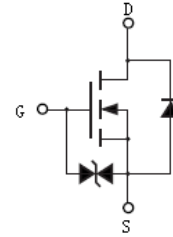


Features

- Fast switching
- ESD improved capability
- Low gate charge
- Low reverse transfer capacitances
- JESD22-A114-B ESD rating of class 1C per human body model

HF

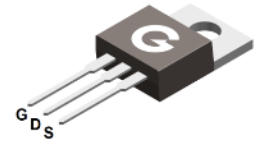


Application

- Power switch circuit of adaptor and charger

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



TO-220AB

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
BL1N60K	TO-220AB	50 pcs / Tube	1N60K

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

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DS}	600	V
Gate-to-Source Voltage	V_{GS}	± 30	V
Continuous Drain Current ($T_C = 25^\circ\text{C}$)	I_D	1.25	A
Continuous Drain Current ($T_C = 100^\circ\text{C}$)		0.8	A
Pulsed Drain Current ($t_p = 10\mu\text{s}$, $T_C = 25^\circ\text{C}$)	I_{DM}	5	A
Single Pulse Avalanche Energy ^{*3}	E_{AS}	50	mJ
Power Dissipation ($T_C = 25^\circ\text{C}$)	P_D	31	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	$R_{\theta JC}$	-	-	4	$^\circ\text{C/W}$
Thermal Resistance Junction-to-Air ^{*1}	$R_{\theta JA}$	-	-	40	$^\circ\text{C/W}$

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	600	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 600V, V _{GS} = 0V	-	-	1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} = ±20V, V _{DS} = 0V	-	-	±10	μA
On Characteristics						
R _{DS(ON)}	Drain-Source On-resistance *2	V _{GS} = 10V, I _D = 0.75A	-	-	8	Ω
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	-	11	-	Ω
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{GS} = 0V	-	178	-	pF
C _{OSS}	Output Capacitance	V _{DS} = 25V	-	20	-	
C _{RSS}	Reverse Transfer Capacitance	f = 1.0MHz	-	3	-	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time *4	V _{DD} = 300V	-	8	-	ns
t _r	Turn-on Rise Time *4	V _{GS} = 10V	-	30	-	
t _{d(OFF)}	Turn-Off Delay Time *4	R _G = 4.7Ω	-	22	-	
t _f	Turn-Off Fall Time *4	I _D = 1.5A	-	55	-	
Q _G	Total Gate-Charge	V _{DD} = 480V	-	7.7	-	nC
Q _{GS}	Gate to Source Charge	V _{GS} = 10V	-	0.9	-	
Q _{GD}	Gate to Drain (Miller) Charge	I _D = 1.5A	-	5.3	-	
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage *2	I _{SD} = 1.5A, V _{GS} = 0V	-	-	1.5	V
t _{rr}	Reverse Recovery Time	I _{SD} = 1.5A, V _{GS} = 0V	-	245	-	ns
Q _{rr}	Reverse Recovery Charge	di/dt = 100A/μs	-	795	-	nC

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 $V_{DD} = 100V, V_{GS} = 10V, L = 50mH$
- Guaranteed by design, not subject to production

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

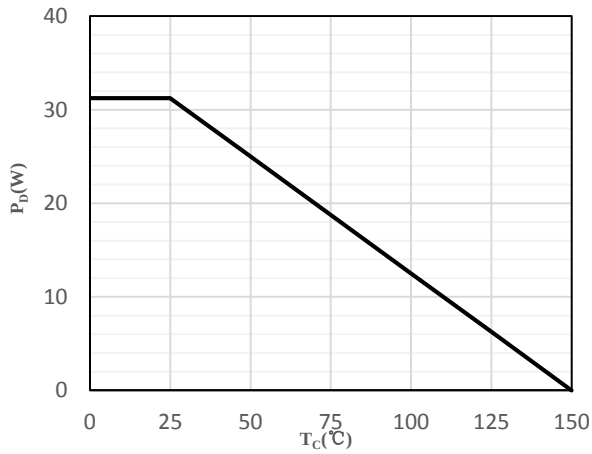


Fig 1 Power Dissipation

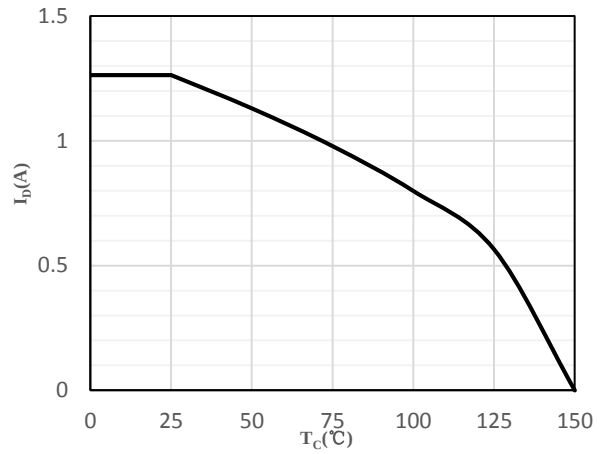


Fig 2 Drain Current

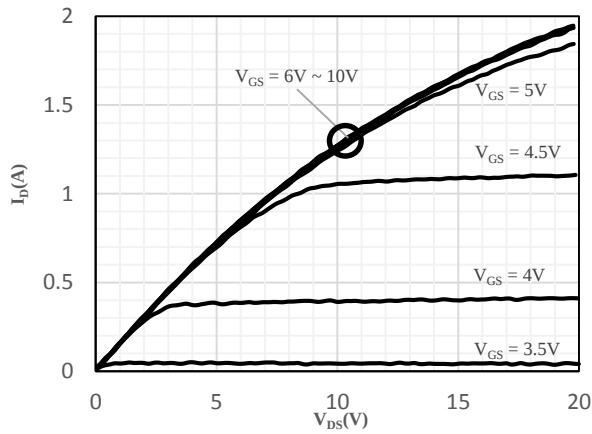


Fig 3 Typical Output Characteristics

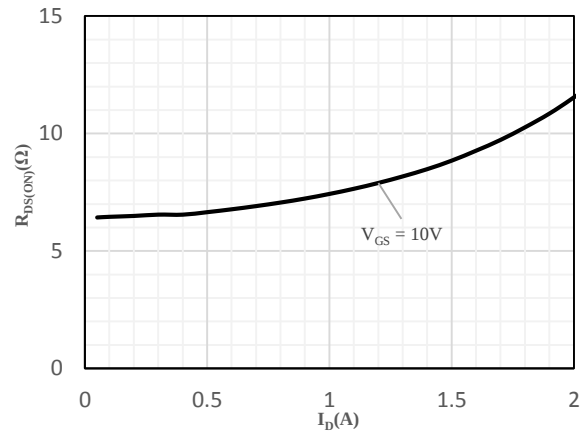


Fig 4 On-Resistance vs. Drain Current
and Gate Voltage

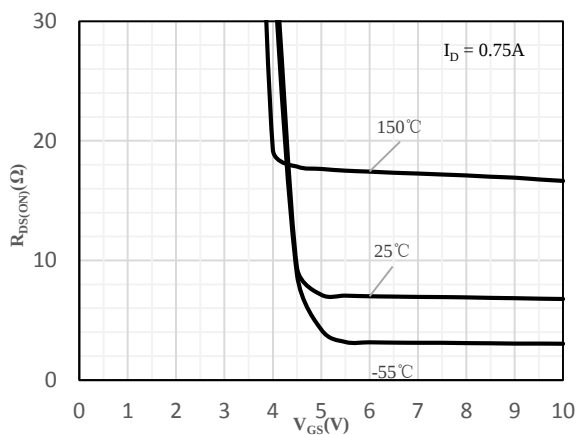


Fig 5 On-Resistance vs. Gate-Source Voltage

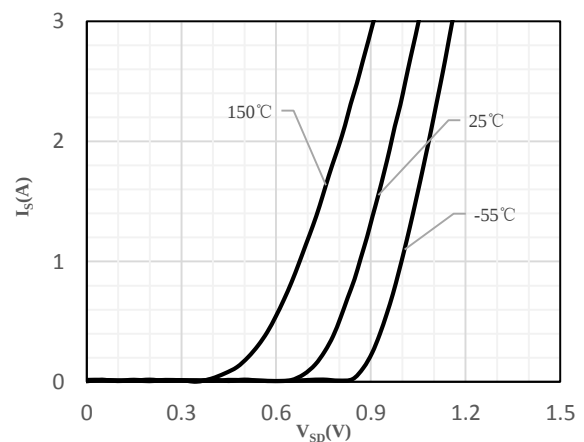


Fig 6 Body-Diode Characteristics

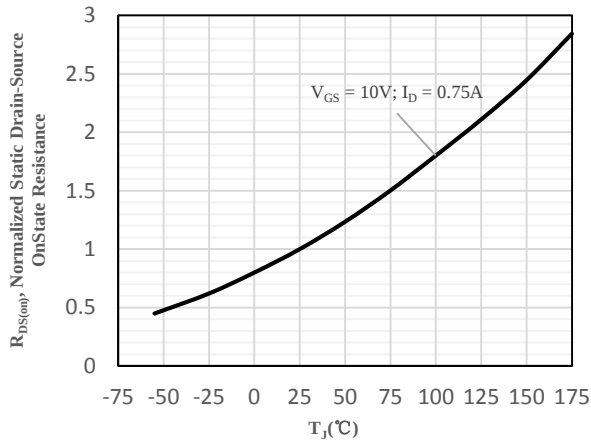


Fig 7 Normalized On-Resistance vs. Junction Temperature

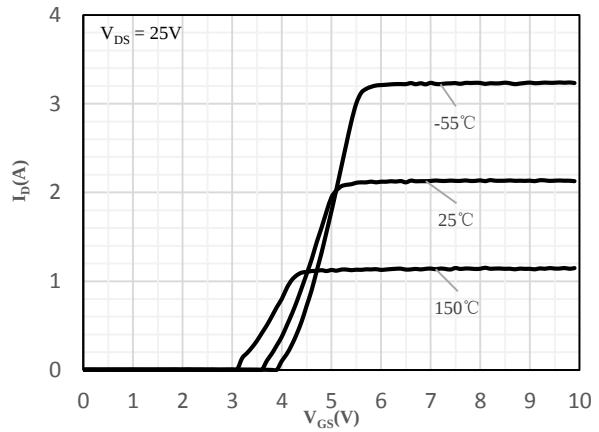


Fig 8 Transfer Characteristics

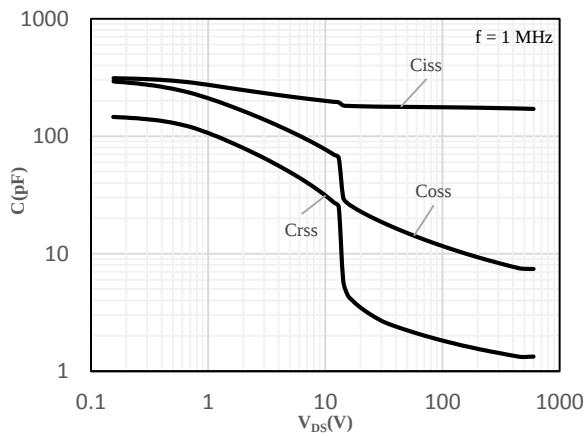


Fig 9 Capacitance Characteristics

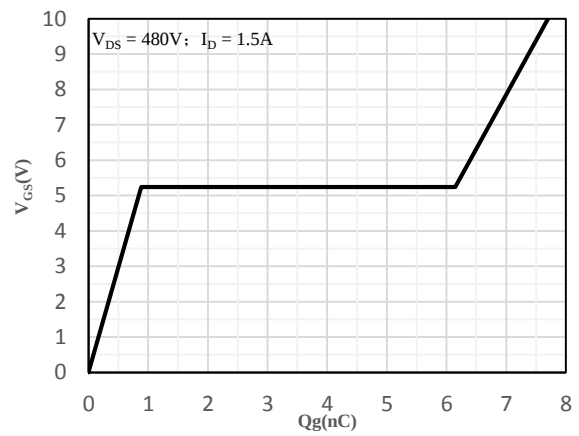


Fig 10 Gate-Charge Characteristics

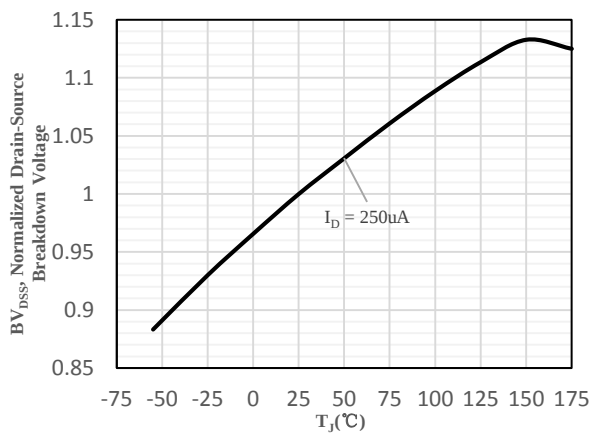


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

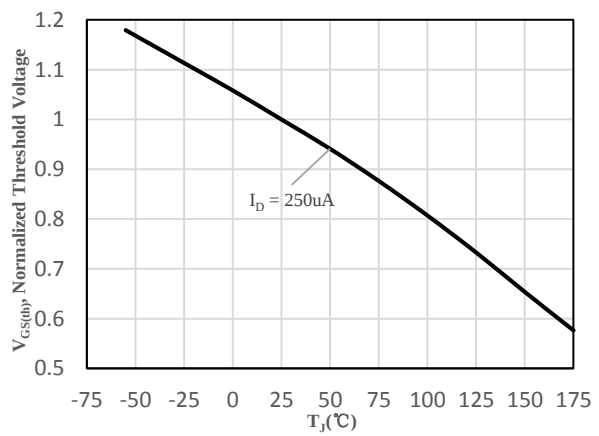
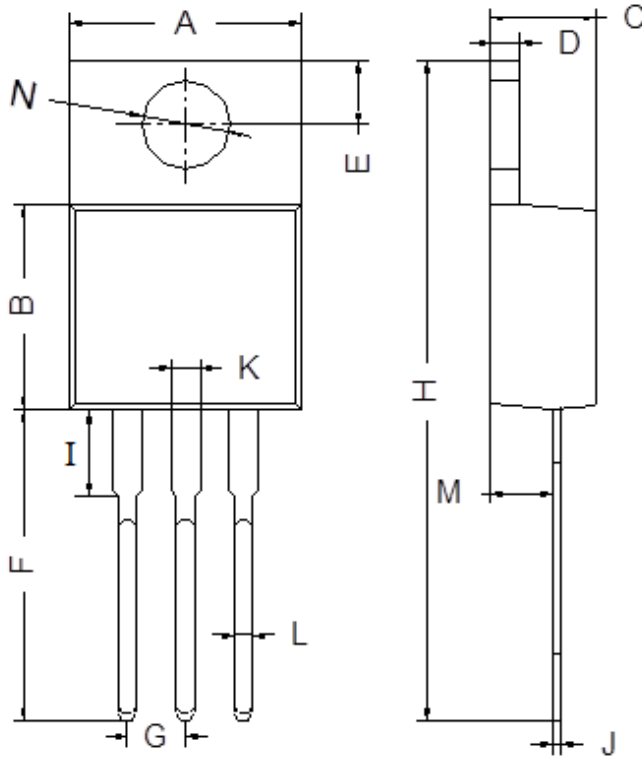


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature

Package Outline Dimensions (Unit: mm)



TO-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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