DATA SHEET

J111; J112; J113
N-channel silicon field-effect transistors

Product specification
File under Discrete Semiconductors, SC07

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Philips
Semiconductors

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N-channel silicon field-effect transistors J111; J112; J113

DESCRIPTION

Symmetrical silicon n-channel junction FETs in plastic TO-92 envelopes. They are intended for applications such as analog switches, choppers, commutators etc.

FEATURES

- High speed switching
- Interchangeability of drain and source connections
- Low $R_{DS\ on}$ at zero gate voltage

PINNING

1 = gate
2 = source
3 = drain

Note: Drain and source are interchangeable.

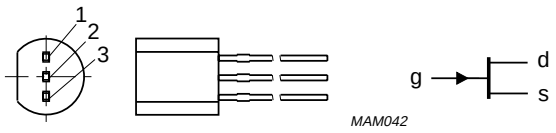


Fig.1 Simplified outline and symbol, TO-92.

QUICK REFERENCE DATA

			J111	J112	J113	
Drain-source voltage	$\pm V_{DS}$	max.	40	40	40	V
Drain current						
V_{DS} = 15 V; V_{GS} = 0	I_{DSS}	min.	20	5	2	mA
Total power dissipation						
up to T_{amb} = 50 °C	P_{tot}	max.	400	400	400	mW
Gate-source cut-off voltage						
V_{DS} = 5 V; I_D = 1 μA	$-V_{GS\ off}$	min.	3	1	0.5	V
		max.	10	5	3	V
Drain-source on-state resistance						
V_{DS} = 0.1 V; V_{GS} = 0	$R_{DS\ on}$	max.	30	50	100	Ω

RATINGS

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

Drain-source voltage	$\pm V_{DS}$	max.	40	V
Gate-source voltage	$-V_{GSO}$	max.	40	V
Gate-drain voltage	$-V_{GDO}$	max.	40	V
Gate forward current (DC)	I_G	max.	50	mA
Total power dissipation				
up to T_{amb} = 50 °C	P_{tot}	max.	400	mW
Storage temperature range	T_{stg}		−65 to + 150	°C
Junction temperature	T_j	max.	150	°C

THERMAL RESISTANCE

From junction to ambient in free air	$R_{th\ j\text{-}a}$	=	250	K/W

STATIC CHARACTERISTICS

T_j = 25 °C unless otherwise specified

			J111	J112	J113	
Gate reverse current						
$-V_{GS}$ = 15 V; V_{DS} = 0	$-I_{GSS}$	max.	1	1	1	nA
Drain cut-off current						
V_{DS} = 5 V; $-V_{GS}$ = 10 V	$-I_{DSX}$	max.	1	1	1	nA
Drain saturation current						
V_{DS} = 15 V; V_{GS} = 0	I_{DSS}	min.	20	5	2	mA
Gate-source breakdown voltage						
$-I_G$ = 1 μA; V_{DS} = 0	$-V_{(BR)GSS}$	min.	40	40	40	V
Gate-source cut-off voltage						
V_{DS} = 5 V; I_D = 1 μA	$-V_{GS\ off}$	min.	3	1	0.5	V
		max.	10	5	3	V
Drain-source on-state resistance						
V_{DS} = 0.1 V; V_{GS} = 0	R_{DSon}	max.	30	50	100	Ω

DYNAMIC CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Input capacitance			
V_{DS} = 0; $-V_{GS}$ = 10 V; f = 1 MHz	C_{is}	typ.	6 pF
V_{DS} = $-V_{GS}$ = 0; f = 1 MHz	C_{is}	typ.	22 pF
		max.	28 pF
Feedback capacitance			
V_{DS} = 0; $-V_{GS}$ = 10 V; f = 1 MHz	C_{rs}	typ.	3 pF
Switching times			
test conditions			
V_{DD} = 10 V; V_{GS} = 0 to V_{GSoff}			
$-V_{GS\ off}$ = 12 V; R_L = 750 Ω for J111			
$-V_{GS\ off}$ = 7 V; R_L = 1550 Ω for J112			
$-V_{GS\ off}$ = 5 V; R_L = 3150 Ω for J113			
Rise time	t_r	typ.	6 ns
Turn-on time	t_{on}	typ.	13 ns
Fall time	t_f	typ.	15 ns
Turn-off time	t_{off}	typ.	35 ns

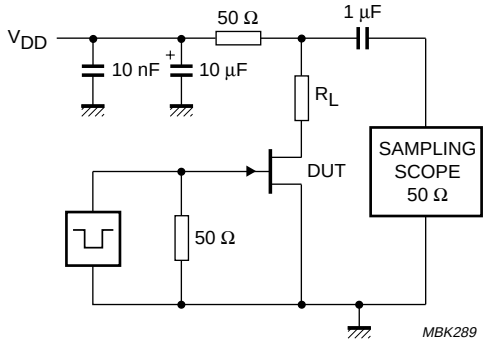


Fig.2 Switching times test circuit.

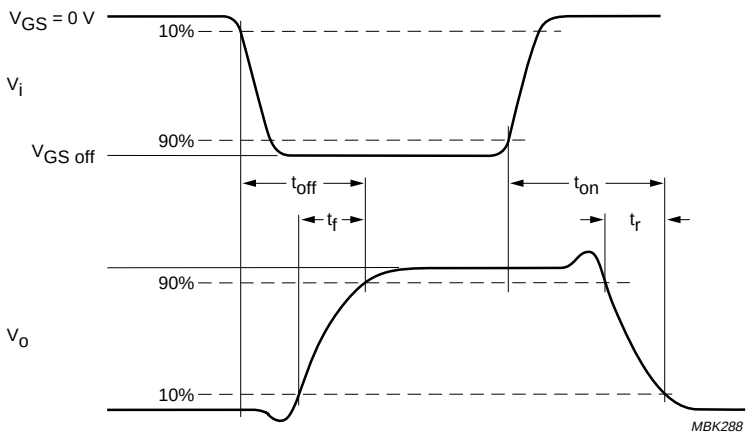
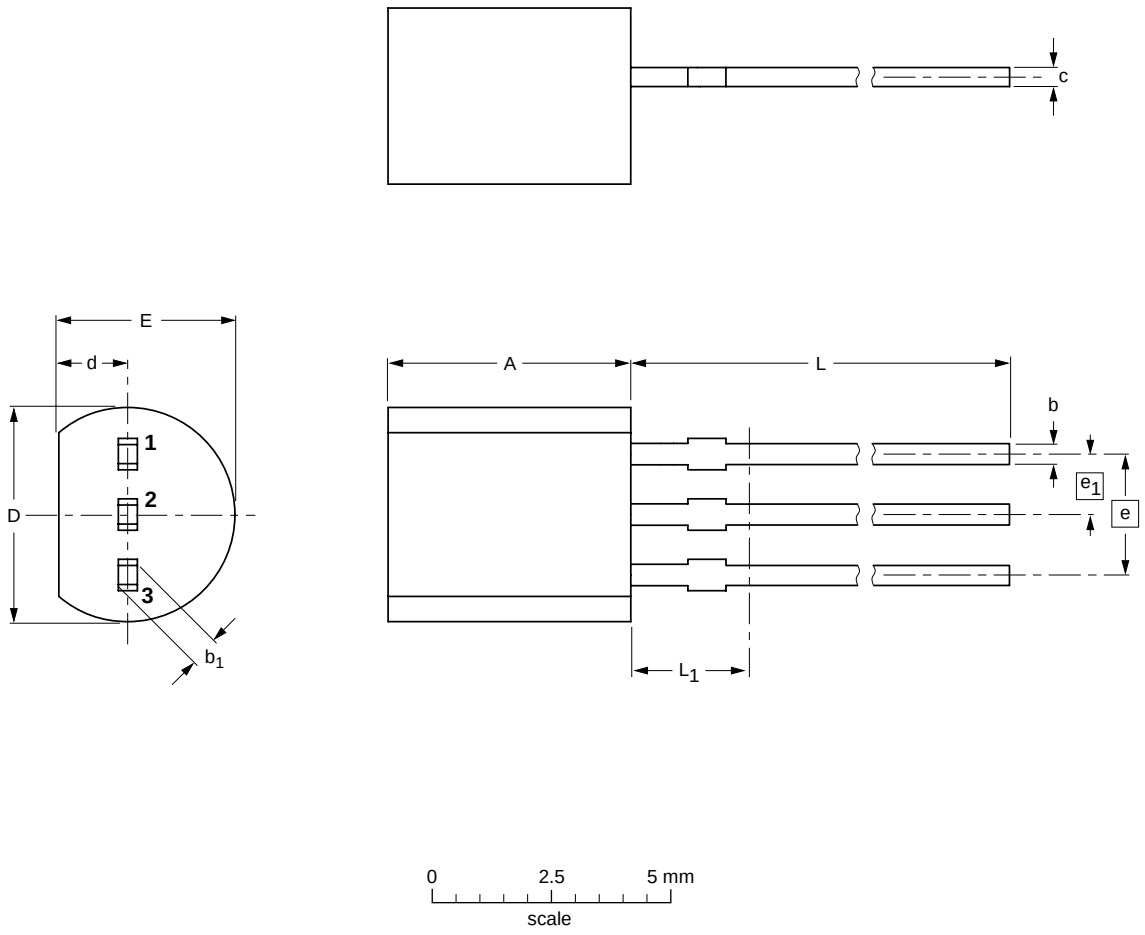


Fig.3 Input and output waveforms.

PACKAGE OUTLINE

Plastic single-ended leaded (through hole) package; 3 leads **SOT54**



DIMENSIONS (mm are the original dimensions)

UNIT	A	b	b_1	c	D	d	E	e	e_1	L	L_1(1)
mm	5.2 5.0	0.48 0.40	0.66 0.56	0.45 0.40	4.8 4.4	1.7 1.4	4.2 3.6	2.54	1.27	14.5 12.7	2.5

Note

1. Terminal dimensions within this zone are uncontrolled to allow for flow of plastic and terminal irregularities.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT54		TO-92	SC-43			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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