

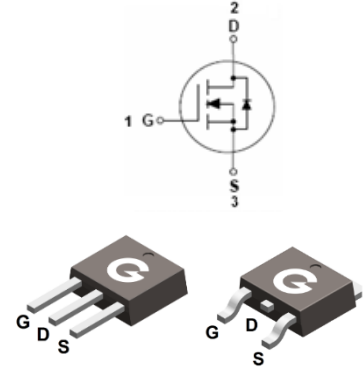
Features

- Low $R_{DS(ON)}$
- Fast switching
- Low gate charge
- Low Reverse transfer capacitances

HF

Mechanical Data

- Case: TO-251, TO-252
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matted-Tin plated; Solderable Per MIL-STD-202, Method 208



TO-251

TO-252

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
BL5N50I	TO-251	80 pcs / Tube	5N50I
BL5N50D	TO-252	80pcs / Tube or 2500pcs / Tape & Reel	5N50D

Maximum Ratings (@ $T_C = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DSS}	500	V
Gate-to-Source Voltage	V_{GSS}	± 30	V
Continuous Drain Current ($T_C = 25^\circ\text{C}$)	I_D	5	A
Continuous Drain Current ($T_C = 100^\circ\text{C}$)		3.1	A
Pulsed Drain Current ($t_p = 10\mu\text{s}$, $T_C = 25^\circ\text{C}$)	I_{DM}	20	A
Single Pulse Avalanche Energy ^{*3}	E_{AS}	125	mJ
Power Dissipation ($T_C = 25^\circ\text{C}$)	P_D	78	W
Operating Junction Temperature Range	T_J	$-55 \sim +150$	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	$-55 \sim +150$	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	-	-	1.6	$^\circ\text{C/W}$
Thermal Resistance Junction-to-Air ^{*1}	$R_{\theta JA}$	-	-	50	$^\circ\text{C/W}$

Electrical Characteristics (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
V _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	500	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 500V, V _{GS} = 0V	-	-	1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} = ±30V, V _{DS} = 0V	-	-	±100	nA
On Characteristics						
R _{DS(ON)}	Drain-Source On-resistance *2	V _{GS} = 10V, I _D = 2.5A	-	-	1.5	Ω
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	2	-	4	V
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{GS} = 0V	-	584	-	pF
C _{OSS}	Output Capacitance	V _{DS} = 25V	-	61	-	
C _{RSS}	Reverse Transfer Capacitance	f = 1MHz	-	4	-	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time *4	V _{DD} = 250V I _D = 5A R _G = 10Ω	-	14	-	ns
t _r	Turn-on Rise Time *4		-	18	-	
t _{d(OFF)}	Turn-Off Delay Time *4		-	32	-	
t _f	Turn-Off Fall Time *4		-	11	-	
Q _G	Total Gate-Charge	V _{DD} = 400V	-	12.6	-	nC
Q _{GS}	Gate to Source Charge	V _{GS} = 10V	-	3.1	-	
Q _{GD}	Gate to Drain (Miller) Charge	I _D = 5A	-	4.9	-	
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage *2	I _{SD} = 5A, V _{GS} = 0V	-	-	1.5	V
t _{rr}	Reverse Recovery Time	I _{SD} = 5A, V _R = 400V	-	328	-	ns
Q _{rr}	Reverse Recovery Charge	dI/dt = 100A/μs	-	1.555	-	μC

Notes:

- The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper
- The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- The E_{AS} data shows Max. rating. The test condition is $V_{DD} = 100V, V_{GS} = 15V, L = 10mH$
- Guaranteed by design, not subject to production

Ratings and Characteristics Curves (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

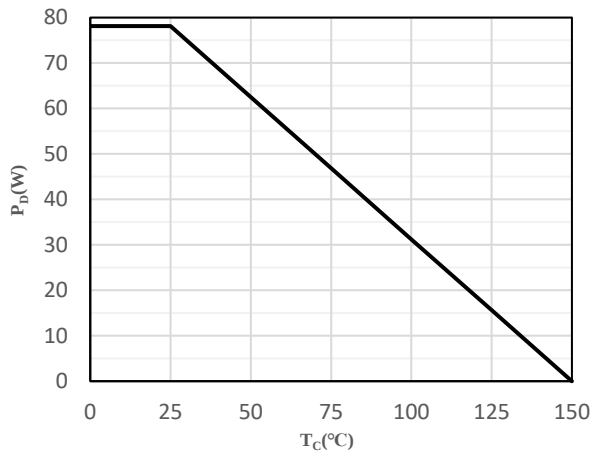


Fig 1 Power Dissipation

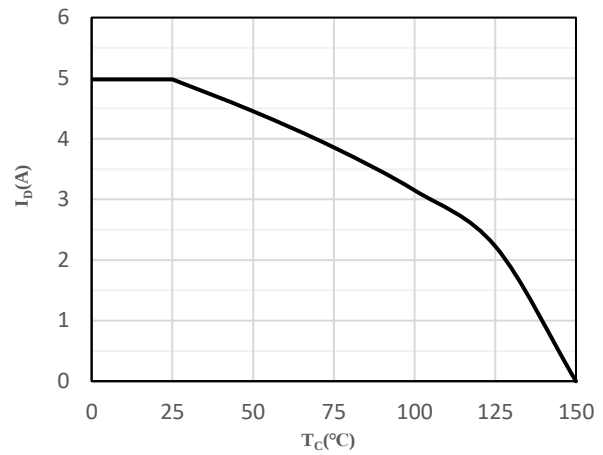


Fig 2 Drain Current

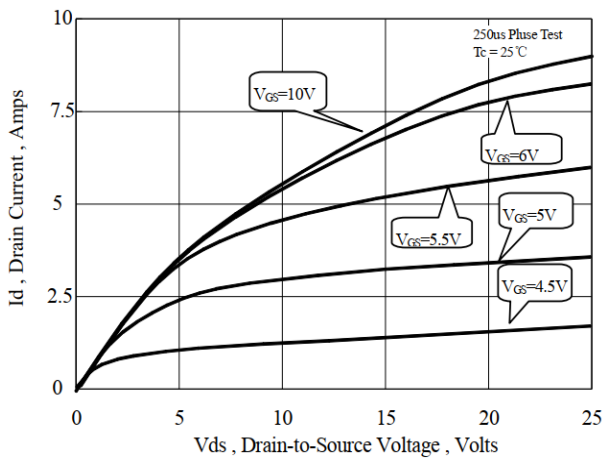


Fig 3 Typical Output Characteristics

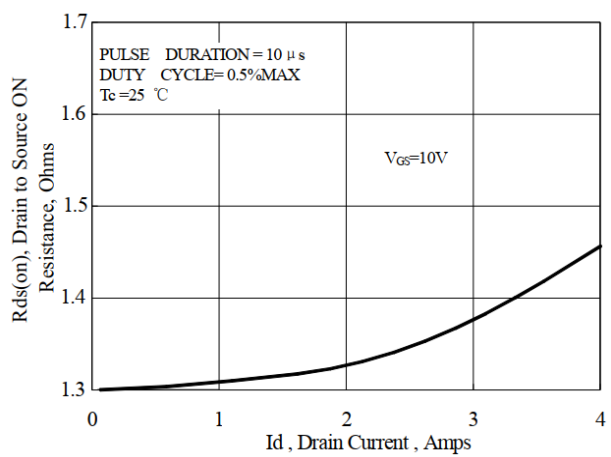


**Fig 4 On-Resistance vs. Drain Current
and Gate Voltage**

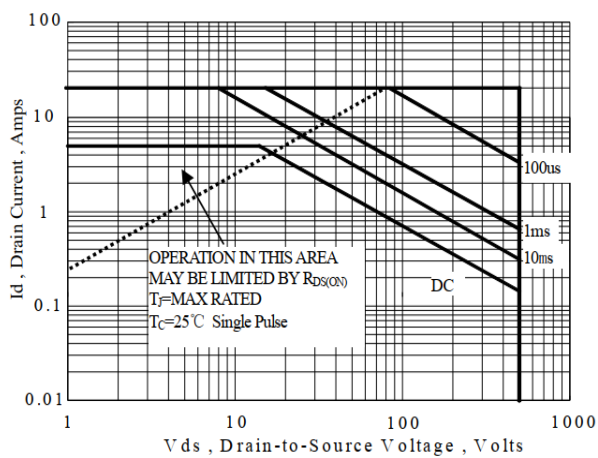


Fig 5 Safe Operation Area

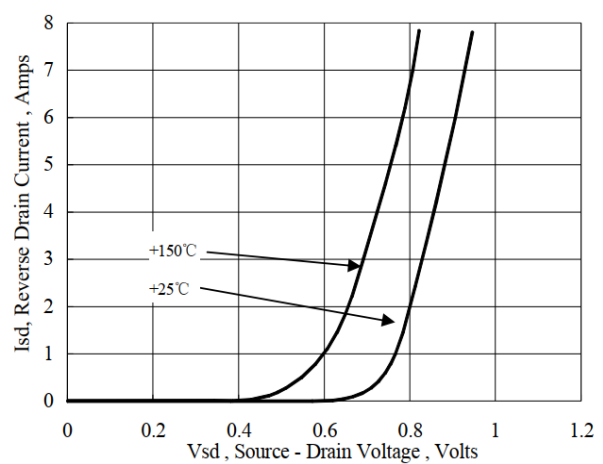


Fig 6 Body-Diode Characteristics

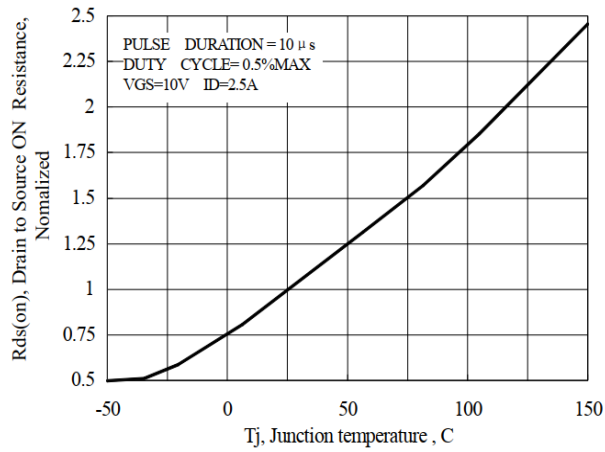


Fig 7 Normalized On-Resistance vs. Junction Temperature

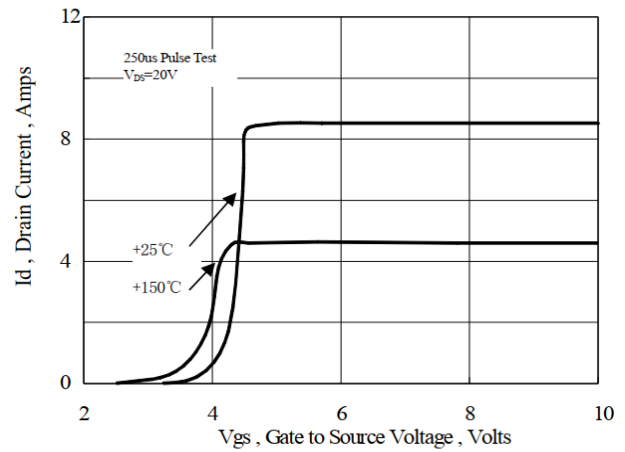


Fig 8 Transfer Characteristics

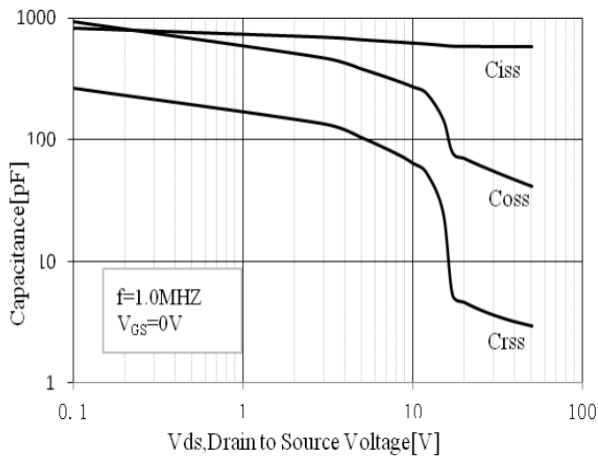


Fig 9 Capacitance Characteristics

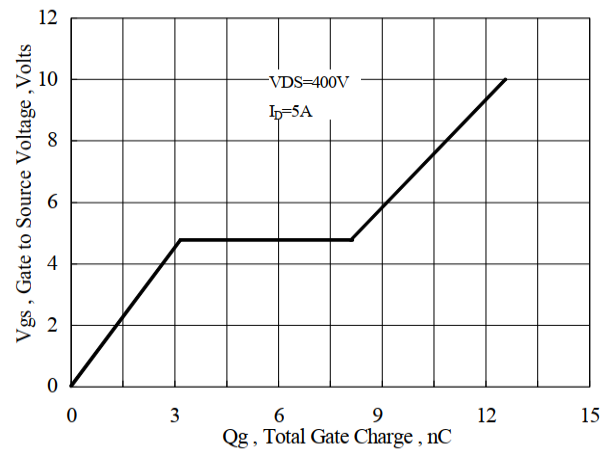


Fig 10 Gate-Charge Characteristics

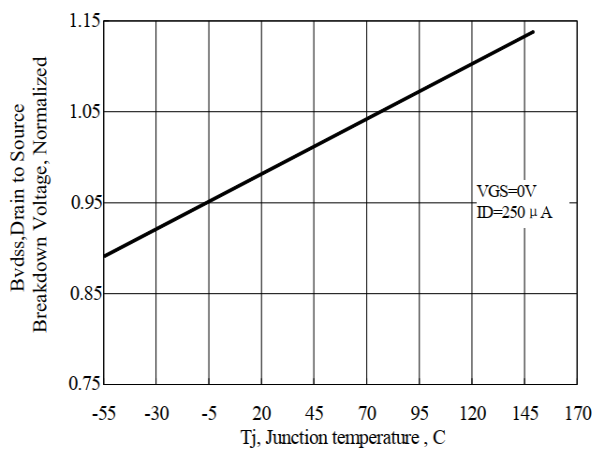


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

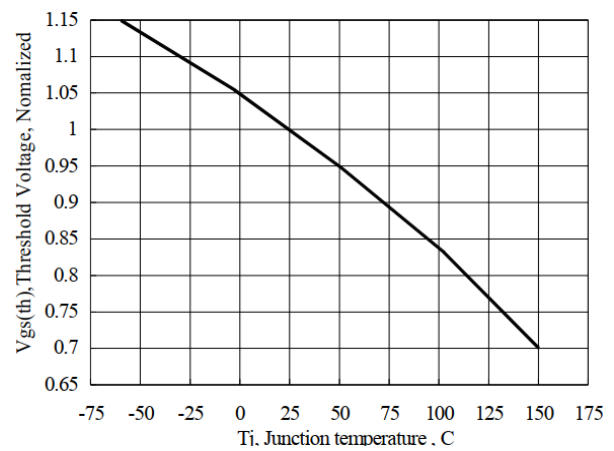
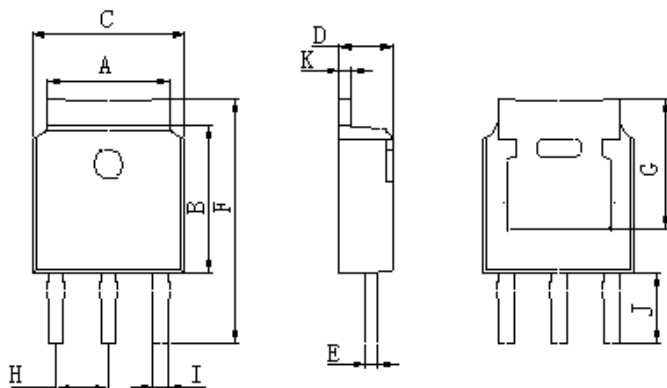
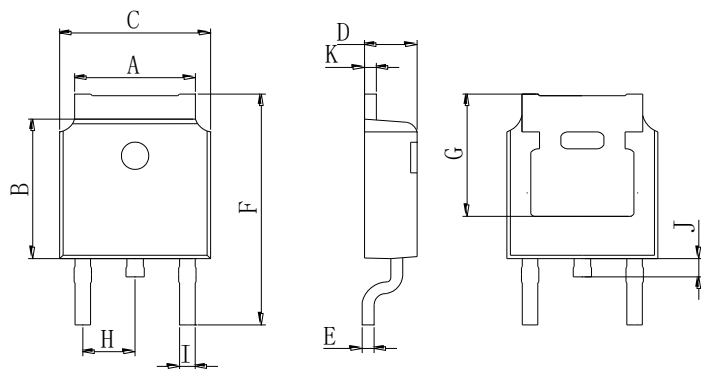


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature

Package Outline Dimensions (Unit: mm)



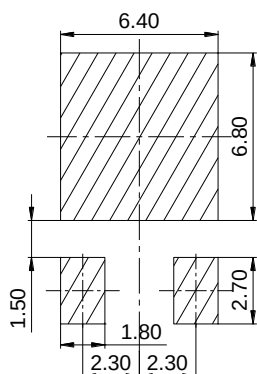
TO-251		
Dimension	Min.	Max.
A	5.05	5.65
B	5.80	6.40
C	6.25	6.85
D	2.20	2.40
E	0.40	0.60
F	11.00	11.60
G	5.05	5.65
H	2.10	2.50
I	0.70	0.90
J	4.00	4.40
K	0.40	0.60



TO-252		
Dimension	Min.	Max.
A	5.05	5.65
B	5.80	6.40
C	6.25	6.85
D	2.20	2.40
E	0.40	0.60
F	9.71	10.31
G	5.05	5.65
H	2.10	2.50
I	0.70	0.90
J	0.50	0.70
K	0.40	0.60

Mounting Pad Layout (Unit: mm)

TO-252



Important Notice

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