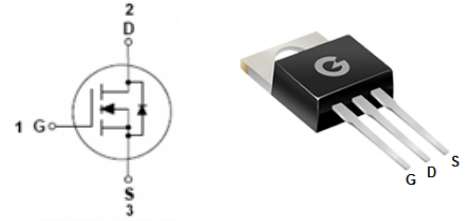


Features

- Super low gate charge
- Green device available
- Excellent C_{dv} / d_t effect decline
- Advanced high cell density trench technology

HF



TO-220AB

Mechanical Data

- Case: TO-220AB
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
BL050N10TH	TO-220AB	50 pcs / Tube	050N10TH

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

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DS}	100	V
Gate-to-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_C = 25^\circ\text{C}$) *1	I_D	190	A
Continuous Drain Current ($T_C = 100^\circ\text{C}$) *1		125	A
Pulsed Drain Current *2	I_{DM}	450	A

Thermal Characteristics

Parameter	Symbol	Value	Unit
Power Dissipation ($T_C = 25^\circ\text{C}$)	P_D	284	W
Thermal Resistance Junction-to-Air *1	$R_{\theta JA}$	50	$^\circ\text{C/W}$
Thermal Resistance Junction-to-Case *1	$R_{\theta JC}$	0.44	$^\circ\text{C/W}$
Operating Junction Temperature Range	T_J	-55 ~ +150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 ~ +150	$^\circ\text{C}$

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	100	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 100V, V _{GS} = 0V, T _C = 25°C	-	-	1	μA
		V _{DS} = 100V, V _{GS} = 0V, T _C = 55°C	-	-	5	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} = ±20V, V _{DS} = 0V	-	-	±100	nA
On Characteristics						
R _{DS(ON)}	Static Drain-Source On-resistance *2	V _{GS} = 10V,I _D = 30A	-	-	5.0	mΩ
		V _{GS} = 6V,I _D = 20A	-	-	6.5	mΩ
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 V _{DS} = 15V f = 1.0MHz	-	4725	-	pF
C _{OSS}	Output Capacitance		-	609	-	
C _{RSS}	Reverse Transfer Capacitance		-	14	-	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time	V _{DD} =30V V _{GS} = 10V R _G = 3Ω I _D = 30A	-	35	-	ns
t _r	Turn-on Rise Time		-	18	-	
t _{d(OFF)}	Turn-Off Delay Time		-	45	-	
t _f	Turn-Off Fall Time		-	55	-	
Q _G	Total Gate-Charge	V _{DD} = 48V V _{GS} = 10V I _D = 25A	-	72	-	nC
Q _{GS}	Gate to Source Charge		-	28	-	
Q _{GD}	Gate to Drain (Miller) Charge		-	15	-	
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage *2	I _{SD} = 1A, V _{GS} = 0V, T _J = 25°C	-	-	1.2	V
I _{SD}	Diode Continuous Forward Current *1,3		-	-	135	A
I _{SDM}	Pulsed Source-Drain Current(Body Diode) *2,3		-	-	450	A

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 data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation

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

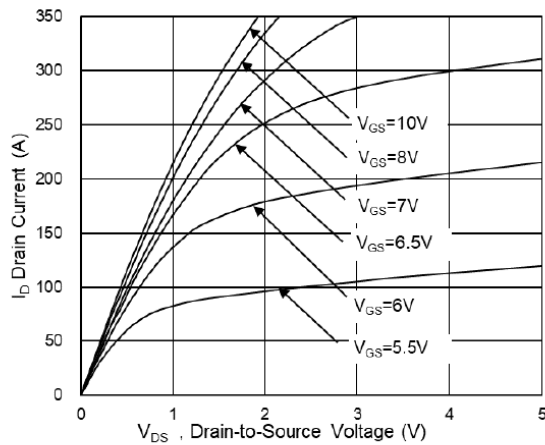


Fig.1 Typical Output Characteristics

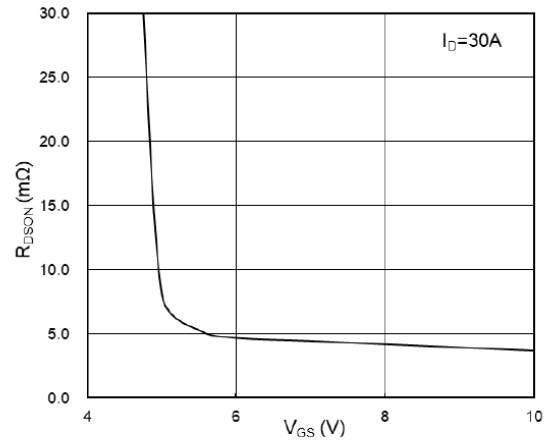


Fig.2 On-Resistance v.s Gate-Source

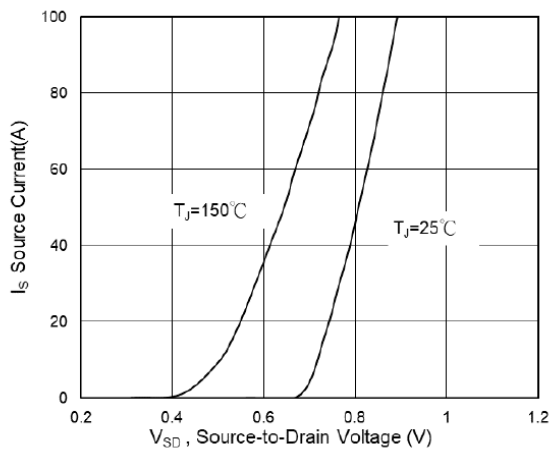


Fig.3 Forward Characteristics of Reverse

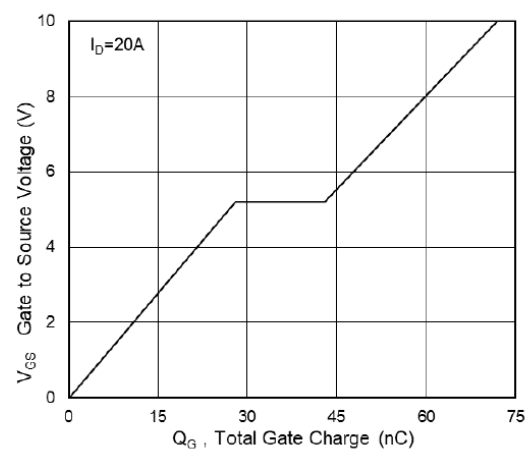


Fig.4 Gate-Charge Characteristics

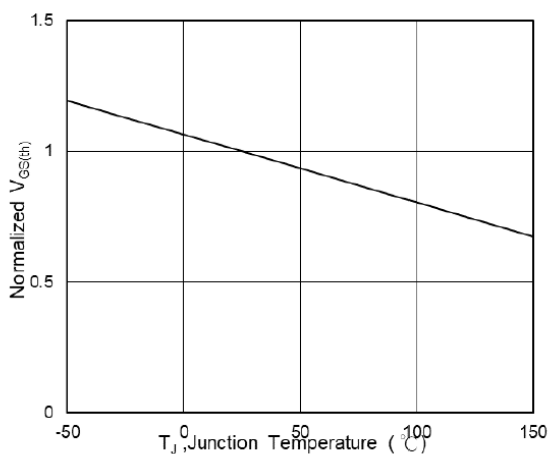


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

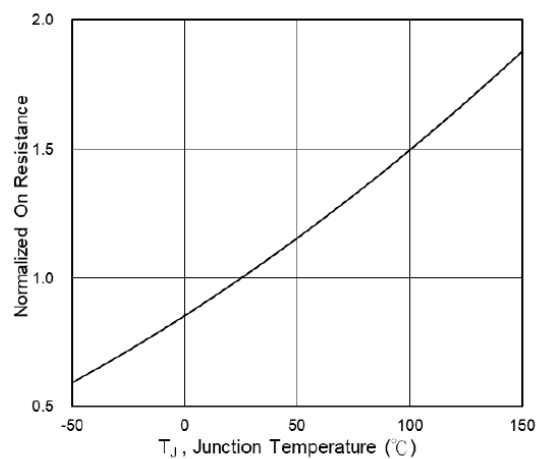


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

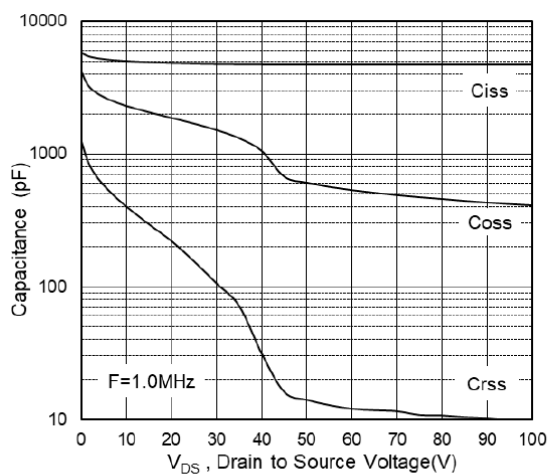


Fig.7 Capacitance

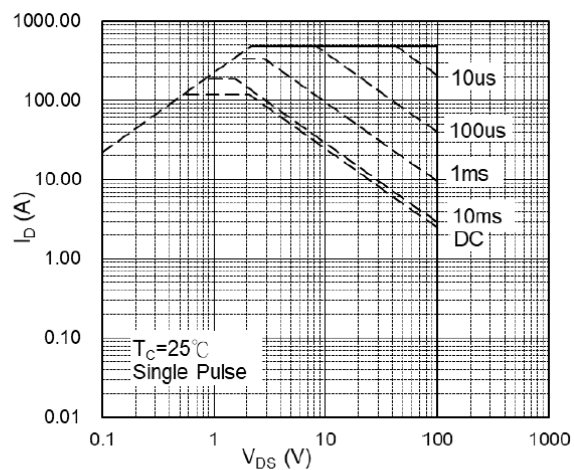
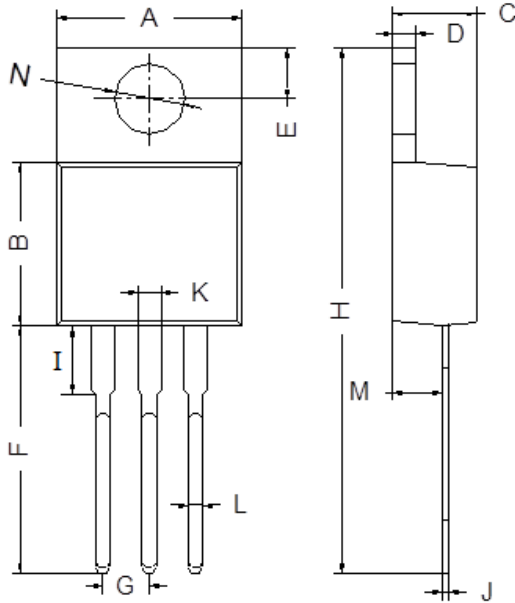


Fig.8 Safe Operating Area

Package Outline Dimensions (Unit: mm)



TO-220AB		
Dimension	Min.	Max.
A	9.80	10.30
B	8.70	9.10
C	4.37	4.77
D	1.07	1.47
E	2.64	2.84
F	13.14	13.74
G	2.44	2.64
H	28.03	28.83
I	3.50	4.00
J	0.28	0.48
K	1.22	1.32
L	0.71	0.91
M	2.40	2.60
N	3.76	3.96

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