

# UN202N23T

N-Channel Enhancement Mode MOSFET

ROHS



www.unsemi.com.tw

## Product Summary

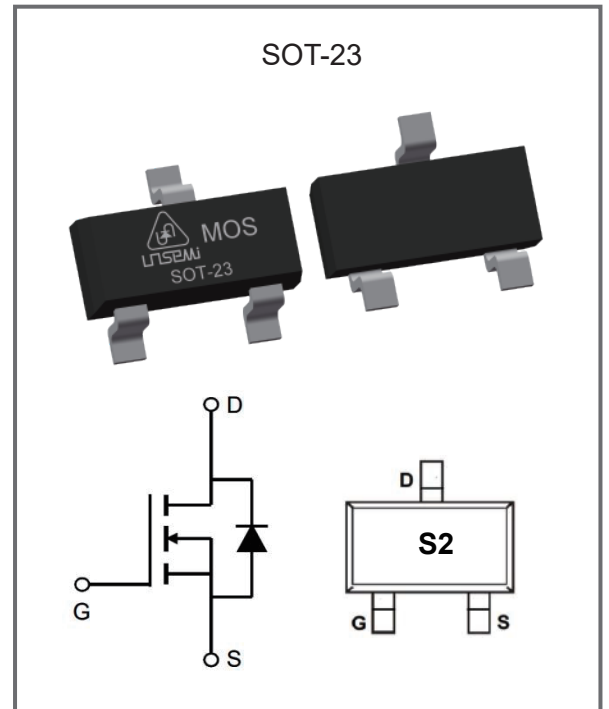
V <sub>DS</sub>	20V
I <sub>D</sub>	4.5A
R <sub>DS(ON)</sub> (@V <sub>GS</sub> =4.5V I <sub>D</sub> =4.5A)	≤40mΩ
R <sub>DS(ON)</sub> (@V <sub>GS</sub> =2.5V I <sub>D</sub> =5A)	≤50mΩ

## Features

- ◆ Advanced Trench Process Technology
- ◆ Low Threshold Voltage
- ◆ Fast Switching Speed
- ◆ Halogen-Free & Lead-Free

## Applications

- ◆ Load Switch for Portable Devices
- ◆ Voltage controlled small signal switch



## Package Marking And Ordering information

Part Number	Package Type	Packaging	Reel(pcs)
UN202N23T	SOT-23	Tape & Reel	3000

**Absolute Maximum Ratings TA = 25°C unless otherwise specified**

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V <sub>DS</sub>	20	V
Gate- Source Voltage	V <sub>GS</sub>	±12	V
Continuous drain current TA = 25°C	I <sub>D</sub>	4.5	A
Peak Drain Current, Pulsed <sup>1)</sup>	I <sub>DM</sub>	13.5	A
Power Dissipation	P <sub>tot</sub>	1.25	W
Operating Junction	T <sub>J</sub>	-55~150	°C
Storage Temperature Range	T <sub>stg</sub>	-55~150	°C

**Thermal Characteristics**

Parameter	Symbol	Max	Units
Thermal Resistance from Junction to Ambient <sup>2)</sup>	R <sub>θJA</sub>	100	°C/W

Note :

- 1) Pulse width ≤100us, duty cycle ≤1%, limited by T<sub>jmax</sub>.
- 2) Device mounted on FR-4 substrate PC board, 2ozcopper, with 1-inch square copper plate in still air

Electrical Characteristics at TA = 25°C unless otherwise specified

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
<b>STATIC PARAMETERS</b>						
Drain-Source Breakdown Voltage	BVDSS	ID = 250μA	20			V
Drain-Source Leakage Current	IDSS	VDS = 20V			1.0	μA
Gate Leakage Current	IGSS	VGS = ±10V			±100	nA
Gate-Source Threshold Voltage	VGS(TH)	VGS = VDS , ID = 250μA	0.5		1.2	V
Drain-Source On-State Resistance	RDS(ON)	VGS = 4.5V , ID = 4.5A		32	40	mΩ
		VGS = 2.5V , ID = 5A		42	50	mΩ
<b>Body-Diode PARAMETERS</b>						
Drain-Source Diode Forward Voltage	VSD	IS = 7A, VGS = 0V			1.2	V
Reverse Recovery Time	trr	IF = 7A, di/dt = 100A /μs		15		ns
Reverse Recovery Charge	Qrr			1.4		nC
<b>DYNAMIC PARAMETERS</b>						
Forward Transconductance	gts	VDS = 10V, ID = 5A		10		S
Input Capacitance	Ciss	VGS = 0V VDS = 10V F = 1MHz		614		pF
Output Capacitance	Coss			104		pF
Reverse Transfer Capacitance	Crss			97		pF
Gate charge total	Qg	VDS = 10V, VGS = 10V, ID = 7A		18		nC
Gate to Source Charge	Qgs			2.5		nC
Gate to Drain Charge	Qgd			2.6		nC
Turn-On Delay Time	td(ON)	VGS = 10V, VDS = 10V, ID = 7A, RG = 4.5Ω, RL = 1.42Ω		5.5		ns
Turn-On Rise Time	tr			31		ns
Turn-Off Delay Time	td(OFF)			19		ns
Turn-Off Fall Time	tf			17		ns

Electrical Characteristics Curves

Fig 1. Output Characteristics

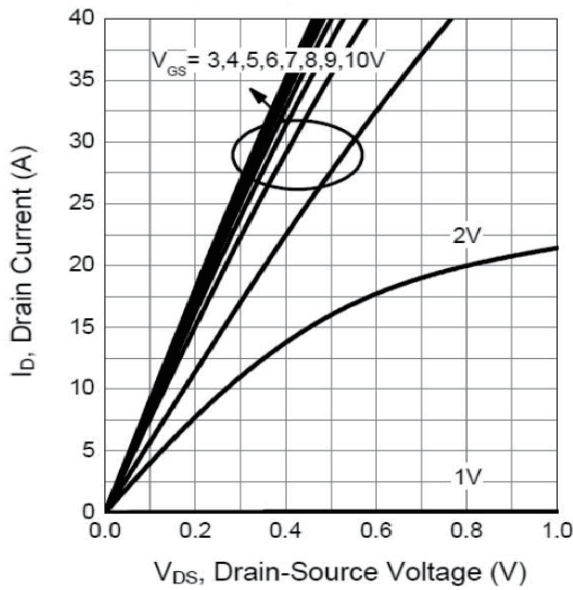


Fig 2. On Resistance

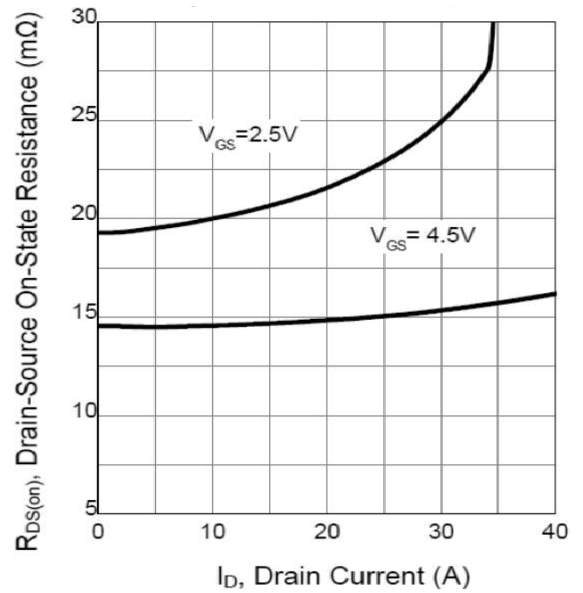


Fig 3. Transfer Characteristics

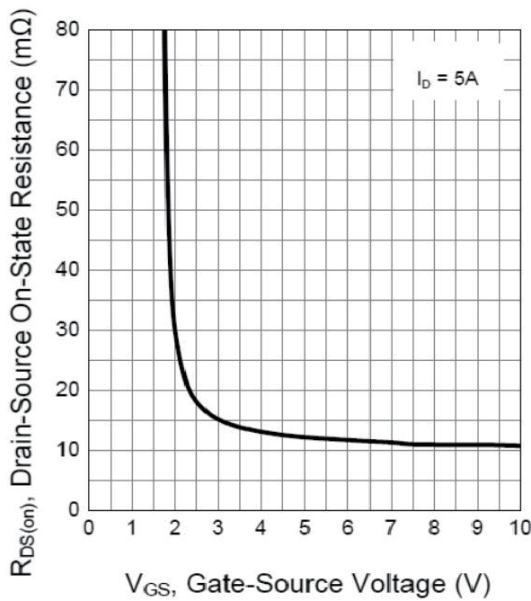
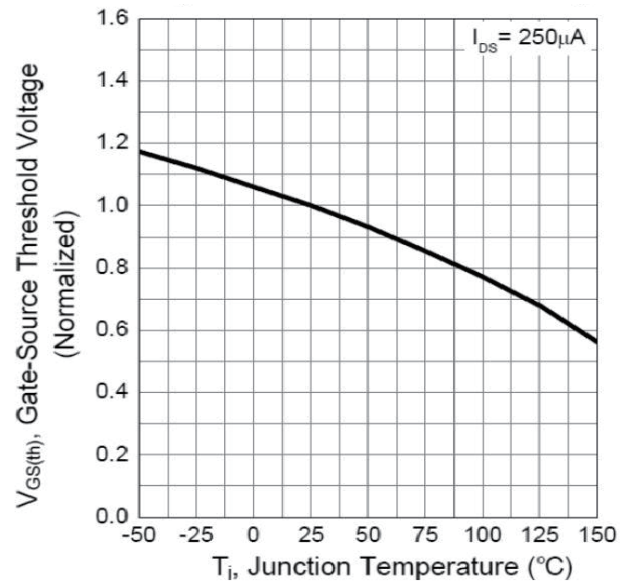


Fig 4. Normalized Threshold Voltage



Electrical Characteristics Curves

Fig 5. Normalized On Resistance

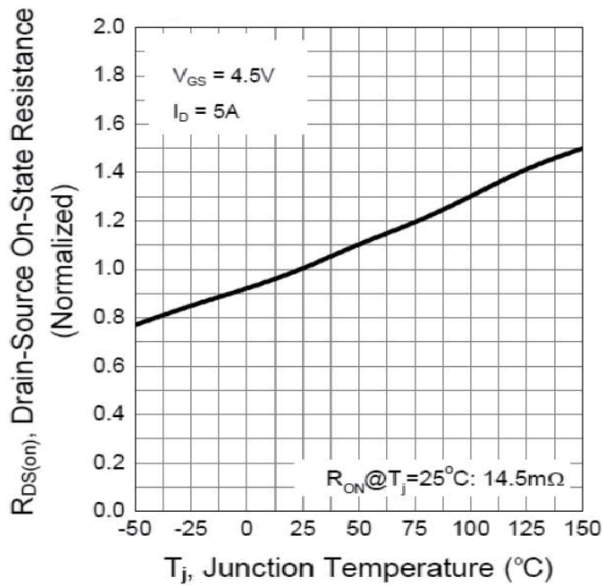


Fig 6. Diode Forward Current

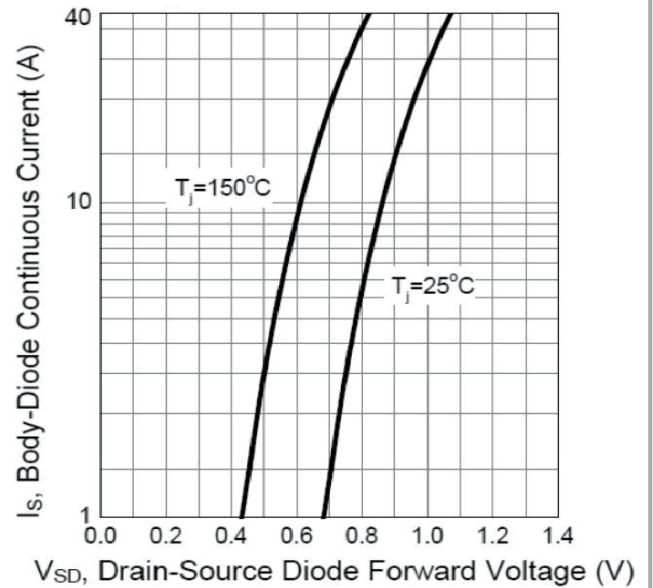


Fig 7. Capacitance

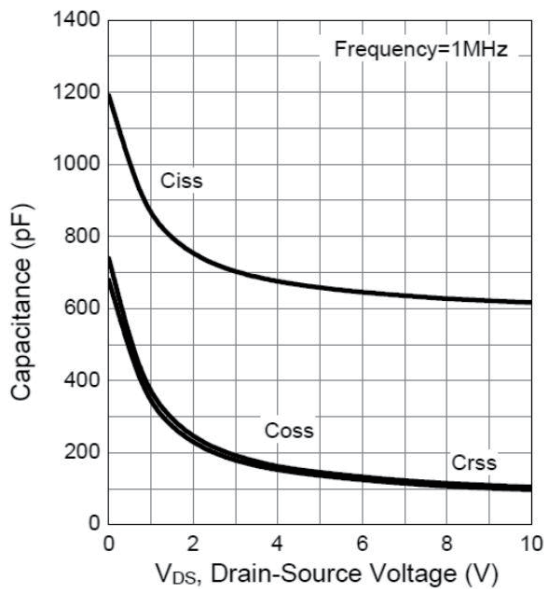
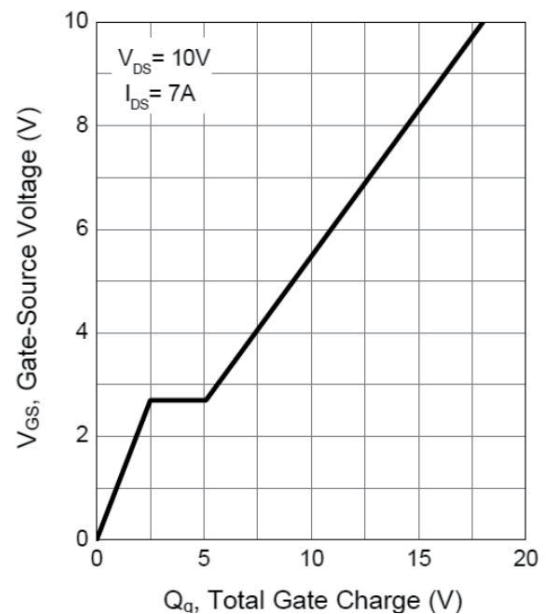


Fig 8. Gate Charge





Test Circuit

Fig.1-1 Switching times test circuit

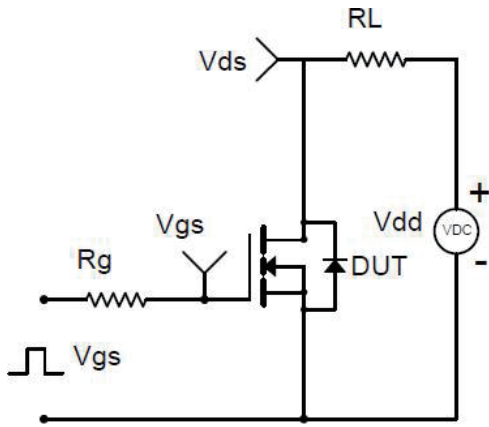


Fig.1-2 Switching Waveform

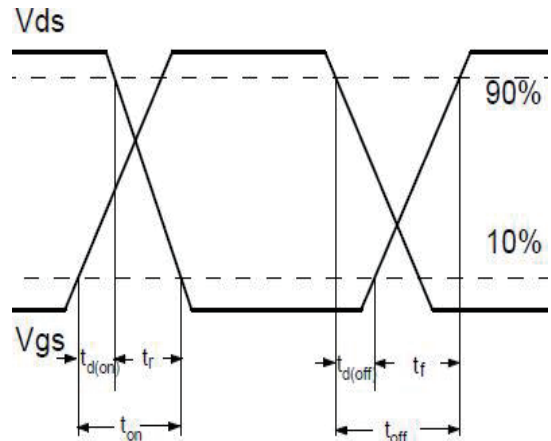


Fig.2-1 Gate charge test circuit

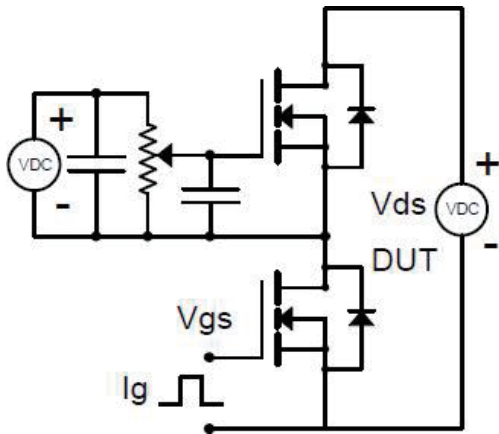


Fig.2-2 Gate charge waveform

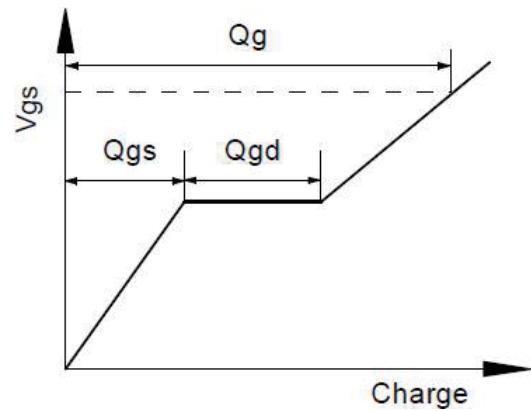


Fig.3-1 Avalanche test circuit

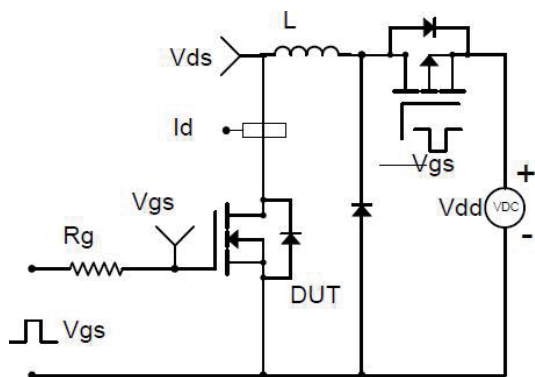
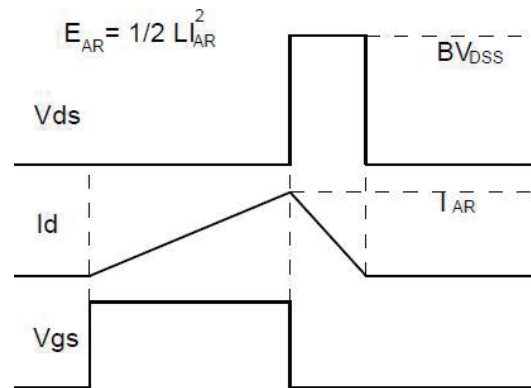
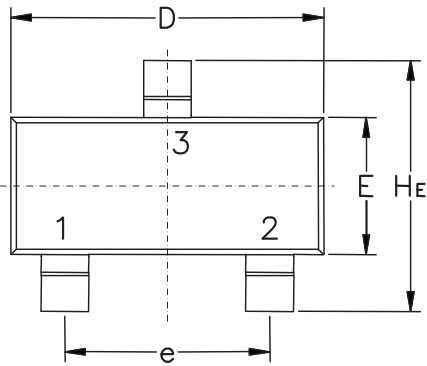


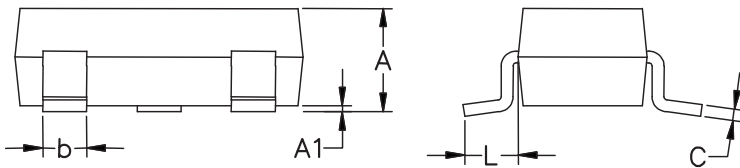
Fig.3-2 Avalanche waveform



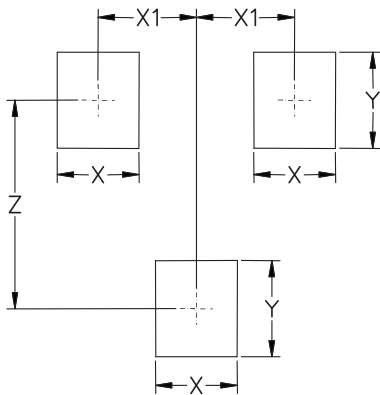
SOT-23 Package Outline & Dimensions (Units: mm / in)



Symbol	Millimeters			Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	0.89	1.00	1.11	0.035	0.040	0.044
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.37	0.44	0.50	0.015	0.018	0.020
C	0.09	0.13	0.18	0.003	0.005	0.007
D	2.80	2.90	3.04	0.110	0.114	0.120
E	1.20	1.30	1.40	0.047	0.051	0.055
e	1.78	1.90	2.04	0.070	0.075	0.081
L	0.35	0.54	0.69	0.014	0.021	0.029
HE	2.10	2.40	2.64	0.083	0.094	0.104



Soldering Footprint



Symbol	Millimeters	Inches
X	0.80	0.031
X1	0.96	0.037
Y	0.90	0.035
Z	2.00	0.079

## Disclaimer

UNSEMI RESERVES THE RIGHT TO MAKE CHANGE ON OUR PRODUCTS , PRODUCTS SPECIFICATION AND DATA WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

UN SEMICONDUCTOR LIMITED its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "UNSEMI") does not give any representations or warranties for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

In no event shall UNSEMI be liable for any indirect, incidental, punitive, special or consequential damages (including any and all implied warranties, warranties of fitness for particular purpose, non-infringement and merchantability.) whether or not such damages are based on tort (including negligence), warranty, breach of contract or any other legal theory.

Statements regarding the suitability of products for certain types of applications are based on UNSEMI knowledge of typical requirements that are often placed on UNSEMI products in generic applications. Such statements are not binding, statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify UNSEMI's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Unless otherwise agreed in writing, UNSEMI product is not designed, authorized or warranted to be suitable for use in medical life-saving, or life-sustaining application , nor in applications where failure or malfunction of a UNSEMI product can reasonably be expected to result in personal injury, death or severe property or environmental damage. UNSEMI and its suppliers accept no liability for inclusion or use of UNSEMI products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

All referenced brands, product names, service names and trademarks are the property of their respective owners.