MSD23N20

N-Channel 20V (D-S) MOSFET

Description

These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

Features

20V,800mA, RDS(ON) =300mΩ@VGS = 4.5V

Improved dv/dt capability

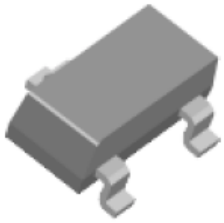
Fast switching

Green Device Available

Suit for 1.5V Gate Drive Applications

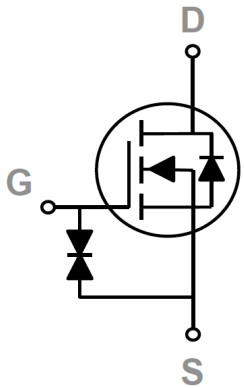
Packing & Order Information

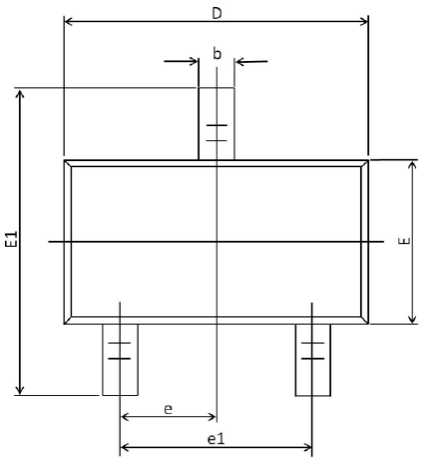
SOT-323, 3,000/Reel

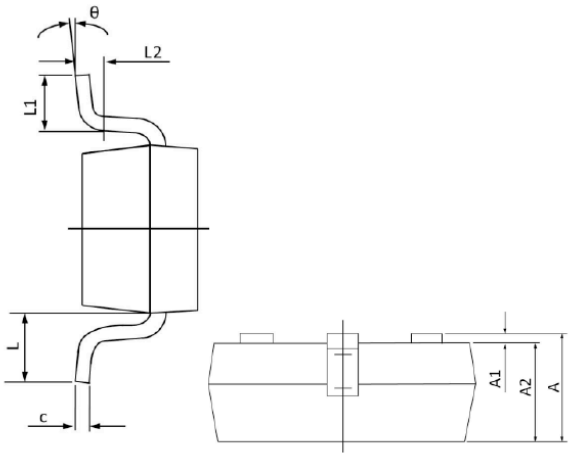


RoHS
COMPLIANT

Graphic symbol







Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	1.100	0.800	0.043	0.031
A1	0.100	0.000	0.004	0.000
A2	1.000	0.800	0.039	0.031
b	0.400	0.200	0.016	0.008
c	0.250	0.080	0.010	0.003
D	2.200	1.800	0.087	0.071
E	1.350	1.150	0.053	0.045
E1	2.450	1.800	0.096	0.071
e	0.65BSC		0.026BSC	
e1	1.400	1.200	0.055	0.047
L	0.525REF.		0.021REF.	
L1	0.460	0.150	0.018	0.006
L2	0.200	0.000	0.008	0.000
θ	8°	0°	8°	0°

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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	800	mA
	Continuous Drain Current @ TC=70°C	510	mA
I_{DM}	Pulsed Drain Current	3.2	A
P_D	Power Dissipation (TC=25°C)	275	mW
	Power Dissipation (TC=100°C)	2.2	mW
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)	450	°C/W

On Characteristics

Symbol	Test Conditions	Min	Typ.	Max.	Units
V_{GS}	V_{DS} = V_{GS}, I_D = 250μA	0.3	0.6	1.0	V
$R_{DS(ON)}$	VGS = 4.5 V, ID = 0.5 A	--	200	300	mΩ
	VGS = 2.5 V, ID = 0.4 A	--	235	400	
	VGS=1.8V ,ID=0.2A	--	295	550	
	VGS=1.5V , ID=0.1A	--	365	800	
	VGS=1.2V , ID=0.1A	--	600	1500	

Off Characteristics

Symbol	Test Conditions	Min	Typ.	Max.	Units
BV_{DSS}	V_{GS}=0, I_D = 250μA	20			V
$\triangle V_{DSS}/\triangle Tj$	VDSS Temperature Coefficient	--	-0.01	--	V/℃
I_{DSS}	V_{DS} = 16 V , V_{GS} = 0 V V_{DS} = 20 V , V_{GS} = 0 V , T_J = 55°C	--	--	10 1	uA
I_{GSS}	V_{GS} = 6 V, V_{DS} = 0 V	--	--	20	uA

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Dynamic Characteristics					
Symbol	**Test Conditions**	**Min**	**Typ.**	**Max.**	**Units**
Q_g	V_{DS} = 10 V , I_D = 0.5A, V_{GS} = 4.5 V	--	1.0	2.0	nC
Q_{gs}		--	0.26	0.5	nC
Q_{gd}		--	0.2	0.4	nC

Dynamic Characteristics					
Symbol	**Test Conditions**	**Min**	**Typ.**	**Max.**	**Units**
C_{ISS}	V_{DS} = 10 V, V_{GS} = 0 V, F = 1.0MHz	--	38.2	75	pF
C_{OSS}		--	14	28	pF
C_{RSS}		--	6	12	pF
$t_{d(on)}$	V_{DD}= 10 V, I_D =0.5 A, R_G = 10 Ω , V_{GEN} = 4.5 V	--	5	10	ns
t_r		--	3.5	7	ns
$t_{d(off)}$		--	14	28	ns
tf		--	6	12	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

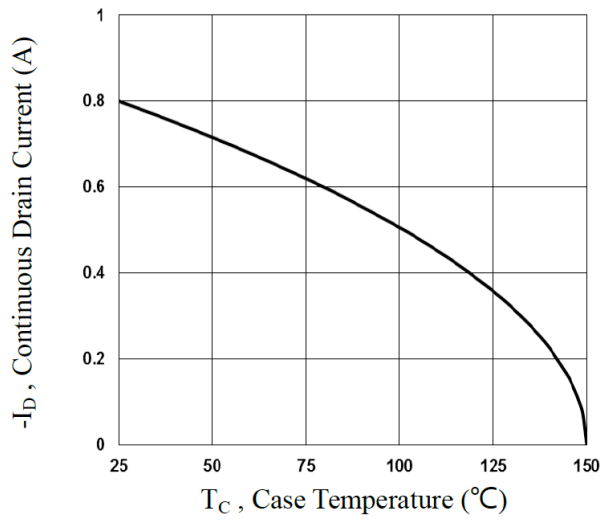


FIG.1-CONTINUOUS DRAIN CURRENT VS Tc

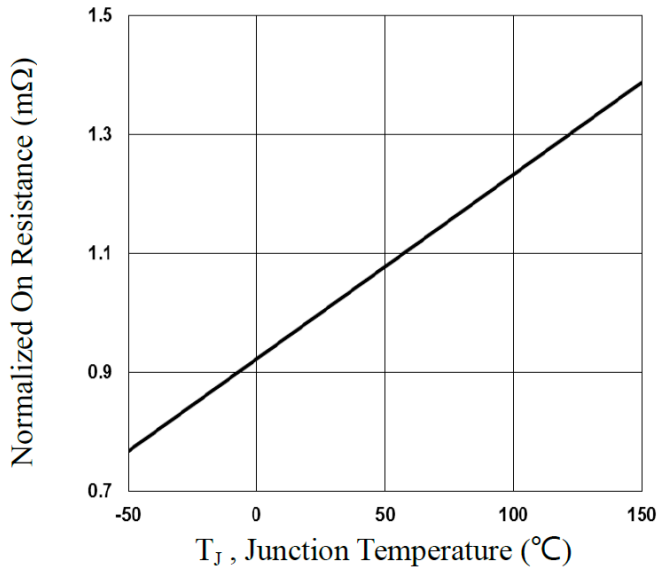


FIG.2-NORMALIZED RDSON VS TJ

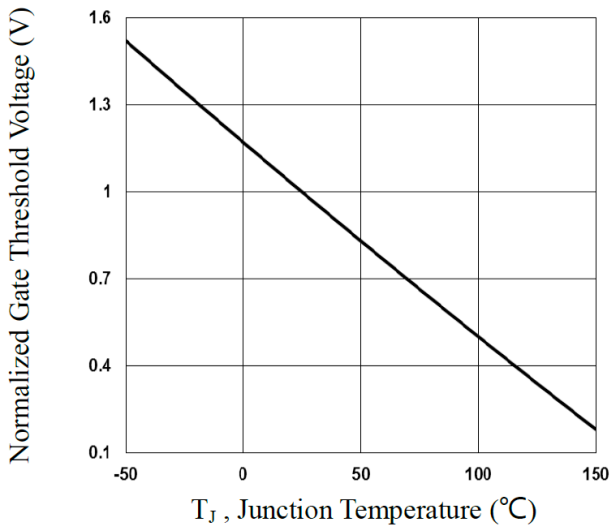


FIG.3-NORMALIZED VTH VS TJ

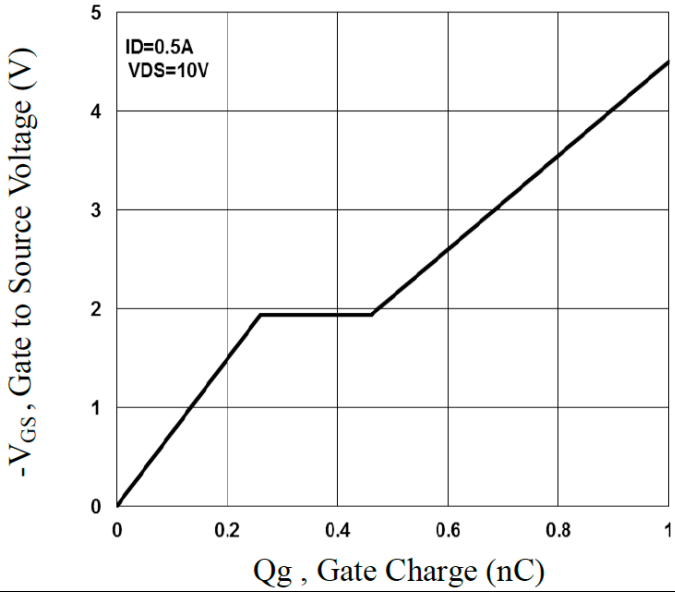


FIG.4-GATE CHARGE WAVEFORM

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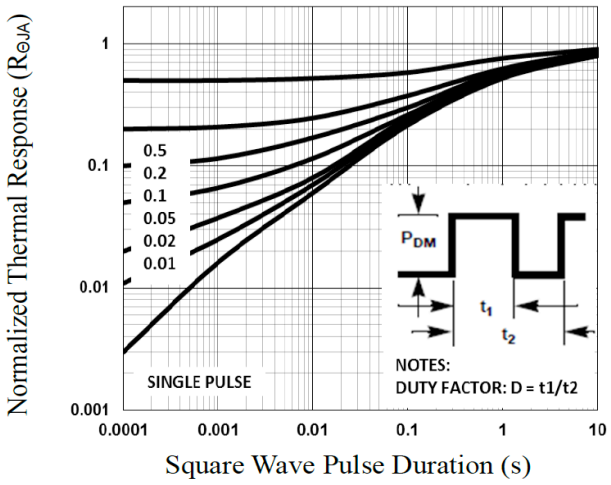


FIG.5-TRANSFER CHARACTERISTICS

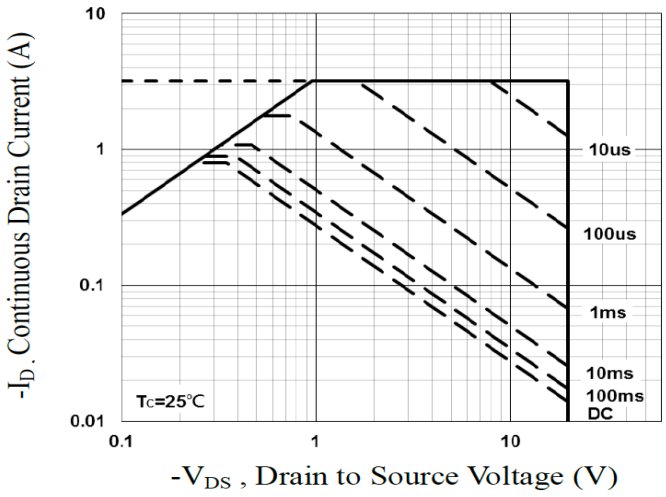


FIG.6-MAX SAFE OPEARTIONAREA

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