N-Channel Enhancement Mode MOSFET

BL027N04TD

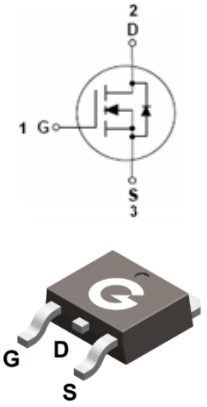
Features

HF

- Super low $R_{DS(on)}$ and gate charge
- Advanced shielded-gate technology
- Green device available
- Excellent c_{dV} / d_t effect decline
- JESD22-A114-B ESD rating of class 1B per human body model

Mechanical Data

- Case: TO-252
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208



TO-252

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
BL027N04TD	TO-252	80 pcs / Tube & 2500 pcs / Tape & Reel	027N04TD

Maximum Ratings (@ T_A = 25°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°C, Silicon Limited)	I_D	160	A
Continuous Drain Current (T_C = 100°C)		110	A
Continuous Drain Current (T_A = 25°C) *1		32	A
Continuous Drain Current (T_A = 100°C) *1		22	A
Pulsed Drain Current (t_p = 10μs, T_C = 25°C)	I_{DM}	640	A
Single Pulse Avalanche Energy *3	E_{AS}	102	mJ
Power Dissipation (T_C = 25°C)	P_D	150	W
Operating Junction Temperature Range	T_J	-55 ~ +175	°C
Storage Temperature Range	T_{STG}	-55 ~ +175	°C

Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	-	0.81	1	°C/W
Thermal Resistance Junction-to-Air *1	$R_{\theta JA}$	-	20	30	°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	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						
$R_{DS(ON)}$	Static Drain-Source On-resistance *2	V_{GS} = 10V, I_D = 30A	-	2.2	2.7	mΩ
		V_{GS} = 4.5V, I_D = 30A	-	3.0	3.6	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	1	1.6	2.5	V
R_G	Gate Resistance	V_{GS} = 0V, f = 1MHz	-	2.2	-	Ω
Dynamic Characteristics						
C_{ISS}	Input Capacitance	V_{GS} = 0V V_{DS} = 20V f = 1.0MHz	-	2815	-	pF
C_{OSS}	Output Capacitance		-	1100	-	
C_{RSS}	Reverse Transfer Capacitance		-	13	-	
Switching Characteristics						
$t_{d(ON)}$	Turn-on Delay Time	V_{DD} = 20V V_{GS} = 10V R_G = 3Ω I_D = 20A	-	4	-	ns
t_r	Turn-on Rise Time		-	5	-	
$t_{d(OFF)}$	Turn-Off Delay Time		-	35	-	
t_f	Turn-Off Fall Time		-	11	-	
Q_G	Total Gate-Charge	V_{DD} = 20V V_{GS} = 10V I_D = 20A	-	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 *2	I_{SD} = 1A, V_{GS} = 0V	-	0.6	1.2	V
trr	Reverse Recovery Time	I_F = 20A, V_{GS} = 0V di/dt = 100A/μs	-	63	-	ns
Qrr	Reverse Recovery Charge		-	73	-	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 pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%
3. The E_{AS} data shows Max. rating. The test condition is V_{DD} = 30V, V_{GS} = 10V, L = 0.1mH
4. Guaranteed by design, not subject to production

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

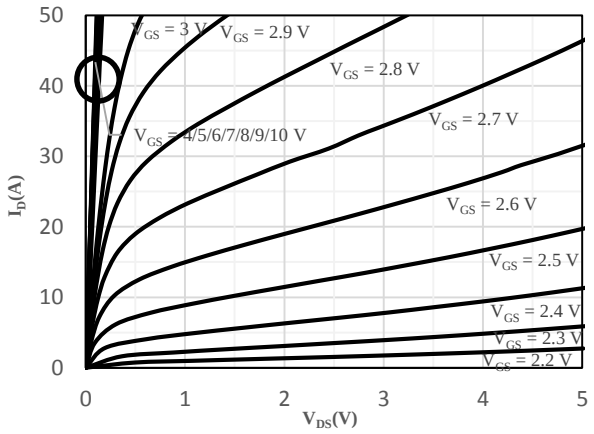


Fig 1 Typical Output Characteristics

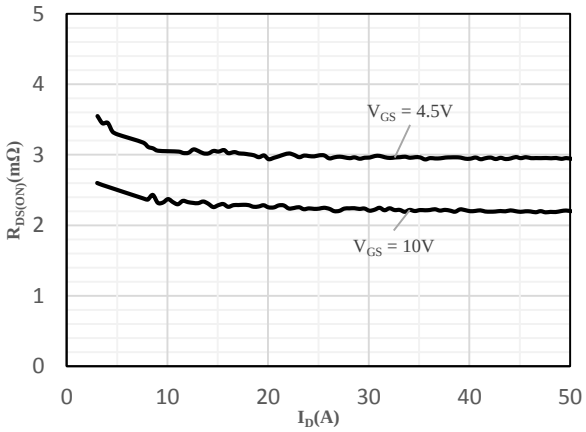


Fig 2 On-Resistance vs. Drain Current and Gate Voltage

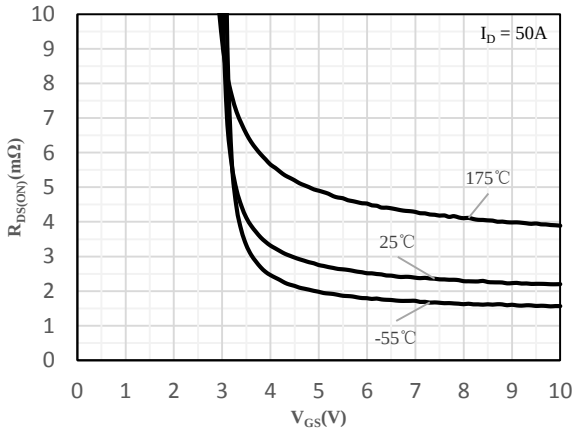


Fig 3 On-Resistance vs. Gate-Source Voltage

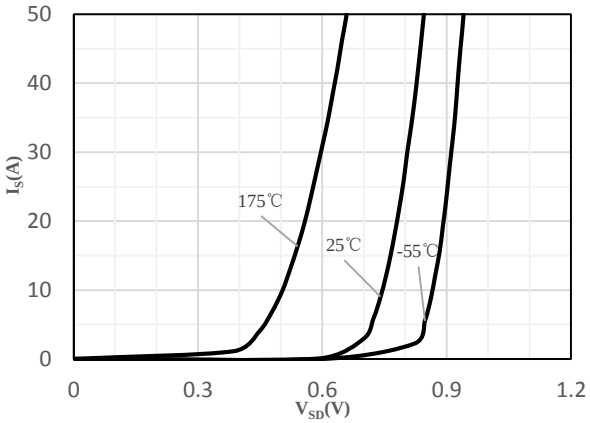


Fig 4 Body-Diode Characteristics

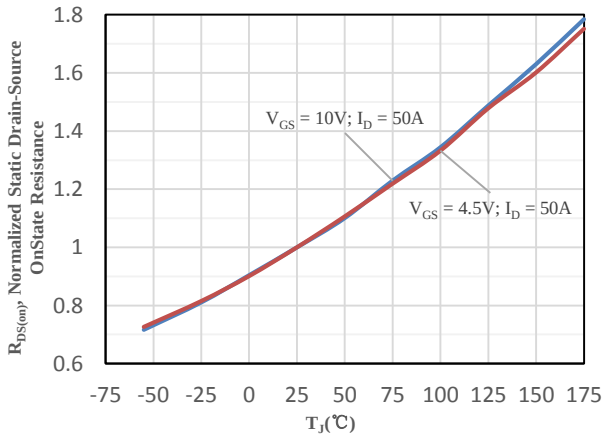


Fig 5 Normalized On-Resistance vs. Junction Temperature

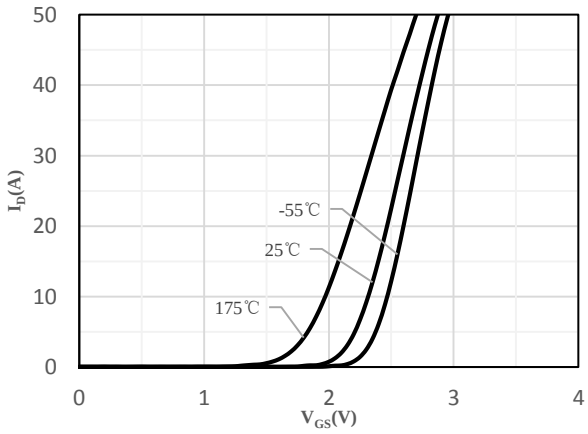


Fig 6 Transfer Characteristics

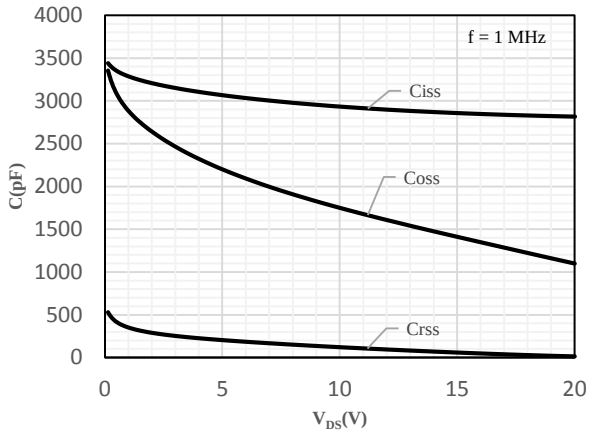


Fig 7 Capacitance Characteristics

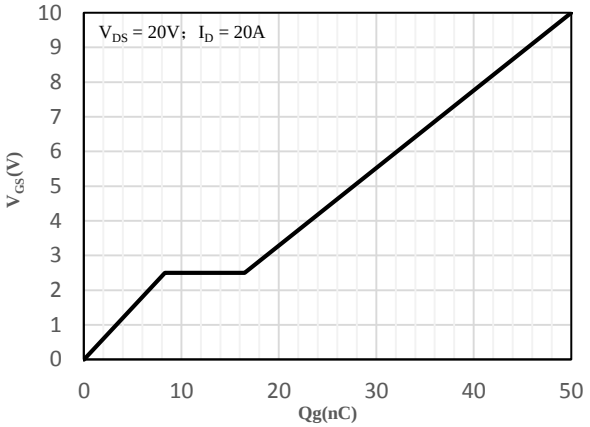


Fig 8 Gate-Charge Characteristics

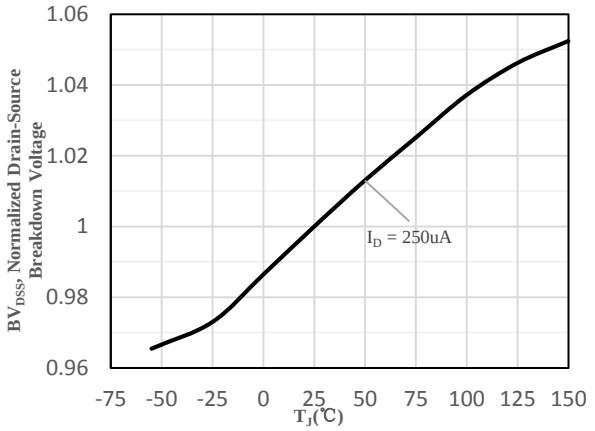


Fig 9 Normalized Breakdown Voltage vs. Junction Temperature

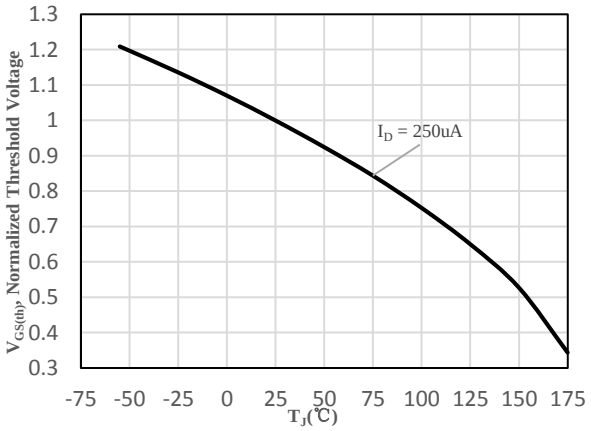


Fig 10 Normalized $V_{GS(th)}$ vs. Junction Temperature

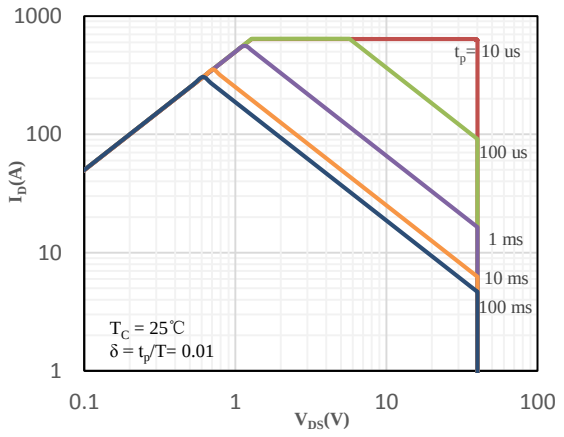


Fig 11 Safe Operation Area

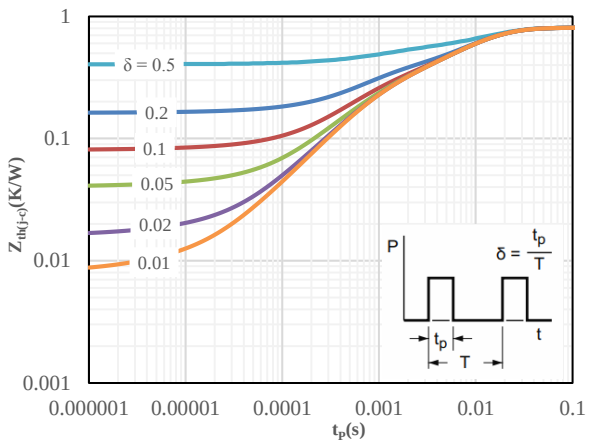
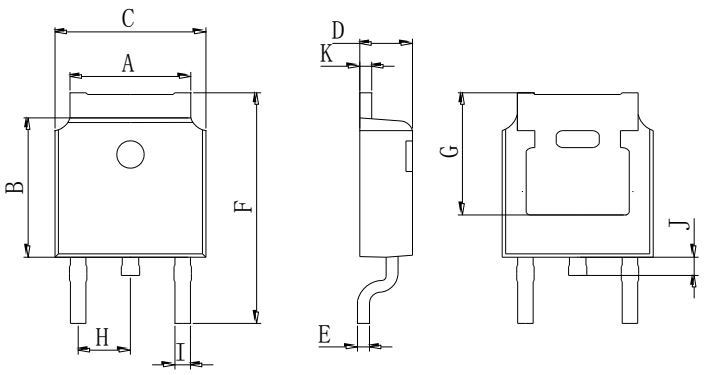


Fig 12 Maximum transient thermal impedance

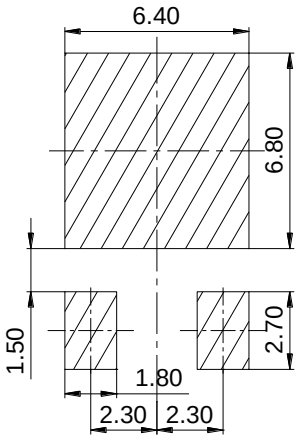
Package Outline Dimensions (Unit: mm)



TO-252		
Dimension	**Min.**	**Max.**
A	5.05	5.65
B	5.80	6.40
C	6.25	6.85
D	2.20	2.40
E	0.40	0.60
F	9.71	10.31
G	5.05	5.65
H	2.10	2.50
I	0.70	0.90
J	0.50	0.70
K	0.40	0.60

Mounting Pad Layout (Unit: mm)

TO-252



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