N-Channel Enhancement Mode MOSFET

BL045N10THB

Features

HF

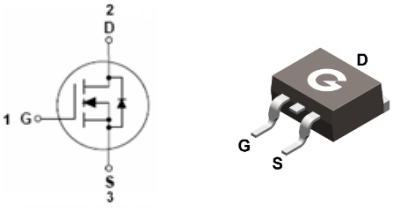
- N-channel, normal level
- Excellent FOM
- Very low on-resistance $R_{DS(on)}$
- Ideal for high-frequency switching and synchronous rectification
- Pb-free lead plating; RoHS compliant

Mechanical Data

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

Key performance parameters

Parameter	Value	Unit
V_{DS}	100	V
$R_{DS(on),\ max}$@10V	4.5	mΩ
$Q_{g,\ typ}$ @10V	105	nC



TO-263

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
BL045N10THB	TO-263	50 pcs / Tube & 800 pcs / Tape & Reel	045N10THB

Maximum Ratings (@ T_A = 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 (T_C = 25°C, Silicon limited) *1	I_D	110	A
Continuous Drain Current (T_C = 100°C, Silicon limited)		70	A
Pulsed Drain Current (t_p = 10μs)*1	I_{DM}	645	A
Single Pulse Avalanche Energy *4	E_{AS}	560	mJ

Thermal Characteristics

Parameter	Symbol	Value	Unit
Power Dissipation (T_C = 25°C)	P_D	178	W
Thermal Resistance Junction-to-Air *2	$R_{\theta JA}$	62	°C/W
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	0.7	°C/W
Operating Junction Temperature Range	T_J	-55 ~ +150	°C
Storage Temperature Range	T_{STG}	-55 ~ +150	°C

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 = 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
$R_{DS(ON)}$	Static Drain-Source On-resistance *2	V_{GS} = 10V,I_D = 100A	-	3.5	4.5	mΩ
		V_{GS} = 6V,I_D = 50A	-	5	7.4	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 150μA	2	2.9	4	V
R_G	Gate resistance	-	-	2.6	-	Ω
Dynamic Characteristics						
C_{ISS}	Input Capacitance	V_{GS} = 0V V_{DS} = 50V f = 1.0MHz	-	6998	8410	pF
C_{OSS}	Output Capacitance		-	892	1610	
C_{RSS}	Reverse Transfer Capacitance		-	40	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD} =50V V_{GS} = 10V R_G = 1.6Ω I_D = 50A	-	35	-	ns
t_r	Turn-on Rise Time		-	18	-	
$t_{d(OFF)}$	Turn-Off Delay Time		-	45	-	
t_f	Turn-Off Fall Time		-	55	-	
Gate charge characteristics						
Q_G	Total Gate-Charge	V_{DD} = 50V I_D = 100A V_{GS} = 10V	-	105	-	nC
Q_{GS}	Gate to Source Charge		-	36.1	-	
Q_{GD}	Gate to Drain (Miller) Charge		-	24.6	-	
Source-Drain Diode Characteristics						
V_{SD}	Diode Forward Voltage *3	I_{SD} = 10A, V_{GS} = 0V	-	1.0	1.2	V
I_{SD}	Diode Continuous Forward Current *5	T_C = 25°C	-	-	137	A
$I_{SD, pulse}$	Diode Pulse current	T_C = 25°C	-	-	548	A
t_{rr}	Reverse recovery time	V_R =50V I_F = 30A, di/dt=100A/us,	-	155	-	ns
Q_{rr}	Reverse recovery charge		-	390	-	nC
I_{RRM}	Reverse recovery current		-	4.7	-	A

Notes:

1. See fig.11
2. The data tested by surface mounted on 1 inch^2 FR-4 board with 2OZ copper
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 = 1mH
5. The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation

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

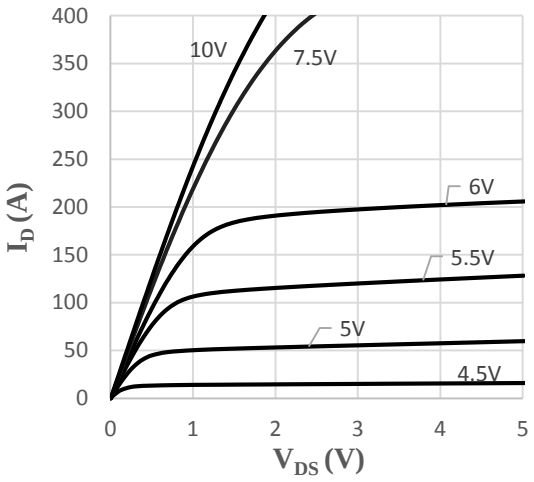


Fig 1 Typical Output Characteristics

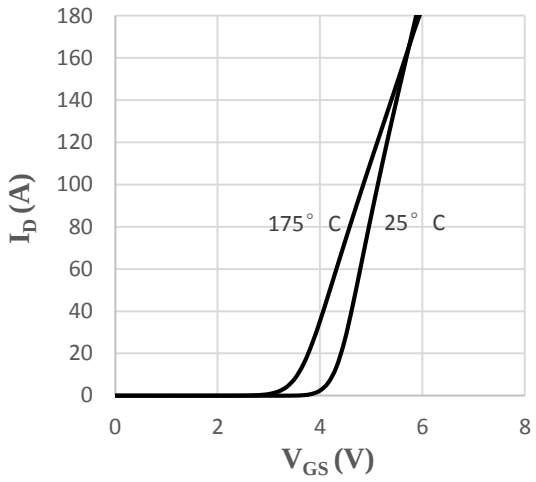


Fig 2 Transfer Characteristics

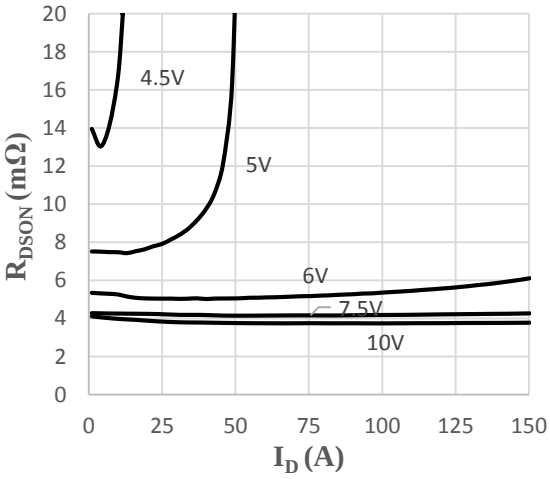


Fig 3 Drian-source on resistance

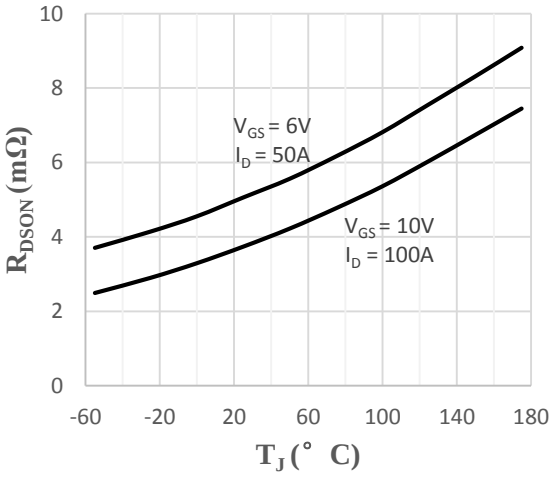


Fig 4 On-Resistance vs. Junction Temperature

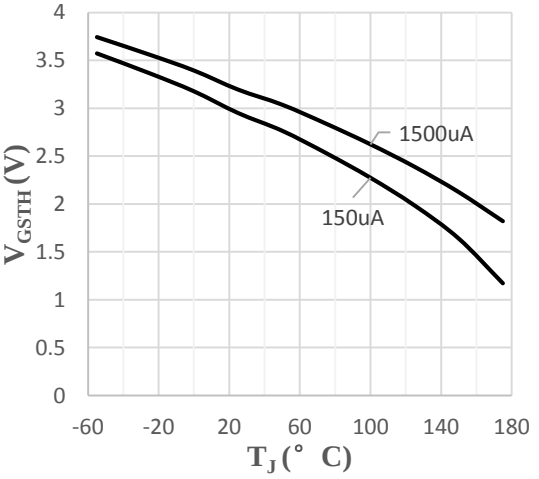


Fig 5 Gate Voltage vs. Junction Temp

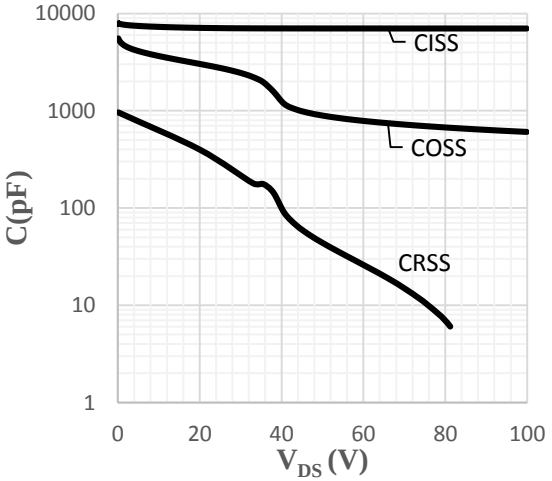


Fig 6 Capacitance Characteristics

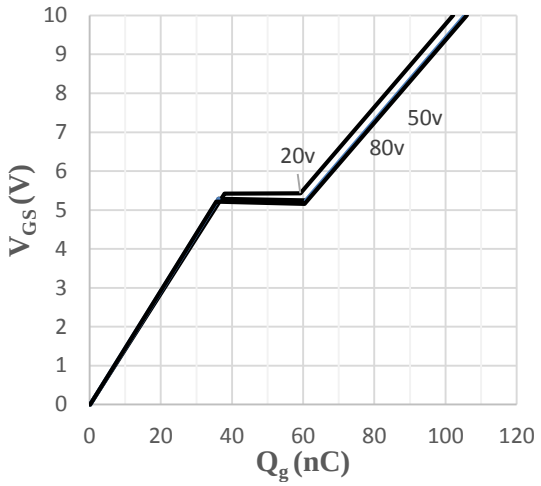


Fig 7 Gate-Charge Characteristics

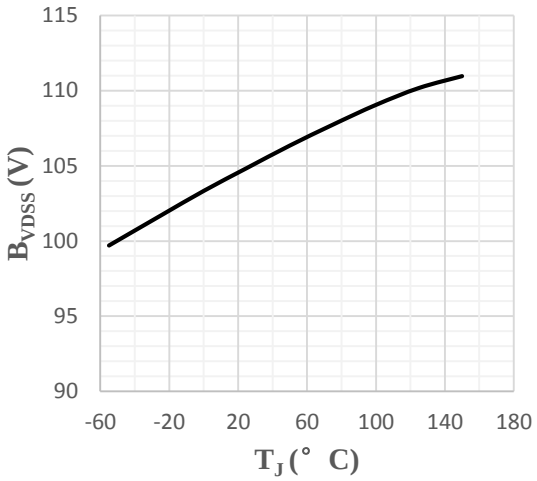


Fig 8 Drain-Source breakdown voltage

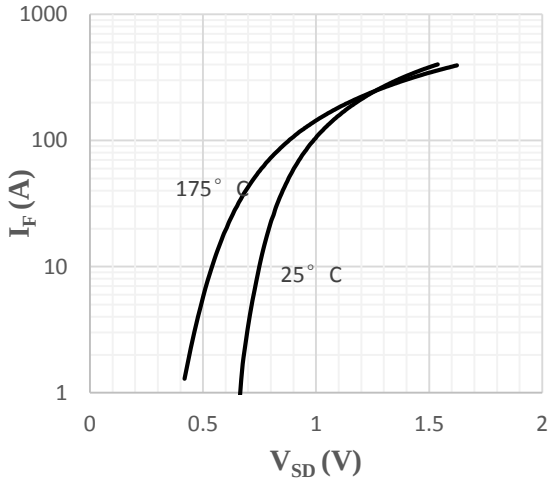


Fig 9 Forward characteristics of reverse diode

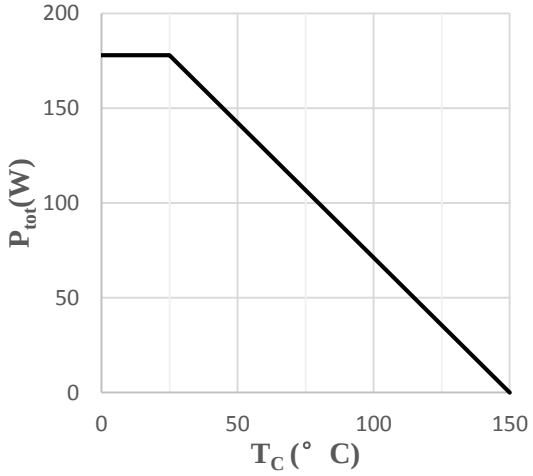


Fig 10 Power dissipation

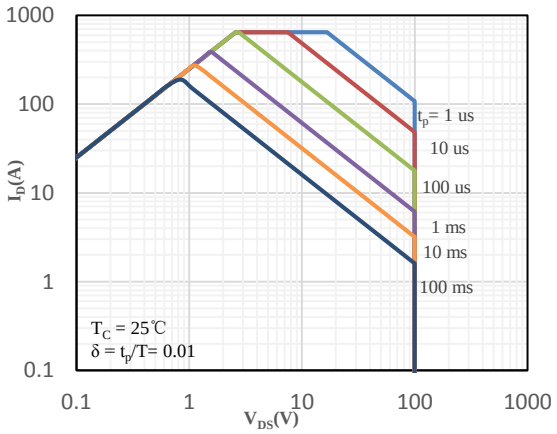


Fig 11 Safe operating area

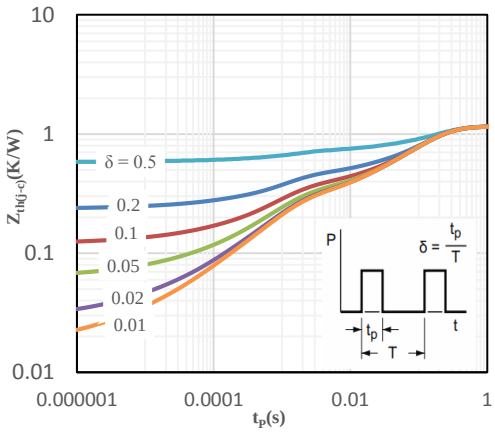
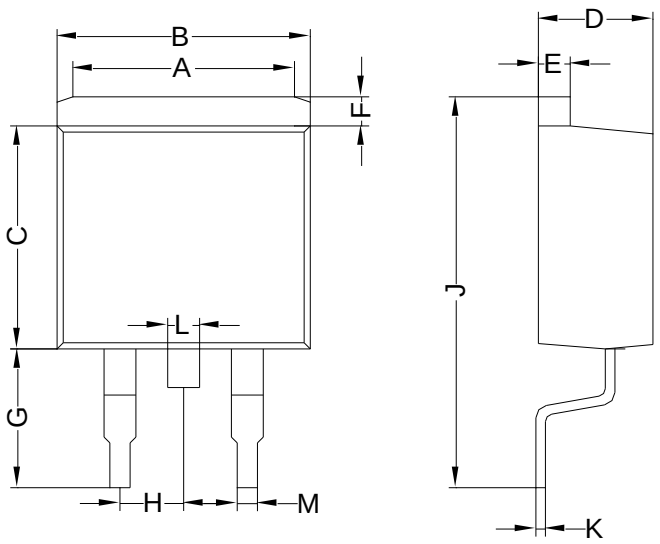


Fig 12 transient thermal impedance

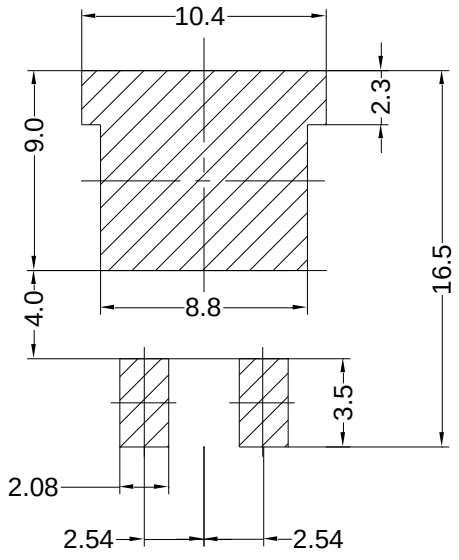
Package Outline Dimensions (Unit: mm)



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	5.34	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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