

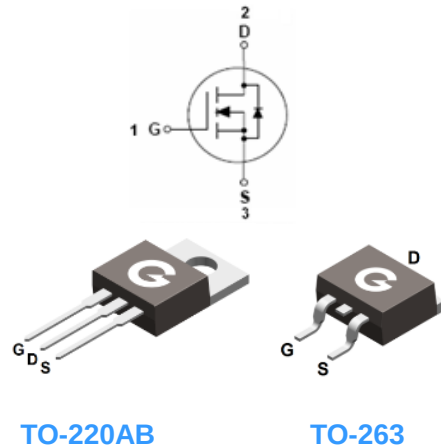
Features

- Super low $R_{DS(on)}$ and gate charge
- Advanced shielded-gate technology
- Green device available
- Excellent c_{dv} / d_t effect decline

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
BL030N04T	TO-220AB	50 pcs / Tube	030N04T
BL030N04TB	TO-263	50 pcs / Tube or 800 pcs / Tape & Reel	030N04TB

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

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DSS}	40	V
Gate-to-Source Voltage	V_{GSS}	± 20	V
Continuous Drain Current ($T_C = 25^\circ\text{C}$, Silicon limited)	I_D	150	A
Continuous Drain Current ($T_C = 25^\circ\text{C}$, Package limited)		120	A
Continuous Drain Current ($T_C = 100^\circ\text{C}$)		95	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}	150	mJ
Power Dissipation (TO-220AB, $T_C = 25^\circ\text{C}$)	P_D	125	W
Power Dissipation (TO-263, $T_C = 25^\circ\text{C}$)		125	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)	$R_{\theta JC}$	-	-	1	$^\circ\text{C/W}$
Thermal Resistance Junction-to-Air(TO-220AB, TO-263)	$R_{\theta JA}$	-	-	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 _{DS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	40	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 40V, 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 = 30A	-	-	3.0	mΩ
		V _{GS} = 4.5V, I _D = 20A	-	-	4.5	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	1	-	2.5	V
R _G	Gate Resistance	V _{GS} = 0V, f = 1MHz	-	5	-	Ω
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{GS} = 0V V _{DS} = 20V f = 1.0MHz	-	2942	-	pF
C _{OSS}	Output Capacitance		-	942	-	
C _{RSS}	Reverse Transfer Capacitance		-	42	-	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time *3	V _{DD} = 20V V _{GS} = 10V R _G = 3Ω I _D = 20A	-	4	-	ns
t _r	Turn-on Rise Time *3		-	5	-	
t _{d(OFF)}	Turn-Off Delay Time *3		-	35	-	
t _f	Turn-Off Fall Time *3		-	11	-	
Q _G	Total Gate-Charge	V _{DD} = 20V V _{GS} = 10V I _D = 30A	-	50	-	nC
Q _{GS}	Gate to Source Charge		-	8.3	-	
Q _{GD}	Gate to Drain (Miller) Charge		-	8.2	-	
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage *1	I _{SD} = 30A, V _{GS} = 0V	-	-	1.2	V
t _{rr}	Reverse Recovery Time	I _F = 30A, V _{GS} = 0V	-	63	-	ns
Q _{rr}	Reverse Recovery Charge	di/dt = 100A/μs	-	73	-	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 $V_{DD} = 30V, V_{GS} = 10V, L = 0.5mH$
- Guaranteed by design, not subject to production

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

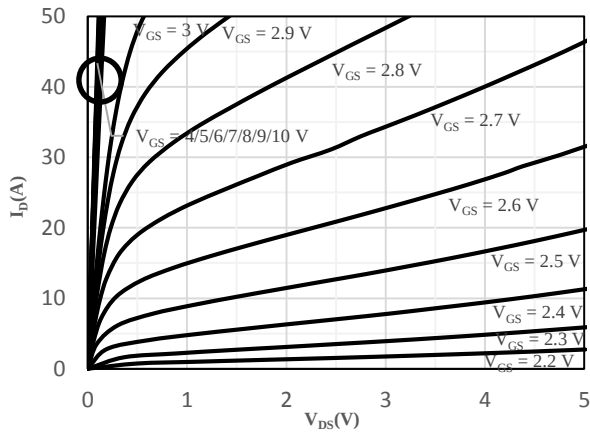


Fig 1 Typical Output Characteristics

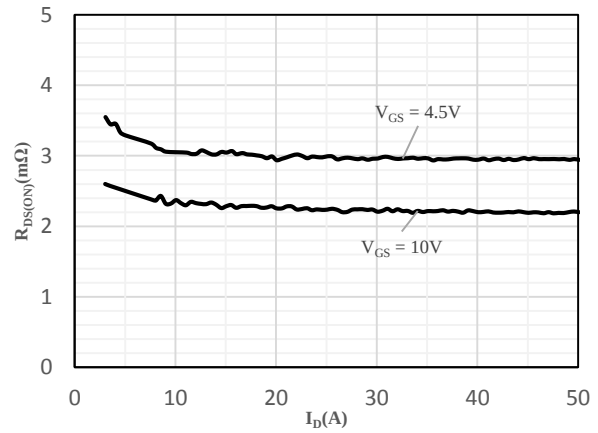


Fig 2 On-Resistance vs. Drain Current and Gate Voltage

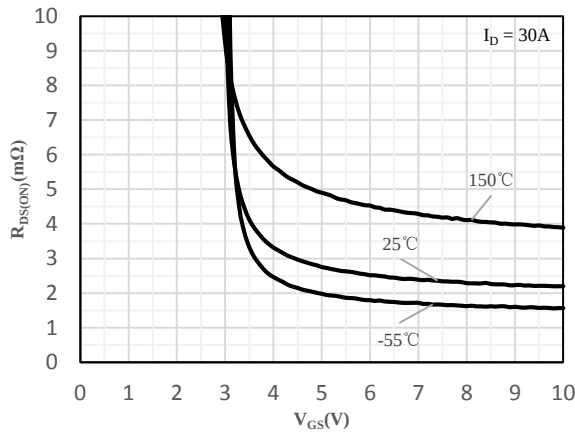


Fig 3 On-Resistance vs. Gate-Source Voltage

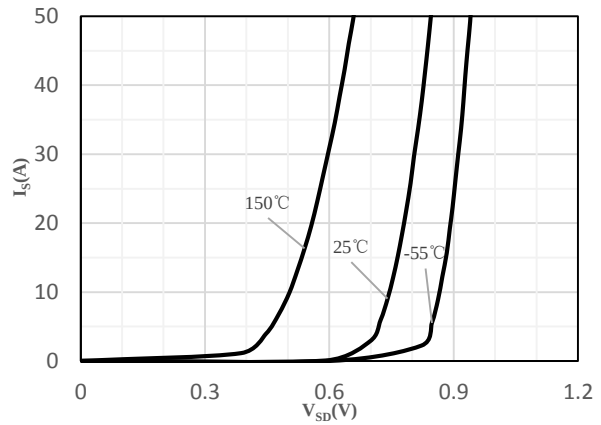


Fig 4 Body-Diode Characteristics

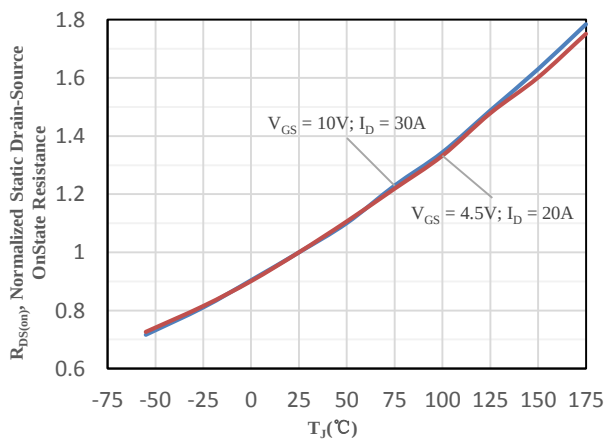


Fig 5 Normalized On-Resistance vs. Junction Temperature

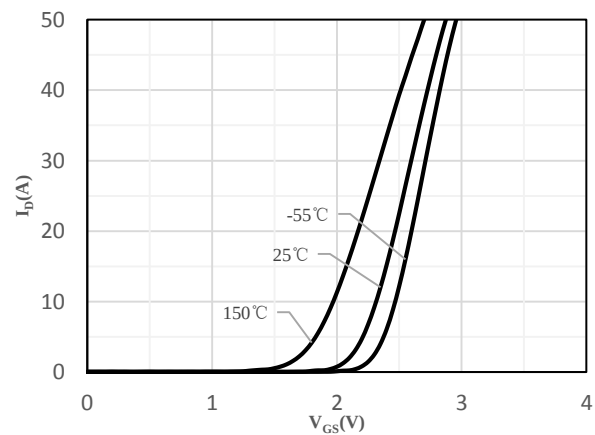


Fig 6 Transfer Characteristics

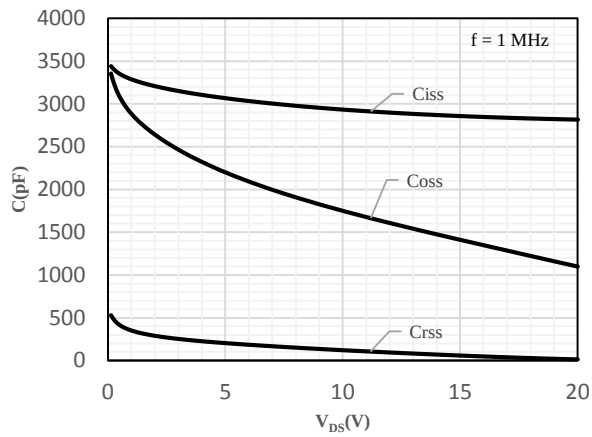


Fig 7 Capacitance Characteristics

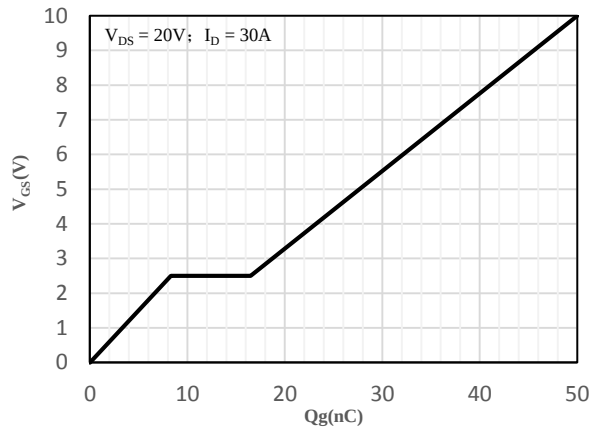


Fig 8 Gate-Charge Characteristics

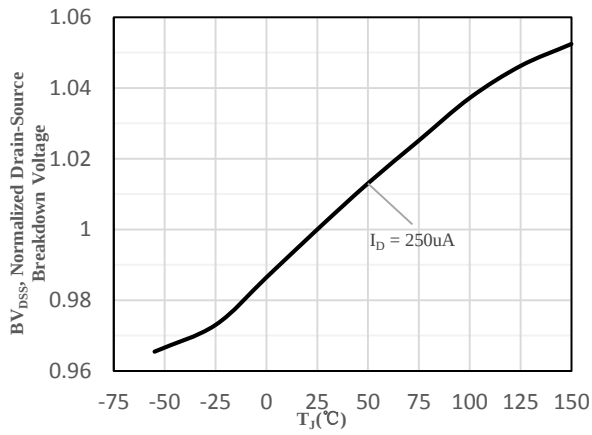


Fig 9 Normalized Breakdown Voltage
vs. Junction Temperature

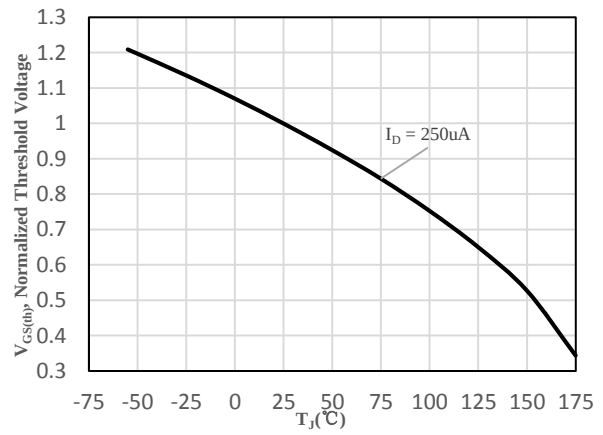
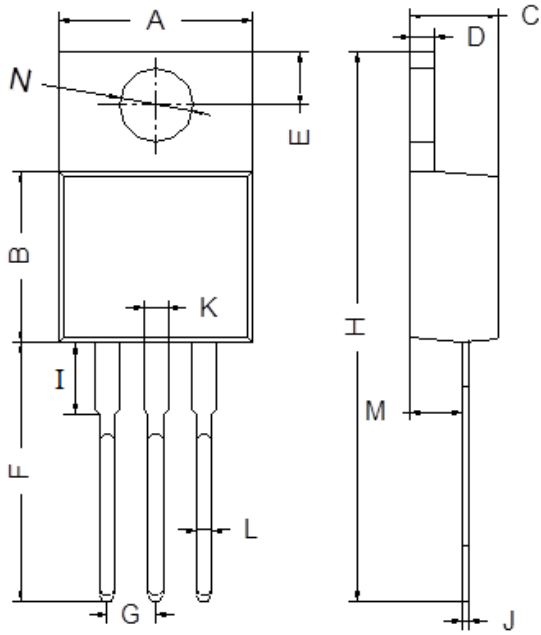
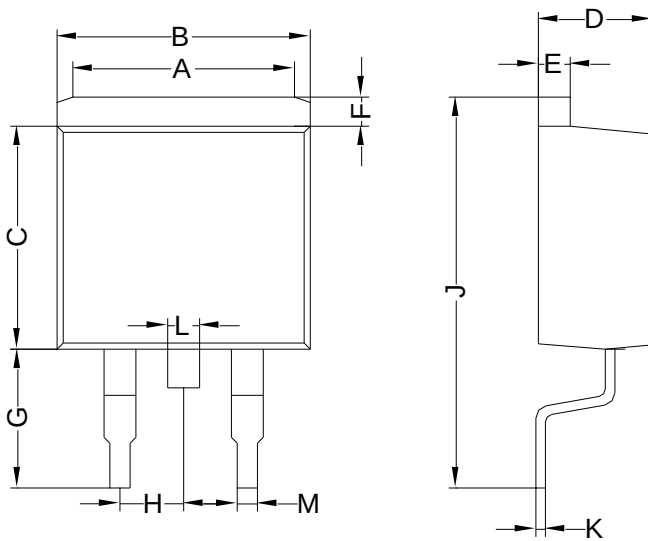


Fig 10 Normalized $V_{GS(th)}$ vs. Junction Temperature

Package Outline Dimensions (Unit: mm)



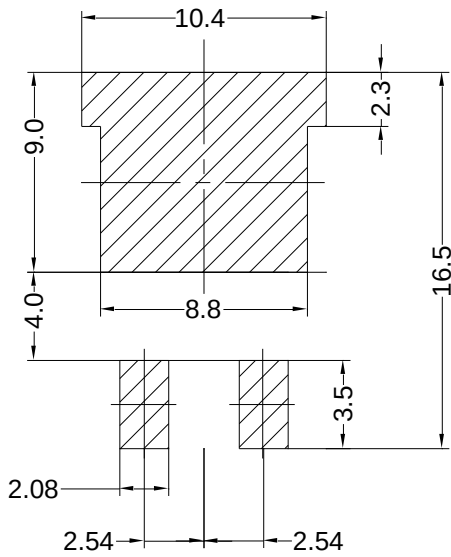
TO-220AB		
Dimension	Min.	Max.
A	9.80	10.30
B	8.70	9.10
C	4.37	4.77
D	1.07	1.47
E	2.64	2.84
F	13.14	13.74
G	2.44	2.64
H	28.03	28.83
I	3.50	4.00
J	0.28	0.48
K	1.22	1.32
L	0.71	0.91
M	2.40	2.60
N	3.76	3.96



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	5.34	5.74
H	2.44	2.64
J	15.30	15.90
K	0.28	0.48
L	1.17	1.37
M	0.71	0.91

Mounting Pad Layout (Unit: mm)

TO-263



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