

General Description

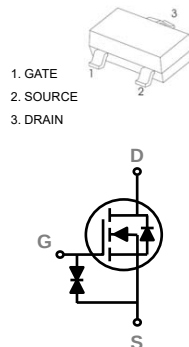
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

Features

20V, 800mA, $R_{DS(ON)} = 200m\Omega @ V_{GS} = 4.5V$
Improved dv/dt capability
Fast switching
ESD protected up to 2KV
Green Device Available

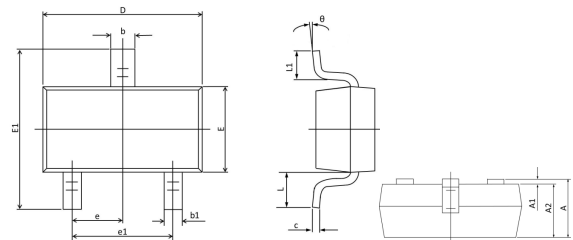
Applications

Notebook
Load Switch
Battery Protection
Hand-held Instruments



BVDSS	RDSON	ID
20V	200mΩ	800mA

SOT-523



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	0.900	0.700	0.035	0.028
A1	0.100	0.000	0.004	0.000
A2	0.800	0.700	0.031	0.028
b	0.350	0.250	0.014	0.010
b1	0.250	0.150	0.010	0.006
c	0.200	0.100	0.008	0.004
D	1.750	1.500	0.069	0.059
E	0.900	0.700	0.035	0.028
E1	1.750	1.400	0.069	0.055
e	0.5TYP.		0.02TYP.	
e1	1.100	0.900	0.043	0.035
L	0.460	0.300	0.018	0.012
L1	0.460	0.260	0.018	0.010
θ	8°	0°	8°	0°

Absolute Maximum Ratings $T_c=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	± 10	V
I_D	Drain Current – Continuous ($T_A=25^\circ\text{C}$)	800	mA
	Drain Current – Continuous ($T_A=70^\circ\text{C}$)	640	mA
I_{DM}	Drain Current – Pulsed ¹	3.2	A
P_D	Power Dissipation ($T_A=25^\circ\text{C}$)	312	mW
	Power Dissipation – Derate above 25°C	2.5	mW/ $^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	400	$^\circ\text{C/W}$

DMG1012-T

Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =250uA	20	---	---	V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C , I _D =1mA	---	-0.01	---	V/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =20V , V _{GS} =0V , T _J =25°C	---	---	1	uA
		V _{DS} =16V , V _{GS} =0V , T _J =125°C	---	---	10	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±10V , V _{DS} =0V	---	---	±10	uA

On Characteristics

R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} =4.5V , I _D =0.5A	---	200	270	mΩ
		V _{GS} =2.5V , I _D =0.4A	---	235	380	
		V _{GS} =1.8V , I _D =0.2A	---	295	550	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	0.3	0.6	1.0	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	3	---	mV/°C

Dynamic and switching Characteristics

Q _g	Total Gate Charge ^{2, 3}	V _{DS} =10V , V _{GS} =4.5V , I _D =0.5A	---	1	---	nC
Q _{gs}	Gate-Source Charge ^{2, 3}		---	0.26	---	
Q _{gd}	Gate-Drain Charge ^{2, 3}		---	0.2	---	
T _{d(on)}	Turn-On Delay Time ^{2, 3}	V _{DD} =10V , V _{GS} =4.5V , R _G =10Ω I _D =0.5A	---	5	---	ns
T _r	Rise Time ^{2, 3}		---	3.5	---	
T _{d(off)}	Turn-Off Delay Time ^{2, 3}		---	14	---	
T _f	Fall Time ^{2, 3}		---	6	---	
C _{iss}	Input Capacitance	V _{DS} =10V , V _{GS} =0V , F=1MHz	---	38.2	---	pF
C _{oss}	Output Capacitance		---	14.4	---	
C _{rss}	Reverse Transfer Capacitance		---	6	---	

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current	V _G =V _D =0V , Force Current	---	---	0.8	A
I _{SM}	Pulsed Source Current		---	---	1.6	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V , I _S =0.2A , T _J =25°C	---	---	1.2	V

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
3. Essentially independent of operating temperature.

RATING AND CHARACTERISTIC CURVES (DMG1012-T)

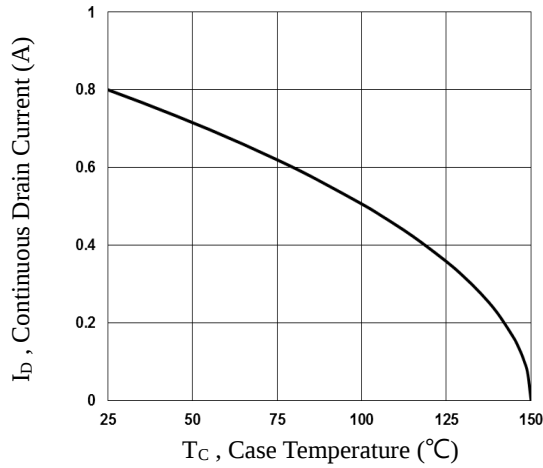


Fig.1 Continuous Drain Current vs. T_C

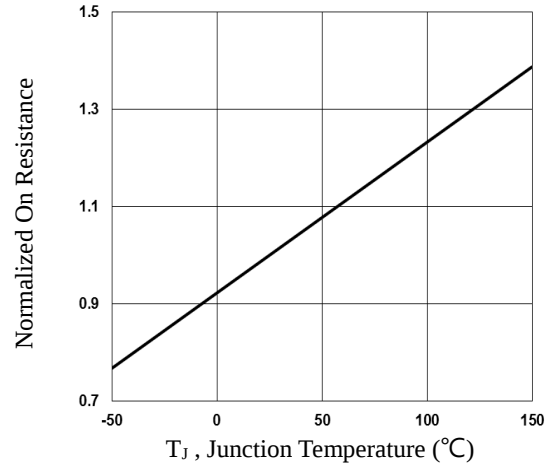


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

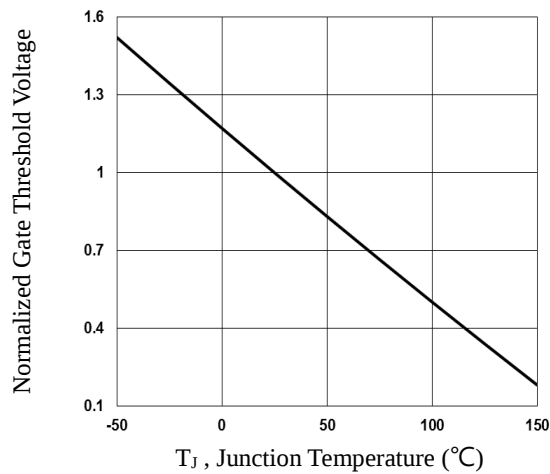


Fig.3 Normalized V_{th} vs. T_J

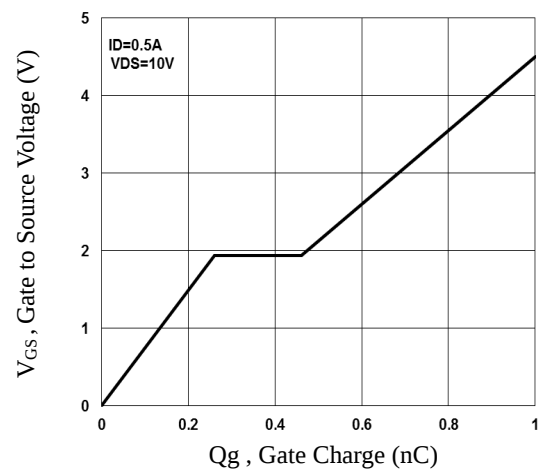


Fig.4 Gate Charge Waveform

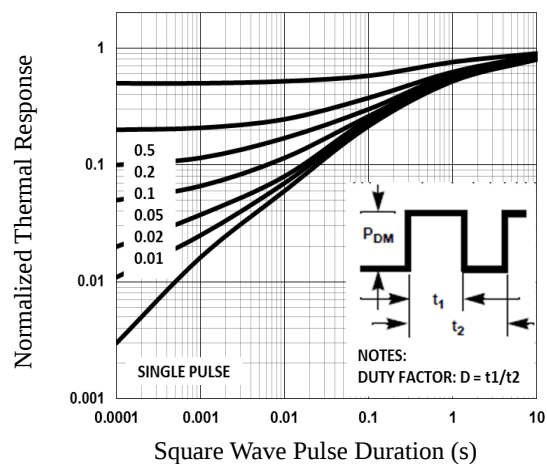


Fig.5 Normalized Transient Response

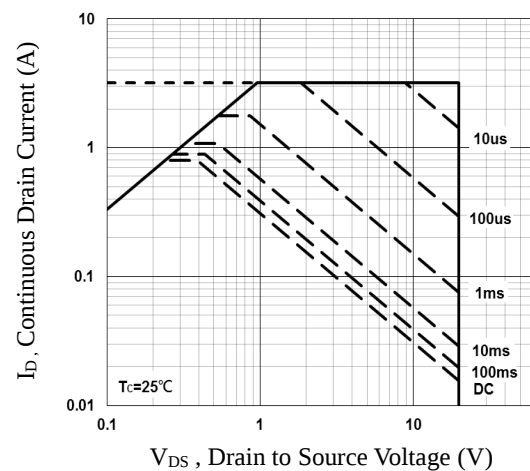


Fig.6 Maximum Safe Operation Area

RATING AND CHARACTERISTIC CURVES (DMG1012-T)

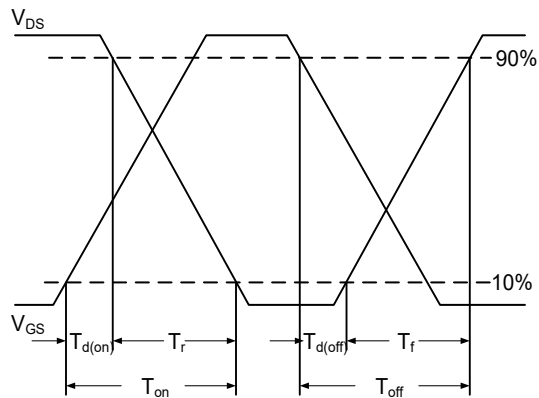


Fig.7 Switching Time Waveform

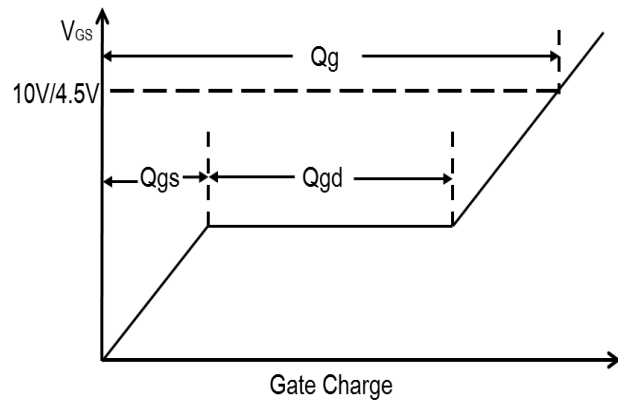


Fig.8 Gate Charge Waveform