DATA SHEET

PN4391 to 4393
N-channel silicon field-effect transistors

Product specification
File under Discrete Semiconductors, SC07

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Philips
Semiconductors

PHILIPS

N-channel silicon field-effect transistors PN4391 to 4393

DESCRIPTION

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

PINNING

1 = gate
2 = source
3 = drain

Note: Drain and source are interchangeable.

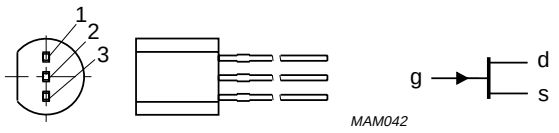


Fig.1 Simplified outline and symbol, TO-92.

QUICK REFERENCE DATA

Drain-source voltage	$\pm V_{DS}$	max.		40		V
Total power dissipation						
up to T_{amb} = 25 °C	P_{tot}	max.		360		mW
			PN4391	**PN4392**	**PN4393**	
Drain current						
V_{DS} = 20 V; V_{GS} = 0	I_{DSS}	min.	50	25	5	mA
Gate-source cut-off voltage						
V_{DS} = 20 V; I_D = 1 nA	$-V_{GS\ off}$	min.	4	2	0.5	V
		max.	10	5	3	V
Drain-source on-resistance						
I_D = 1 mA; V_{GS} = 0	$R_{DS\ on}$	max.	30	60	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
Forward gate current (DC)	I_G	max.	50	mA
Total power dissipation				
up to T_{amb} = 25 °C	P_{tot}	max.	360	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	$R_{th\ j\text{-}a}$	=	350	K/W

STATIC CHARACTERISTICS

T_j = 25 °C unless otherwise specified

			PN4391	PN4392	PN4393	
Reverse gate current						
$-V_{GS}$ = 20 V; V_{DS} = 0	$-I_{GSS}$	max.	1.0	1.0	1.0	nA
$-V_{GS}$ = 20 V; V_{DS} = 0						
T_{amb} = 100 °C	$-I_{GSS}$	max.	200	200	200	nA
Drain cut-off current						
$-V_{GS}$ = 12 V; V_{DS} = 20 V	I_{DSX}	max.	1.0			nA
$-V_{GS}$ = 7 V; V_{DS} = 20 V	I_{DSX}	max.		1.0		nA
$-V_{GS}$ = 5 V; V_{DS} = 20 V	I_{DSX}	max.			1.0	nA
$-V_{GS}$ = 12 V; V_{DS} = 20 V; T_{amb} = 100 °C	I_{DSX}	max.	200			nA
$-V_{GS}$ = 7 V; V_{DS} = 20 V; T_{amb} = 100 °C	I_{DSX}	max.		200		nA
$-V_{GS}$ = 5 V; V_{DS} = 20 V; T_{amb} = 100 °C	I_{DSX}	max.			200	nA
Drain saturation current						
V_{DS} = 20 V; V_{GS} = 0	I_{DSS}	min.	50	25	5	mA
		max.	150	100	60	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} = 20 V; I_D = 1 nA	$-V_{GS\ off}$	min.	4.0	2.0	0.5	V
		max.	10	5.0	3.0	V
Drain-source on-resistance						
I_D = 1 mA; V_{GS} = 0	$R_{DS\ on}$	max.	30	60	100	Ω
Drain-source on-voltage						
V_{GS} = 0; I_D = 12 mA	$V_{DS\ on}$	max.	0.4			V
V_{GS} = 0; I_D = 6 mA	$V_{DS\ on}$	max.		0.4		V
V_{GS} = 0; I_D = 3 mA	$V_{DS\ on}$	max.			0.4	V

DYNAMIC CHARACTERISTICS

T_j = 25 °C unless otherwise specified

			PN4391	PN4392	PN4393	
Drain-source on-resistance						
V_{DS} = 0 V; V_{GS} = 0; f = 1 kHz; T_a = 25 °C	$R_{DS\ on}$	max.	30	60	100	Ω
Input capacitance						
V_{DS} = 20 V; V_{GS} = 0; f = 1 MHz; T_a = 25 °C	C_{iss}	max.	16	16	16	pF
Feedback capacitance						
V_{DS} = 0; $-V_{GS}$ = 12 V | f = 1 MHz	C_{rss}	max.	5			pF
V_{DS} = 0; $-V_{GS}$ = 7 V | f = 1 MHz	C_{rss}	max.		5		pF
V_{DS} = 0; $-V_{GS}$ = 5 V | f = 1 MHz	C_{rss}	max.			5	pF
Switching times						
test conditions						
V_{DD} = 10 V; V_{GS} = 0 to $V_{GS\ off}$	I_D	=	12	6.0	3.0	mA
	$-V_{GS\ off}$	=	12	7.0	5.0	V
	R_L	=	750	1550	3150	Ω
Rise time	t_r	max.	5	5	5	ns
Turn-on time	t_{on}	max.	15	15	15	ns
Fall time	t_f	max.	15	20	30	ns
Turn-off time	t_{off}	max.	20	35	50	ns

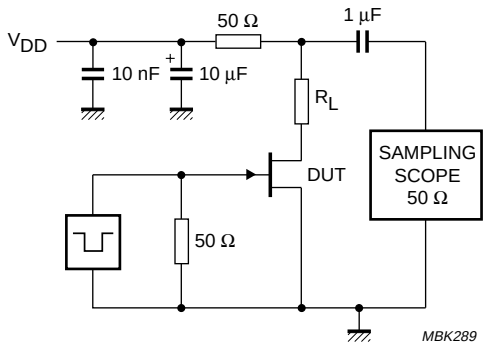


Fig.2 Switching times test circuit.

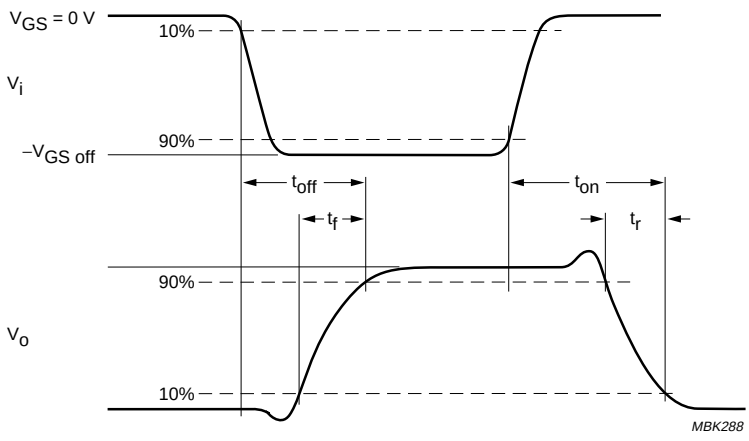
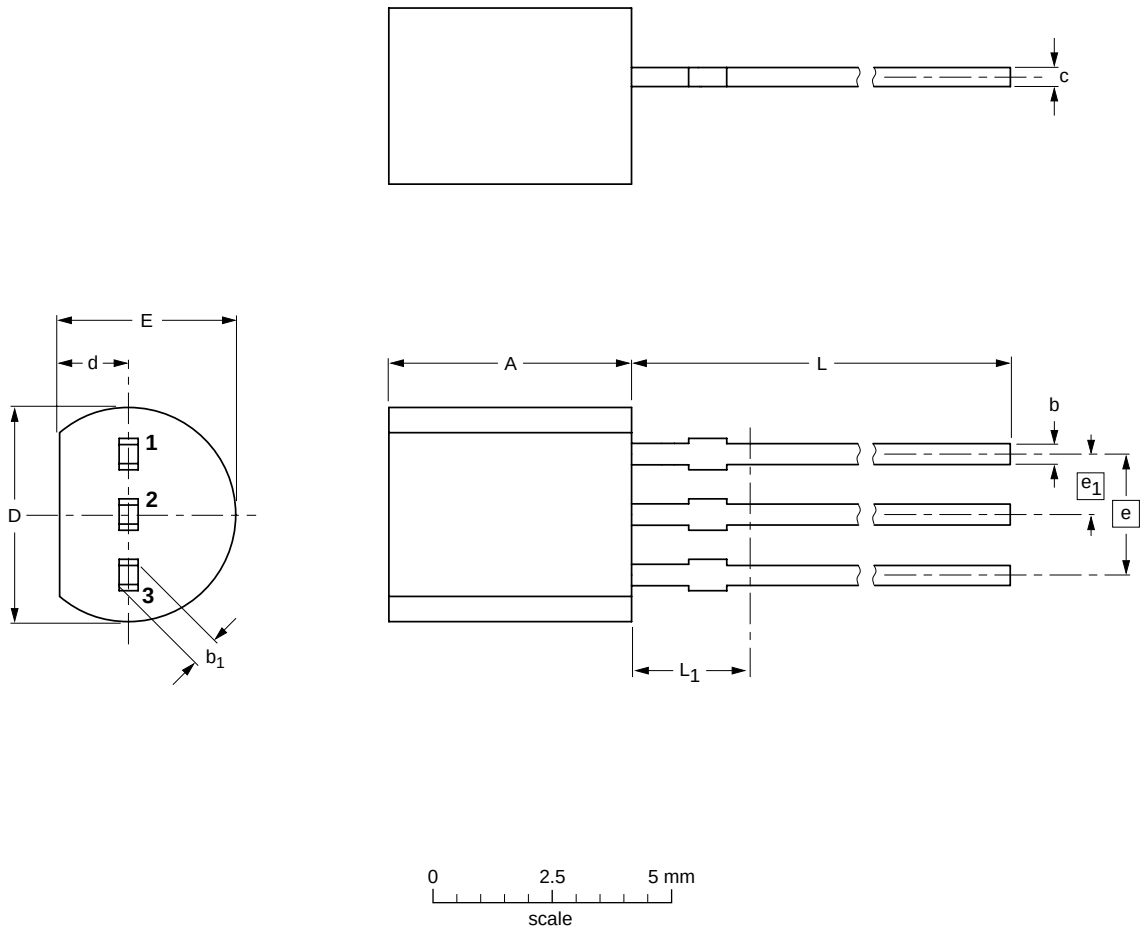


Fig.3 Input and output waveforms.

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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