MSD23N00

N-Channel 20V (D-S) MOSFET

Description

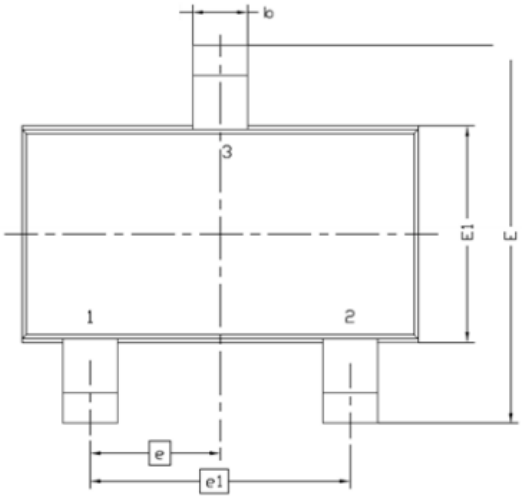
These miniature surface mount MOSFETs utilize a high cell density trench process to provide low rDS(on) and to ensure minimal power loss and heat dissipation. Typical applications are DC-DC converters and power management in portable and battery-powered products such as computers, printers, PCMCIA cards, cellular and cordless telephones.

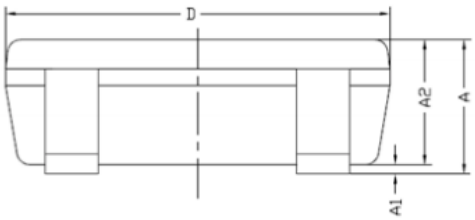
Features

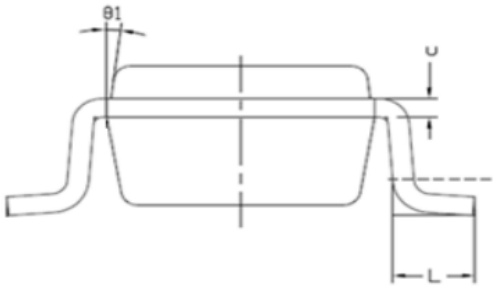
- Low rDS(on) provides higher efficiency and extends battery life
- Low thermal impedance copper leadframe
- SOT-23 saves board space
- Fast switching speed
- High performance trench technology
- RoHS compliant package

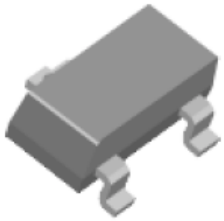
Packing & Order Information

3,000/Reel



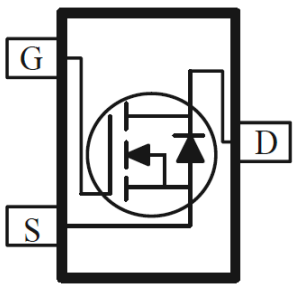






RoHS
COMPLIANT

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	

Brückewell

MSD23N00

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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	20	V
V_{GS}	Gate-Source Voltage	±8	V
I_D	Continuous Drain Current @ TC=25°C	4.3	A
	Continuous Drain Current @ TC=70°C	3.3	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)	100	°C/W
Steady State	Maximum Junction-to-Ambient(RthJA)	166	

On Characteristics					
Symbol	**Test Conditions**	**Min**	**Typ.**	**Max.**	**Units**
V_{GS}	V_{DS} = V_{GS}, I_D = 250μA	0.7	--	--	V
$R_{DS(ON)}$	VGS = 4.5 V, ID = 4.3 A	--	--	0.0035	Ω
	VGS = 2.5 V, ID = 3.5 A	--	--	0.0050	

Off Characteristics					
Symbol	**Test Conditions**	**Min**	**Typ.**	**Max.**	**Units**
V_{GS}	V_{DS} = V_{GS}, I_D = 250μA	.7	--	--	V
$R_{DS(ON)}$	VGS = 4.5 V, ID = 4.3 A VGS = 2.5 V, ID = 3.5 A	--	30 40	35 50	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	10	--	--	A
I_{GSS}	V_{GS} = 8 V, V_{DS} = 0 V	--	4	100	nA
V_{SD}	IS = 0.46 A, VGS = 0 V	--	0.65	1.20	V
Gfs	V_{DS} = 5 V , I_D = 3 A	--	11	--	S

MSD23N00

N-Channel 20V (D-S) MOSFET

Dynamic Characteristics					
Symbol	**Test Conditions**	**Min**	**Typ.**	**Max.**	**Units**
Q_g	V_{DS} = 10 V , I_D = 2.5 A, V_{GS} = 3.0 V	--	7.0	--	nC
Q_{gs}		--	11.2	--	nC
Q_{gd}		--	1.9	--	nC

Dynamic Characteristics					
Symbol	**Test Conditions**	**Min**	**Typ.**	**Max.**	**Units**
C_{ISS}	V_{DS} = 15 V, V_{GS} = 0 V, F = 1.0MHz	--	700	--	pF
C_{OSS}		--	175	--	pF
C_{RSS}		--	85	--	pF
$t_{d(on)}$	V_{DD}= 10 V, I_D = 1 A, R_G = 6 Ω , V_{GEN} = 4.5 V	--	9	--	ns
t_r		--	11	--	ns
$t_{d(off)}$		--	18	--	ns
tf		--	5	--	ns

Notes

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

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

MSD23N00

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Characteristics Curve

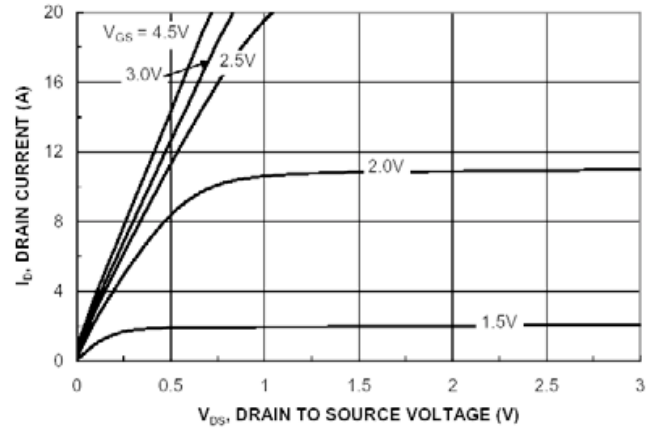

FIG.1-ON REGION CHARACTERISTICS

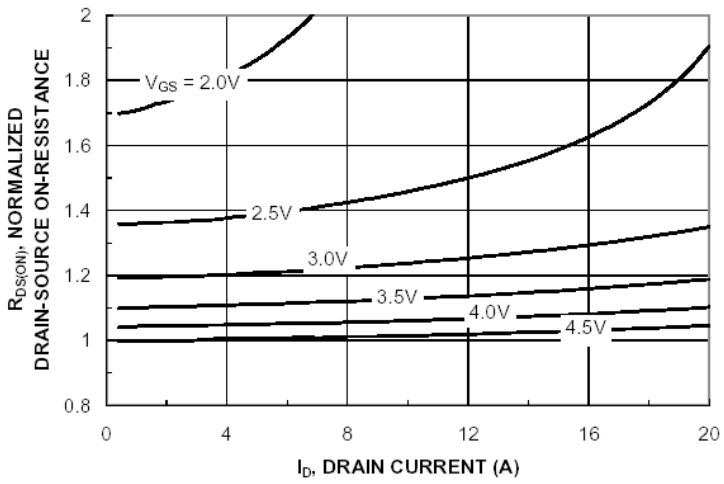

FIG.2-ON-RESISTANCE VARIATION WITH DRAIN CURRENT AND GATE VOLTAGE

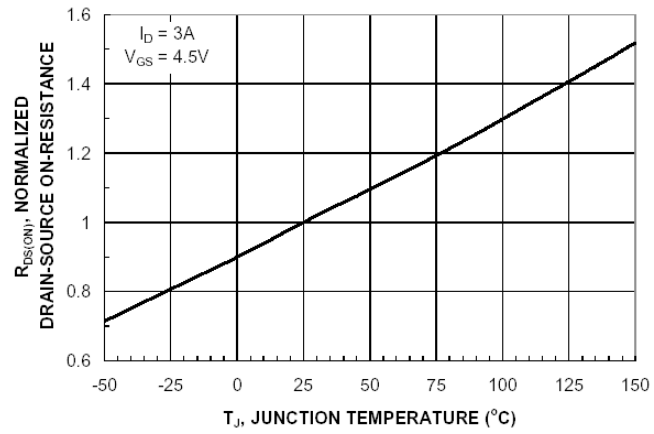

FIG.3-ON-RESISTANCE VARIATION WITH TEMPERATURE

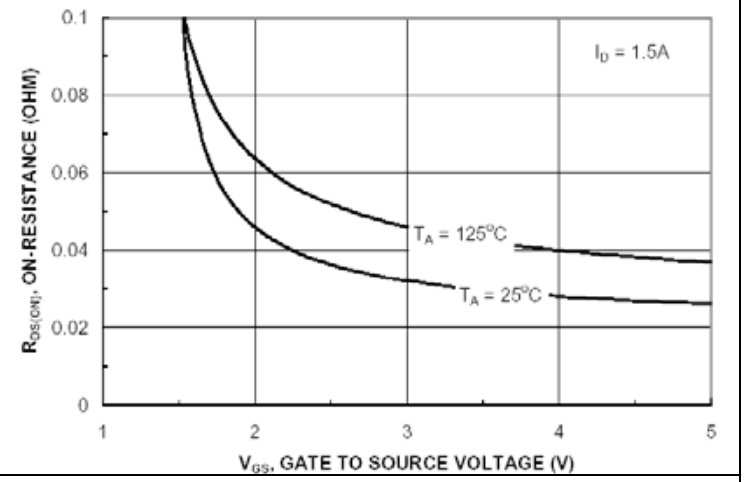

FIG.4-ON-RESISTANCE VARIATION WITH DRAIN CURRENT AND TEMPERATURE

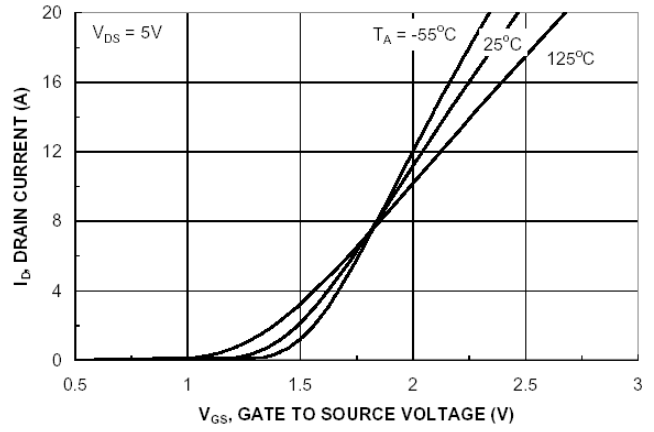

FIG.5-TRANSFER CHARACTERISTICS

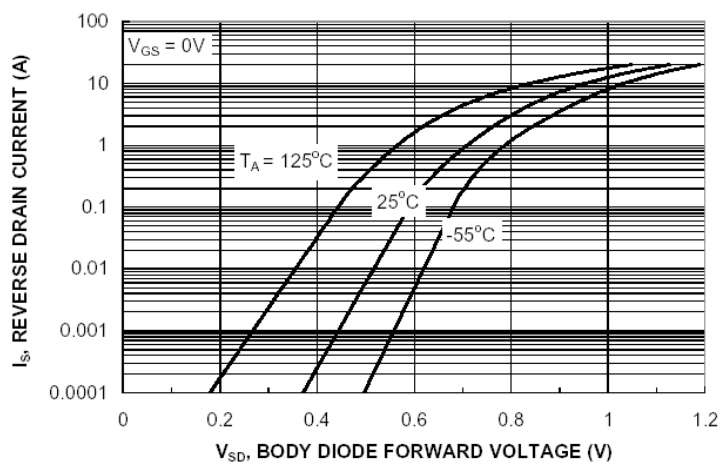

FIG.6-GATE THRESHOLD VARIATION WITH TEMPERATURE

MSD23N00

N-Channel 20V (D-S) MOSFET

■Characteristics Curve

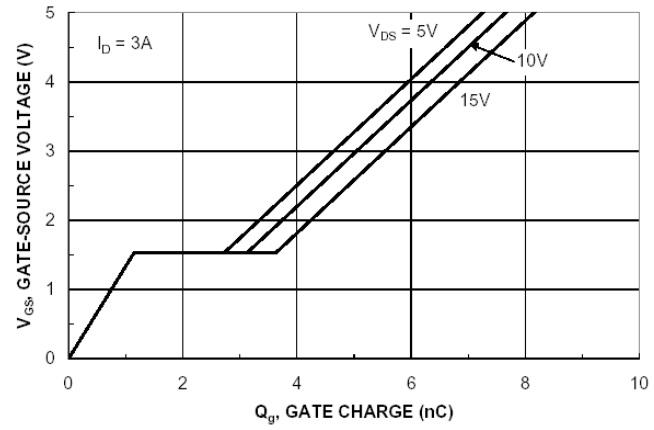

FIG.7-GATE CHARGE CHARACTERISTIC

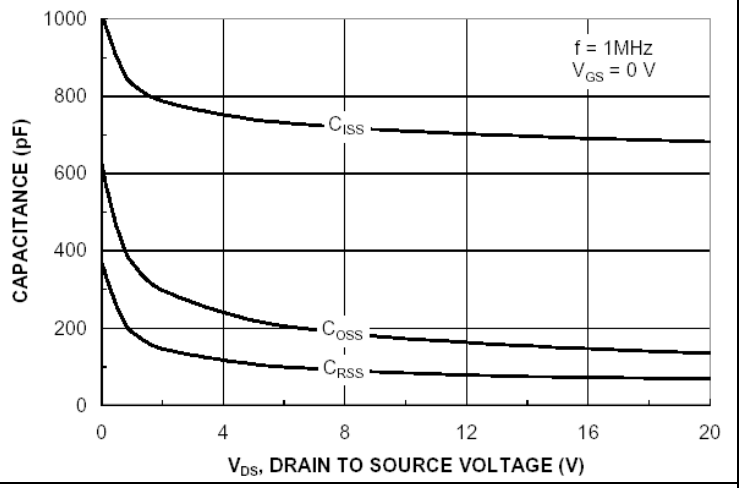

FIG.8-CAPACITANCE CHARACTERISTIC

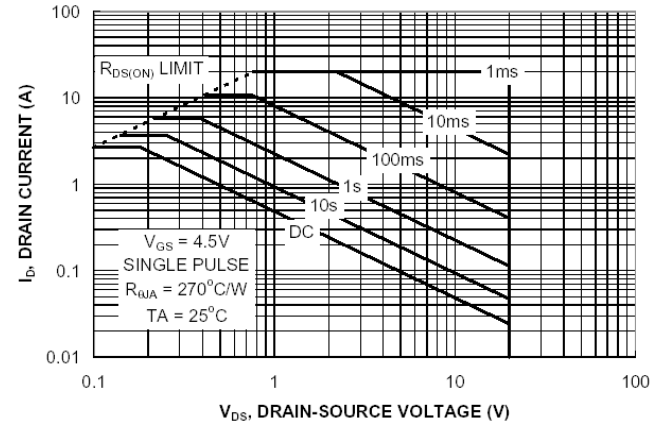

FIG.9-MAXIMUM SAFE OPERATING AREA

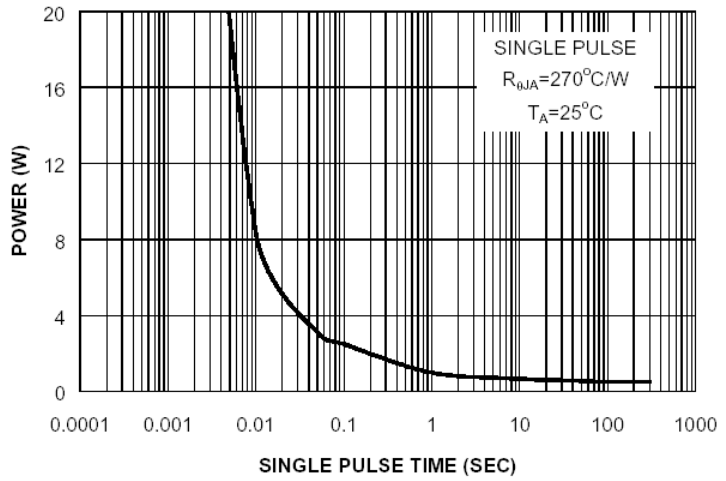

FIG.10-BREAKDOWN VOLTAGE VARIATION WITH TEMPERTURE

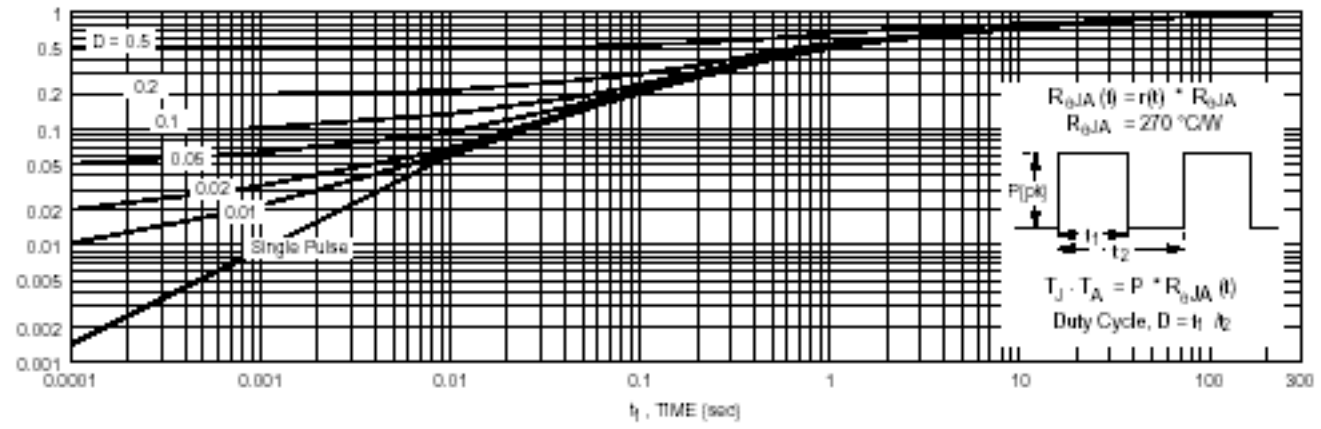

Figure 11. Transient Thermal Response Curve.

Thermal characterization performed using the conditions described in Note 1b.
Transient thermal response will change depending on the circuit board design.

FIG.11-TRANSIENT THERMAL RESPONSE CURVE

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