MS49N20

P-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
- Miniature SO-8 Surface Mount Package Saves Board Space
- High power and current handling capability
- Low side high current DC-DC Converter applications
- RoHS compliant package

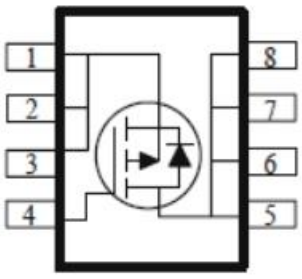
Packing & Order Information

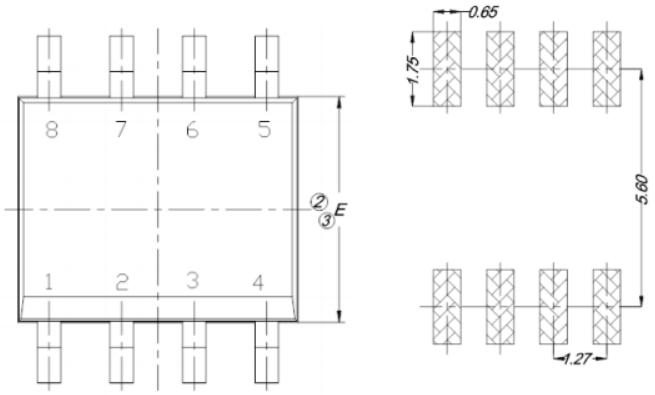
3,000/Reel

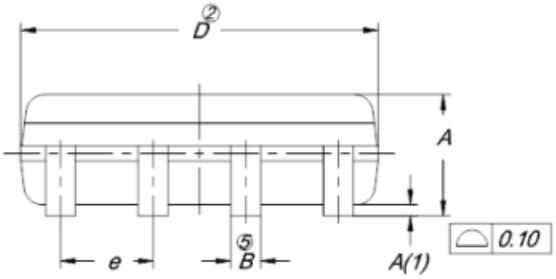


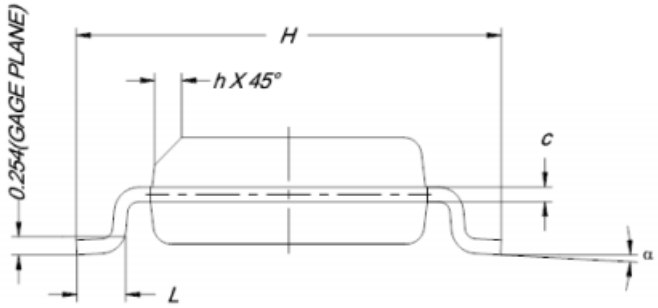
RoHS
COMPLIANT

Graphic symbol









DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	1.35	1.55	1.75
A(1)	0.10	0.18	0.25
B	0.38	0.45	0.51
C	0.19	0.22	0.25
D	4.80	4.90	5.00
E	3.80	3.90	4.00
e	1.27 BSC		
H	5.80	6.00	6.20
L	0.50	0.72	0.93
α	0°	4°	8°
h	0.25	0.38	0.50

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MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings (T_A=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°C)	±6.9	A
	Continuous Drain Current[a] (T_A =70°C)	±5.6	A
I_{DM}	Pulsed Drain Current[b]	±40	A
I_S	Continuous Source Current (Diode Conduction)[a]	1.7	A
P_D	Power Dissipation[a] (T_A =25°C)	2.1	W
	Power Dissipation[a] (T_A =70°C)	1.3	W
T_J/T_{STG}	Operating Junction and Storage Temperature	-55 to +150	°C

Thermal Resistance Ratings

Symbol	Parameter	Maximum	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient[a] (t <= 10 sec)	62.5	°C/W
	Maximum Junction-to-Ambient[a] (Steady-State)	110	

Notes:

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

b. 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 = -250uA	1			
I_{GSS}	Gate-Body Leakage	V_{DS} = 0 V , V_{GS} = ±20 V			±100	nA
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 24 V , V_{GS} = 0 V V_{DS} = 24 V , V_{GS} = 0 V , T_J= 55°C			1 10	uA
$I_{D(on)}$	On-State Drain Current	V_{DS} = 5 V , V_{GS} = 10 V	20			A
$r_{DS(on)}$	Drain-Source On-Resistance	V_{GS} = 10 V , I_D = 6.9 A V_{GS} = 4.5 V , I_D = 6.0 A			34 41	mΩ
g_{fs}	Forward Tranconductance	V_{DS} = 15 V , I_D = 6.9 A		20		S
V_{SD}	Diode Forward Voltage	I_S = 1.7 A , V_{GS} = 0 V		0.77		V

Dynamic[b]

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
Q_g	Total Gate Charge	V_{DS} = 15 V , I_D = 6.9 A , V_{GS} = 4.5 V	--	4.0	--	nC
Q_{gs}	Gate-Source Charge		--	1.1	--	nC
Q_{gd}	Gate-Drain Charge		--	1.4	--	nC

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Dynamic[b]						
Symbol	**Parameter**	**Test Conditions**	**Min**	**Typ.**	**Max.**	**Units**
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 15 V , R_L = 1.9 Ω , V_{GEN} = 10 V , I_D = 1 A	--	12	--	ns
t_r	Rise Time		--	10	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	60	--	ns
tf	Fall Time		--	15	--	ns
trr	Input Capacitance	I_F = 1.7 A , Di/Dt = 100 A/uS	--	50	--	ns

NOTE:

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

Guaranteed by design, not subject to production testing.

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■Characteristic Curves

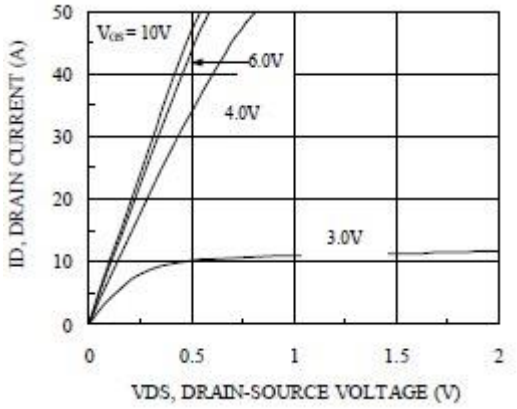


FIG.1-ON REGION CHARACTERISTICS

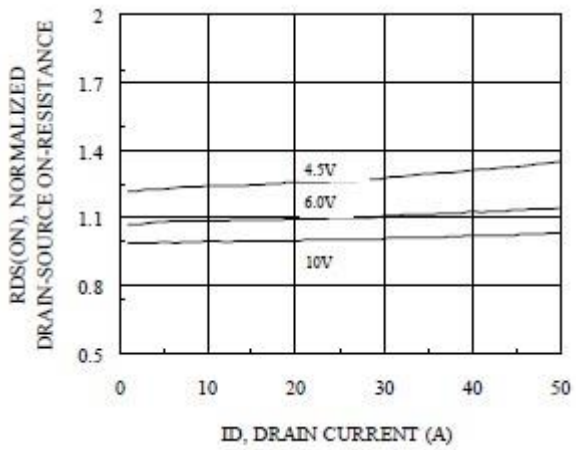


FIG.2- ON-RESISTANCE VARIATION WITH DRAIN CURRENT GATE VOLTAGE

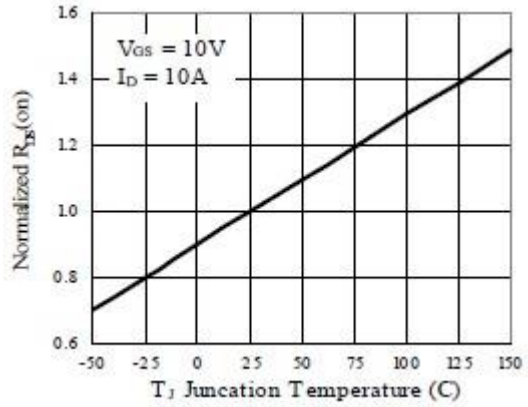


FIG.3-ON RESISTANCE VARIATION WITH TEMPERATURE

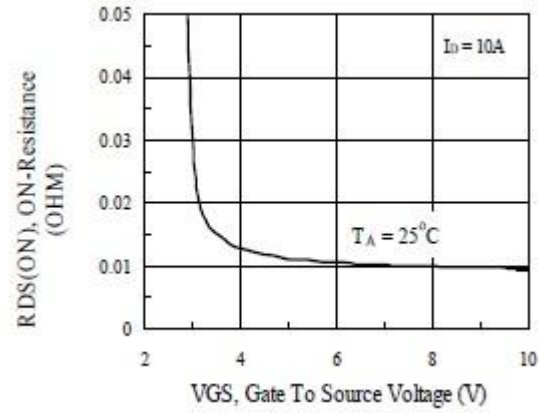


FIG.4-ON-RESISTANCE VARIATION WITH GATE TO SOURCE VOLTAGE

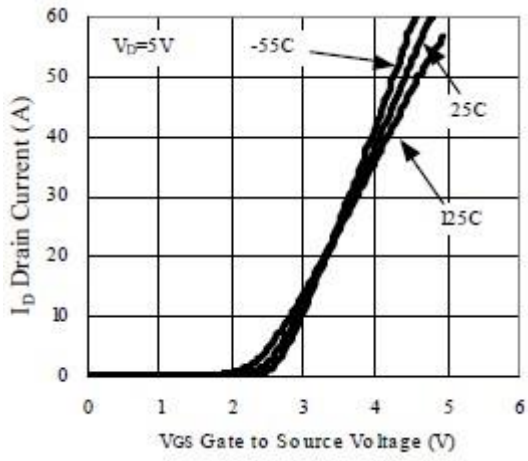


FIG.5-TRANSFER CHARACTERISTICS

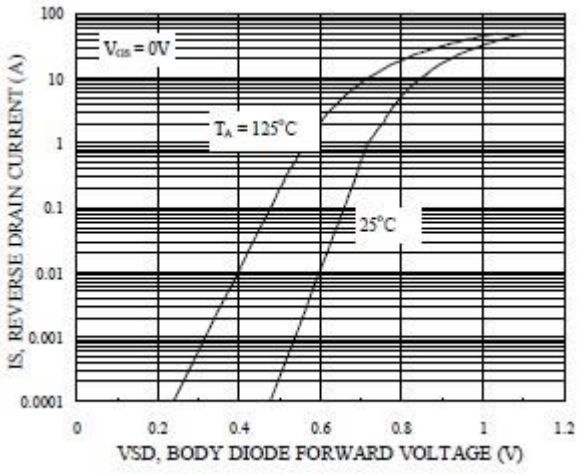


FIG.6-BODY DIODE FORWARD VOLTAGE VARIATION WITH WOURCE CURRENT AND TEMPERATURE

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■Characteristic Curves

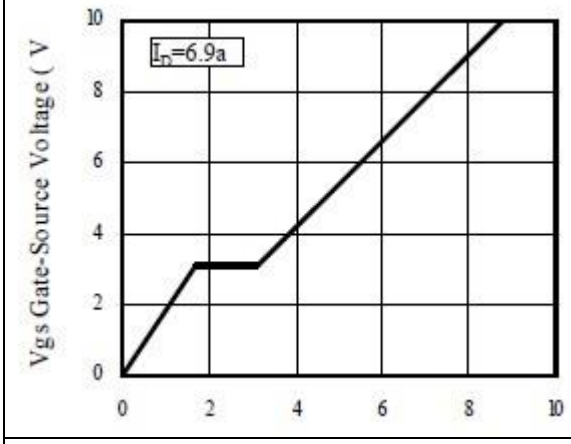


FIG.7-GATE CHARGE CHARACTERISTICS

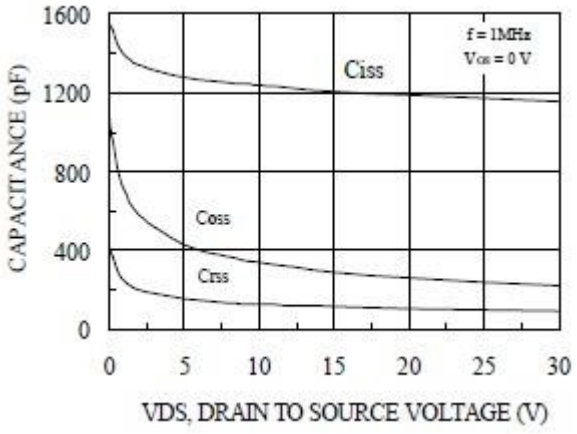


FIG.8-CAPACITANCE CHARACTERISTICS

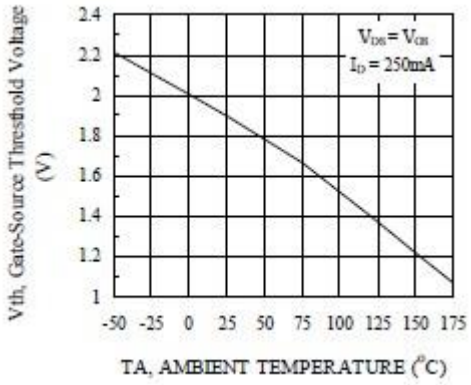


FIG.9-THRESHOLD VS AMBIENT TEMPERATURE

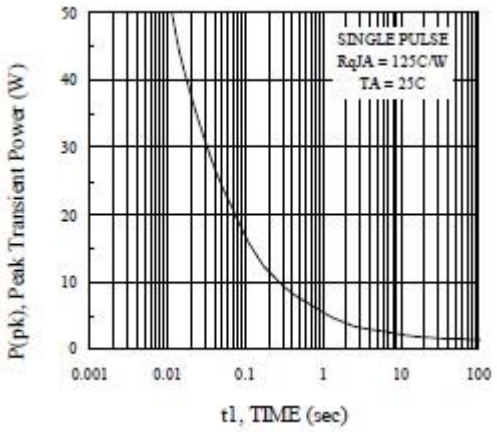


FIG.10-SINGLE PULSE MAXIMUM POWER DISSIPATION

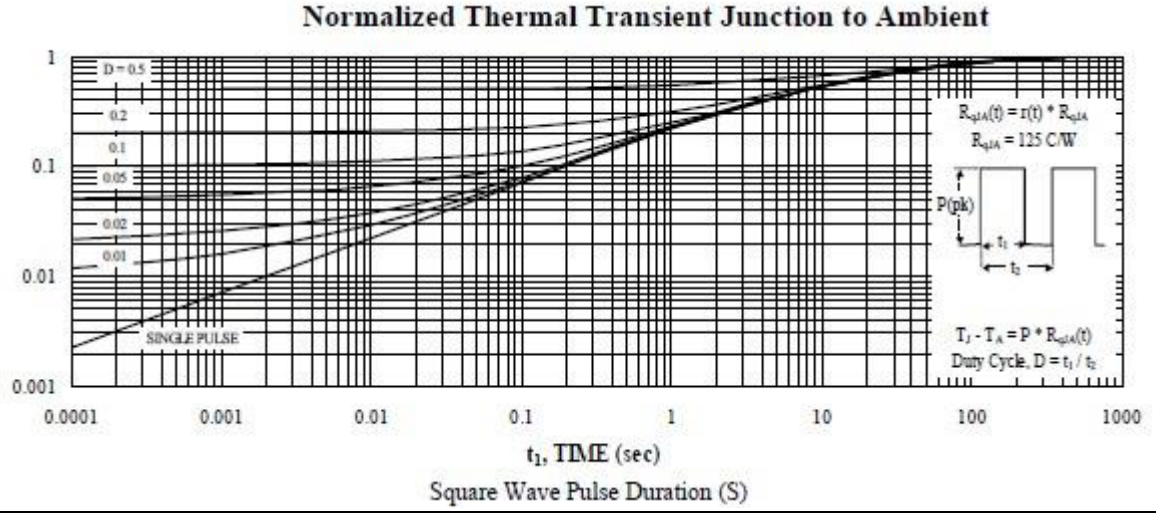


FIG.11-TRANSIENT THERMAL RESPONSE CURVE

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