MSD23N22

N-Channel 30V (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.

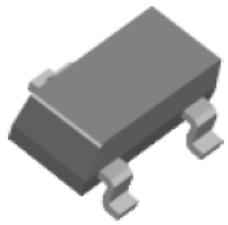
Features

- Low rDS(on) provides higher efficiency and extends battery life
- Low thermal impedance copper leadframe
- SOT-23 saves board space
- Fast switching speed
- High performance trench technology
- RoHS compliant package

Package type：SOT-23

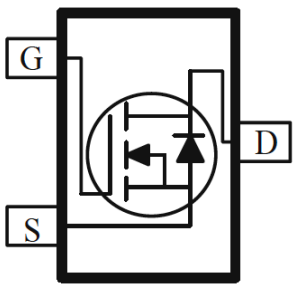
Packing & Order Information

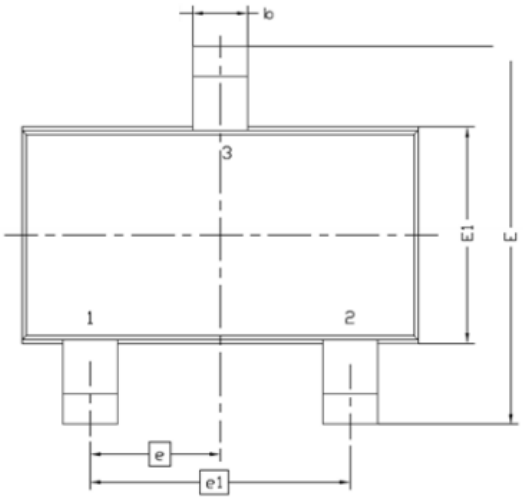
3,000/Reel

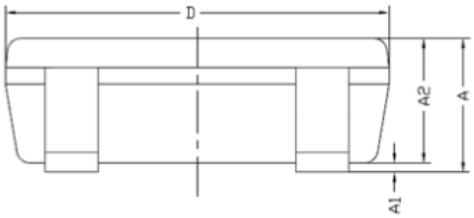


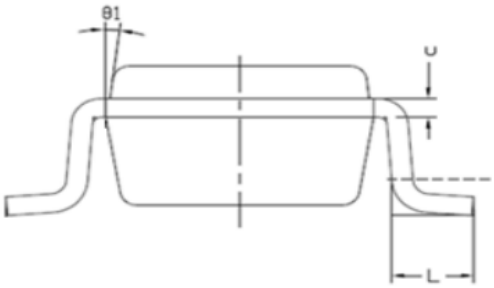
RoHS
COMPLIANT

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 noted)

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Continuous Drain Current @ TC=25°C	2.5	A
	Continuous Drain Current @ TC=70°C	2.0	A
I_{DM}	Pulsed Drain Current	10	A
I_S	Continuous Source Current (Diode Conduction)	0.46	A
P_D	Power Dissipation (TC=25°C)	1.25	W
	Power Dissipation (TC=100°C)	0.8	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 noted)

Symbol	Parameter	Maximum	Units
t <= 5 sec	Maximum Junction-to-Ambient(RthJA)	150	°C/W
Steady State	Maximum Junction-to-Ambient(RthJA)	200	

On Characteristics

Symbol	Test Conditions	Min	Typ.	Max.	Units
V_{GS}	V_{DS} = V_{GS}, I_D = 250μA	2.0	--	4.0	V
$R_{DS(ON)}$	V_{GS} = 10 V , I_D = 3.5 A	--	40	47	Ω

Off Characteristics

Symbol	Test Conditions	Min	Typ.	Max.	Units
$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.0	1.5	3.0	V
$R_{DS(ON)}$	V_{GS} = 10 V , I_D = 2.5 A V_{GS} = 4.5 V , I_D = 1.7 A	--	62 102	85 125	mΩ
I_{DSS}	V_{DS} = 16 V , V_{GS} = 0 V V_{DS} = 20 V , V_{GS} = 0 V , T_J = 55°C	--	--	1 10	uA
ID(on)	V_{GS} = 5 V, V_{DS} = 4.5 V	6	--	--	A
I_{GSS}	V_{GS} = 8 V, V_{DS} = 0 V	--	4	100	nA
V_{SD}	I_S = 0.46 V, V_{GS} = 0 V	--	0.65	--	V
Gfs	V_{DS} = 5 V , I_D = 3 A	--	3.5	--	S

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Dynamic Characteristics					
Symbol	Test Conditions	Min	Typ.	Max.	Units
Q_g	V_{DS} = 10 V , I_D = 2.5 A, V_{GS} = 4.5 V	--	3.5	7	nC
Q_{gs}		--	0.8	7	nC
Q_{gd}		--	1.0	2	nC
C_{ISS}	V_{DS} = 15 V, V_{GS} = 0 V, F = 1.0MHz	--	720	1500	pF
C_{OSS}		--	165	400	pF
C_{RSS}		--	60	200	pF
$t_{d(on)}$	V_{DD}= 10 V, I_D = 1 A, R_G = 6 Ω , V_{GEN} = 4.5 V	--	10	20	ns
t_r		--	13	30	ns
$t_{d(off)}$		--	14	30	ns
tf		--	4	20	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

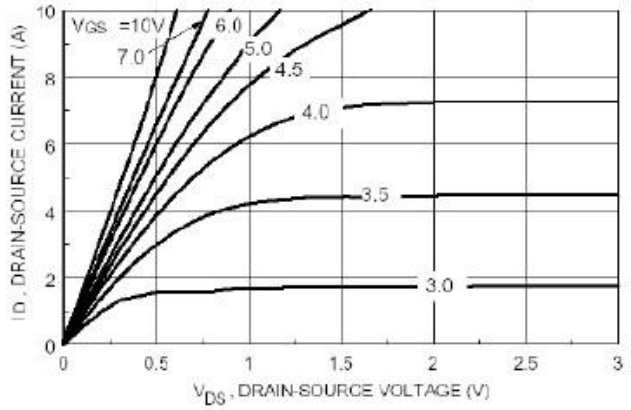

FIG.1-ON REGION CHARACTERISTICS

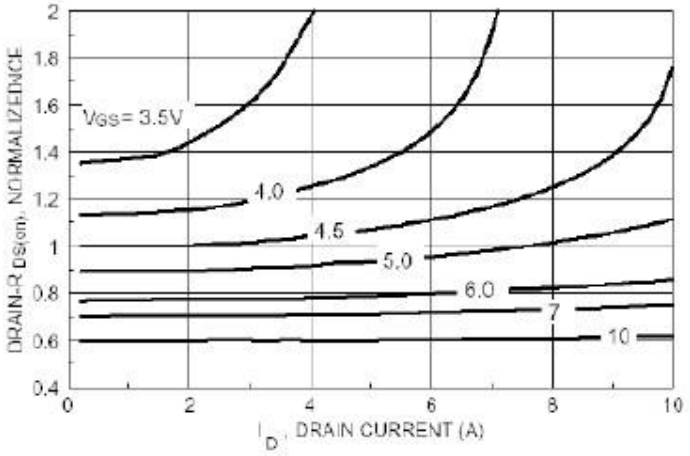

FIG.2-ON-RESISTANCE VARIATION WITH DRAIN CURRENT AND GATE VOLTAGE

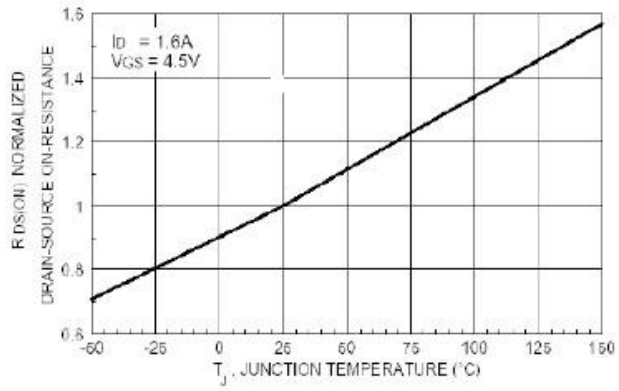

FIG.3-ON-RESISTANCE VARIATION WITH TEMPERATURE

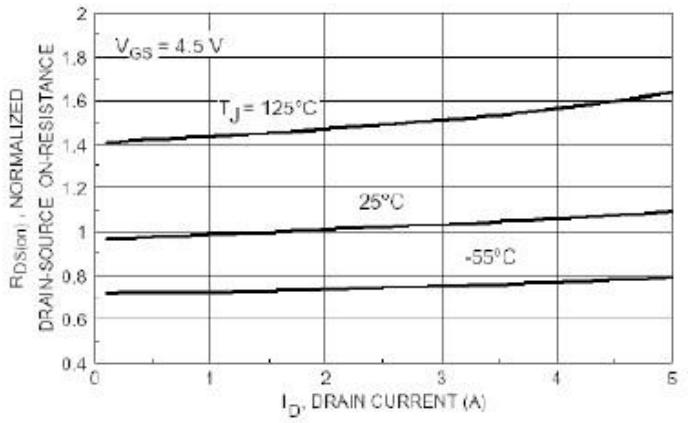

FIG.4-ON-RESISTANCE VARIATION WITH DRAIN CURRENT AND TEMPERATURE

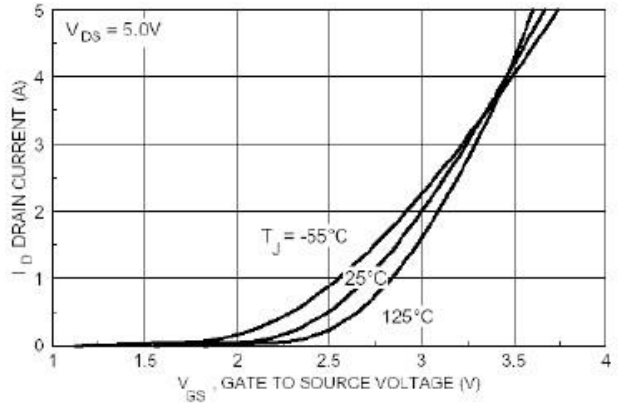

FIG.5-TRANSFER CHARACTERISTICS

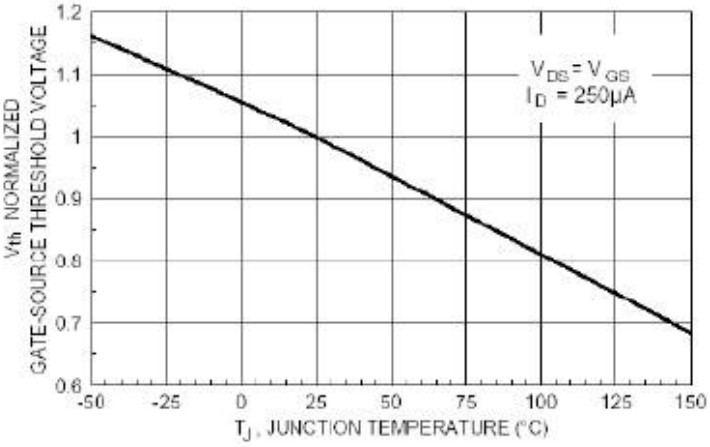

FIG.6-GATE THRESHOLD VARIATION WITH TEMPERATURE

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■Characteristics Curve

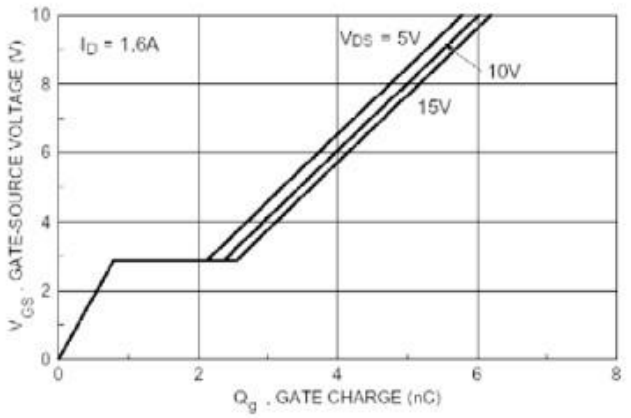

FIG.7-GATE CHARGE CHARACTERISTIC

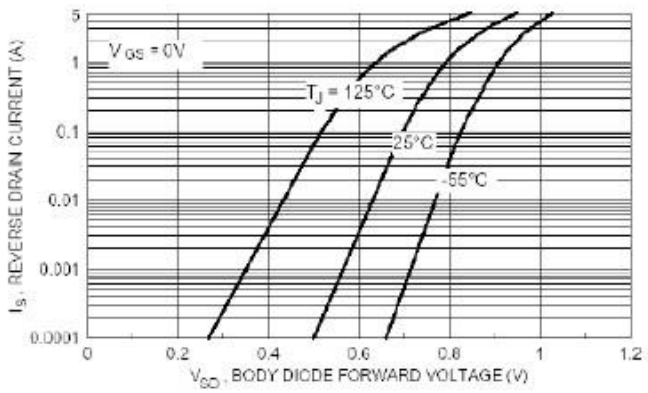

FIG.8-CAPACITANCE CHARACTERISTIC

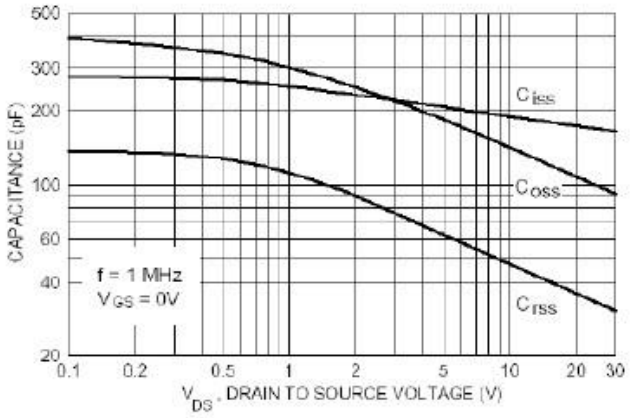

FIG.9-MAXIMUM SAFE OPERATING AREA

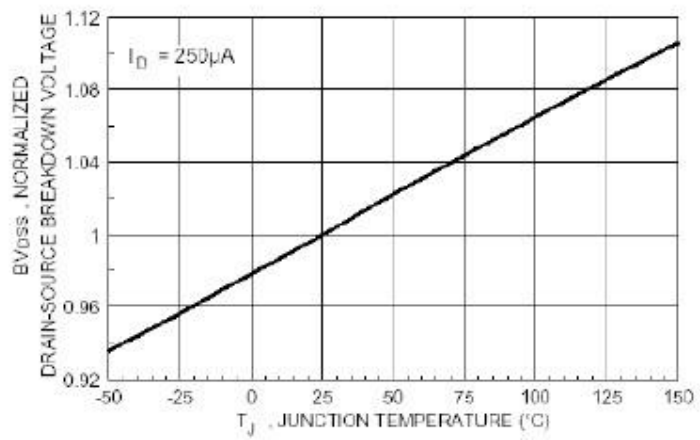

FIG.10-BREAKDOWN VOLTAGE VARIATION WITH TEMPERTURE

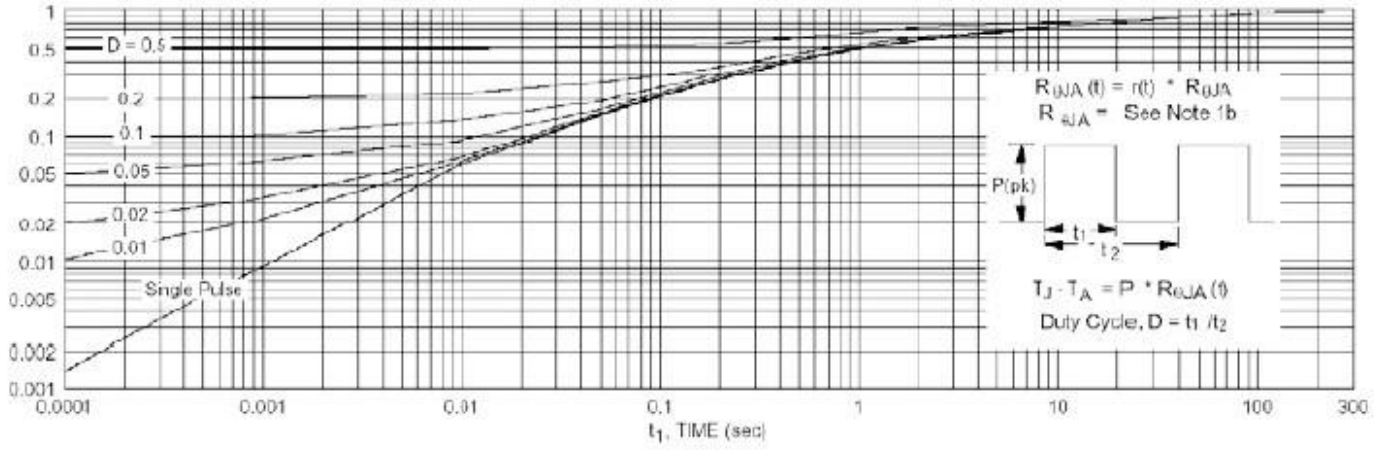

FIG.11-TRANSIENT THERMAL RESPONSE CURVE

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