40V 60A N-Channel Enhancement Mode Power MOSFET

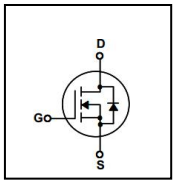
Features

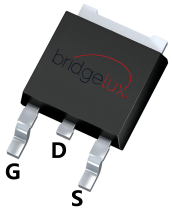
- RDSON≤10.5mΩ@Vgs=10V, Id=10A
- Advanced trench technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired

Application

- Load Switch
- PWM Application
- DC/DC Converter
- High Frequency Switching

SYMBOL





TO-252

ASSEMBLY MESSAGE

Product Name	Package	Packaging
BXT105N04D	TO-252	Reel

ABSOLUTE MAXIMUM RATINGS (T_C=25°C unless otherwise noted)

Parameter		Symbol	Rating	Unit
			TO-252	
Drain-Source Voltage		V_{DSS}	40	V
Drain Current	Continuous (T_C = 25°C)	I_D	60	A
	Continuous (T_C = 100°C)		32.5	A
Drain Current	Pulsed (Note1)	I_{DM}	240	A
Single Pulsed Avalanche Energy		EAS	70	mJ
Gate-Source Voltage		V_{GSS}	±20	V
Power Dissipation	T_C =25°C	P_D	60	W
Maximum Junction Temperature		T_J	150	°C
Storage Temperature Range		T_{STG}	-55 to 150	°C

Note： 1. Repetitive Rating: Pulse width limited by maximum junction temperature

THERMAL CHARACTERISTICS

Parameter	Symbol	Max.	Unit
		TO-252	
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.08	°C / W

ELECTRICAL CHARACTERISTICS（T_J=25℃,unless otherwise Noted）

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	VGS=0V, ID=250μA	40			V
Zero Gate Voltage Drain Current	I_{DSS}	VDS=40V, VGS=0V			1	uA
Gate-Body Leakage Current, Forward	I_{GSS}	VGS=20V			100	nA
Gate-Body Leakage Current, Reverse		VGS=-20V			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	VDS=VGS, ID=250μA	1.0		2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	VGS=10V, ID=10A		8.2	10.5	mΩ
		VGS=4.5V, ID=5A		9.8	12	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	VDS=20V, VGS=0V, f=1.0MHz		910		pF
Output Capacitance	C_{OSS}			152		pF
Reverse Transfer Capacitance	C_{RSS}			10.5		pF
SWITCHING PARAMETERS						
Turn-ON Delay Time	$t_{D(ON)}$	VDD=20V, ID=20A, VGS = 10V, RG=3Ω		6		ns
Turn-ON Rise Time	t_R			9		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			30		ns
Turn-OFF Fall-Time	t_F			5		ns
Total Gate Charge(Note2)	Q_G	VDS =20V, VGS =10V, ID =20A		13		nC
Gate Source Charge	Q_{GS}			3		nC
Gate Drain Charge	Q_{GD}			2		nC
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage	V_{SD}	Is=10A, VGS=0V			1.4	V
Diode Continuous Forward Current	I_S				60	A
Maximum Pulsed Drain to Source Diode Forward Current	I_{SM}				240	A
Body Diode Reverse Recovery Time	trr	IF=20A, dI/dt=100A/μs		18		ns
Body Diode Reverse Recovery Charge	Qrr			9		nC

Note：2. Essentially independent of operating temperature

TYPICAL CHARACTERISTICS

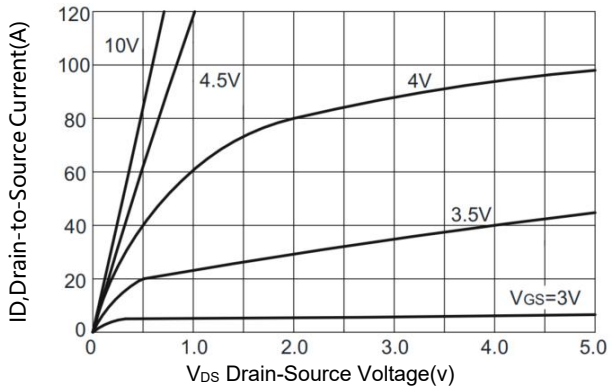


Figure1. Typical Output Characteristics

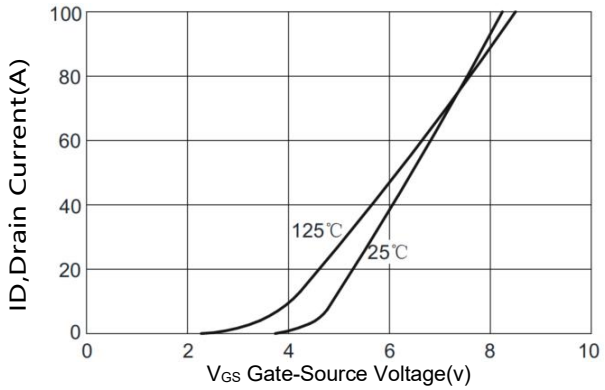


Figure2. Typical Transfer Characteristics

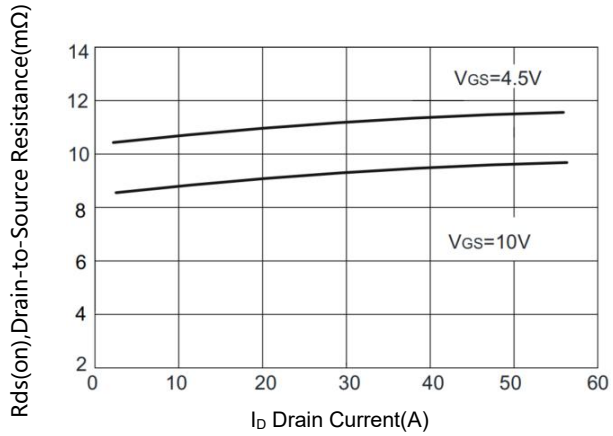


Figure3. On-Resistance versus Drain Current

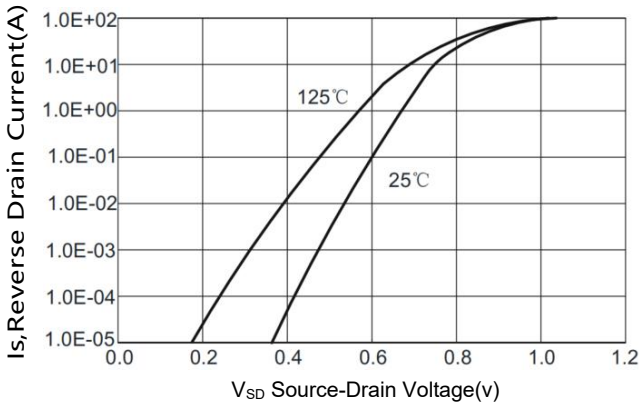


Figure4. Diode forward voltage versus Current

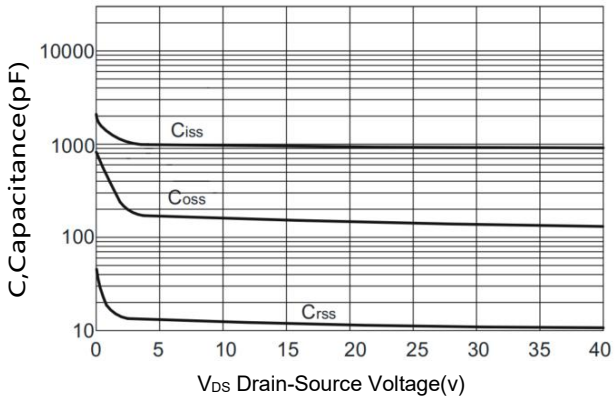


Figure5. Typical Capacitance versus V_{DS}

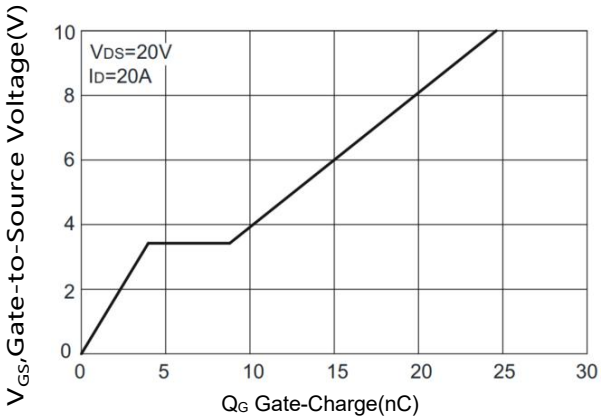


Figure6. Typical Gate Charge versus V_{GS}

TYPICAL CHARACTERISTICS(Cont.)

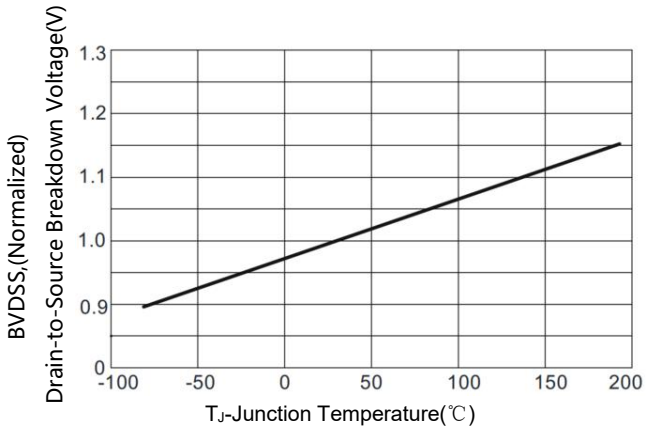


Figure7. BV_{DSS} Variation with Temperature

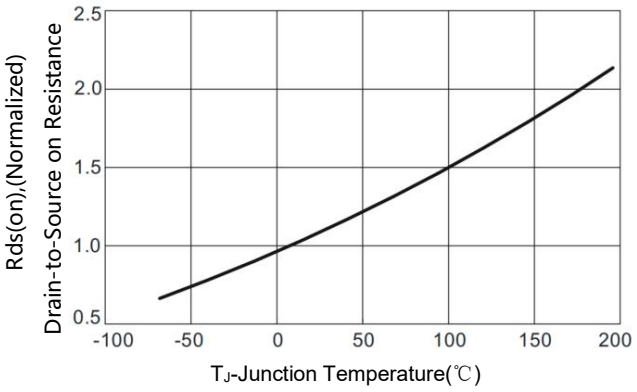


Figure8. On-Resistance Variation with Temperature

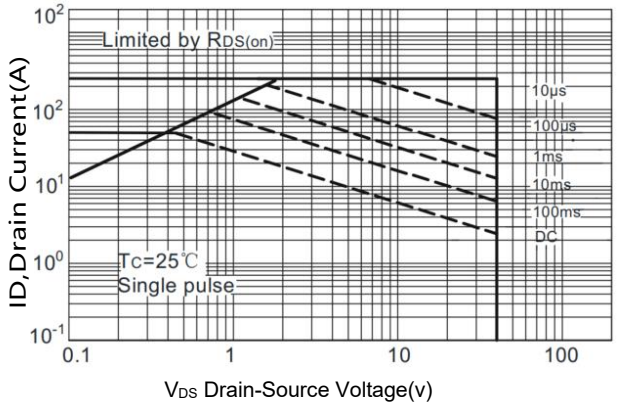


Figure9. Maximum Safe Operating Area

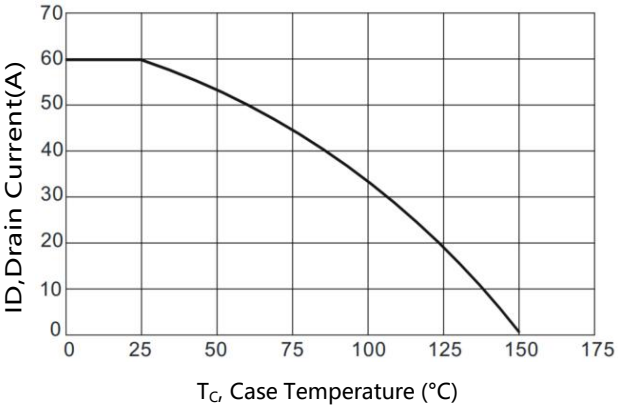
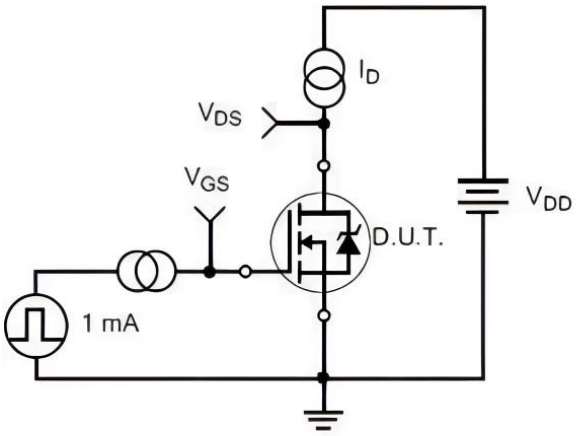
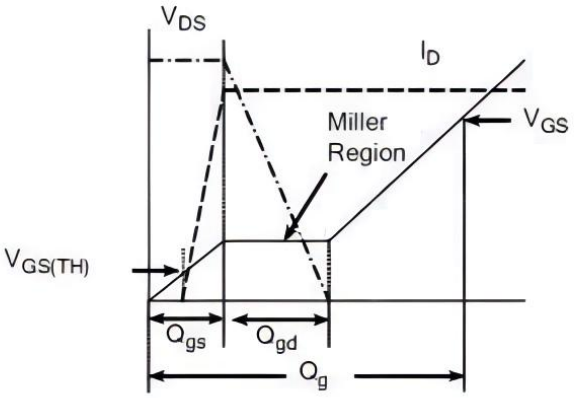


Figure10. Maximum Continuous Drain Current versus Case Temperature

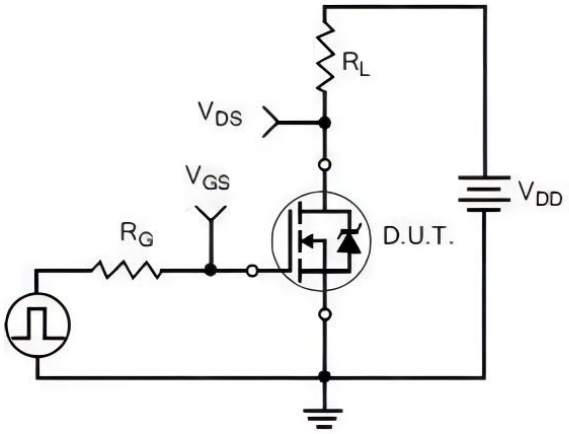
TEST CIRCUITS AND WAVEFORMS



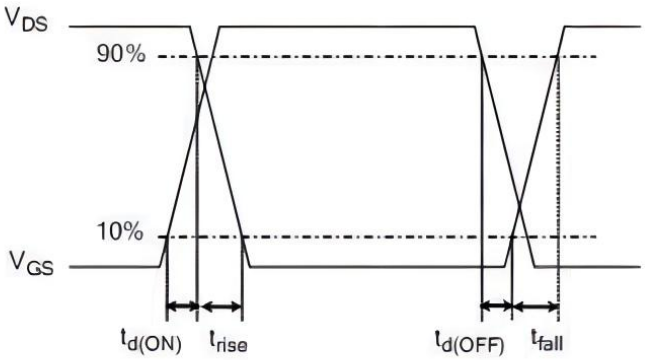
Gate Charge Test Circuit



Gate Charge Waveform

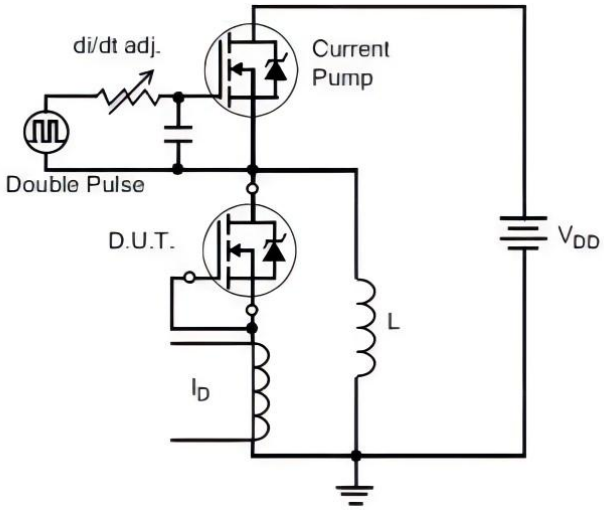


Resistive Switching Test Circuit

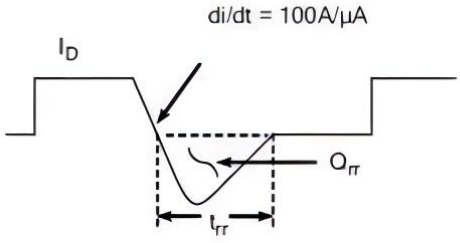


Resistive Switching Waveforms

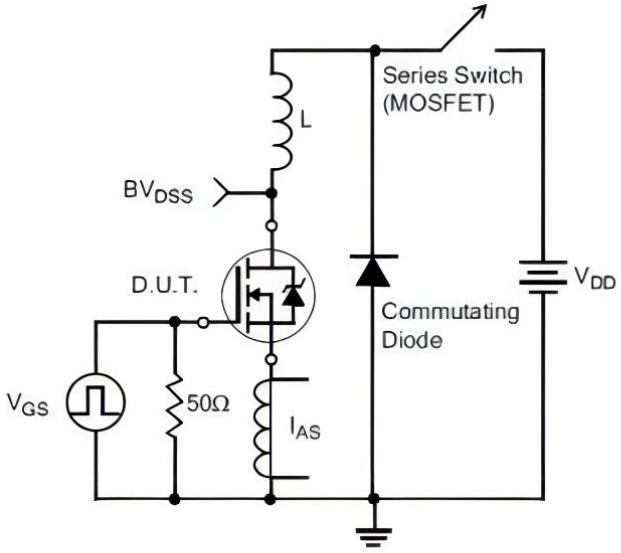
TEST CIRCUITS AND WAVEFORMS(Cont.)



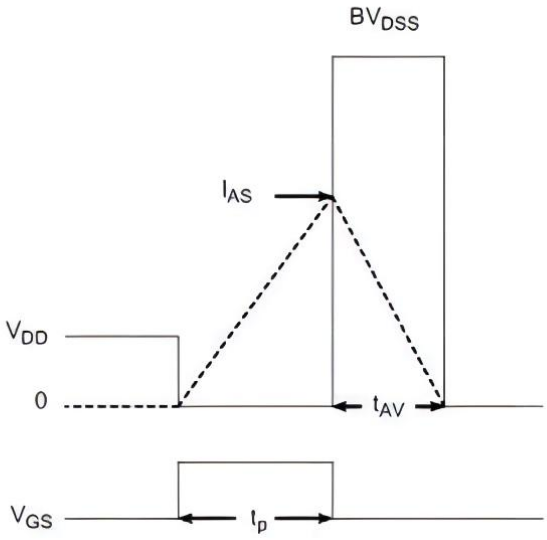
Diode Reverse Recovery Test Circuit



Diode Reverse Recovery Waveform



Unclamped Inductive Switching Test Circuit



$$E_{AS} = \frac{I_{AS}^2 L}{2}$$

Unclamped Inductive Switching Waveforms

Revision history

Document revision history

Date	Revision	Changes
18-Sep-2021	1.0	First release

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