

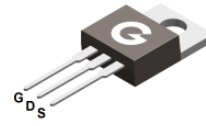
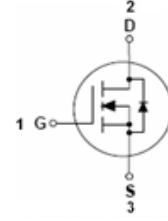
Features

- Excellent FOM
- Very low on-resistance $R_{DS(on)}$
- Ideal for high-frequency switching and synchronous rectification
- HBM: JESD22-A114-B: 1C
- RoHS compliant with Halogen-free

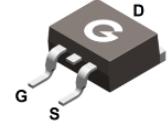
HF

Mechanical Data

- Case: TO-220AB, TO-263
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208



TO-220AB



TO-263

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
BL042N10TH	TO-220AB	50 pcs / Tube	042N10TH
BL042N10THB	TO-263	50 pcs / Tube & 800 pcs / Tape & Reel	042N10THB

Maximum Ratings (@ $T_C = 25^\circ\text{C}$ 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 ($T_C = 25^\circ\text{C}$, Silicon Limited)	I_D	160	A
Continuous Drain Current ($T_C = 25^\circ\text{C}$, Package Limited)		120	A
Continuous Drain Current ($T_C = 100^\circ\text{C}$)		105	A
Continuous Drain Current ($T_A = 25^\circ\text{C}$)		28	A
Continuous Drain Current ($T_A = 100^\circ\text{C}$)		20	A
Pulsed Drain Current ($t_p = 10\mu\text{s}$, $T_C = 25^\circ\text{C}$)	I_{DM}	480	A
Single Pulse Avalanche Energy ^{*2}	E_{AS}	536	mJ
Power Dissipation (TO-220AB, $T_C = 25^\circ\text{C}$)	P_D	208	W
Power Dissipation (TO-263, $T_C = 25^\circ\text{C}$)		208	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 (TO-220AB, TO-263)	$R_{\theta JC}$	-	0.5	0.6	$^\circ\text{C/W}$
Thermal Resistance Junction-to-Air (TO-220AB, TO-263)	$R_{\theta JA}$	-	15	20	$^\circ\text{C/W}$

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	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 = 100A	-	3.4	4.2	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	-	3	-	Ω
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{GS} = 0V	-	7087	-	pF
C _{OSS}	Output Capacitance	V _{DS} = 50V	-	916	-	
C _{RSS}	Reverse Transfer Capacitance	f = 100KHz	-	19	-	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time *3	V _{DS} = 50V	-	35	-	ns
t _r	Turn-on Rise Time *3	V _{GS} = 10V	-	18	-	
t _{d(OFF)}	Turn-Off Delay Time *3	R _G = 1.6Ω	-	45	-	
t _f	Turn-Off Fall Time *3	I _D = 50A	-	55	-	
Q _G	Total Gate-Charge	V _{DS} = 50V	-	118	-	nC
Q _{GS}	Gate to Source Charge	V _{GS} = 10V	-	35	-	
Q _{GD}	Gate to Drain (Miller) Charge	I _D = 100A	-	37	-	
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage *1	I _{SD} = 10A, V _{GS} = 0V	-	0.77	1.2	V
t _{rr}	Reverse Recovery Time	I _{SD} = 30A, V _{GS} = 0V	-	80	-	ns
Q _{rr}	Reverse Recovery Charge	dI _{SD} /dt = 100A/μs	-	170	-	nC

Notes:

1. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
2. The E_{AS} data shows Max. rating. The test condition is $V_{DD} = 50V, V_{GS} = 10V, L = 1mH$
3. Guaranteed by design, not subject to production

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

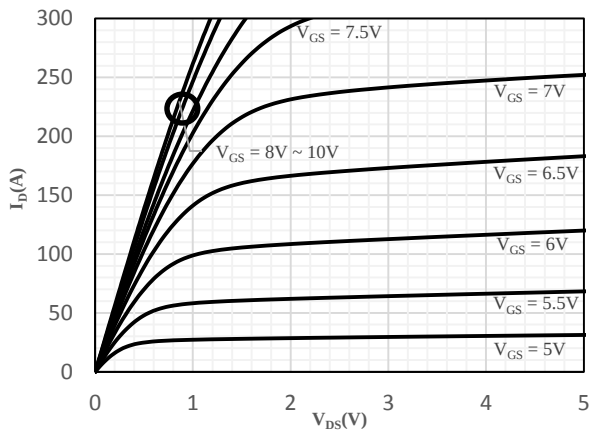
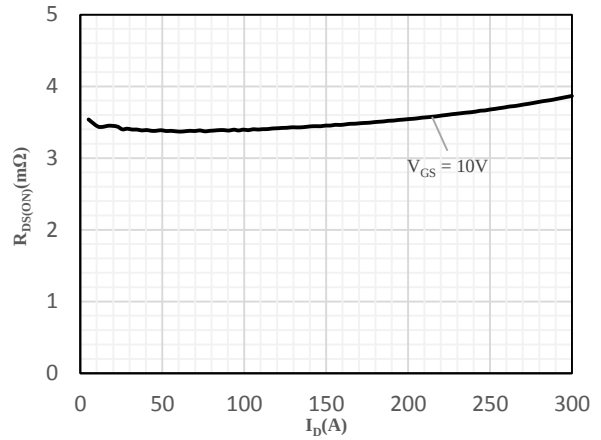


Fig 1 Typical Output Characteristics



**Fig 2 On-Resistance vs. Drain Current
and Gate Voltage**

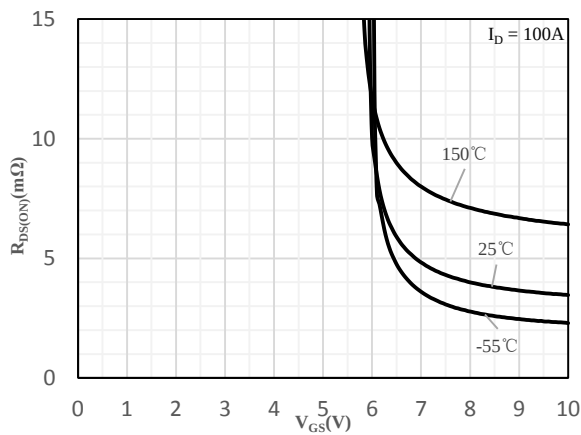


Fig 3 On-Resistance vs. Gate-Source Voltage

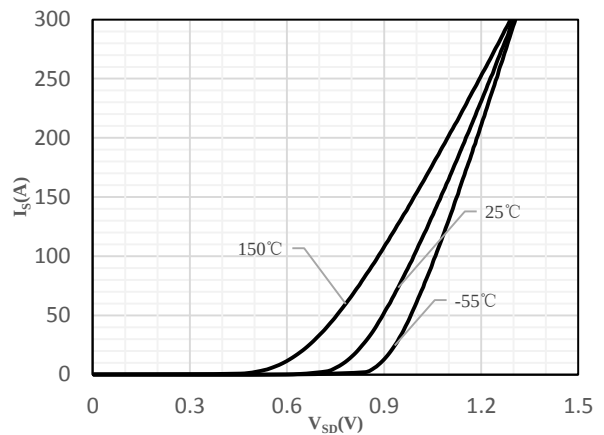
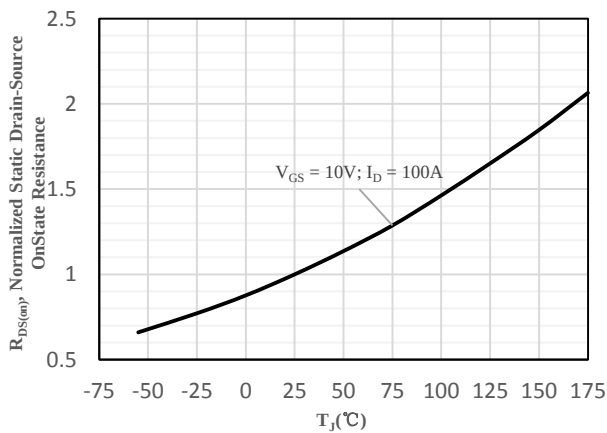


Fig 4 Body-Diode Characteristics



**Fig 5 Normalized On-Resistance vs. Junction
Temperature**

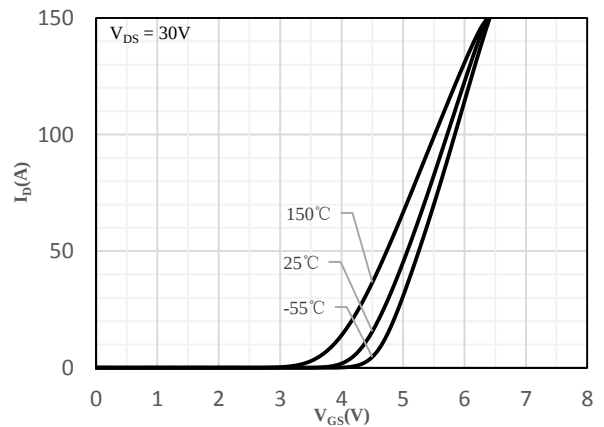


Fig 6 Transfer Characteristics

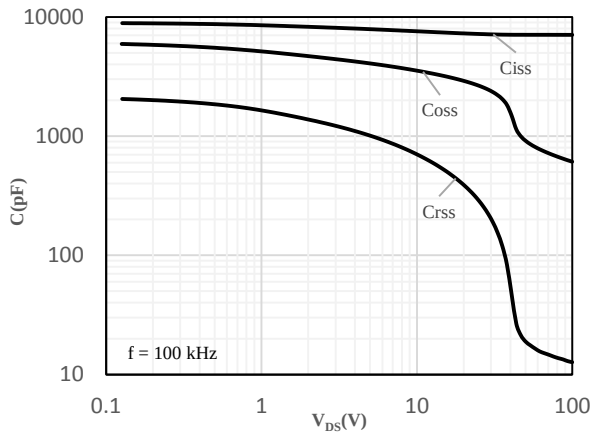


Fig 7 Capacitance Characteristics

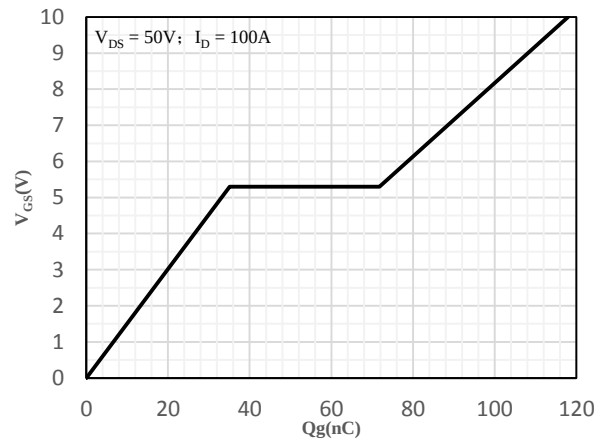


Fig 8 Gate-Charge Characteristics

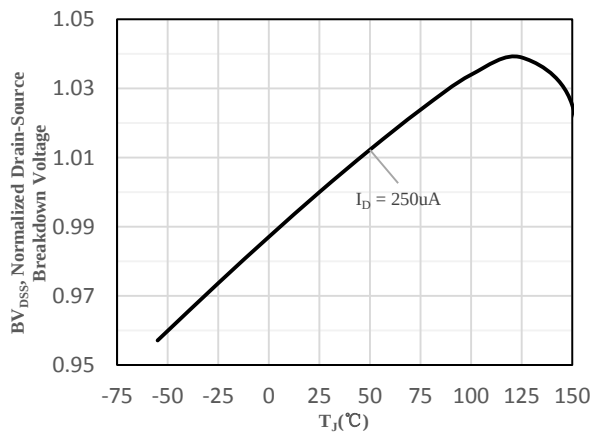


Fig 9 Normalized Breakdown Voltage
vs. Junction Temperature

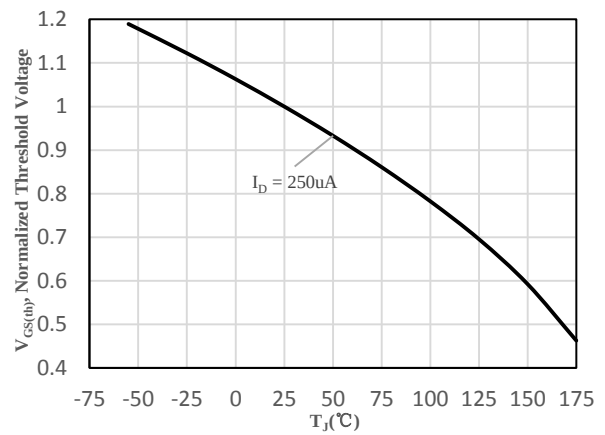


Fig 10 Normalized $V_{GS(th)}$ vs. Junction Temperature

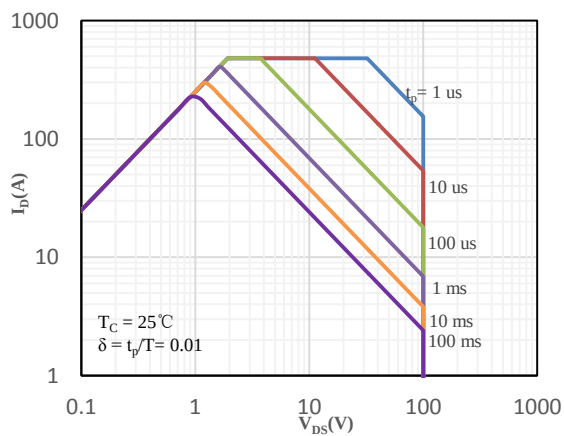


Fig 11 Safe Operation Area

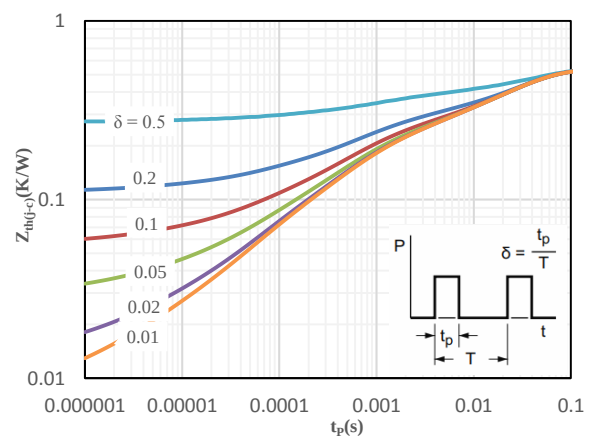
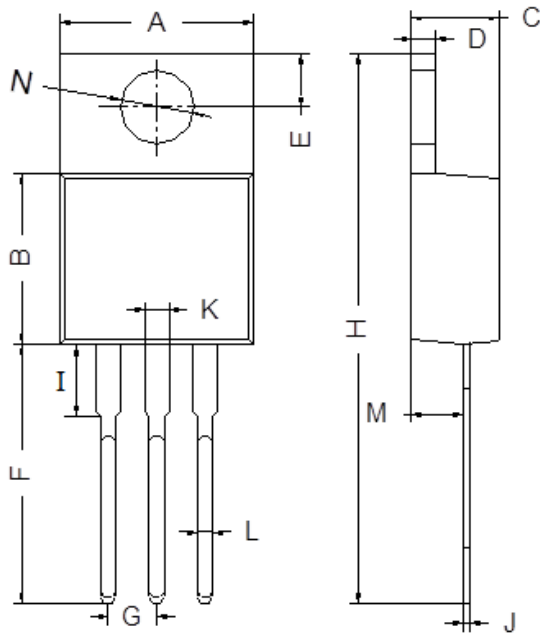
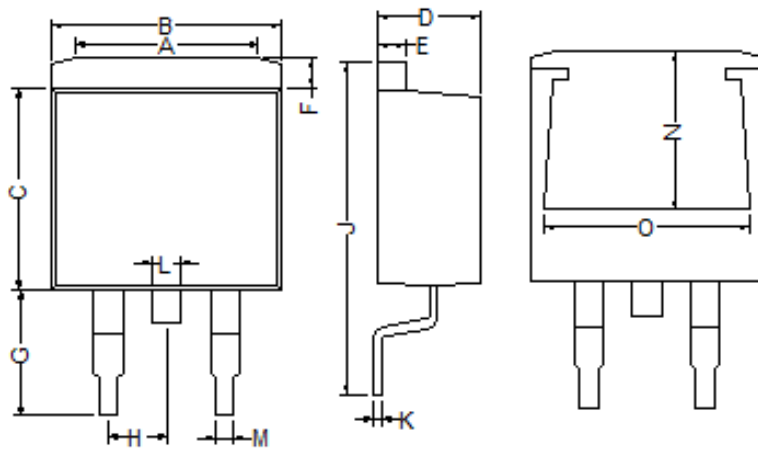


Fig 12 Maximum transient thermal impedance

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



TO-263		
Dimension	Min.	Max.
A	6.00	8.00
B	9.90	10.30
C	8.50	9.10
D	4.37	4.77
E	1.07	1.47
F	1.07	1.47
G	5.05	5.74
H	2.44	2.66
J	15.15	15.80
K	0.28	0.48
L	1.17	1.37
M	0.71	0.91
N	6.55	7.68
O	7.70	8.10

Mounting Pad Layout (Unit: mm)

TO-263

