

700V 15A N-Channel Super Junction Power MOSFET

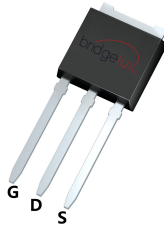
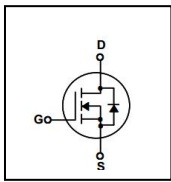
FEATURES

- $R_{DS(ON)} \leq 0.28 \Omega$ @ $V_{GS}=10V, I_D=7.5A$
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Fast switching capability
- Lead free product is acquired

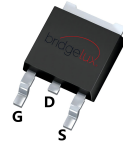
Applications

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)

SYMBOL



TO-251



TO-252



TO-220F

ASSEMBLY MESSAGE

Product Name	Package	Packaging
BXC70R280U	TO-251	Tube
BXC70R280D	TO-252	Tube/Reel
BXC70R280F	TO-220F	Tube

ABSOLUTE MAXIMUM RATINGS ($T_C=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Rating		Unit	
		BXC70R280U/D	BXC70R280F		
Drain-Source Voltage	V_{DSS}	700		V	
Drain Current	Continuous ($T_C = 25^\circ\text{C}$)	15		A	
		9.9		A	
Drain Current	Pulsed (Note1)	I_{DM}	60	A	
Gate-Source Voltage	V_{GSS}	± 30		V	
Avalanche Energy	Single Pulse (Note2)	E_{AS}	322	mJ	
Avalanche Current (Note1)	I_{AR}	6		A	
Peak Diode Recovery dv/dt	dv/dt	15		V/ns	
Power Dissipation (Note 2)	$T_C = 25^\circ\text{C}$	P_D	132	34	W
	Derate above 25°C		1.056	0.272	W/ $^\circ\text{C}$
Maximum Junction Temperature	T_J	150		$^\circ\text{C}$	
Storage Temperature Range	T_{STG}	-55 to 150		$^\circ\text{C}$	

Note: 1. Limited by maximum junction temperature, maximum duty cycle is 0.75
 2. $L=2.5\text{mH}$, $V_{DD}=50\text{V}$, $R_G=25 \Omega$, Starting $T_J = 25^\circ\text{C}$

THERMAL CHARACTERISTICS

Parameter	Symbol	Max.		Unit
		BXC70R280U/D	BXC70R280F	
Thermal Resistance, Junction-to-Case	R _{θJC}	0.947	3.68	°C / W
Thermal Resistance, Junction-to-Ambient	R _{θJA}	106	58	°C / W

ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise Noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	VGS=0V, ID=250μA	700			V
Zero Gate Voltage Drain Current	I _{DSS}	VDS=700V, VGS=0V			1	uA
		VDS=560V, TC = 125°C		10		uA
Gate-Body Leakage Current, Forward	I _{GSS}	VGS=30V			100	nA
Gate-Body Leakage Current, Reverse		VGS=-30V			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	VDS=VGS, ID=250μA	2.5		4.0	V
Drain-Source On-State Resistance	R _{DS(ON)}	VGS=10V, ID=7.5A		0.24	0.28	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	VDS=100V, VGS=0V, f=1.0MHz		1090		pF
Output Capacitance	C _{OSS}			40		pF
Reverse Transfer Capacitance	C _{RSS}			2.3		pF
SWITCHING PARAMETERS						
Turn-ON Delay Time	t _{D(ON)}	VDD=400V, ID=7.5A, VGS = 10V, RG=25Ω		20		ns
Turn-ON Rise Time	t _R			41		ns
Turn-OFF Delay Time	t _{D(OFF)}			94		ns
Turn-OFF Fall-Time	t _F			45		ns
Total Gate Charge(Note5)	Q _G	VDS =560V, VGS =10V, ID =7.5A		25		nC
Gate Source Charge	Q _{GS}			3.7		nC
Gate Drain Charge	Q _{GD}			10.4		nC
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage	V _{SD}	IF=7.5A, VGS=0V		0.85		V
Diode Continuous Forward Current	I _S				15	A
Pulsed Drain-Source Current	I _{SM}				60	A
Reverse Recovery Time	t _{RR}	VR = 400 V, IF = 7.5A di/dt=100 A/μs		402		ns
Reverse Recovery Charge	Q _{RR}			4.1		uC

TYPICAL CHARACTERISTICS

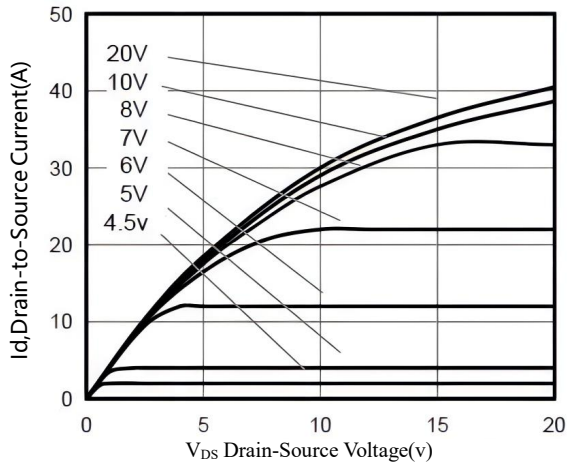


Figure1. Typical Output Characteristics

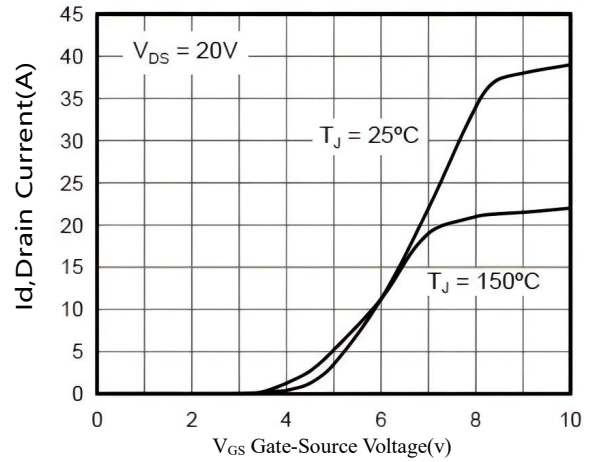


Figure2. Typical Transfer Characteristics

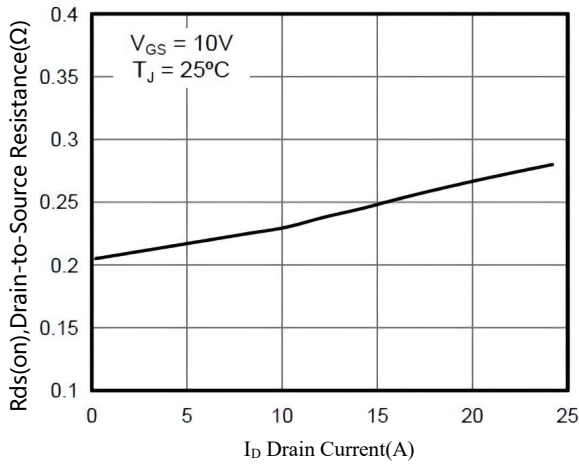


Figure3. On-Resistance versus Drain Current

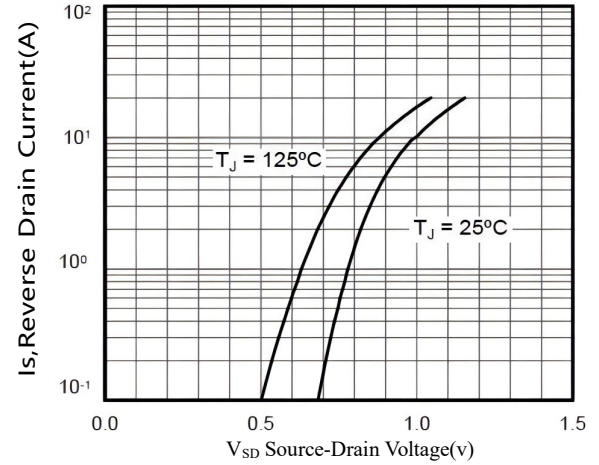


Figure4. Diode forward voltage versus Current

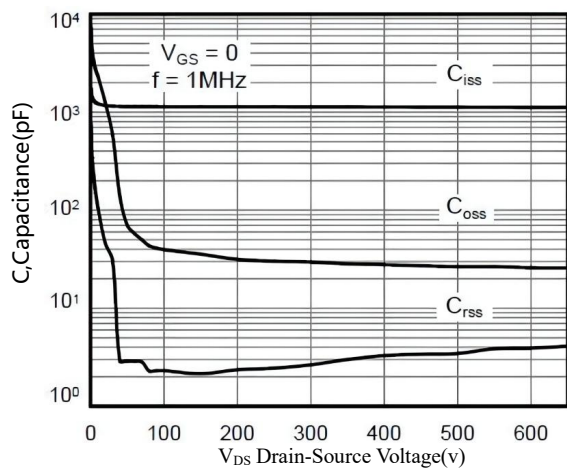


Figure5. Typical Capacitance versus VDS

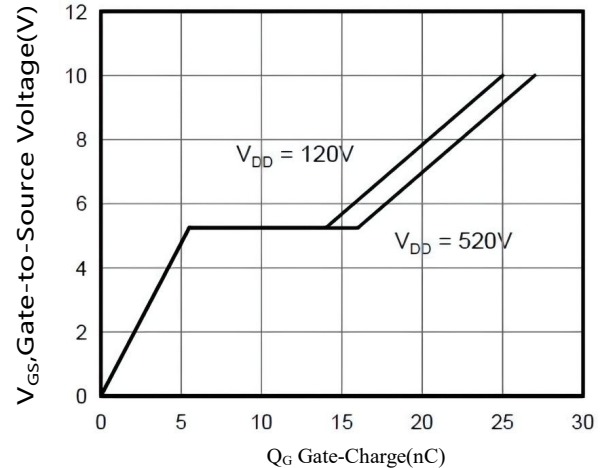


Figure6. Typical Gate Charge versus VGS

TYPICAL CHARACTERISTICS(Cont.)

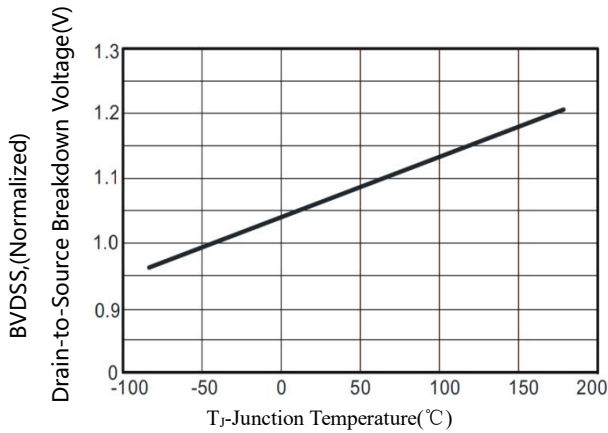


Figure7. BV_{DSS} Variation with Temperature

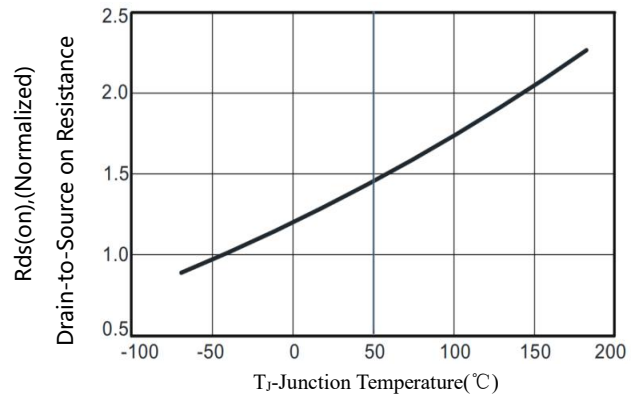
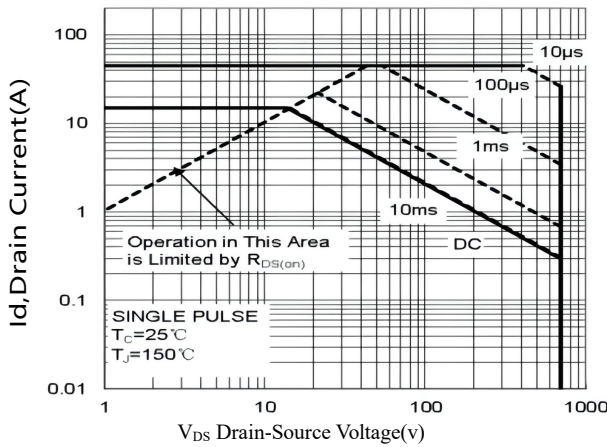
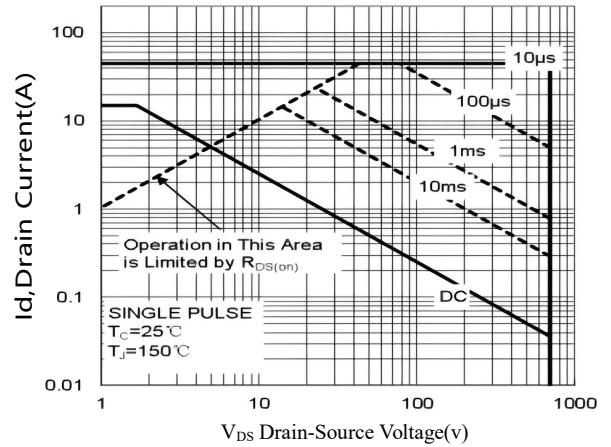


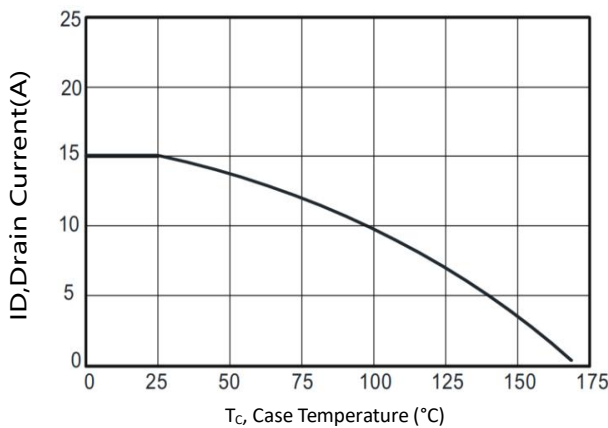
Figure8. On-Resistance Variation with Temperature



**Figure9. Maximum Safe Operating Area
BXC70R280U/D**

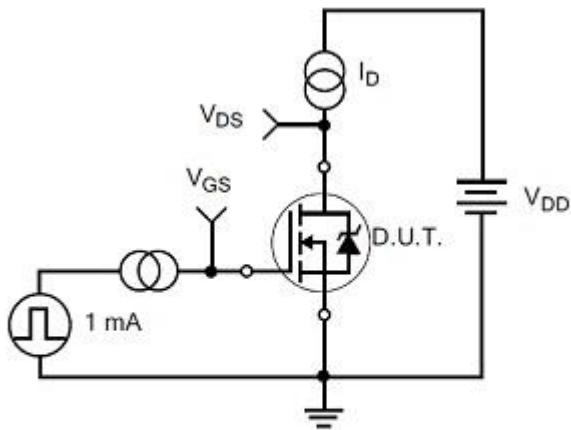


**Figure9. Maximum Safe Operating Area
BXC70R280F**

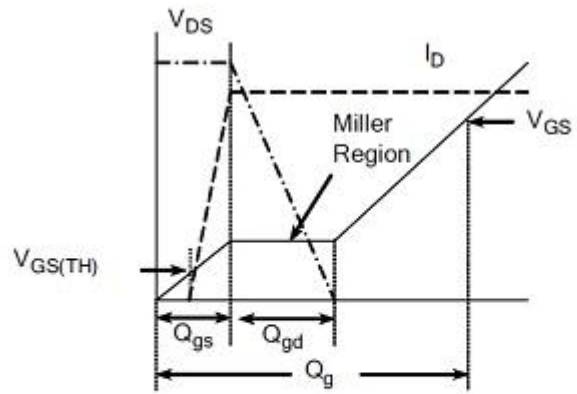


**Figure10. Maximum Continuous Drain Current
versus Case Temperature**

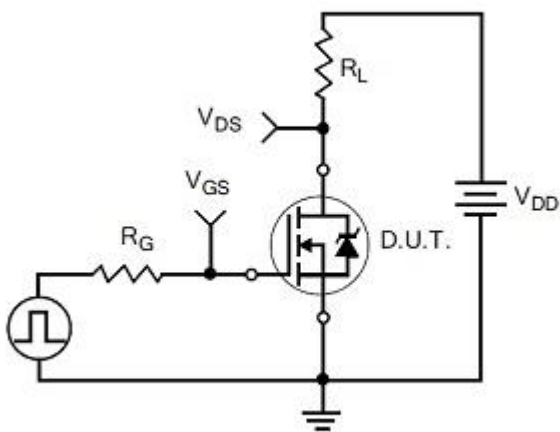
TEST CIRCUITS AND WAVEFORMS



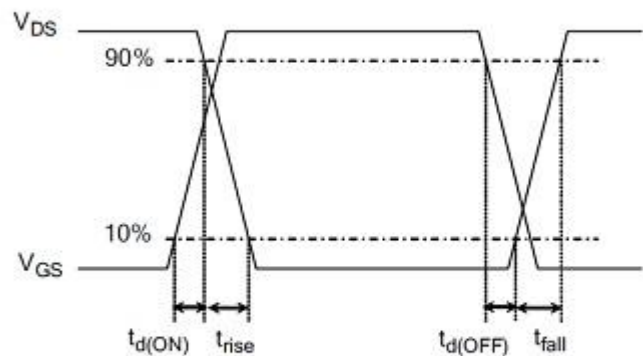
Gate Charge Test Circuit



Gate Charge Waveform

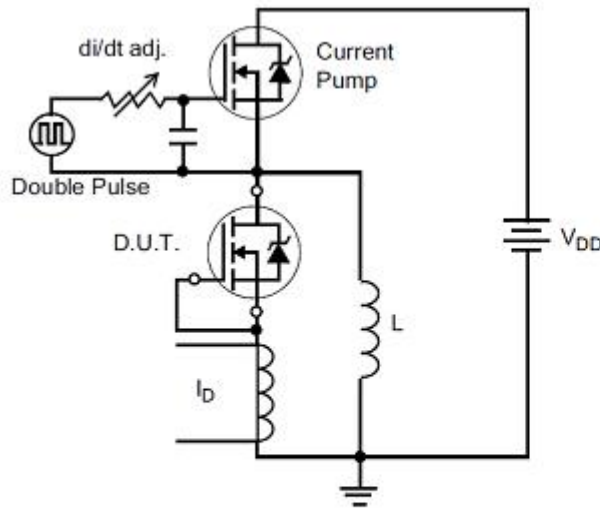


Resistive Switching Test Circuit

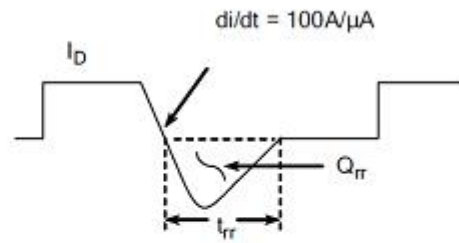


Resistive Switching Waveforms

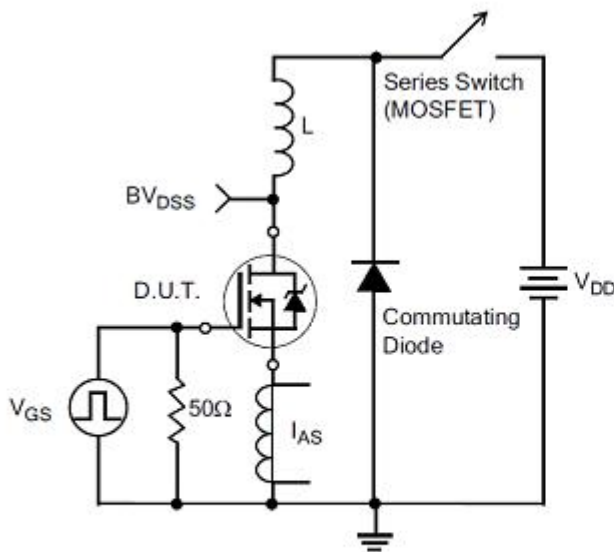
TEST CIRCUITS AND WAVEFORMS(Cont.)



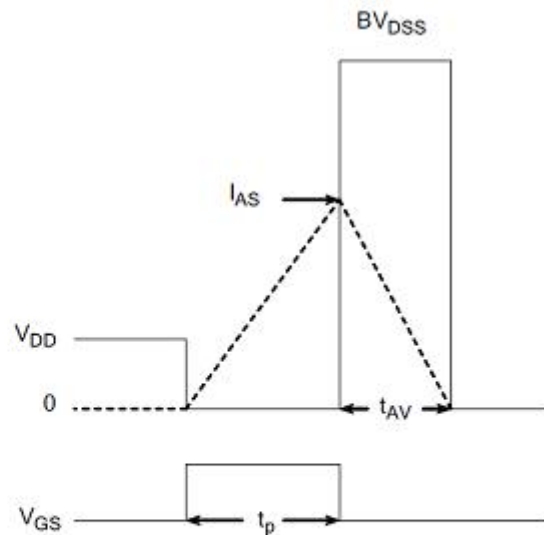
Diode Reverse Recovery Test Circuit



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
6-Nov-2021	1.0	First release

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