STEK

- **Avalanche Energy Specified**
- **Fast Switching**
- **Simple Drive Requirements**
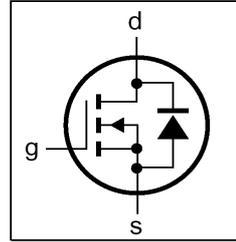
BV_{DSS}	**600V**
$R_{DS(ON)}$	**4.4** Ω
I_D	**2A**

TO252

Description

This advanced high voltage MOSFET is produced using Belling's proprietary DMOS technology. Designed for high efficiency switch mode power supply.
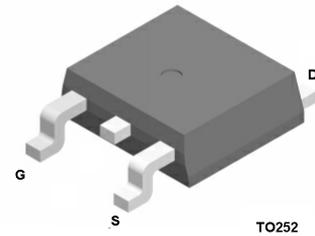
Absolute Maximum Ratings ($T_C=25^{o}C$ unless otherwise noted)

Symbol	Parameter	Value	Units
V_{DS}	Drain-Source Voltage	600	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current	2	A
	Continuous Drain Current ($T_C=100\ ^{o}C$)	1.26	A
I_{DM}	Drain Current (pulsed) (Note 1)	8	A
P_D	Power Dissipation	42	W
	Linear Derating Factor	0.33	W/℃
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	55	mJ
I_{AR}	Avalanche Current (Note 1)	2	A
E_{AR}	Repetitive Avalanche Energy (Note 1)	4.2	mJ
Tj	Operating Junction Temperature Range	-55 to +150	^{o}C
T_{SDG}	Storage Temperature Range	-55 to +150	^{o}C

Thermal Characteristics

Symbol	Parameter	Value	Units
$R_{th\ j-c}$	Thermal Resistance, Junction to Case Max.	3	℃/ W
$R_{th\ j-a}$	Thermal Resistance, Junction to Ambient Max.	110	℃/ W

N-channel Enhancement Mode Power MOSFET

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=1mA	-	0.6	-	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=1A	-	-	4.4	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=1A	-	1.5	-	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	-	13	-	nC
Q_{gs}	Gate-Source Charge	I_D=2A V_{GS}=10V	-	2	-	nC
Q_{gd}	Gate-Drain Charge	(note3)	-	4.7	-	nC
$t_{(on)}$	Turn-on Delay Time	V_{DD}=300V	-	12	-	ns
t_r	Turn-on Rise Time	I_D=2A	-	21	-	ns
$t_{(off)}$	Turn-off Delay Time	R_G=25Ω	-	30	-	ns
t_f	Turn-off Fall Time	note3 (note3)	-	24	-	ns
C_{iss}	Input Capacitance	V_{DS}=25V	-	358	-	pF
C_{oss}	Output Capacitance	V_{GS}=0V	-	56	-	pF
C_{rss}	Reverse Transfer Capacitance	f = 1MHz	-	9.2	-	pF

Source-Drain Diode Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
I_S	Continuous Source Diode Forward Current		-	-	2	A
I_{SM}	Pulsed Source Diode Forward Current (note1)		-	-	8	A
V_{SD}	Forward On Voltage	V_{GS}=0V, I_S=2A	-	-	1.4	V
t_{rr}	Reverse Recovery Time	V_{GS}=0V, I_S=2A(note3)	-	340	-	ns
Q_{rr}	Reverse Recovery Charge	dI_F/dt =100A/us	-	1	-	uC

Note：

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

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

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

Total 6 Pages

Typical Characteristics
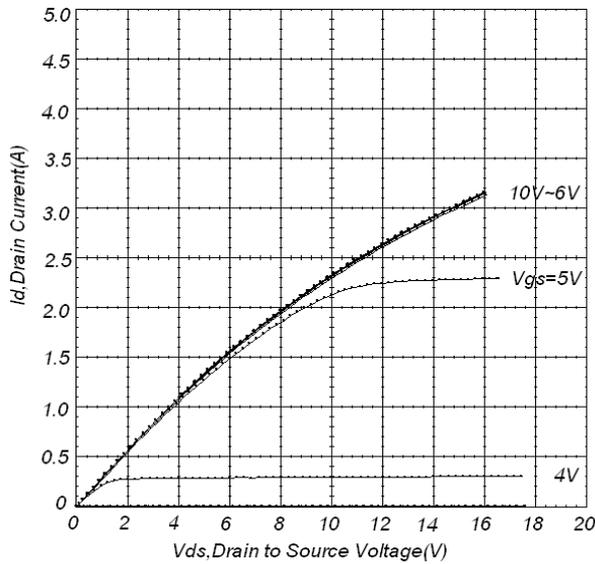
Fig 1. Typical Output Characteristics
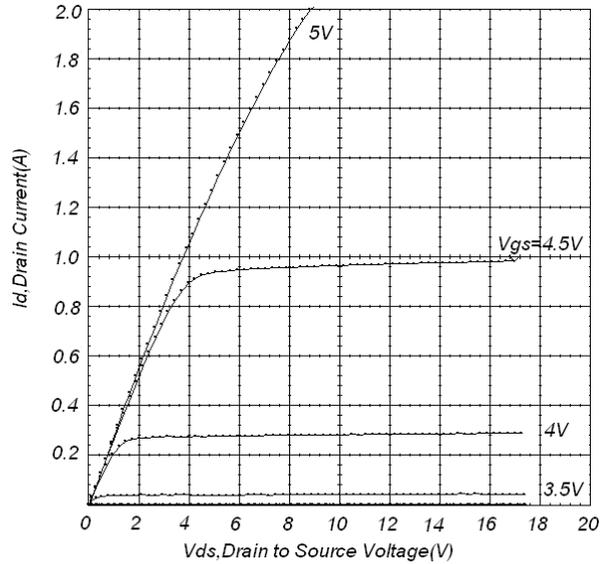
Fig 2. Typical Output Characteristics
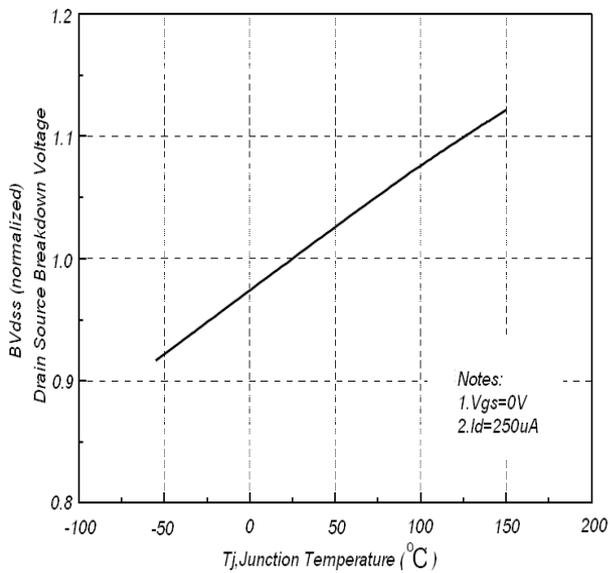
Fig 3. Normalized BVdss vs. Junction
Temperature
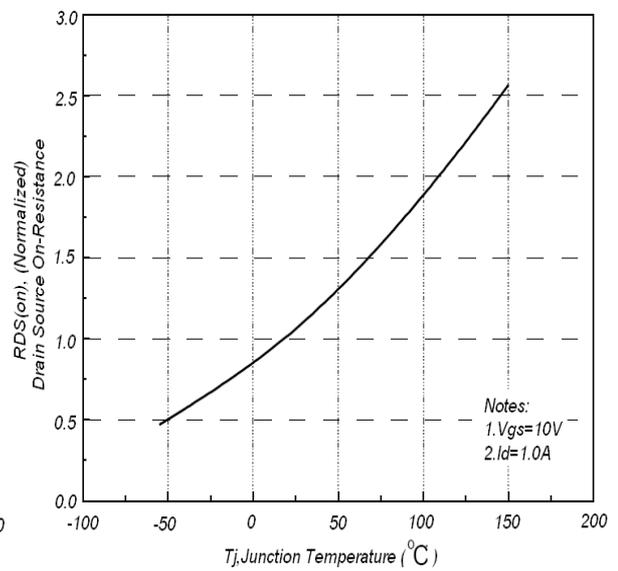
Fig 4. Normalized On-Resistance vs.
Junction Temperature

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
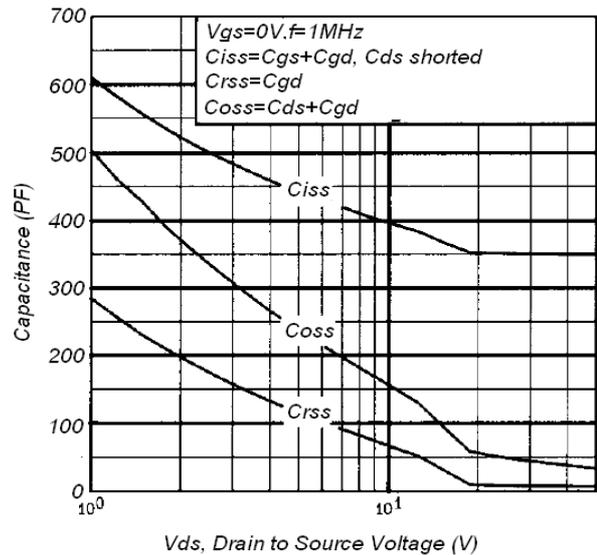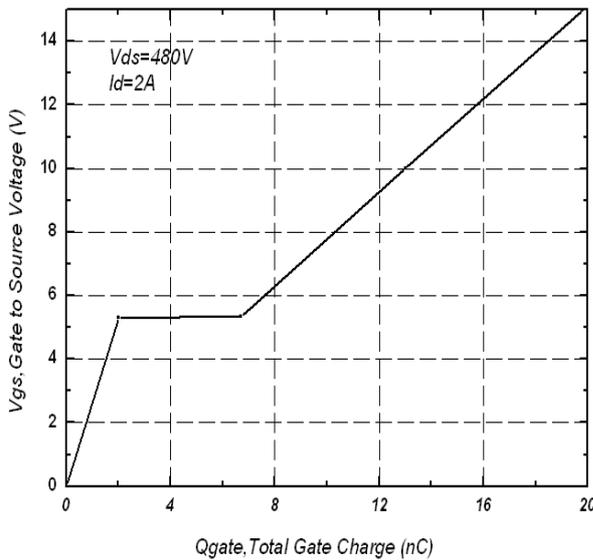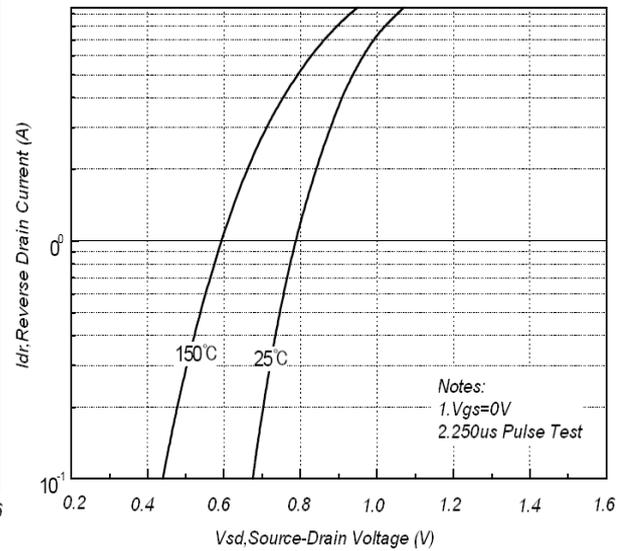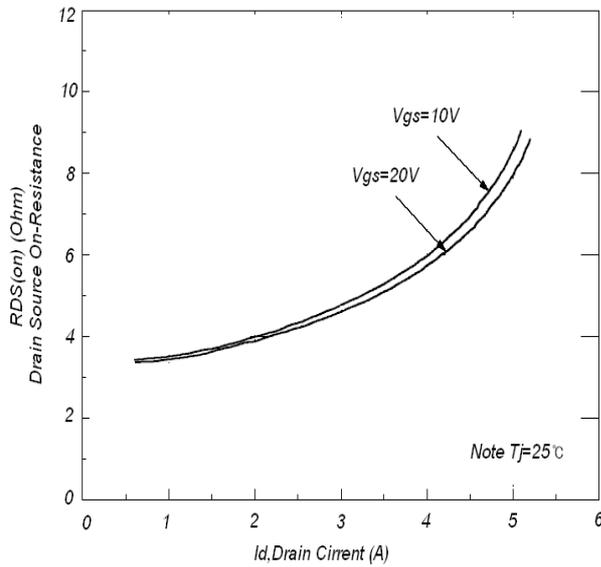
Typical Characteristics （**continued**）
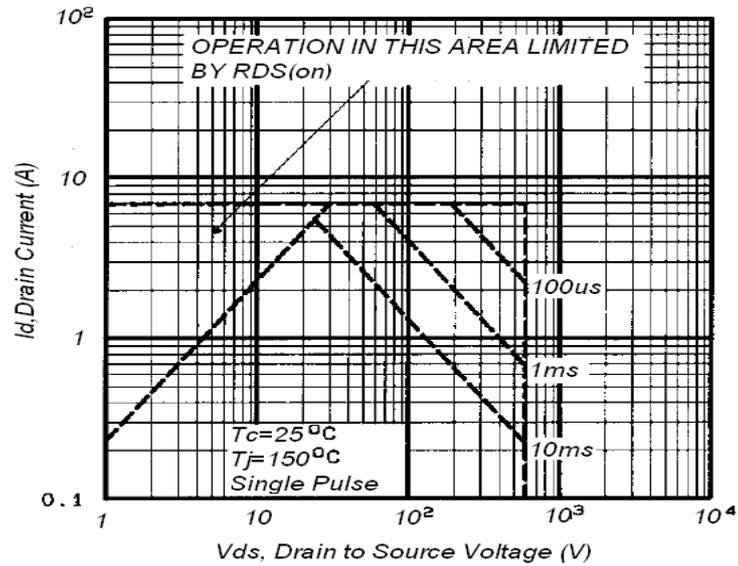
Fig 9. Maximum Safe Operating Area
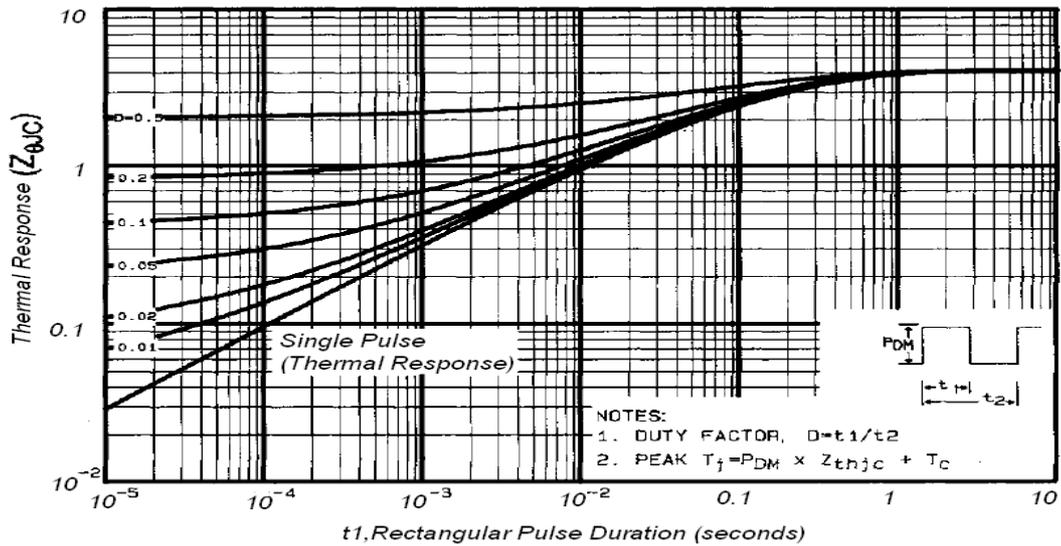

Fig 10. Transient Thermal Response Curve

Test Circuit and Waveform
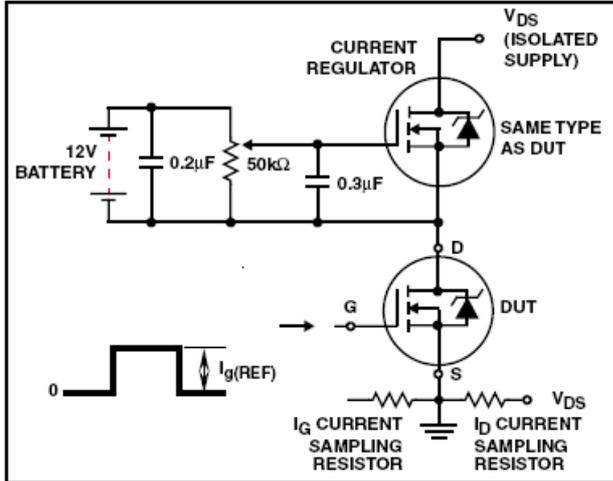
Fig 11. Gate Charge Circuit
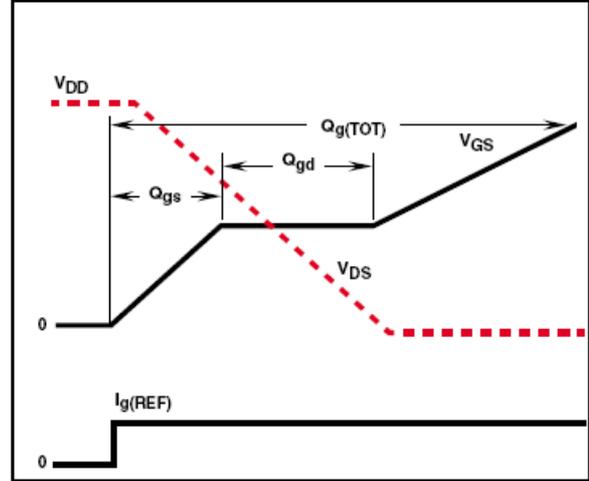
Fig 12. Gate Charge Waveform
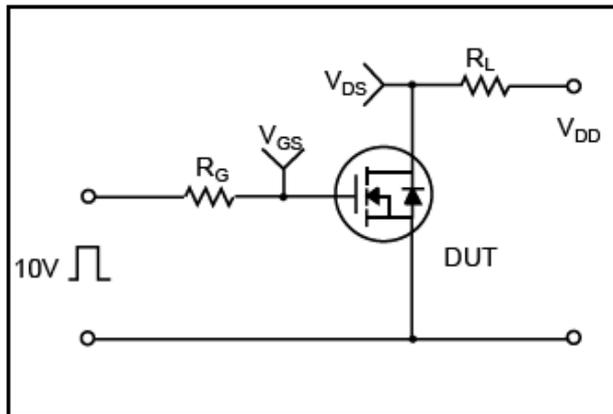
Fig 13. Switching Time Circuit
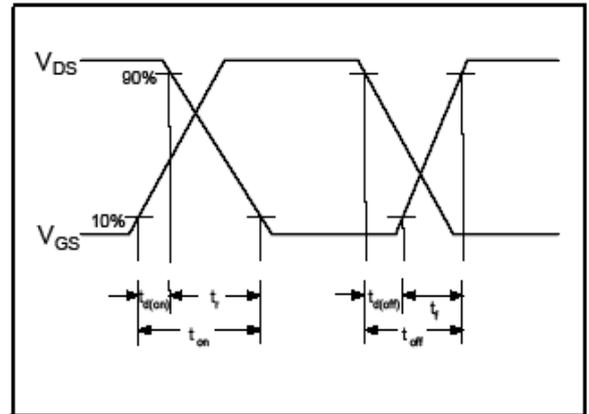
Fig 14. Switching Time Waveform

$$E_{AS} = \frac{1}{2} L I_{AS}^2 \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$
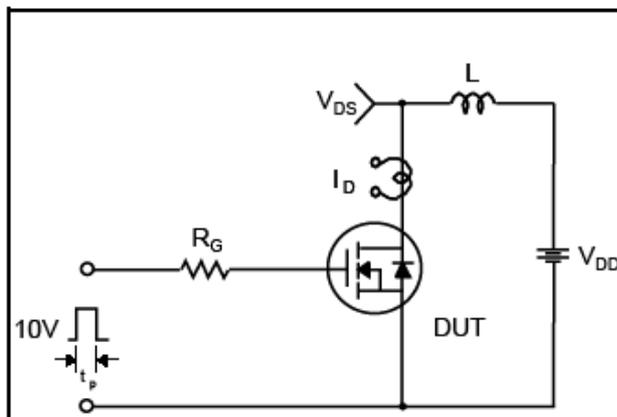
Fig 15. Unclamped Inductive
Switching Test Circuit
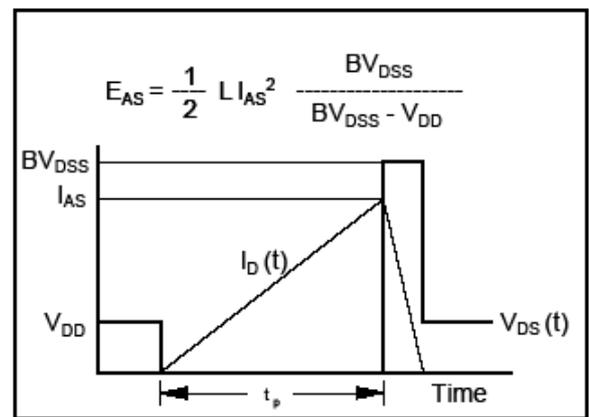
Fig 16. Unclamped Inductive
Switching Waveforms