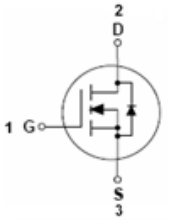
N-Channel Enhancement Mode MOSFET

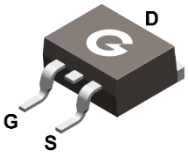
BL038N06THB

Features

HF

- Super low gate charge
- 100% E_{AS} guaranteed
- Excellent Cdv/dt effect decline
- Advanced high cell density Trench technology
- JESD22-A114-B ESD rating of class 1C per human body model





TO-263

Mechanical Data

- Case: TO-263
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matted-Tin plated; Solderable Per MIL-STD-202, Method 208

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
BL038N06THB	TO-263	50 pcs / Tube & 800 pcs / Tape & Reel	038N06THB

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

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DSS}	60	V
Gate-to-Source Voltage	V_{GSS}	±20	V
Continuous Drain Current (T_C = 25°C, Package limited)	I_D	100	A
Continuous Drain Current (T_C = 25°C, Silicon limited)		191	A
Continuous Drain Current (T_C = 100°C, Silicon limited)		100	A
Pulsed Drain Current (t_p = 10μs, T_C = 25°C)	I_{DM}	400	A
Single Pulse Avalanche Energy *4	E_{AS}	140	mJ
Power Dissipation (T_C = 25°C)	P_D	250	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	$R_{\theta JC}$	-	0.5	0.8	°C/W
Thermal Resistance Junction-to-Air *1	$R_{\theta JA}$	-	-	30	°C/W
Thermal Resistance Junction-to-Air *2		-	-	52	°C/W

Electrical Characteristics (@ T_A = 25°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	60	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 48V, 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 *3	V_{GS} = 10V, I_D = 60A	-	3.2	3.8	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	2	2.6	4	V
R_G	Gate Resistance	V_{DS} = V_{GS} = 0V, f = 1MHz	-	1	-	Ω
Dynamic Characteristics						
C_{ISS}	Input Capacitance	V_{GS} = 0V V_{DS} = 15V f = 1MHz	-	4646	-	pF
C_{OSS}	Output Capacitance		-	1540	-	
C_{RSS}	Reverse Transfer Capacitance		-	55	-	
Switching Characteristics						
$t_{d(ON)}$	Turn-on Delay Time *5	V_{DD} = 30V V_{GS} = 10V R_G = 3Ω I_D = 100A	-	14	-	ns
t_r	Turn-on Rise Time *5		-	96	-	
$t_{d(OFF)}$	Turn-Off Delay Time *5		-	40	-	
t_f	Turn-Off Fall Time *5		-	115	-	
Q_G	Total Gate-Charge	V_{DD} = 48V I_D = 45A V_{GS} = 10V	-	63	-	nC
Q_{GS}	Gate to Source Charge		-	20	-	
Q_{GD}	Gate to Drain (Miller) Charge		-	5.1	-	
Source-Drain Diode Characteristics						
V_{SD}	Diode Forward Voltage *3	I_{SD} = 1A, V_{GS} = 0V, T_J = 25°C	-	0.6	1.2	V
trr	Reverse Recovery Time	I_{SD} = 30A, V_{GS} = 30V dI/d_t = 100A/μs	-	53	-	ns
Qrr	Reverse Recovery Charge		-	74	-	nC

Notes:

1. The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper
2. The data tested by surface mounted on a minimum recommended FR-4 board
3. The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%
4. The E_{AS} data shows Max. rating. The test condition is V_{DD} = 50V, V_{GS} = 10V, L = 0.5mH
5. Guaranteed by design, not subject to production

Ratings and Characteristics Curves (@ T_A = 25°C unless otherwise specified)

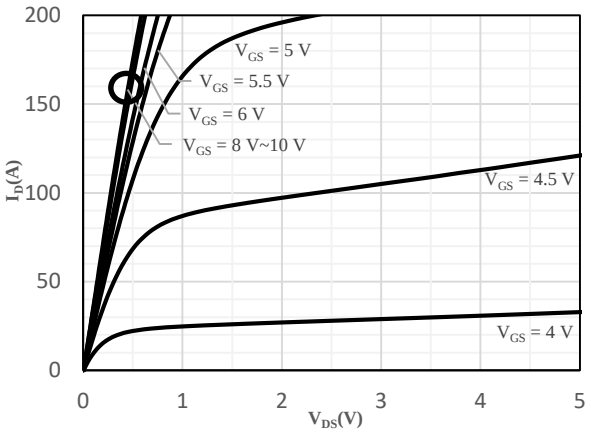


Fig 1 Typical Output Characteristics

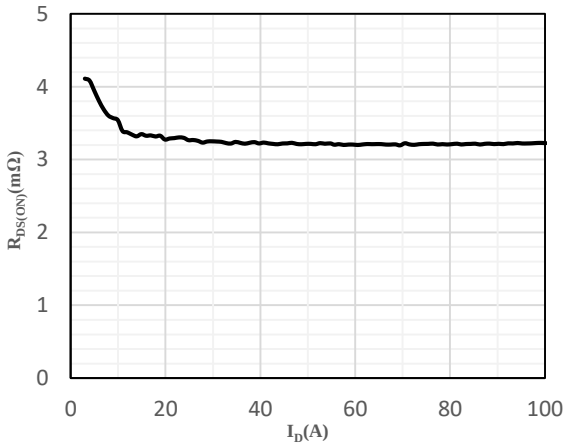


Fig 2 On-Resistance vs. Drain Current and Gate Voltage

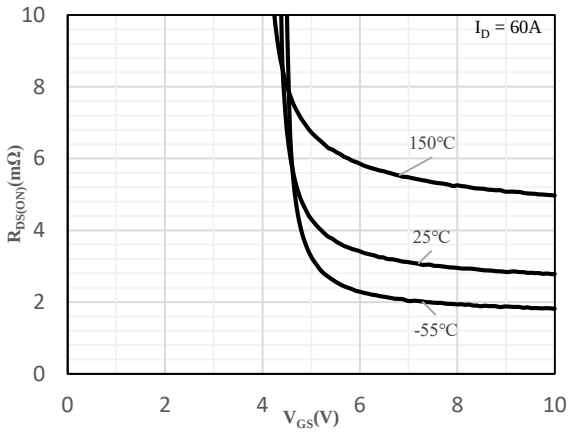


Fig 3 On-Resistance vs. Gate-Source Voltage

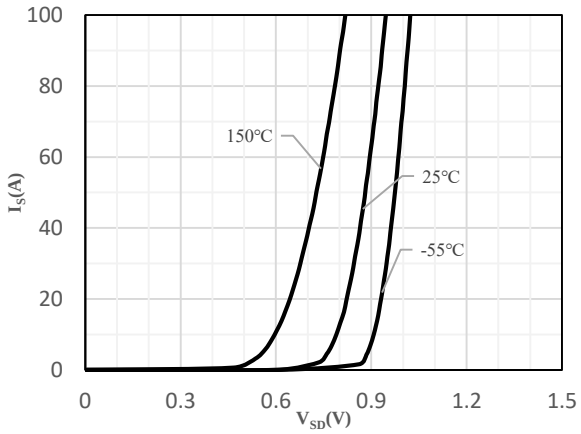


Fig 4 Body-Diode Characteristics

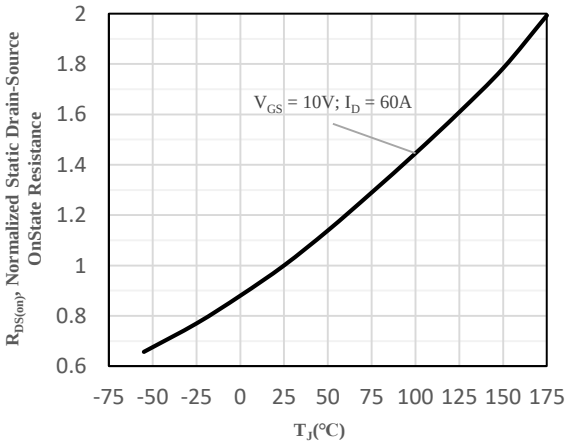


Fig 5 On-Resistance vs. Junction Temperature

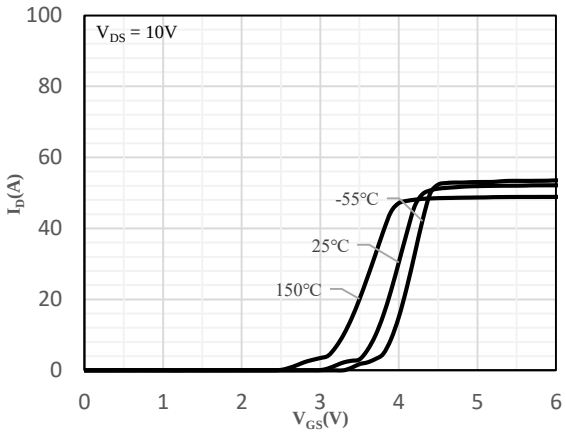


Fig 6 Transfer Characteristics

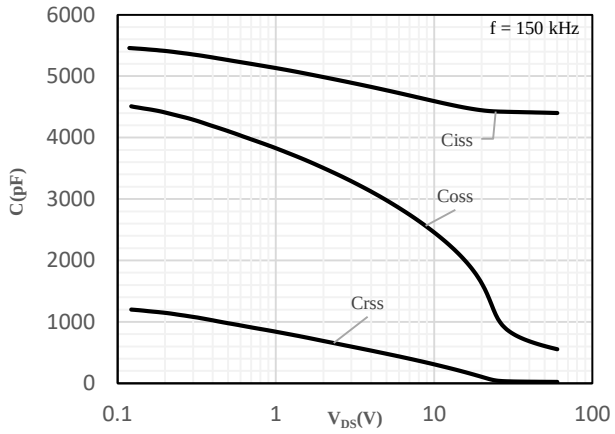


Fig 7 Capacitance Characteristics

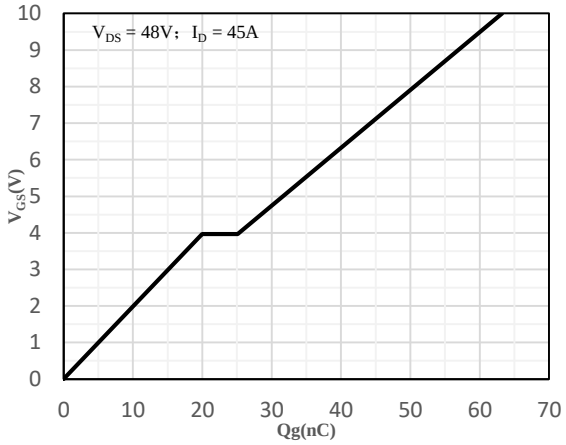


Fig 8 Gate-Charge Characteristics

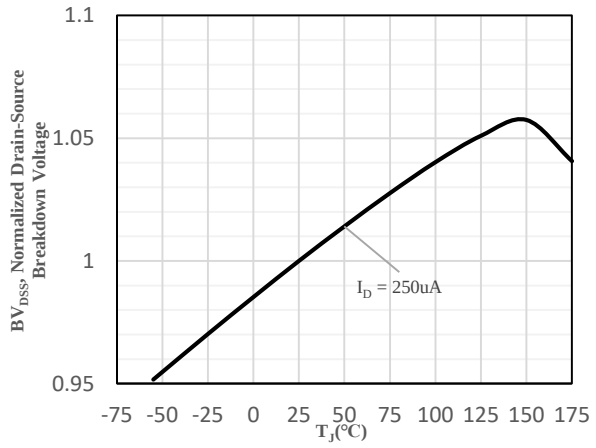


Fig 9 Breakdown Voltage vs. Junction Temperature

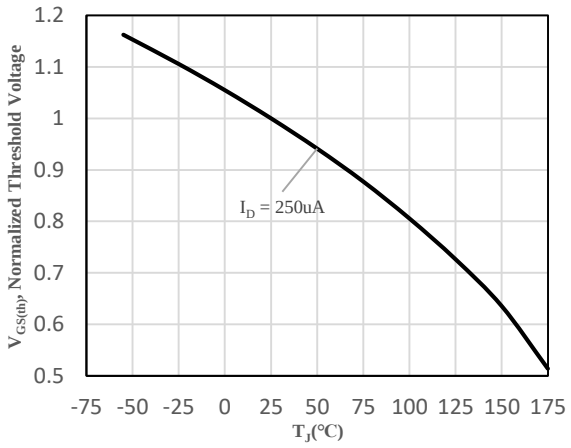


Fig 10 $V_{GS(th)}$ vs. Junction Temperature

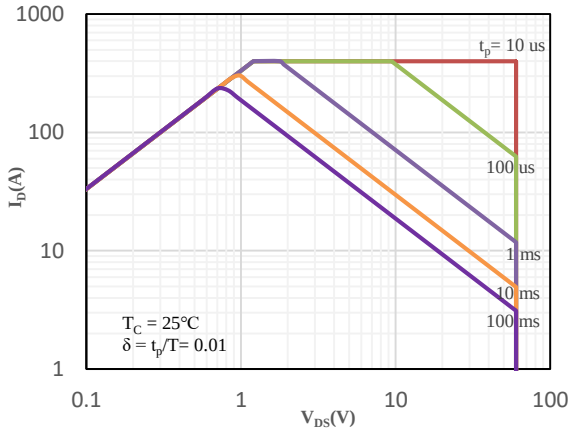


Fig 11 Safe Operation Area

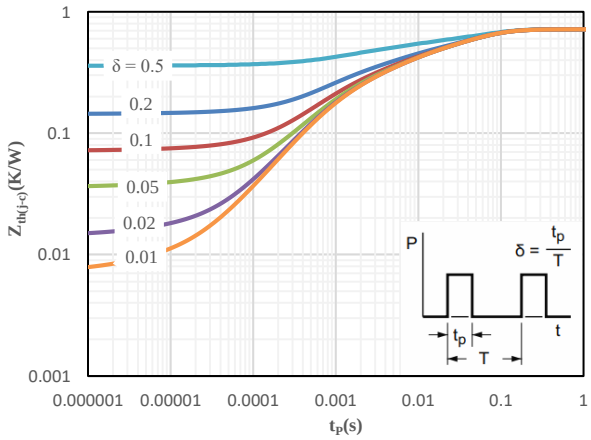
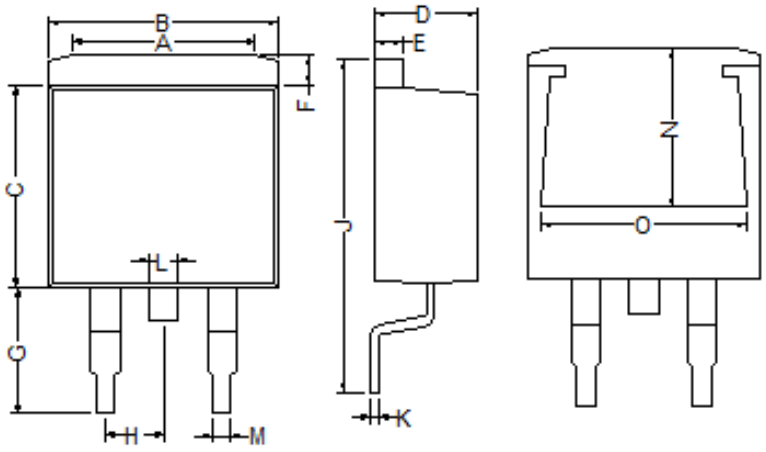


Fig 12 Maximum transient thermal impedance

Package Outline Dimensions (Unit: mm)



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