain	–	±20	V
V_{GSth}	gate-source threshold voltage	I_D = 1 mA; V_{DS} = V_{GS}	3	4	V
I_D	drain current		–	250	mA
R_{DSon}	drain-source on-state resistance	I_D = 100 mA; V_{GS} = 10 V	10	14	Ω
P_{tot}	total power dissipation	up to T_{amb} = 25 °C	–	1.5	W

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{DS}	drain-source voltage		–	450	V
V_{GSO}	gate-source voltage	open drain	–	±20	V
I_D	drain current		–	250	mA
I_{DM}	peak drain current		–	1	A
P_{tot}	total power dissipation	up to T_{amb} = 25 °C; note 1	–	1.5	W
T_{stg}	storage temperature		–65	+150	°C
T_j	operating junction temperature		–	150	°C

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	83.3	K/W

Note to the “Limiting values” **and** “Thermal characteristics”

1. Device mounted on an epoxy printed-circuit board, 40 × 40 × 1.5 mm; mounting pad for drain lead minimum 6 cm^2.

CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)DSS}$	drain-source breakdown voltage	V_{GS} = 0; I_D = 10 μA	450	–	–	V
V_{GSth}	gate-source threshold voltage	V_{DS} = V_{GS}; I_D = 1 mA	2	3	4	V
I_{DSS}	drain-source leakage current	V_{GS} = 0; V_{DS} = 350 V	–	–	1	μA
I_{GSS}	gate leakage current	V_{DS} = 0; V_{GS} = ±20 V	–	–	±100	nA
R_{DSon}	drain-source on-state resistance	V_{GS} = 10 V; I_D = 100 mA	–	10	14	Ω
$\lvert y_{fs} \rvert$	forward transfer admittance	V_{DS} = 25 V; I_D =250 mA	200	–	–	mS
C_{iss}	input capacitance	V_{GS} = 0; V_{DS} = 25 V; f = 1 MHz	–	90	120	pF
C_{oss}	output capacitance	V_{GS} = 0; V_{DS} = 25 V; f = 1 MHz	–	25	35	pF
C_{rss}	reverse transfer capacitance	V_{GS} = 0; V_{DS} = 25 V; f = 1 MHz	–	2	5	pF
Switching times (see Figs 2 and 3)						
t_{on}	turn-on time	V_{GS} = 0 to 10 V; V_{DD} = 200 V; I_D = 100 mA	–	–	10	ns
t_{off}	turn-off time	V_{GS} = 10 to 0 V; V_{DD} =200 V; I_D = 100 mA	–	–	100	ns

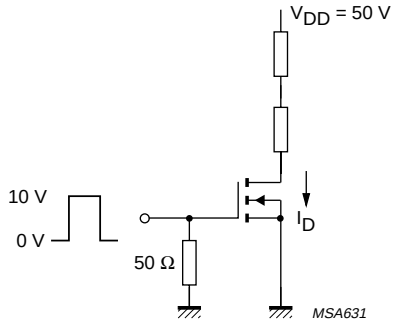


Fig.2 Switching time test circuit.

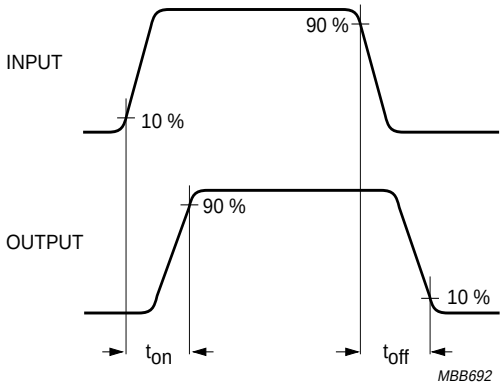


Fig.3 Input and output waveforms.

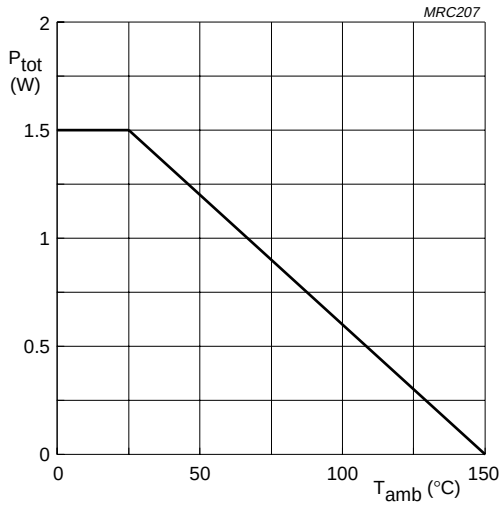
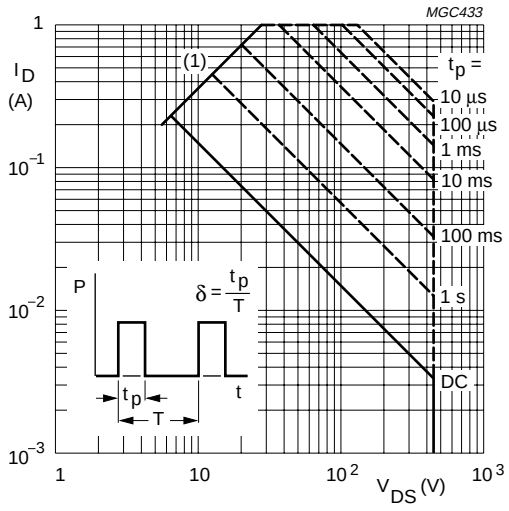
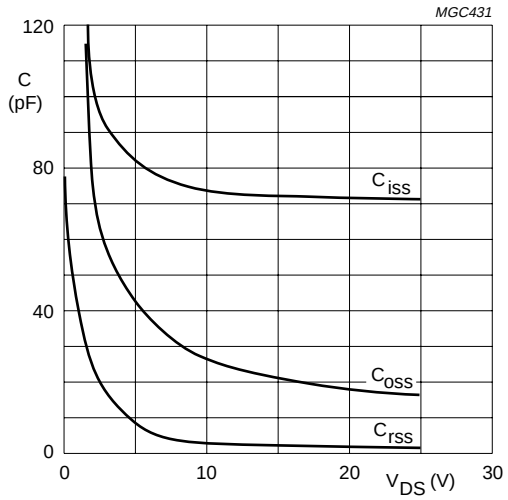


Fig.4 Power derating curve.



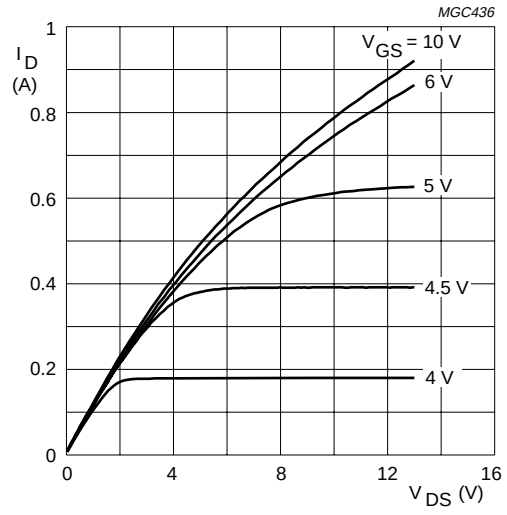
δ = 0.01.
T_{amb} = 25 °C.
(1) R_{DSon} limitation.

Fig.5 DC SOAR.



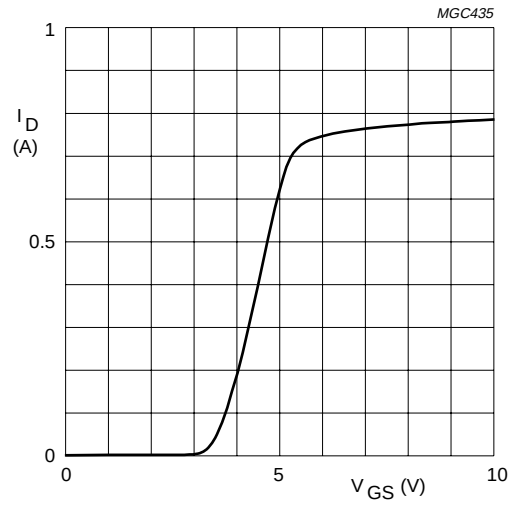
V_{GS} = 0.
T_j = 25 °C.
f = 1 MHz.

Fig.6 Capacitance as a function of drain source voltage; typical values.



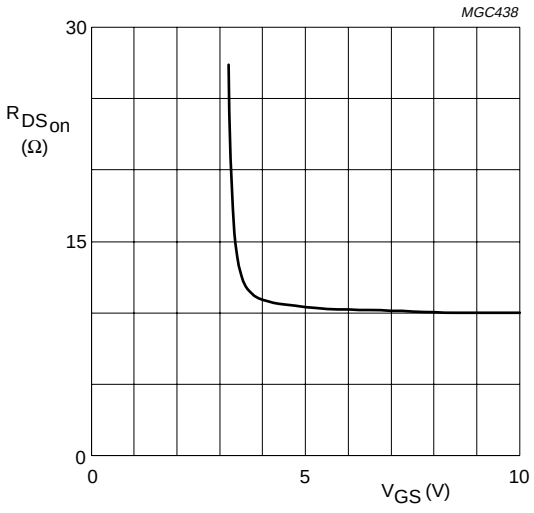
T_j = 25 °C.

Fig.7 Typical output characteristics.



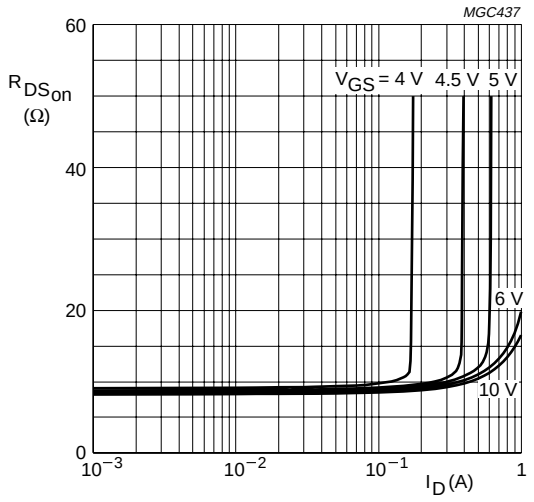
V_{DS} = 10 V.
T_j = 25 °C.

Fig.8 Typical transfer characteristics.



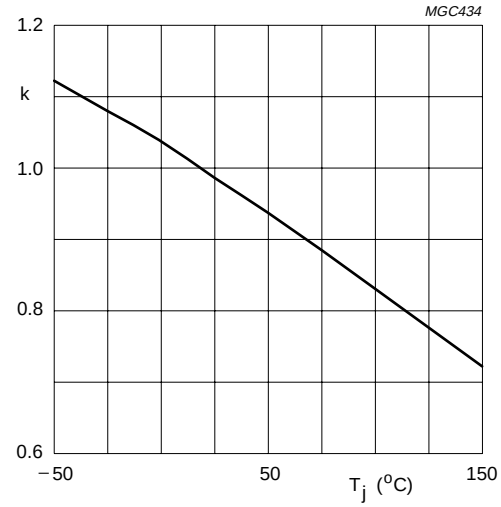
I_D = 10 mA.
T_j = 25 °C.

Fig.9 Drain-source on-state resistance as a function of gate-source voltage; typical values.



T_j = 25 °C.

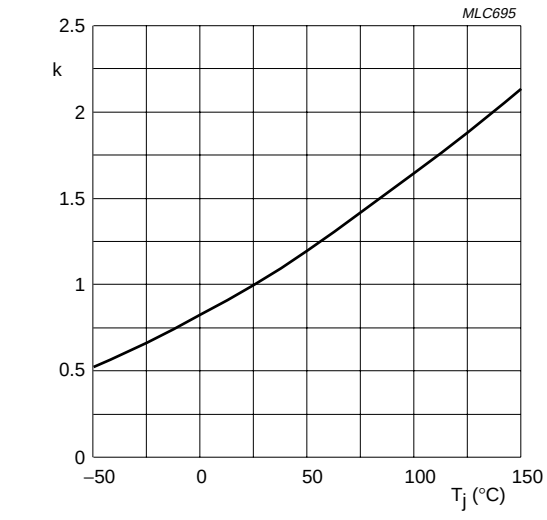
Fig.10 Drain-source on-state resistance as a function of drain current; typical values.



$$k = \frac{V_{GSth} \text{ at } T_j}{V_{GSth} \text{ at } 25\ °C}$$

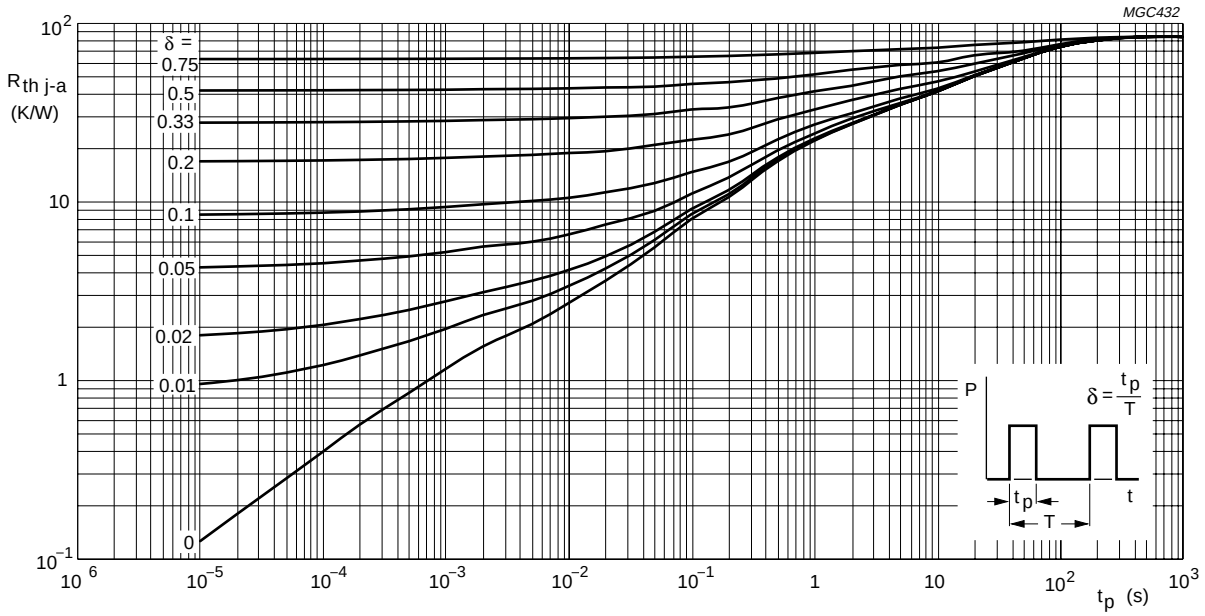
I_D = 1 mA; $V_{DS} = V_{GS}$.

Fig.11 Temperature coefficient of gate-source threshold voltage.



$$k = \frac{R_{DSon} \text{ at } T_j}{R_{DSon} \text{ at } 25\ °C}$$

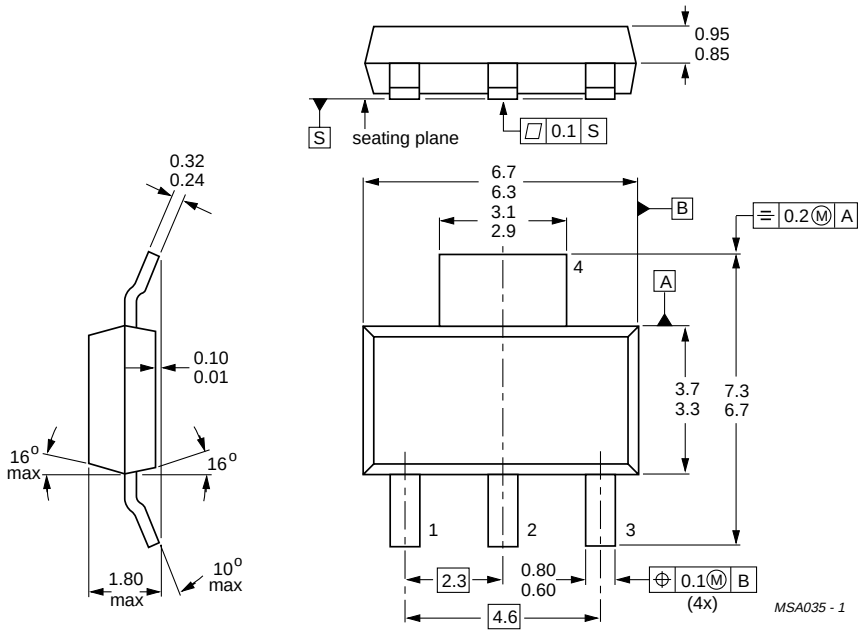
Fig.12 Temperature coefficient of drain-source on-state resistance.



T_{amb} = 25 °C.

Fig.13 Thermal resistance from junction to ambient as a function of pulse time; typical values.

PACKAGE OUTLINE



Dimensions in mm.

Fig.14 SOT223.

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.
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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