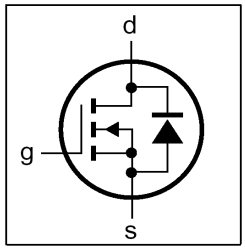
N-channel Enhancement Mode Power MOSFET

- **Avalanche Energy Specified**
- **Fast Switching**
- **Simple Drive Requirements**

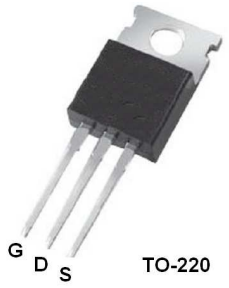


BV_{DSS}	600V
$R_{DS(ON)}$	2.5Ω
I_D	4.5A

Description

This advanced high voltage MOSFET is produced using Belling's proprietary DMOS technology.

Designed for high efficiency switch mode power supply.



Absolute Maximum Ratings (T_C=25°C unless otherwise noted)

Symbol	Parameter	Value	Units
V_{DS}	Drain-Source Voltage	600	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current	4.5	A
	Continuous Drain Current (T_C=100 °C)	2.6	A
I_{DM}	Drain Current (pulsed) (Note 1)	18	A
P_D	Power Dissipation	104	W
	Linear Derating Factor	0.83	W/°C
E_{AS}	Single Pulsed Avalanche Energy (Note2)	218	mJ
I_{AR}	Avalanche Current	4.5	A
E_{AR}	Repetitive Avalanche Energy	10.4	mJ
Tj	Operating Junction Temperature Range	-55 to +150	°C
T_{SDG}	Storage Temperature Range	-55 to +150	°C

Thermal Characteristics

Symbol	Parameter	Value	Units
$R_{th\ j\text{-}c}$	Thermal Resistance, Junction to case Max.	1.2	℃/ W
$R_{th\ j\text{-}a}$	Thermal Resistance, Junction to Ambient Max.	62.5	℃/ W

Electrical Characteristics (T_C=25C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	600	-	-	V
ΔBV_{DSS} /ΔT_J	Breakdown Voltage Temperature Coefficient	Reference to 25℃, I_D=250uA	-	0.6	-	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=2.25A	-	-	2.5	Ω
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	2	-	4	V
g_{fs}	Forward Transconductance(note3)	V_{DS}=15V, I_D=2.25A	-	4.7	-	S
I_{DSS}	Drain-Source Leakage Current	V_{DS}=600V, V_{GS}=0V	-	-	1	uA
	Drain-Source Leakage Current Tc=125℃	V_{DS}=480V, V_{GS}=0V	-	-	100	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}= ± 20V	-	-	±100	nA
Q_g	Total Gate Charge	V_{DD}=480V I_D=4.5A V_{GS}=10V note3	-	23.7	-	nC
Q_{gs}	Gate-Source Charge		-	5.4	-	nC
Q_{gd}	Gate-Drain Charge		-	9.4	-	nC
$t_{(on)}$	Turn-on Delay Time	V_{DD}=300V I_D=4.5A R_G=25Ω note3	-	13	-	ns
t_r	Turn-on Rise Time		-	21	-	ns
$t_{(off)}$	Turn-off Delay Time		-	35	-	ns
t_f	Turn-off Fall Time		-	25	-	ns
C_{iss}	Input Capacitance	V_{DS}=25V V_{GS}=0V f = 1MHz	-	690	-	pF
C_{oss}	Output Capacitance		-	125	-	pF
C_{rss}	Reverse Transfer Capacitance		-	14	-	pF

Source-Drain Diode Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
I_S	Continuous Source Diode Forward Current		-	-	4.5	A
I_{SM}	Pulsed Source Diode Forward Current (note1)		-	-	18	A
V_{SD}	Forward On Voltage	V_{GS}=0V, I_S=4.5A	-	-	1.4	V
t_{rr}	Reverse Recovery Time	V_{GS}=0V, I_S=4.5A dI$_F$/dt = 100A/us	-	680	-	ns
Q_{rr}	Reverse Recovery Charge		-	2	-	uC

Note：

(1) Repetitive Rating: Pulse width limited by maximum junction temperature

(2) L=18.9mH, Ias=4.5A，Vdd=50V，Rg=25Ω，staring Tj=25C

(3) Pulse width ≤ 300 us; duty cycle ≤ 2%

Typical Characteristics

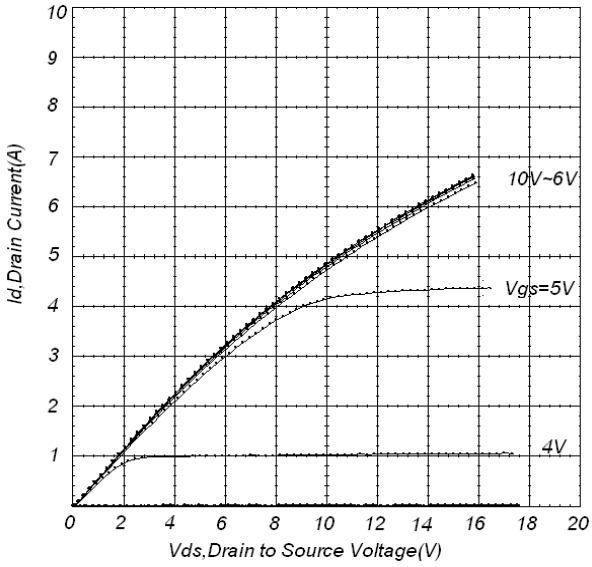


Fig 1. Typical Output Characteristics

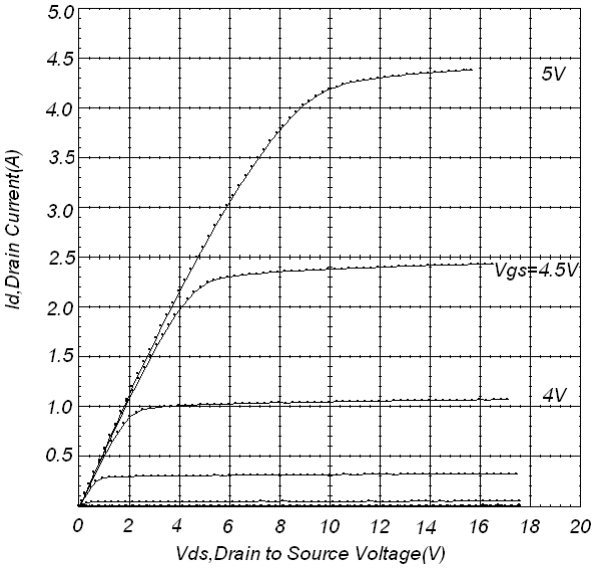


Fig 2. Typical Output Characteristics

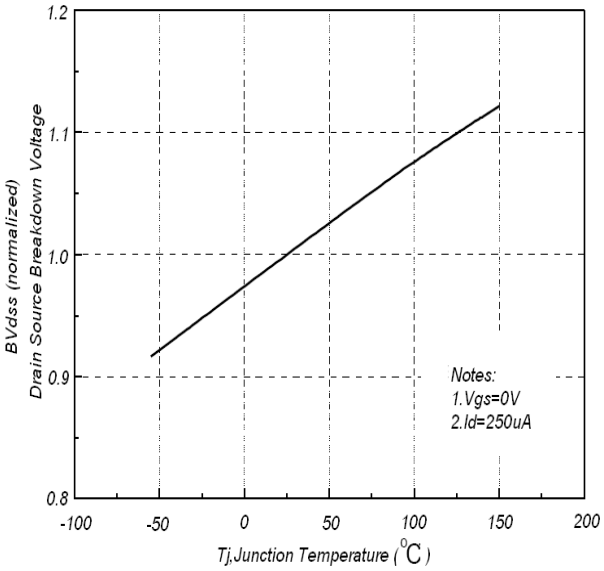


Fig 3. Normalized BVdss vs. Junction Temperature

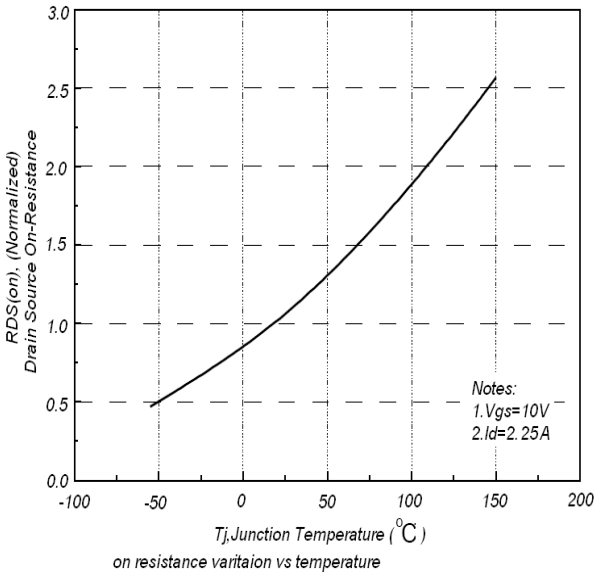


Fig 4. Normalized On-Resistance vs. Junction Temperature

Typical Characteristics （continued）

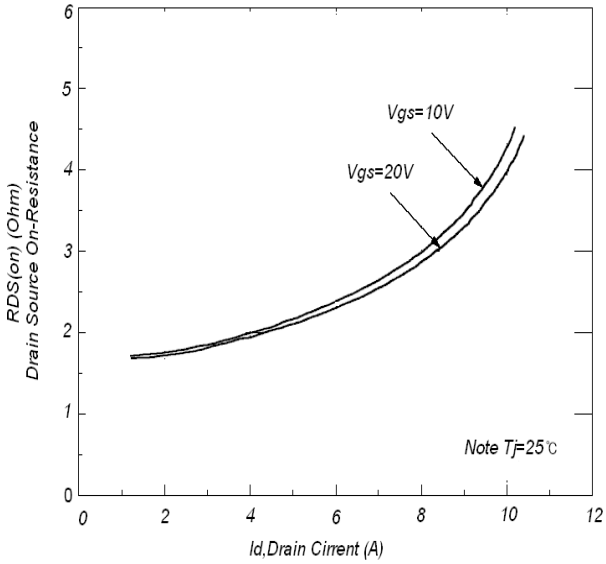


Fig 5. On-Resistance Variation vs. Drain Current and Gate Voltage

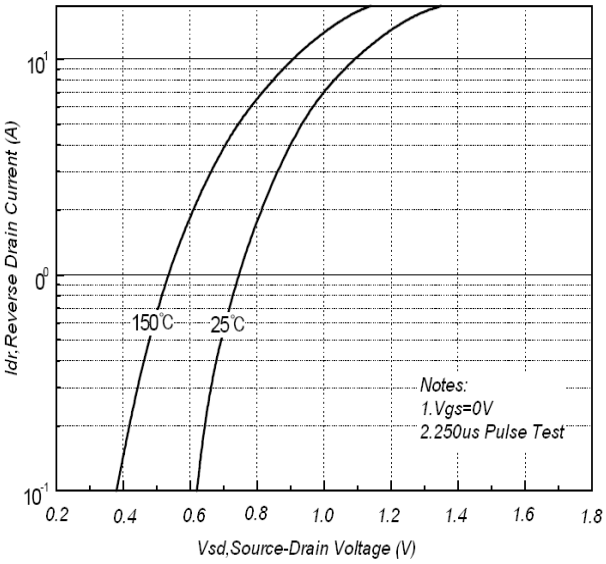


Fig 6. Body Diode Forward Voltage Variation vs. Source Current and Temperature

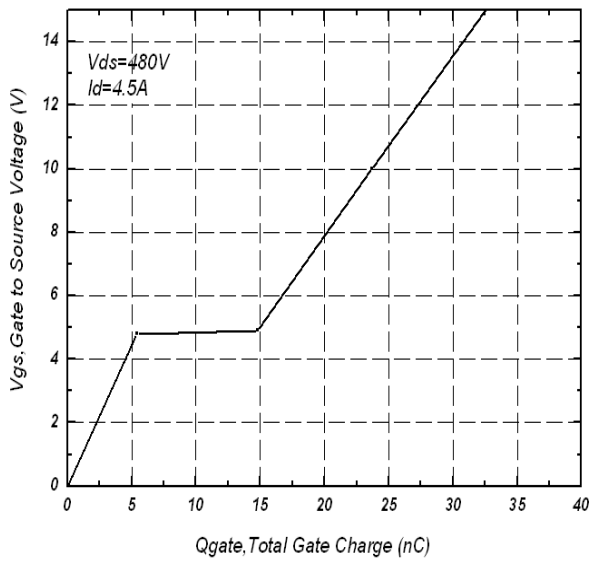


Fig 7. Gate Charge Characteristics

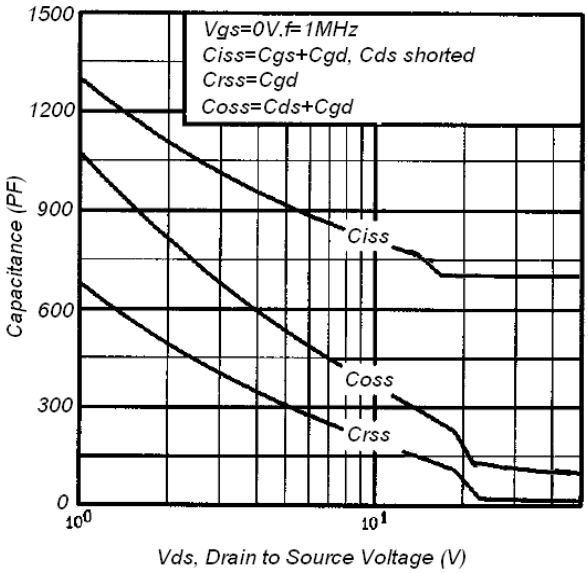


Fig 8. Capacitance Characteristics

Typical Characteristics （continued）

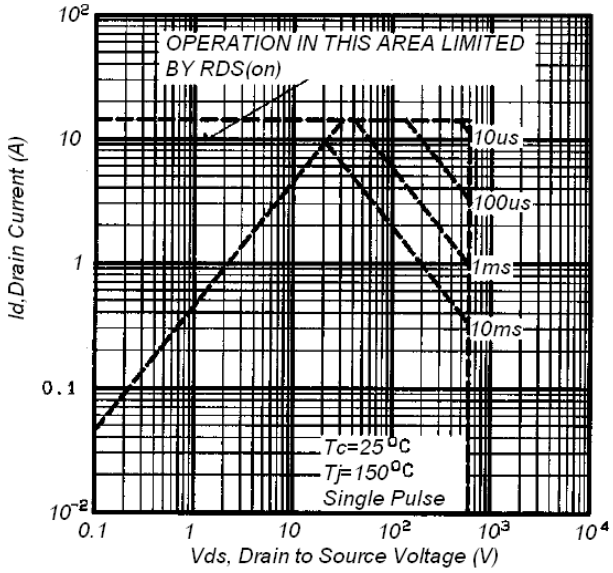


Fig 9. Maximum Safe Operating Area

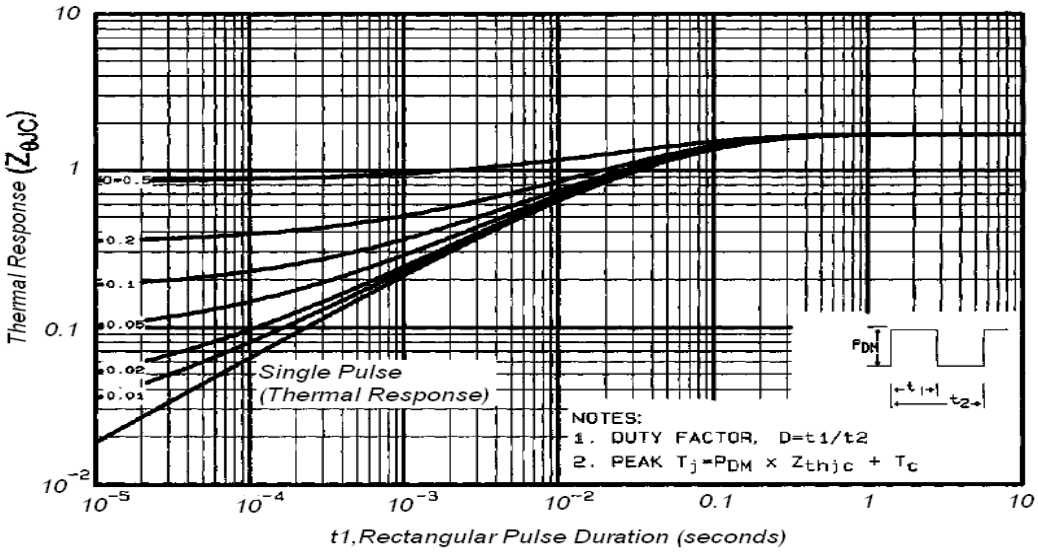


Fig 10. Transient Thermal Response Curve

Test Circuit and Waveform

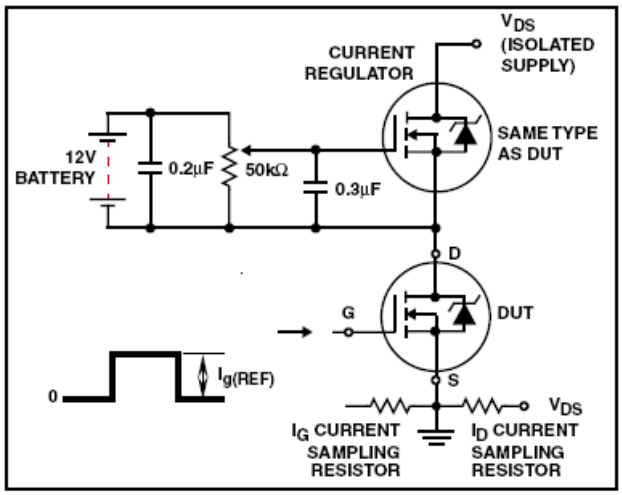


Fig 11. Gate Charge Circuit

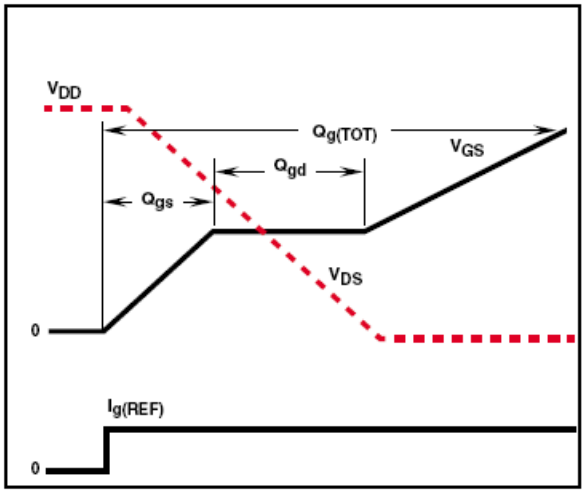


Fig 12. Gate Charge Waveform

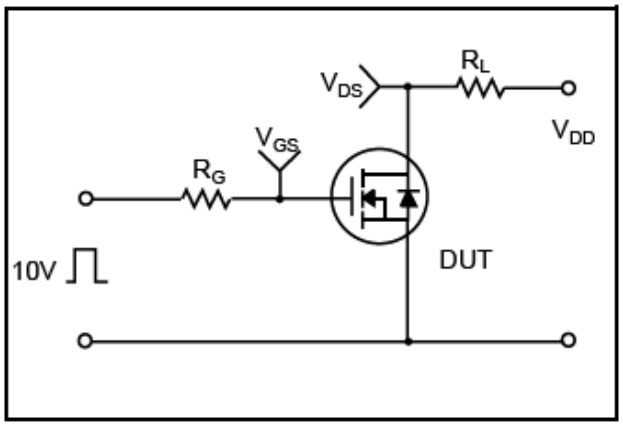


Fig 13. Switching Time Circuit

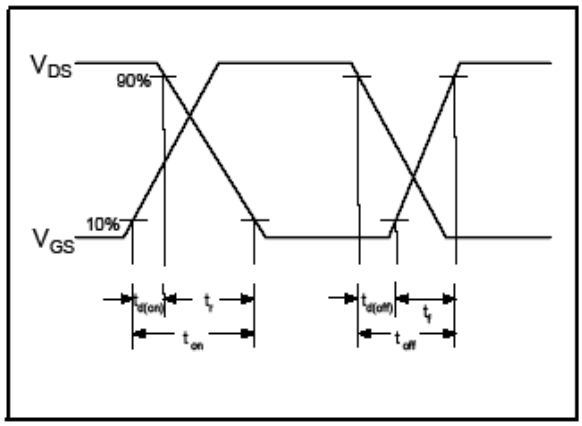


Fig 14. Switching Time Waveform

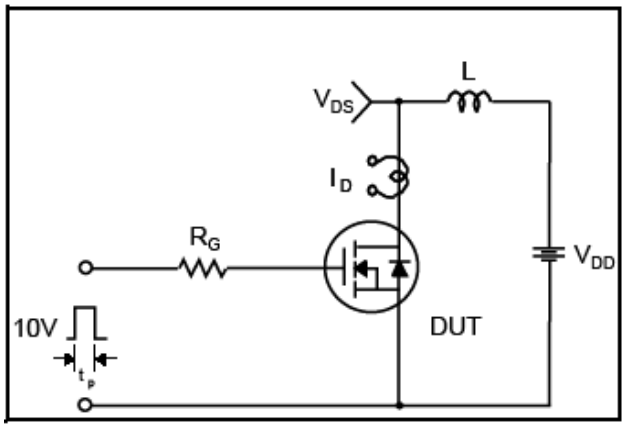


Fig 15. Unclamped Inductive Switching Test Circuit

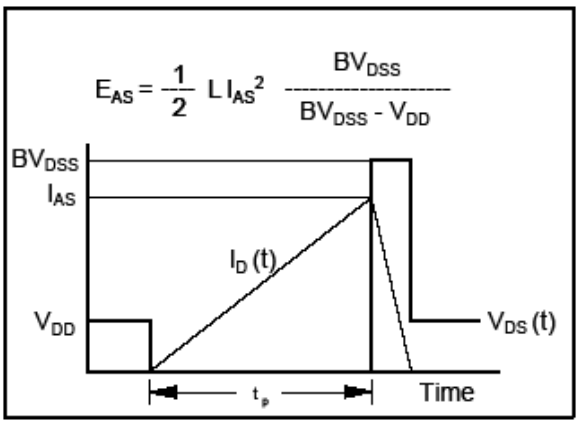


Fig 16. Unclamped Inductive Switching Waveforms