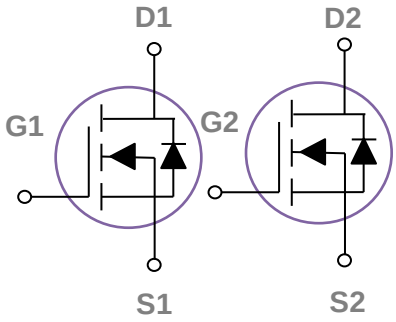
Description：

This Dual N-Channel MOSFET uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge.

It can be used in a wide variety of applications.



Features：

1) V_{DS}=40V,I_D=28A,$R_{DS(ON)}$ <13m Ω @V_{GS}=10V
2) Improved dv/dt capability
3) Fast switching
4) 100% EAS Guaranteed
5) Green Device Available.

Absolute Maximum Ratings： (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Continuous Drain Current-Continuous -T_C=25℃	28	A
	Continuous Drain Current-T_C=100℃	21	
I_{DM}	Drain Current – Pulsed[2]	90	A
E_{AS}	Single Pulse Avalanche Energy[3]	28	mJ
P_D	Power Dissipation-T_C=25℃	35	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	℃

Thermal Characteristics：

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance,Junction to Case(Steady State)[1]	62	℃/W
$R_{\theta JA}$	Thermal Resistance,Junction to Ambient[1]	4.1	

Package Marking and Ordering Information：

Part NO.	Marking	Package
ZD013DNG	D013DN	DFN3*3-8D

Electrical Characteristics： (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250μA	40	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{GS}=0V, V_{DS}=32V, T_J=25℃	---	---	1	μA
		V_{GS}=0V, V_{DS}=32V, T_J=55℃	---	---	5	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0A	---	---	±100	nA
On Characteristics						
$V_{GS(th)}$	GATE-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	1	1.5	2.5	V
$R_{DS(ON)}$	Drain-Source On Resistance[2]	V_{GS}=10V,I_D=20A	---	10	13	mΩ
		V_{GS}=4.5V,I_D=10A	---	13	20	
G_{FS}	Forward Transconductance	V_{DS}=5V, I_D=20A	---	36	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	2.1	4.2	Ω
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=15V, V_{GS}=0V, f=1MHz	---	1300	---	pF
C_{oss}	Output Capacitance		---	118	---	
C_{rss}	Reverse Transfer Capacitance		---	85	---	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD}=12V , V_{GS}=10V , R_G=3.3Ω ,I_D=6A	---	8.6	---	ns
t_r	Rise Time		---	3.4	---	ns

$t_{d(off)}$	Turn-Off Delay Time	V_{DD}=12V , V_{GS}=10V , R_G=3.3Ω ,I_D=6A	---	25	---	ns
t_f	Fall Time		---	2.2	---	ns
Q_g	Total Gate Charge	V_{DS}=20V , V_{GS}=4.5V , I_D=12A	---	10.7	---	nC
Q_{gs}	Gate-Source Charge		---	3.3	---	nC
Q_{gd}	Gate-Drain Charge		---	4.2	---	nC
Drain-Source Diode Characteristics						
V_{SD}	Source-Drain Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	V
I_S	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	42	A
I_{SM}	Pulsed Source Current[2,5]		---	---	100	A

Notes:

1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3.The EAS data shows Max. rating . The test condition is V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=25A
4.The power dissipation is limited by 150℃ junction temperature
5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics: (T_C=25℃ unless otherwise noted)

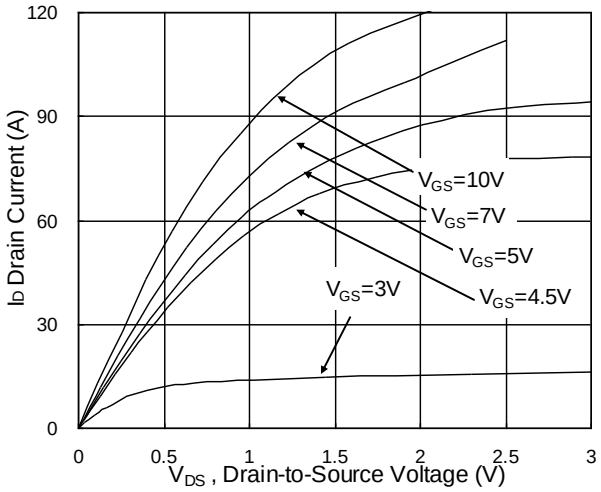


Fig.1 Typical Output Characteristics

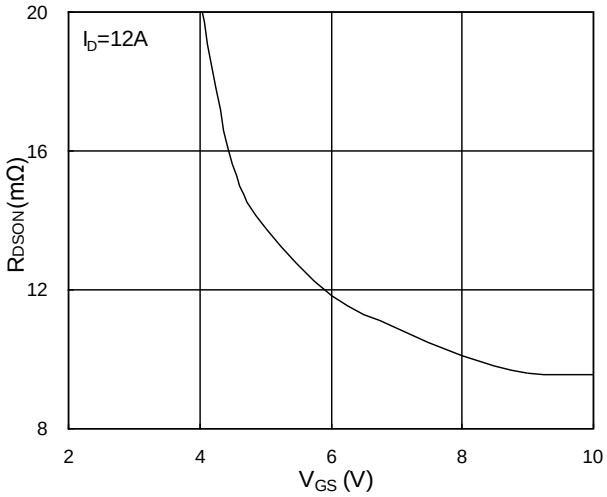


Fig.2 On-Resistance vs. G-S Voltage

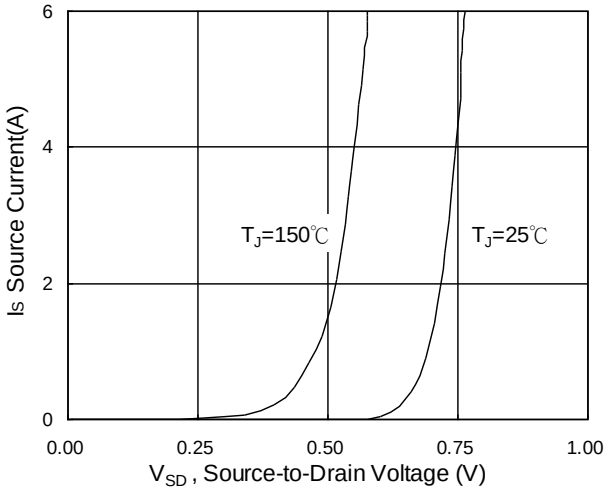


Fig.3 Forward Characteristics of Reverse

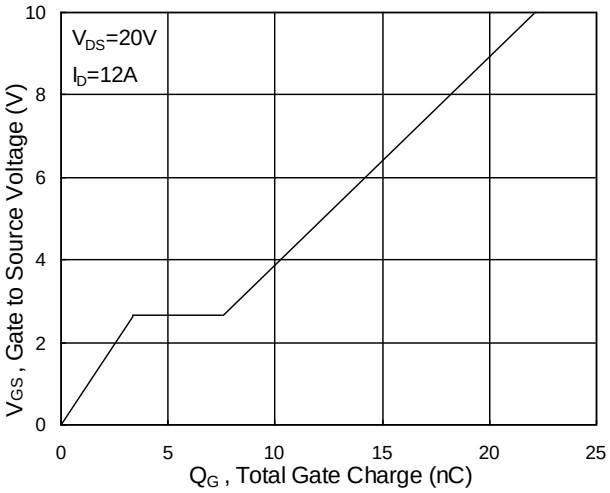


Fig.4 Gate-Charge Characteristics

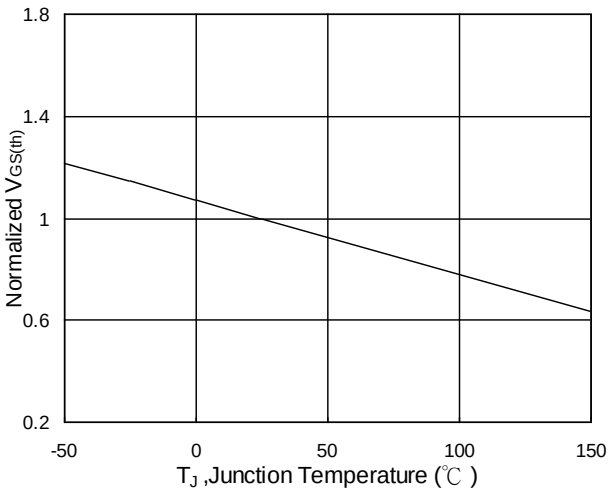


Fig.5 $V_{GS(th)}$ vs. T_J

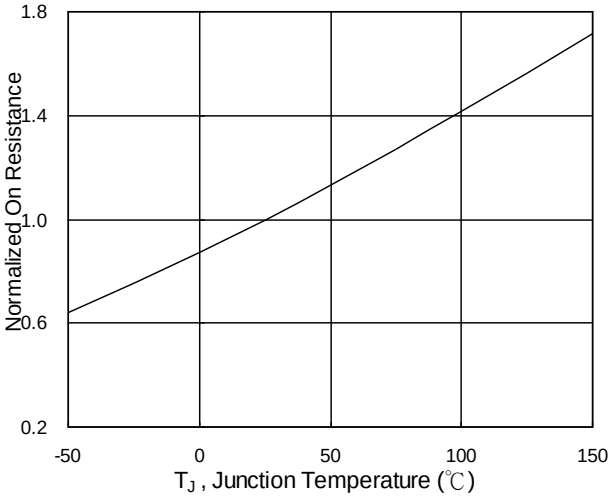


Fig.6 Normalized R_{DSON} vs. T_J

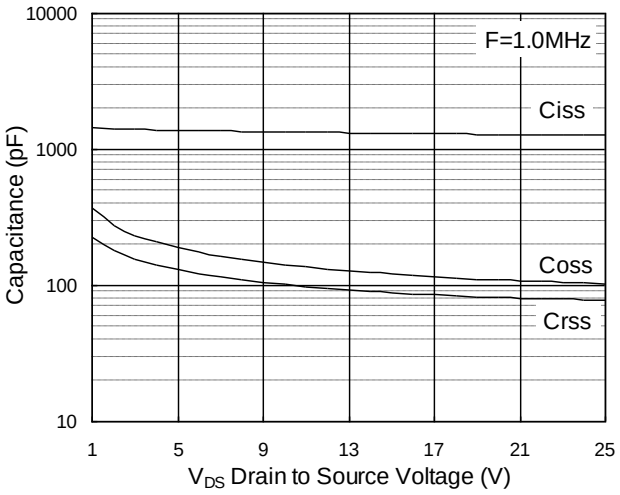


Fig.7 Capacitance

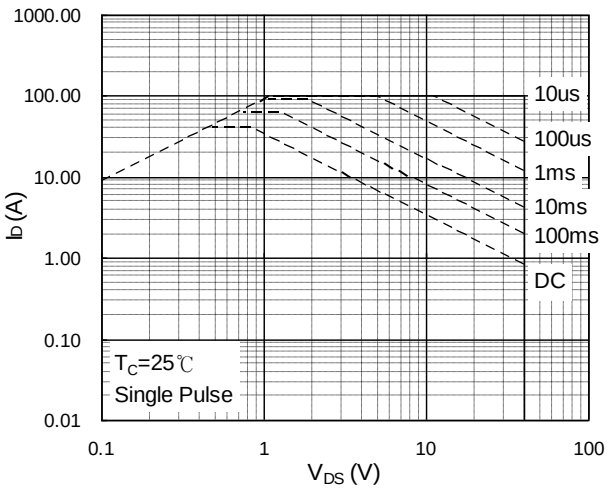


Fig.8 Safe Operating Area

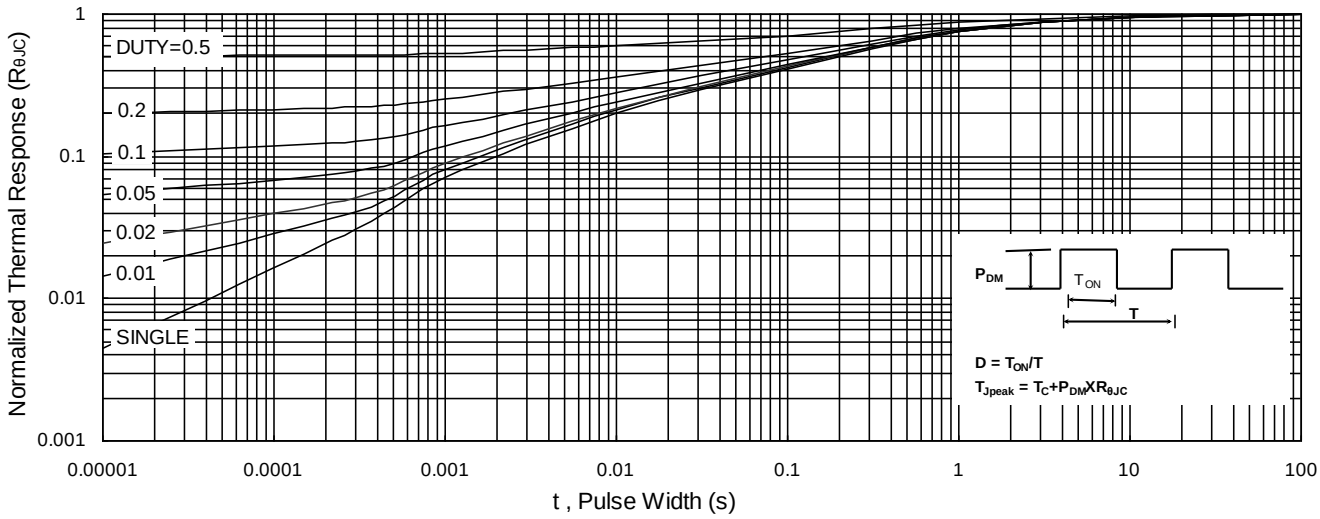


Fig.9 Normalized Maximum Transient Thermal Impedance

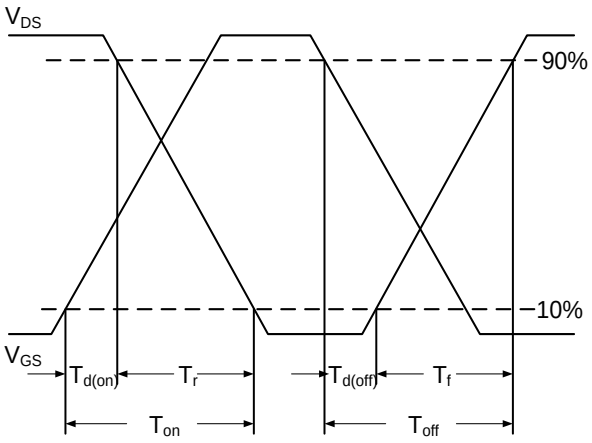


Fig.10 Switching Time Waveform

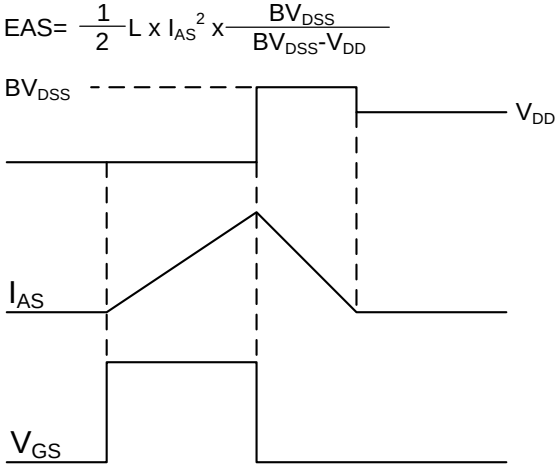


Fig.11 Unclamped Inductive Switching Waveform