

MSC22N03

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

Description

These miniature surface mount MOSFETs utilize a high cell density trench process to provide low RDS(on) and to ensure minimal power loss and heat dissipation.

Typical applications are DC-DC converters and power management in portable and battery-powered products such as computers, printers, and PCMCIA cards, cellular and cordless telephones.

Features

- Low rDS(on) provides higher efficiency and extends battery life
- Low thermal impedance copper lead frame
- DFN5X6 8L saves board space
- Fast switching speed
- High performance trench technology

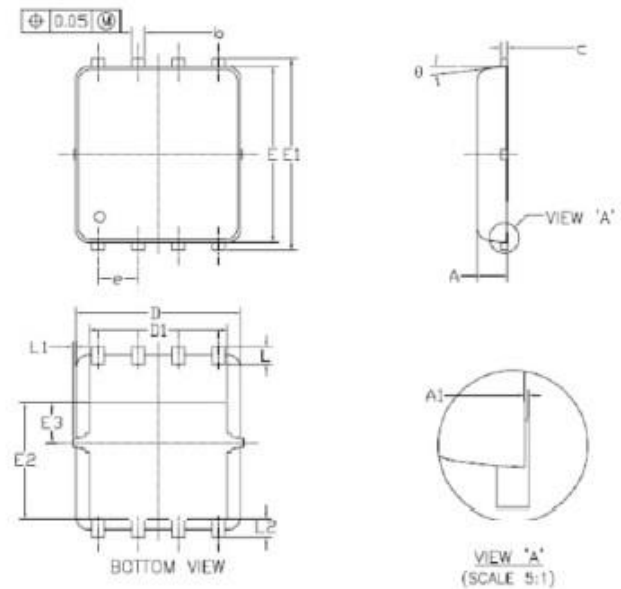
Packing type : DFN5X6

Packing & Order Information

3,000/Reel

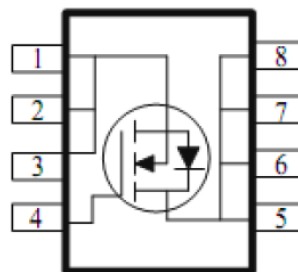


**RoHS
COMPLIANT**



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.85	0.95	1.00	0.033	0.037	0.039
A1	0.00	—	0.05	0.000	—	0.002
b	0.30	0.40	0.50	0.012	0.016	0.020
c	0.15	0.20	0.25	0.006	0.008	0.010
D	5.20 BSC			0.205 BSC		
D1	4.35 BSC			0.171 BSC		
E	5.55 BSC			0.219 BSC		
E1	6.05 BSC			0.238 BSC		
E2	3.625 BSC			0.143 BSC		
E3	1.275 BSC			0.050 BSC		
e	1.27 BSC			0.050 BSC		
L	0.45	0.55	0.65	0.018	0.022	0.026
L1	0	—	0.15	0	—	0.006
L2	0.68 REF			0.027 REF		
θ	0°	—	10°	0°	—	10°

Graphic symbol



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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	30	V
V_{GS}	Gate-Source Voltage	20	V
I_D	Continuous Drain Current ^a ($T_A=25^{\circ}\text{C}$)	22	A
	Continuous Drain Current ^a ($T_A=70^{\circ}\text{C}$)	18	A

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

Symbol	Parameter	Value	Unit
I_{DM}	Pulsed Drain Current ^b	50	A
I_S	Continuous Source Current (Diode Conduction) ^a	2.3	A
P_D	Power Dissipation ^a ($T_A=25^{\circ}\text{C}$)	5	W
	Power Dissipation ^a ($T_A=70^{\circ}\text{C}$)	2.2	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 ($t \leq 10$ sec)	25	$^{\circ}\text{C}/\text{W}$
	Maximum Junction-to-Ambient C/W^a (Steady-State)	65	

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-Source Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	1			V
I_{GSS}	Gate-Body Leakage	$V_{DS} = 0\text{ V}, V_{GS} = 20\text{ V}$			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 5	μA
$I_{D(on)}$	On-State Drain Current	$V_{DS} = 5\text{ V}, V_{GS} = 10\text{ V}$	40			A
$r_{DS(on)}$	Drain-Source On-Resistance	$V_{GS} = 10\text{ V}, I_D = 2\text{ A}$ $V_{GS} = 4.5\text{ V}, I_D = 2\text{ A}$			7.5 11.5	$\text{m}\Omega$
g_{fs}	Forward Transconductance	$V_{DS} = 15\text{ V}, I_D = 2\text{ A}$		40		S
V_{SD}	Diode Forward Voltage	$I_S = 2\text{ A}, V_{GS} = 0\text{ V}$		0.7		V

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Dynamic ^b						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
Q_g	Total Gate Charge	$V_{DS} = 15\text{ V}$, $I_D = 10\text{ A}$, $V_{GS} = 4.5\text{ V}$	--	16	--	nC
Q_{gs}	Gate-Source Charge		--	5	--	nC
Q_{gd}	Gate-Drain Charge		--	6	--	nC
$t_{d(on)}$	Turn-On Delay Time	$I_D = 1\text{ A}$, $R_L = 6\ \Omega$, $V_{GEN} = 10\text{ V}$, $V_{DD} = 15\text{ V}$	--	5	--	ns
t_r	Rise Time		--	4	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	23	--	ns
t_f	Fall Time		--	9	--	ns

Notes

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

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