

MS23N18

N-Channel 30-V (D-S) MOSFET

Description

These miniature surface mount MOSFETs utilize High Cell Density process. Low $r_{DS(on)}$ assures minimal power loss and conserves energy, making this device ideal for use in power management circuitry. Typical applications are lower voltage application, power management in portable and battery-powered products such as computers, printers, PCMCIA cards, cellular and cordless telephones.

Features

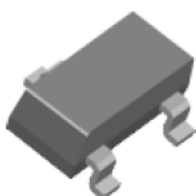
- Low $r_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed
- RoHS compliant package

Typical Applications:

- White LED boost converters
- Automotive Systems
- Industrial DC/DC Conversion Circuits

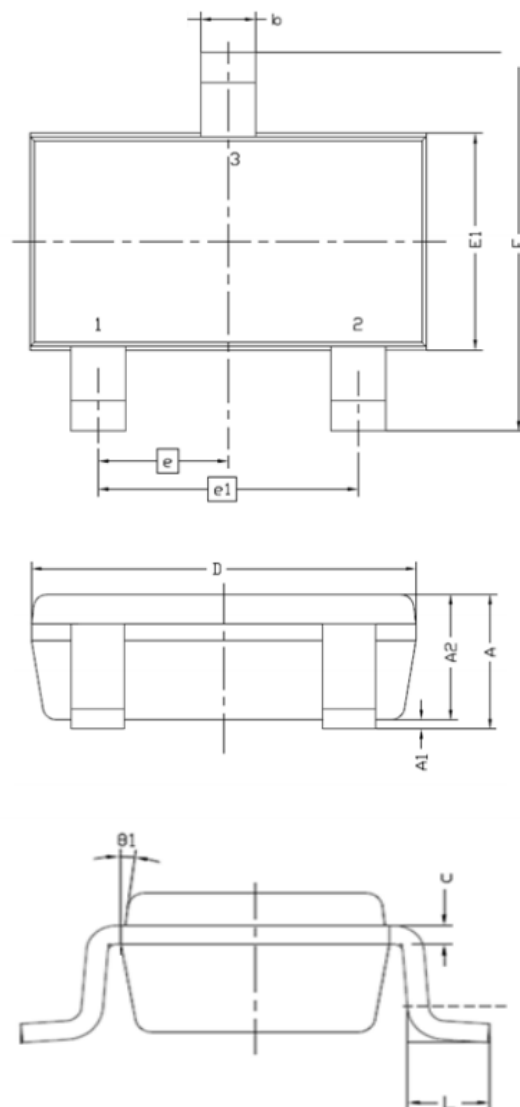
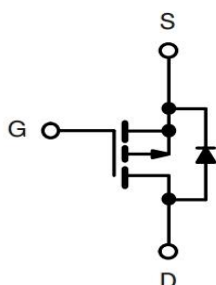
Packing & Order Information

3,000/Reel



RoHS
COMPLIANT

Graphic symbol



Symbol	MILLIMETERS	
	MIN	MAX
A	0.8	1.2
A1	0	0.1
A2	0.7	1.1
b	0.3	0.5
c	0.1	0.2
D	2.7	3.1
E	2.6	3
E1	1.4	1.8
e	0.95 BSC	
e1	1.9 BSC	
L	0.3	0.6
θ1	7° NOM	

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MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings (Tc=25°C unless otherwise specified)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current ^a ($T_A = 25^\circ\text{C}$)	2.4	A
	Continuous Drain Current ^a ($T_A = 70^\circ\text{C}$)	1.9	A
I_{DM}	Pulsed Drain Current ^b	10	A
I_S	Continuous Source Current (Diode Conduction) ^a	1.9	A
P_D	Power Dissipation ^a ($T_A = 25^\circ\text{C}$)	1.3	W
	Power Dissipation ^a ($T_A = 70^\circ\text{C}$)	0.8	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 C/W ^a (t <= 10 sec)	100	$^\circ\text{C/W}$
	Maximum Junction-to-Ambient C/W ^a (Steady-State)	166	

Notes

- Surface Mounted on 1" x 1" FR4 Board.
- Pulse width limited by maximum junction temperature

Electrical Characteristics

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			V
I_{GSS}	Gate-Body Leakage	$V_{DS} = 0 \text{ V}$, $V_{GS} = \pm 20 \text{ V}$			± 100	nA
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 24 \text{ V}$, $V_{GS} = 0 \text{ V}$ $V_{DS} = 24 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 55^\circ\text{C}$			1 25	μA
$I_{D(on)}$	On-State Drain Current ^A	$V_{DS} = 5 \text{ V}$, $V_{GS} = 10 \text{ V}$	5			A
$r_{DS(on)}$	Drain-Source On-Resistance ^A	$V_{DS} = 10 \text{ V}$, $I_D = 1.9 \text{ A}$ $V_{DS} = 4.5 \text{ V}$, $I_D = 1.6 \text{ A}$			160 250	m Ω
g_{fs}	Forward Transconductance ^A	$V_{GS} = 15 \text{ V}$, $I_D = 1.9 \text{ A}$		6		S
V_{SD}	Diode Forward Voltage	$I_S = 0.95 \text{ A}$, $V_{GS} = 0 \text{ V}$		0.84		V

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Dynamic ^b						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
Q_g	Total Gate Charge	$V_{DS} = 15\text{ V}$, $I_D = 1.9\text{ A}$, $V_{GS} = 4.5\text{ V}$	--	1.4	--	nC
Q_{gs}	Gate-Source Charge		--	0.4	--	nC
Q_{gd}	Gate-Drain Charge		--	0.7	--	nC
$t_{d(on)}$	Turn-On Delay Time	$V_{DS} = 15\text{ V}$, $I_D = 1.9\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_L = 7.9\ \Omega$, $R_{GEN} = 6\ \Omega$	--	2	--	ns
t_r	Rise Time		--	5	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	12	--	ns
t_f	Fall Time		--	4	--	ns
C_{ISS}	Input Capacitance	$V_{DS} = 15\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1.0\text{ MHz}$	--	103	--	pF
C_{OSS}	Output Capacitance		--	21	--	pF
C_{RSS}	Reverse Transfer Capacitance		--	16	--	pF

Notes

- Pulse test: $PW \leq 300\mu s$ duty cycle $\leq 2\%$.
- Guaranteed by design, not subject to production testing.

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Typical Electrical Characteristics

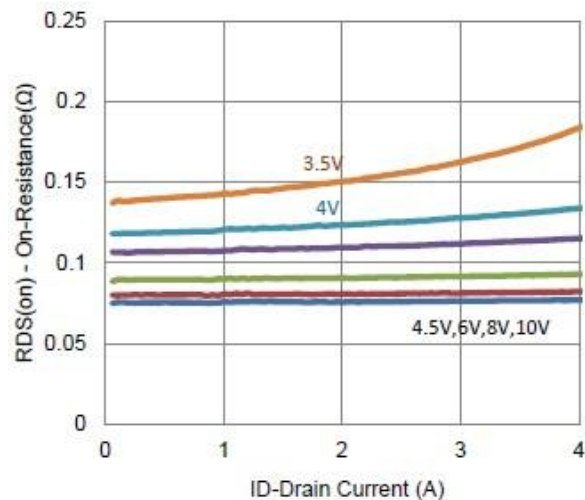


FIG.1-ON RESISTANCE VS. DRAIN CURRENT

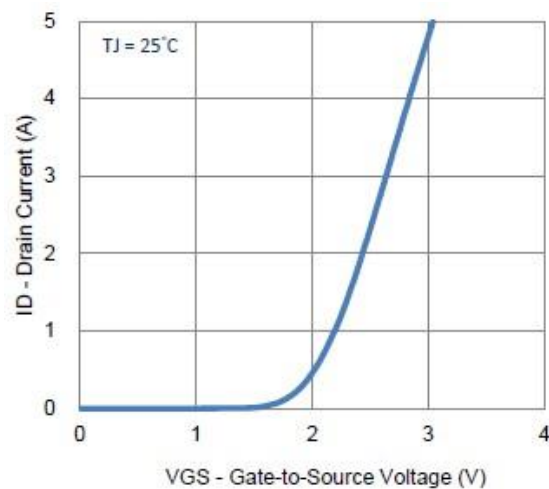


FIG.2-TRANSFER CHARACTERISTICS

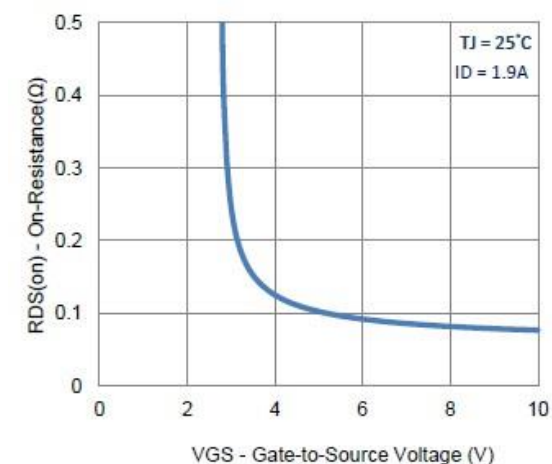


FIG.3-ON RESISTANCE VS GATE-TO-SOURCE VOLTAGE

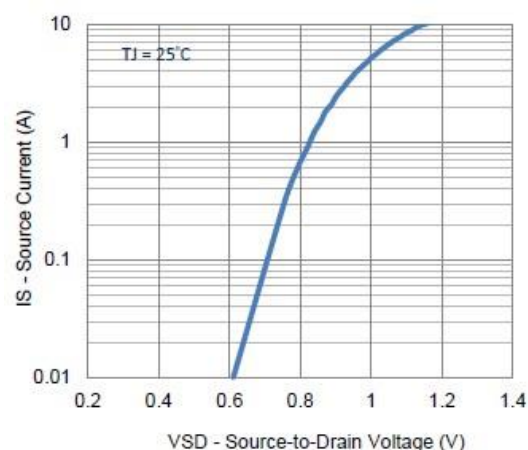


FIG.4-DRAIN-TO-SOURCE FORWARD VOLTAGE

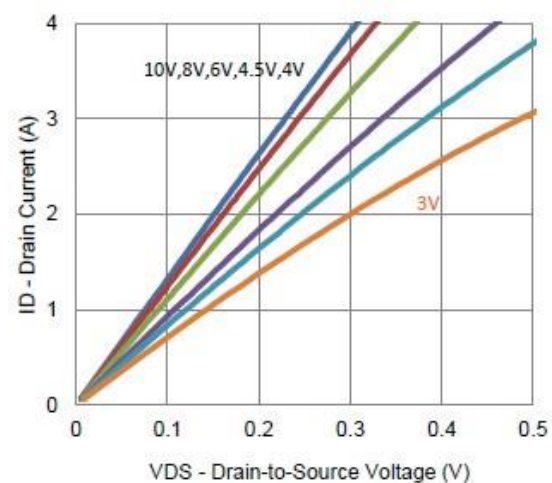


FIG.5-OUTPUT CHARACTERISTICS

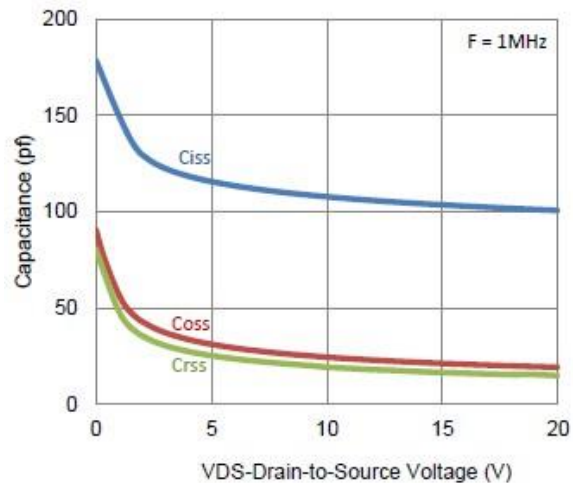


FIG.6-CAPACITANCE

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Typical Electrical Characteristics

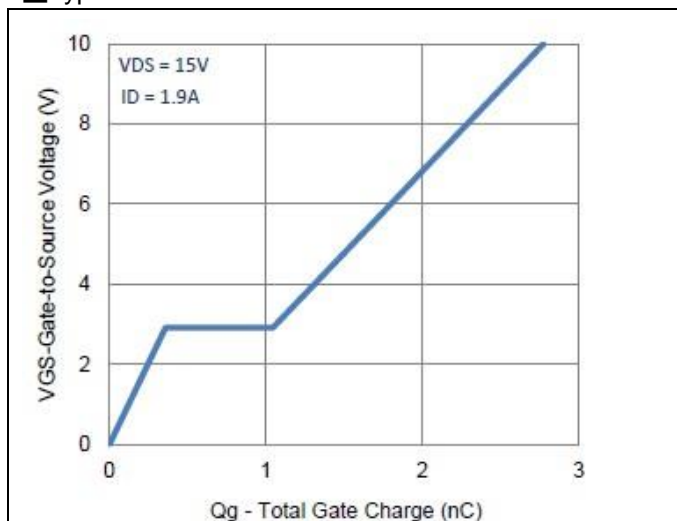


FIG.7-GAGE CHARGE

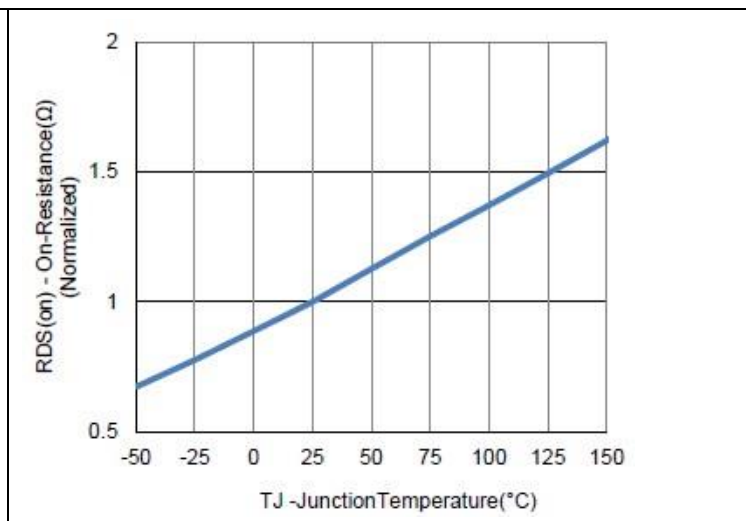


FIG.8-NORMALIZED ON-RESISTANCE VS JUNCTION TEMPERATURE

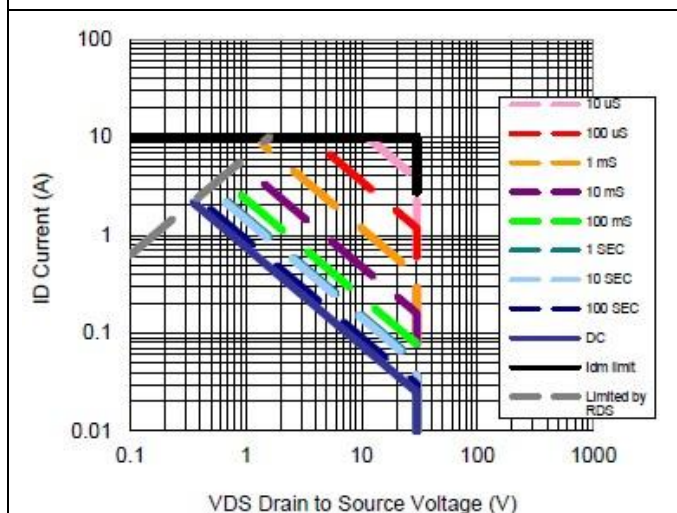


FIG.9-SAFE OPERATING AREA

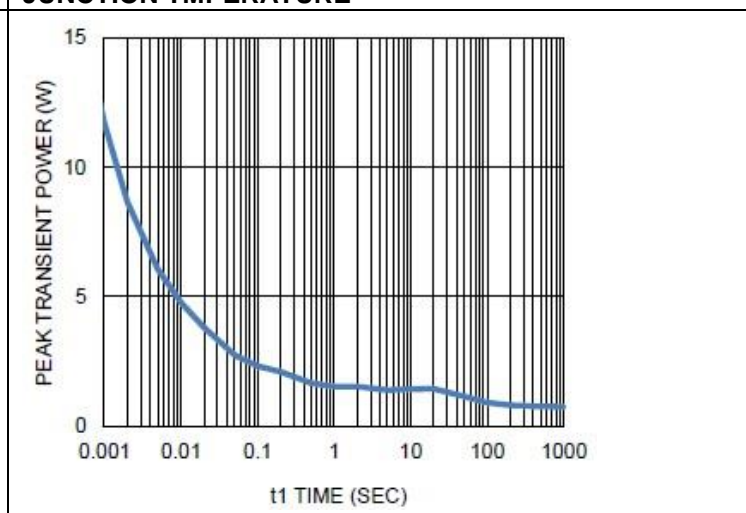


FIG.10-SINGLE PULSE MAXIMUM POWER DISSIPATION

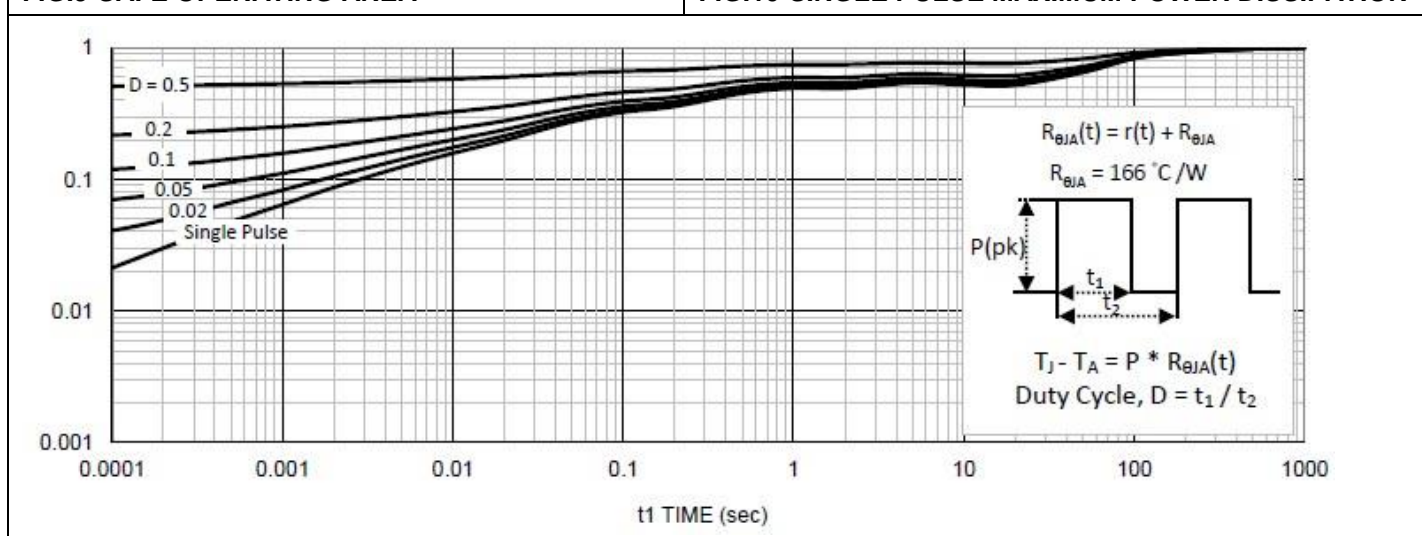


FIG.11-NORMALIZED THERMAL TRANSIENT JUNCTION TO AMBIENT

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