

MS23N28

N-Channel 100-V (D-S) MOSFET

Description

The MS23N28 is a high performance trench N-ch MOSFETs with extreme high cell density, which provide excellent $R_{DS(ON)}$ and gate charge for most of the small power switching and load switch applications. The device meets the RoHS and Green Product requirement with full function reliability approved.

Features

- Advanced high cell density Trench technology
- Low $R_{DS(ON)}$
- Low Gate Charge
- Green Device Available

Typical Applications:

- PWM Applications
- Load Switch
- Power management

Package type : SOT-23

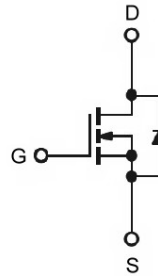
Packing & Order Information

3,000/Reel

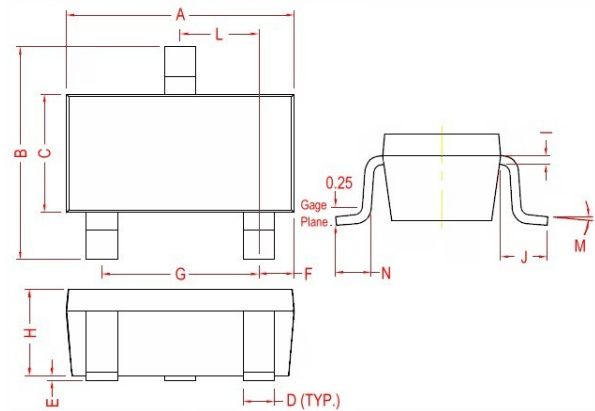


RoHS Compliant

Graphic Symbol

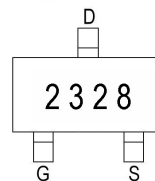


Package Dimension



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	2.70	3.10	H	0.90	1.30
B	2.40	3.00	I	0.10	0.21
C	1.40	1.75	J	0.60 Ref.	
D	0.30	0.50	L	0.95	1.15
E	0.01	0.15	M	0°	10°
F	0.40	0.60	N	0.25	0.60
G	2.00 Ref.				

Marking



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MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings (unless otherwise specified)

Symbol	Parameter	Value	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current ³ ($T_A = 25^\circ\text{C}$)	2	A
	Continuous Drain Current ³ ($T_A = 70^\circ\text{C}$)	1.6	A
I_{DM}	Pulsed Drain Current ^{1,2} ($T_A = 25^\circ\text{C}$)	4.0	A
P_D	Power Dissipation ($T_A = 25^\circ\text{C}$)	1.0	W
T_J/T_{STG}	Operating Junction and Storage Temperature	-55 to +150	$^\circ\text{C}$

Thermal Resistance Ratings

Symbol	Parameter	Maximum	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient ³	125	$^\circ\text{C/W}$

Electrical Characteristics ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	1.0	-	2.5	V
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$	100	-	-	V
g_{fs}	Forward Transconductance	$V_{DS} = 15\text{V}, I_D = 1.5\text{A}$	-	4	-	S
I_{GSS}	Gate-Source Leakage Current	$V_{DS} = 0\text{V}, V_{GS} = \pm 20\text{V}$	-	-	± 100	nA
I_{DSS}	Drain-Source Leakage Current	$V_{DS} = 80\text{V}, V_{GS} = 0\text{V}, T_J = 25^\circ\text{C}$	-	-	1	μA
		$V_{DS} = 80\text{V}, V_{GS} = 0\text{V}, T_J = 55^\circ\text{C}$	-	-	10	
$R_{DS(on)}$	Static Drain-Source On-Resistance ²	$V_{GS} = 10\text{V}, I_D = 1.5\text{A}$	-	-	150	m Ω
		$V_{GS} = 4.5\text{V}, I_D = 1.0\text{A}$	-	-	160	
V_{SD}	Diode Forward Voltage ²	$I_S = 1\text{A}, V_{GS} = 0\text{V}, T_J = 25^\circ\text{C}$	-	-	1.2	V
I_S	Continuous Source Current (Diode)	$V_G = V_D = 0\text{V}, \text{Force Current}$	-	-	1.5	A
I_{SM}	Pulsed Source Current (Diode)		-	-	3.0	

Notes

1. Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
3. Surface mounted on 1 in² copper pad of FR4 board; 270 $^\circ\text{C/W}$ when mounted on min. copper pad.

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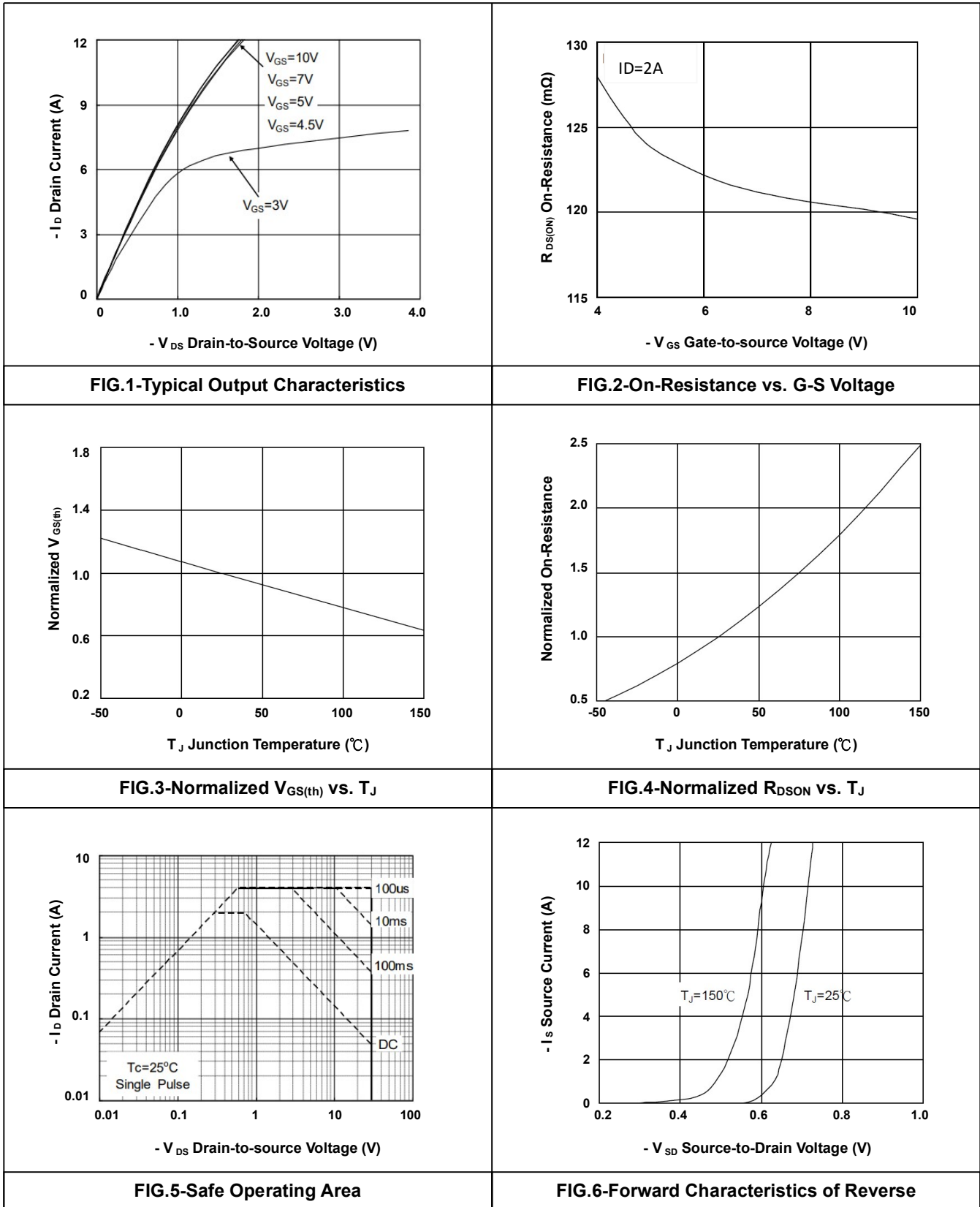
Dynamic and switching Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
Q _g	Total Gate Charge ²	V _{DS} = 60V	--	25.5	--	nC
Q _{gs}	Gate-Source Charge	I _D = 2A	--	4.2	--	
Q _{gd}	Gate-Drain Charge	V _{GS} = 5V	--	4.3	--	
t _{d(on)}	Turn-On Delay Time ²	V _{DS} = 50V	--	17.3	--	ns
t _r	Rise Time	I _D = 1A	--	2.8	--	
t _{d(off)}	Turn-Off Delay Time	V _{GS} = 10V	--	50	--	
t _f	Fall Time	R _G = 3.3Ω	--	2.8	--	
C _{ISS}	Input Capacitance	V _{DS} = 15V	--	1077	--	pF
C _{OSS}	Output Capacitance	V _{GS} = 0V	--	46	--	
C _{RSS}	Reverse Transfer Capacitance	f = 1.0MHz	--	32	--	

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- Typical Electrical Characteristics



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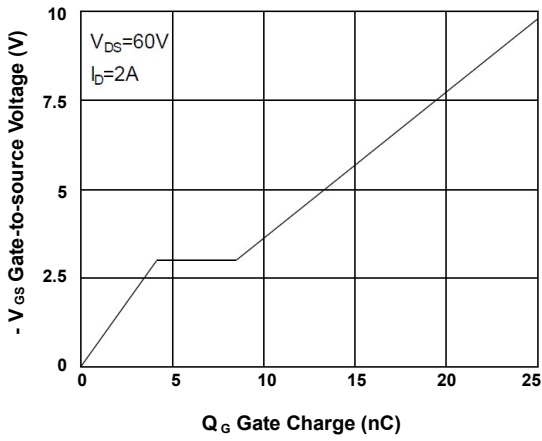


FIG.7-Gate Charge Characteristics

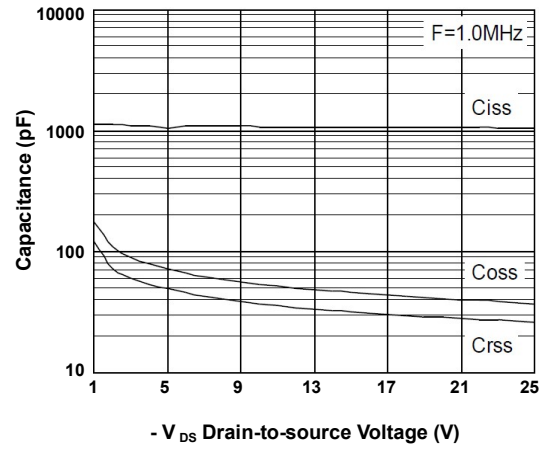


FIG.8-Capacitance Characteristics

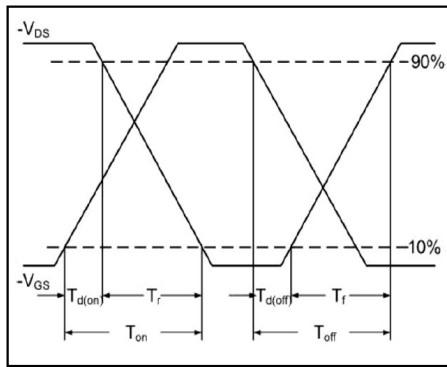


FIG.9-Switching Time Waveform

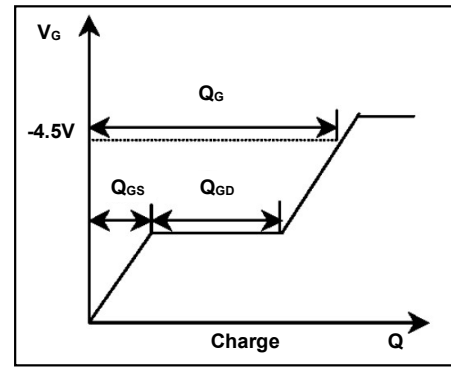


FIG.10-Gate Charge Waveform

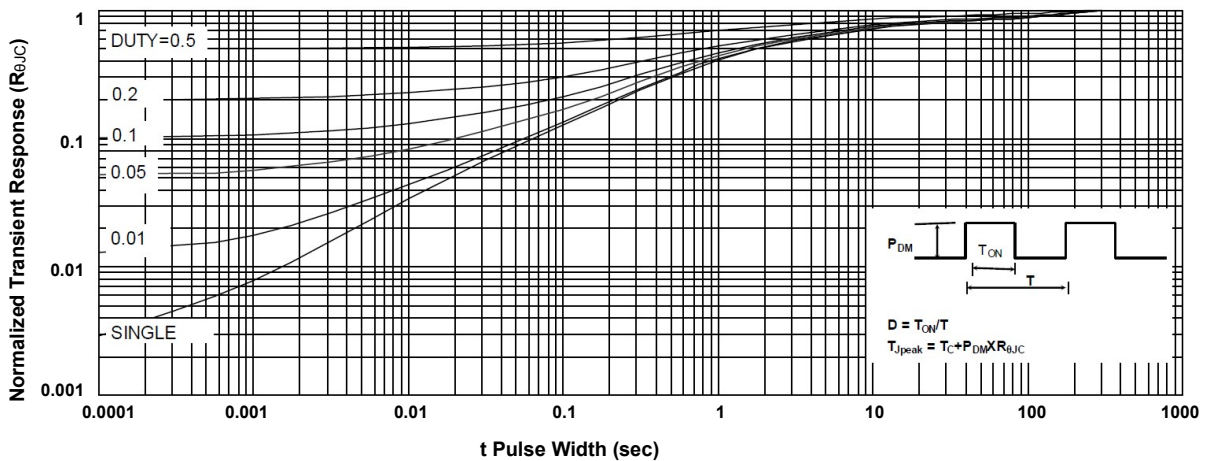


FIG.11-Normalized Maximum Transient Thermal Impedance

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