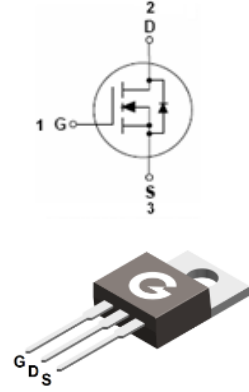


Features

- Advanced shielded-gate trench technology
- Ultra low RDS(ON) to minimize conduction losses
- Superior thermal resistance
- Low power loss, high power density
- HBM: JESD22-A114-B: 1C
- RoHS compliant with Halogen-free

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
BL023N10TH	TO-220AB	50 pcs / Tube	023N10TH

Maximum Ratings (@ T_C = 25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V _{DSS}	100	V
Gate-to-Source Voltage	V _{GSS}	±20	V
Continuous Drain Current (Package Limited)	I _D	180	A
Continuous Drain Current (T _C = 25°C, Silicon Limited)		280	A
Continuous Drain Current (T _C = 100°C, Silicon Limited)		177	A
Pulsed Drain Current (t _p = 10μs, T _C = 25°C)	I _{DM}	720	A
Single Pulse Avalanche Energy ^{*2}	E _{AS}	900	mJ
Power Dissipation (T _C = 25°C)	P _D	312	W
Operating Junction Temperature Range	T _J	-55 ~ +150	°C
Storage Temperature Range	T _{STG}	-55 ~ +150	°C

Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance Junction-to-Case	R _{θJC}	-	-	0.4	°C/W
Thermal Resistance Junction-to-Air	R _{θJA}	-	-	62	°C/W

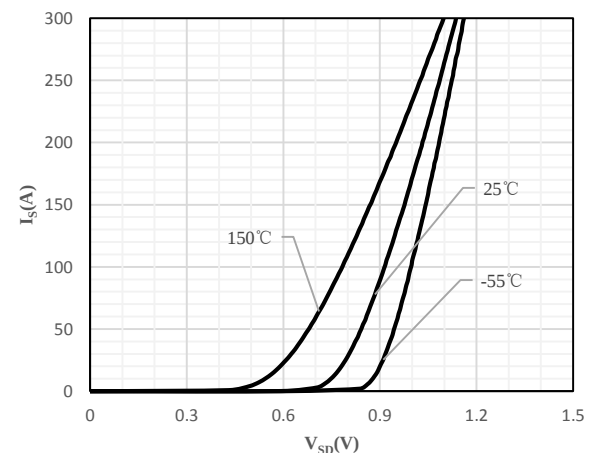
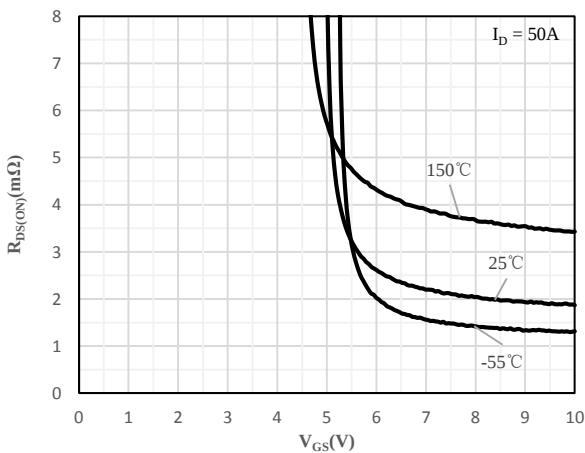
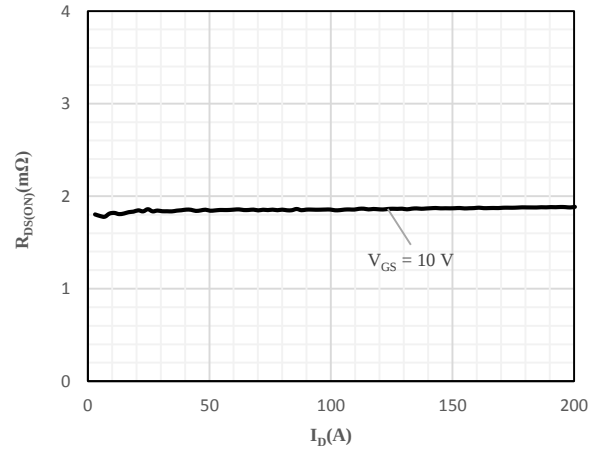
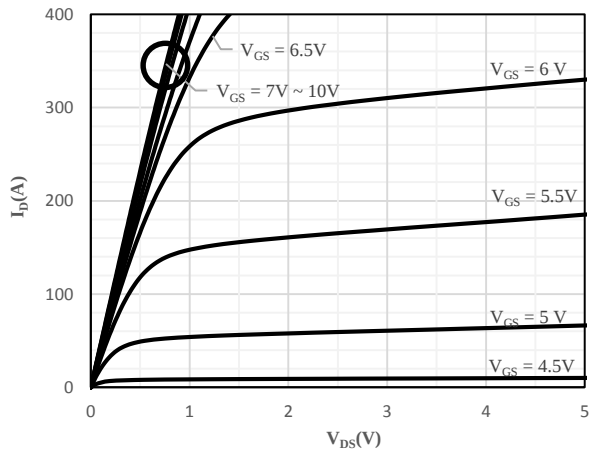
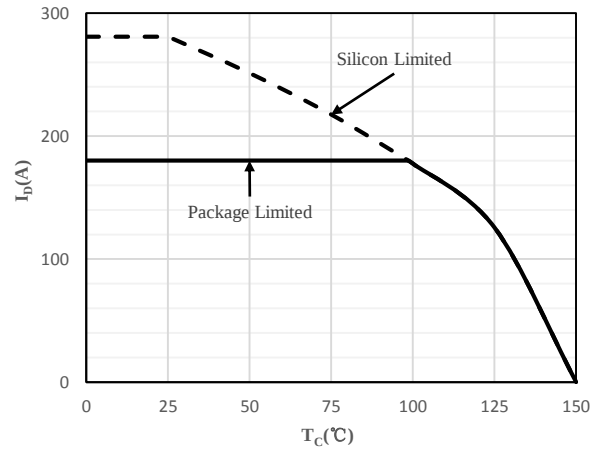
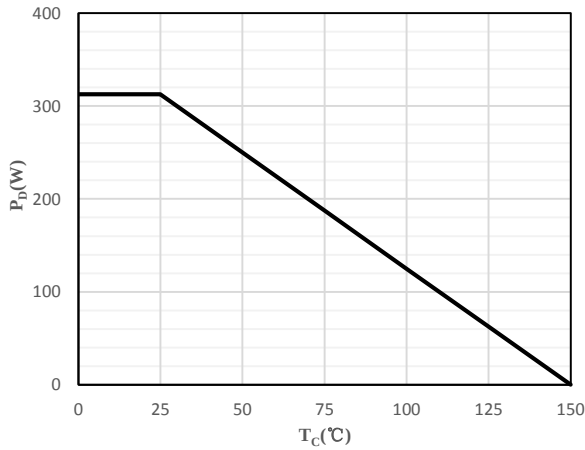
Electrical Characteristics (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
V _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 1mA	100	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 100V, V _{GS} = 0V	-	-	1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} = ±20V, V _{DS} = 0V	-	-	±100	nA
On Characteristics						
R _{DS(ON)}	Drain-Source On-resistance *1	V _{GS} = 10V, I _D = 50A	-	1.9	2.3	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	2	3	4	V
R _G	Gate Resistance	V _{GS} = 0V, f = 1MHz	-	1.2	-	Ω
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{GS} = 0V	-	9875	-	pF
C _{OSS}	Output Capacitance	V _{DS} = 40V	-	4167	-	
C _{RSS}	Reverse Transfer Capacitance	f = 100kHz	-	182	-	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time	V _{DD} = 50V	-	45	-	ns
t _r	Turn-on Rise Time	V _{GS} = 15V	-	64	-	
t _{d(OFF)}	Turn-Off Delay Time	R _G = 3.3Ω	-	130	-	
t _f	Turn-Off Fall Time	I _D = 50A	-	36	-	
Q _G	Total Gate-Charge	V _{DD} = 50V	-	142	-	nC
Q _{GS}	Gate to Source Charge	V _{GS} = 10V	-	47	-	
Q _{GD}	Gate to Drain (Miller) Charge	I _D = 100A	-	33	-	
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage *1	I _{SD} = 50A, V _{GS} = 0V	-	0.84	1.2	V
t _{rr}	Reverse Recovery Time	I _F = 40A, V _{GS} = 0V	-	110	-	ns
Q _{rr}	Reverse Recovery Charge	dI _F /d _t = 100A/us	-	280	-	nC

Notes:

- 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 $V_{DD} = 50V, V_{GS} = 10V, L = 0.5mH$

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



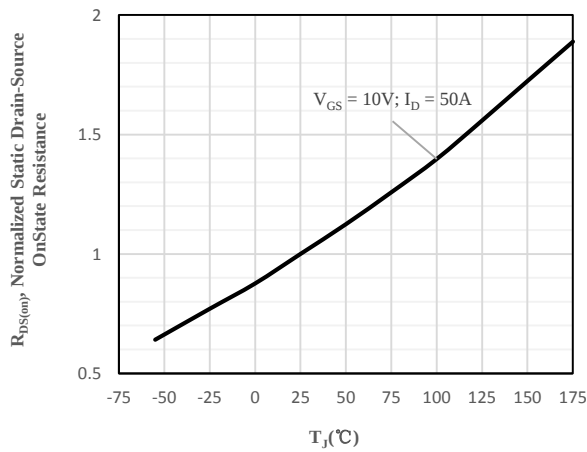


Fig 7 Normalized On-Resistance vs. Junction Temperature

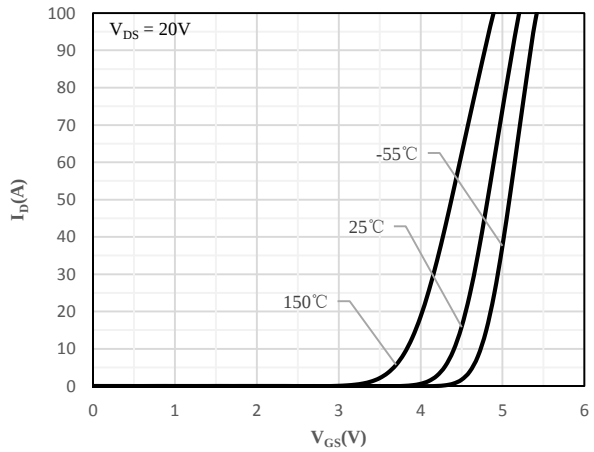


Fig 8 Transfer Characteristics

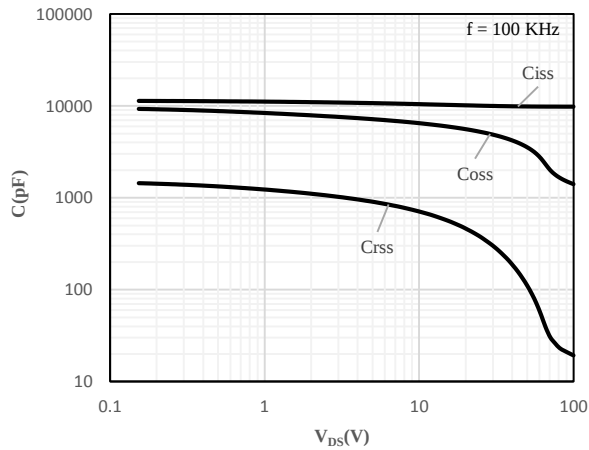


Fig 9 Capacitance Characteristics

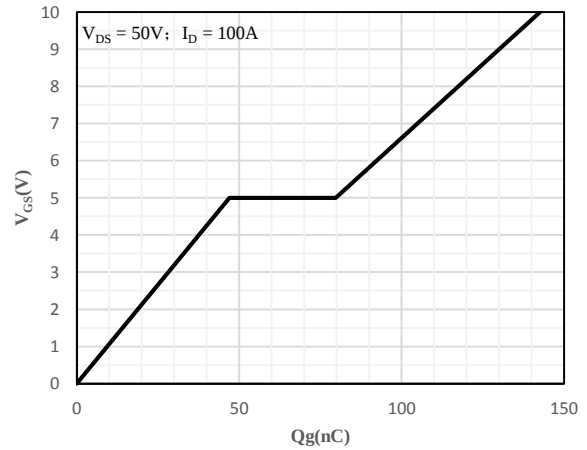


Fig 10 Gate-Charge Characteristics

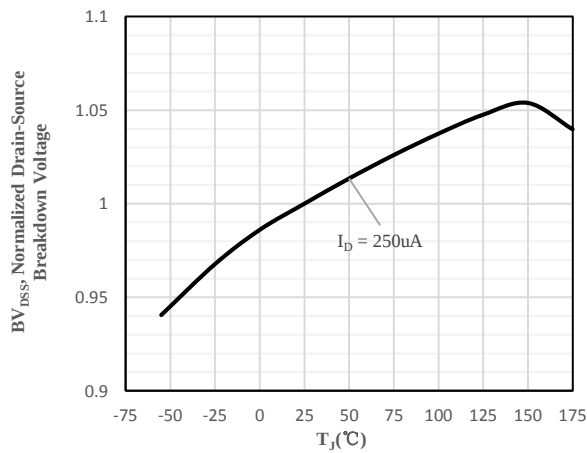


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

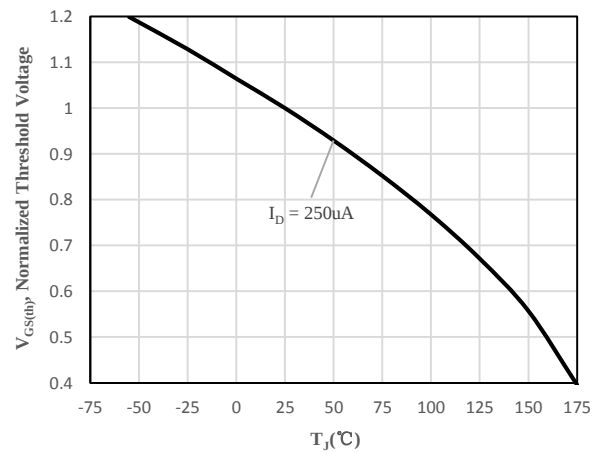
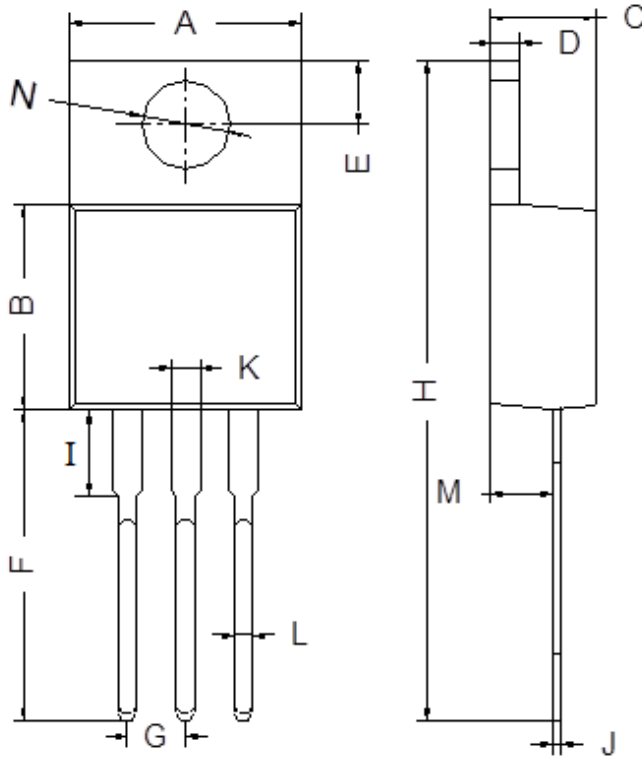


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature

Package Outline Dimensions (Unit: mm)



TO-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