

MS 20N04NE

P-Channel 20-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 PWMDC-DC converters, power management in portable and battery-powered products such as computers, printers, battery charger, telecommunication power system, and telephones power system.

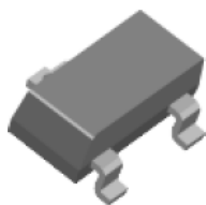
Features

- Low $r_{DS(on)}$ provides higher efficiency and extends battery life
- High power and current handling capability
- Low side high current DC-DC Converter
- Applications
- Miniature SOT-23 Surface Mount Package
- Saves Board Space
- RoHS compliant package

Package type : SOT-23

Packing & Order Information

3,000/Reel

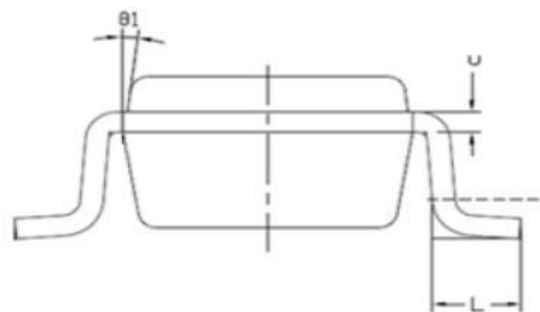
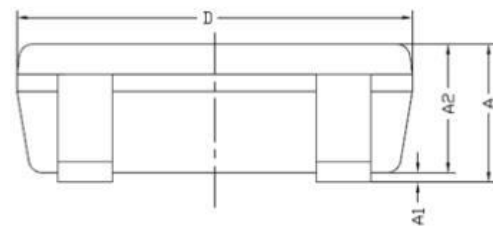
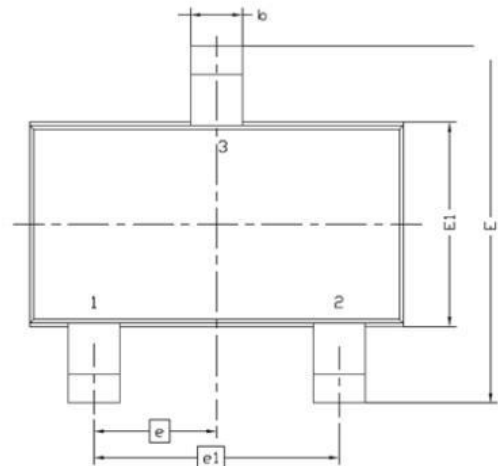
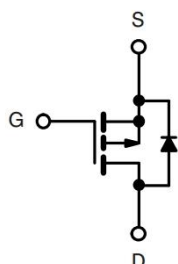


**RoHS
COMPLIANT**



ESD Protected

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 ($T_A=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current ^a ($T_A=25^\circ\text{C}$)	4.0	A
	Continuous Drain Current ^a ($T_A=70^\circ\text{C}$)	3.1	A
I_{DM}	Pulsed Drain Current ^b	± 20	A
I_S	Continuous Source Current (Diode Conduction) ^a	1.6	A
T_J/T_{STG}	Operating Junction and Storage Temperature	-55 to +150	$^\circ\text{C}$
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

Thermal Resistance Ratings

Symbol	Parameter	Maximum	Units
R_{THJA}	Maximum Junction-to-Ambient ^a ($t \leq 5$ sec)	100	$^\circ\text{C/W}$
	Maximum Junction-to-Ambient ^a (Steady-State)	166	

Notes :

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

Static

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$V_{GS(th)}$	Gate-Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$	0.7			V
I_{GSS}	Gate-Body Leakage	$V_{DS} = 0$ V, $V_{GS} = \pm 8$ V			± 100	nA
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 16$ V, $V_{GS} = 0$ V $V_{DS} = 16$ V, $V_{GS} = 0$ V, $T_J = 55^\circ\text{C}$			1 10	μA
$I_{D(on)}$	On-State Drain Current ^A	$V_{DS} = 5$ V, $V_{GS} = 4.5$ V	10			A
$R_{DS(on)}$	Drain-Source On-Resistance ^A	$V_{GS} = 4.5$ V, $I_D = 4.6$ A $V_{GS} = 2.5$ V, $I_D = 3.9$ A			32 44	m Ω
g_{fs}	Forward Transconductance ^A	$V_{DS} = 10$ V, $I_D = 4.0$ A		11.3		S
V_{SD}	Diode Forward Voltage	$I_S = 1.6$ A, $V_{GS} = 0$ V		0.75		V

Dynamic^b

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
Q_g	Total Gate Charge	$V_{DS} = 10$ V, $I_D = 4.0$ A, $V_{GS} = 4.5$ V		13.4		nC
Q_{gs}	Gate-Source Charge			0.9		nC
Q_{gd}	Gate-Drain Charge			2.0		nC

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Dynamic ^b						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 10\text{ V}$, $R_L = 15\ \Omega$, $V_{GEN} = 4.5\text{ V}$, $I_D = 5\text{ A}$		8		ns
t_r	Rise Time			24		ns
$t_{d(off)}$	Turn-Off Delay Time			35		ns
t_f	Fall Time			10		ns
t_{rr}	Source-Drain Reverse Recovery Time	$I_F = 1.6\text{ A}$, $di/dt = 100\text{ A/uS}$		40		ns

Notes :

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

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