MS9N20E

Dual N-Channel 20-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, PCMCIA cards, cellular and cordless telephones.

Features

• Low rDS(on) provides higher efficiency and extends battery life

• Low thermal impedance copper leadframe

• DFN2X5 6PP saves board space

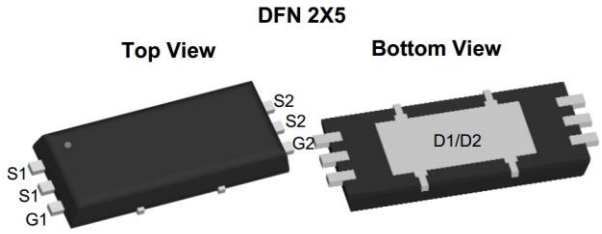
• Fast switching speed

• High performance trench technology

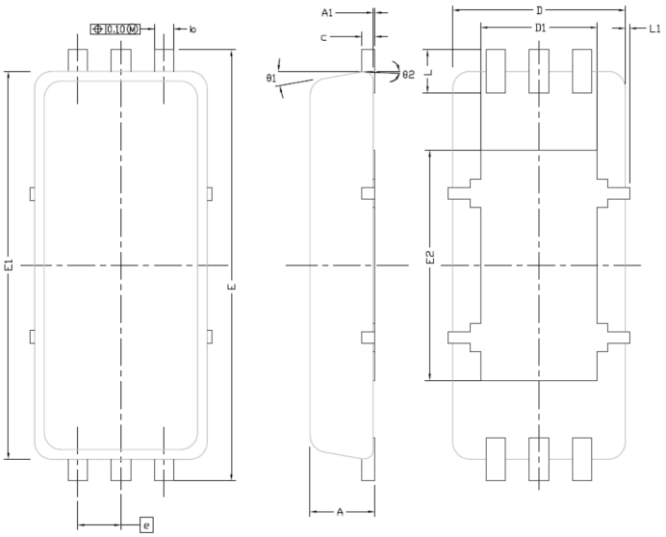
Package type：DFN 2X5

Packing & Order Information

3,000/Reel

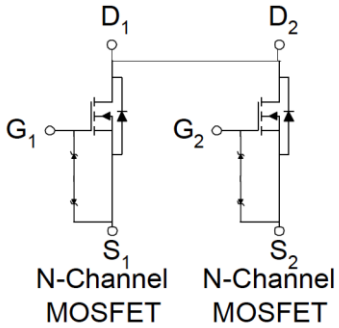


RoHS
COMPLIANT



DIM.	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	0.75	0.80	0.028	0.030	0.0315
A1	0.00	---	0.05	0.000	---	0.002
b	0.20	0.225	0.30	0.008	0.009	0.012
c	0.10	0.152	0.20	0.004	0.006	0.008
D	2.00 BSC			0.079 BSC		
D1	1.30	1.35	1.55	0.051	0.053	0.061
E	5.00 BSC			0.197 BSC		
E1	4.50 BSC			0.177 BSC		
E2	2.60	2.67	2.95	0.102	0.105	0.116
e	0.50 BSC			0.020 BSC		
L	0.40	0.50	0.600	0.016	0.0197	0.0236
L1	0	---	0.100	0	---	0.004
θ1	0°	10°	12°	0°	10°	12°
θ2	3° BSC			3° BSC		

Graphic symbol



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Absolute Maximum Ratings (Tc=25°C unless otherwise specified)			
Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	±12	V
I_D	Continuous Drain Current[a] (T_A =25°C)	11.0	A
	Continuous Drain Current[a] (T_A =70°C)	8.5	A
I_{DM}	Pulsed Drain Current[b]	±40	A
I_S	Continuous Source Current (Diode Conduction)[a]	3.1	A
P_D	Power Dissipation[a] (T_A =25°C)	3.5	W
	Power Dissipation[a] (T_A =70°C)	1.8	W
T_J/T_{STG}	Operating Junction and Storage Temperature	-55 to +150	°C

Notes:

a. Surface Mounted on 1" x 1" FR4 Board.

b. Pulse width limited by maximum junction temperature

Thermal Characteristics (Tc=25°C unless otherwise specified)		
Parameter	Maximum	Units
Maximum Junction-to-Ambient[a] (t <= 10 sec)	62.5	°C/W
Maximum Junction-to-Ambient[a] (Steady-State)	80	

Static Characteristics					
Symbol	Test Conditions	Min	Typ.	Max.	Units
V_{GS}	V_{DS} = V_{GS}, I_D = -250μA	0.5	--	--	V
I_{GSS}	V_{DS} = 0 V , V_{GS} = ±12 V	--	--	±100	nA
I_{DSS}	V_{DS} = 16 V , V_{GS} = 0 V V_{DS} = 16 V , V_{GS} = 0 V , T_J= 55°C	--	--	1 30	uA
$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 4.5 V	20	--	--	A
$r_{DS(on)}$	V_{DS} = 4.5 V, I_D = 6.7 A V_{DS} = 2.5 V, I_D = 4.5 A	--	--	22 28	mΩ
g_{fs}	V_{DS} = 15 V, I_D = 6 A	--	22	--	S
V_{SD}	I_S = 0.5 A , V_{GS} = 0 V	--	0.7	--	V

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Dynamic Characteristics					
Symbol	Test Conditions	Min	Typ.	Max.	Units
Q_g	V_{DS} = 15 V , I_D = 6.0 A, V_{GS} = 4.5 V	--	9.2	--	nC
Q_{gs}		--	1.9	--	nC
Q_{gd}		--	2.8	--	nC
$t_{d(on)}$	V_{DD} = 10 V , R_L = 15 Ω, V_{GEN} = 4.5 V , I_D = 1 A	--	1.7	--	ns
t_r		--	2.3	--	ns
$t_{d(off)}$		--	1.1	--	ns
t_f		--	4.4	--	ns

Notes:

a. Pulse test: PW <= 300us duty cycle <= 2%.

b. Guaranteed by design, not subject to production testing.

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■Characteristics Curve

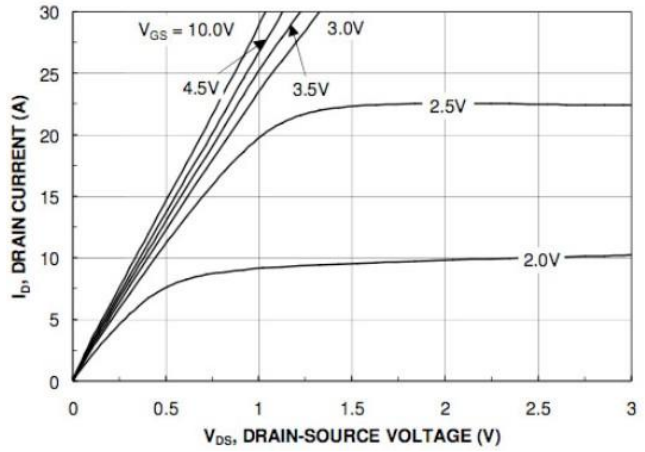

FIG.1-OUTPUT CHARACTERISTICS

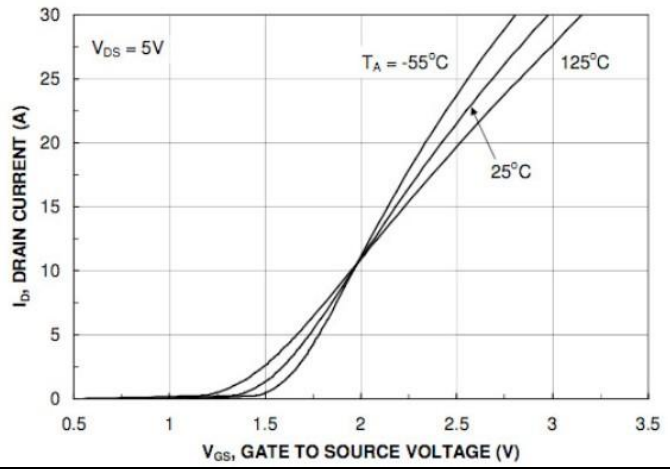

FIG.2-TRANSFER CHARACTERISTICS

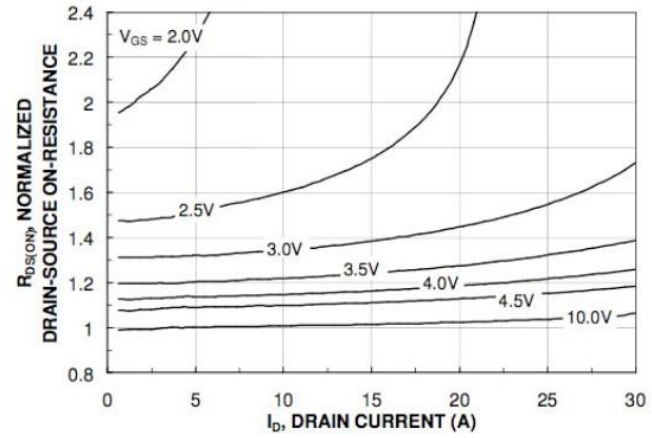

FIG.3-ON-RESISTANCE VS. DRAIN CURRENT

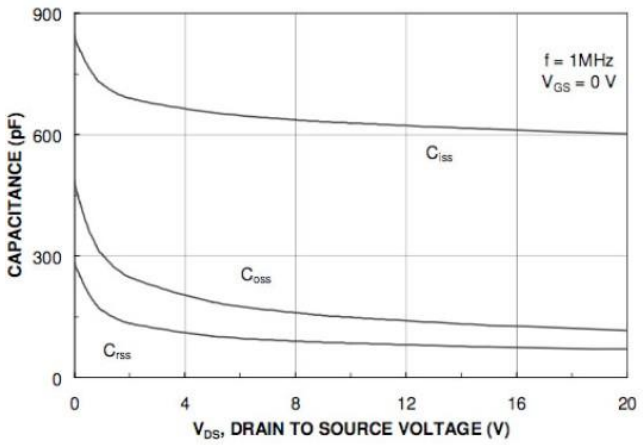

FIG.4-CAPACITANCE

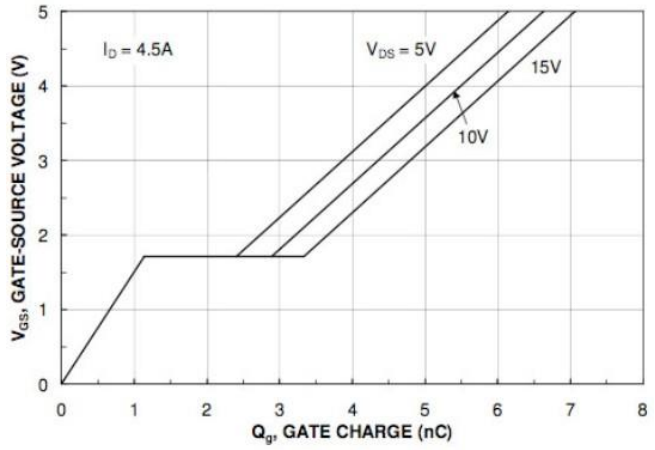

FIG.5-GATE CHARGE

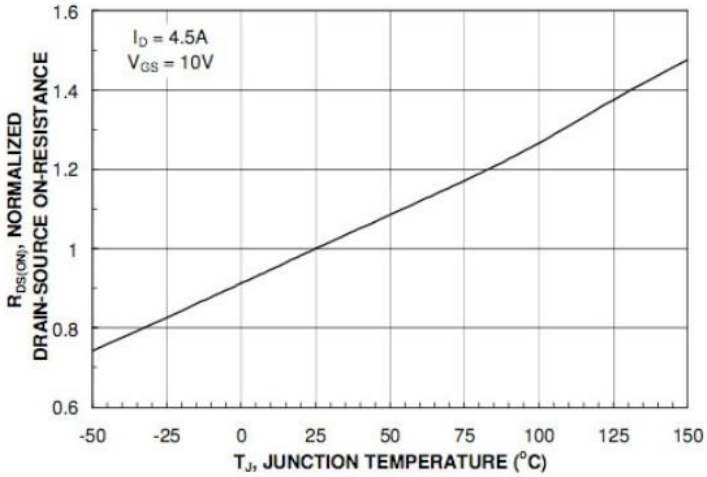

FIG.6-ON-RESISTANCE VS. JUNCTION TEMPERATURE

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■Characteristics Curve

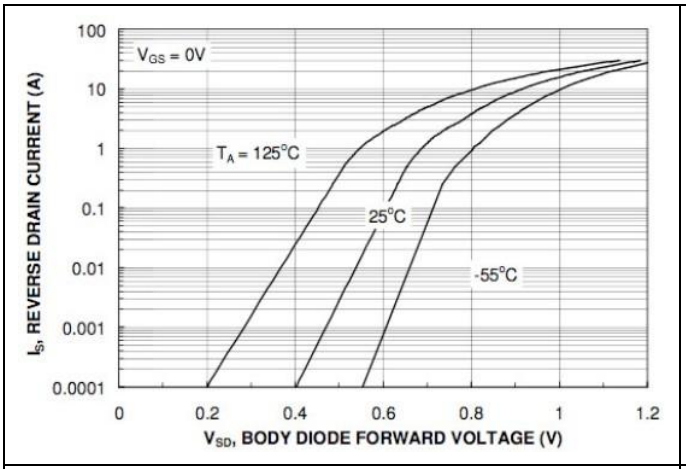

FIG.7-SOURCE-DRAIN DIODE FORWARD VOLTAGE

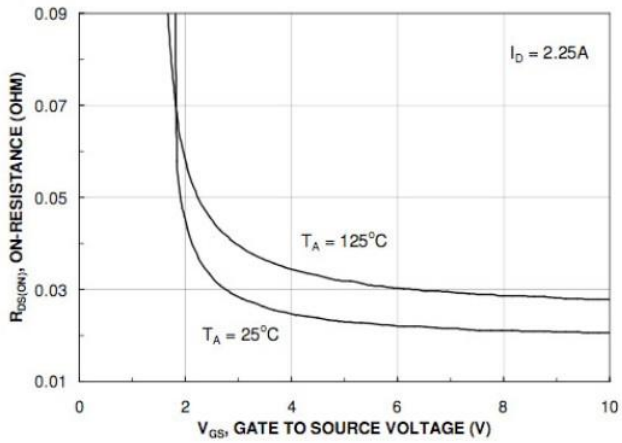

FIG.8-ON-RESISTANCE VS. GATE-TO-SOURCE VOLTAGE

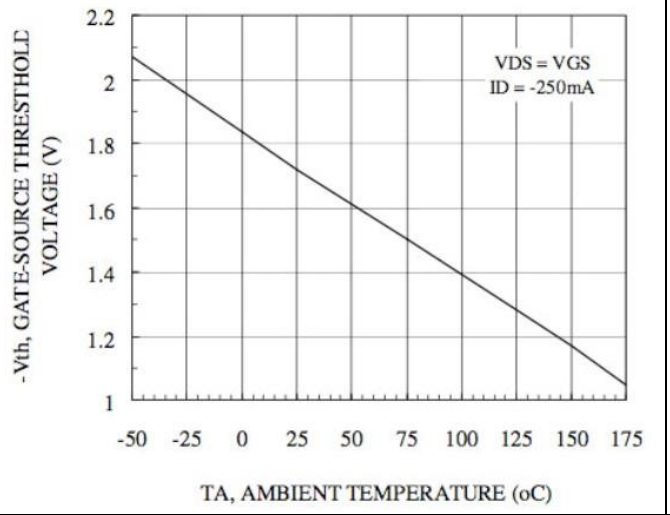

FIG.9-VTH GATE TO SOURCE VOLTAGE VS TEMPERATURE

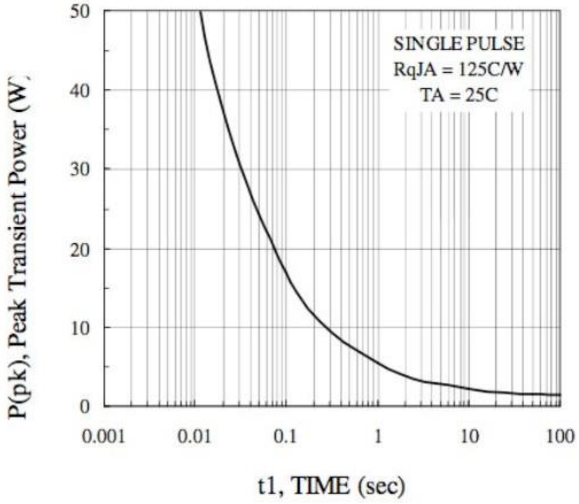

FIG.10-SINGLE PULSE POWER, JUNCTION-TO-AMBIENT

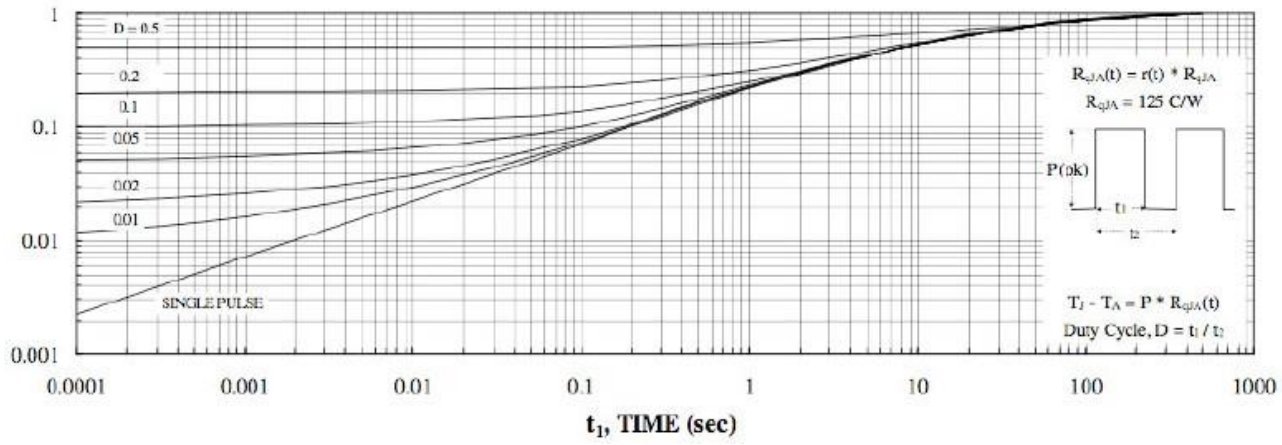

FIG.11-NORMALIZED THERMAL TRANSIENT JUNCTION TO AMBIENT

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