

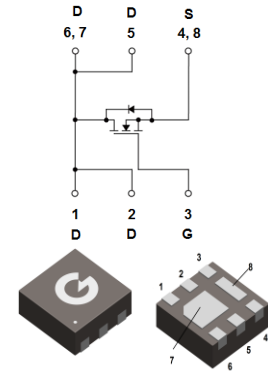
Features

- Advanced Shielded-Gate Trench technology
- Low on-resistance
- Fast switching speed
- Low thermal resistance

HF

Mechanical Data

- Case: DFN2020-6L
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208



DFN2020-6L

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
BL090N04TDF1	DFN2020-6L	3000 pcs / Tape & Reel	090N04T

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)	I _D	30	A
Continuous Drain Current (T _A = 25°C) *1		12	A
Continuous Drain Current (T _A = 100°C) *1		7.6	A
Pulsed Drain Current (t _p = 10μs, T _A = 25°C)	I _{DM}	80	A
Single Pulse Avalanche Energy *3	E _{AS}	15	mJ
Power Dissipation (T _C = 25°C)	P _D	13	W
Power Dissipation (T _A = 25°C) *1		2	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 _{θJC}	-	-	9	°C/W
Thermal Resistance Junction-to-Air *1	R _{θJA}	-	-	62	°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 *2	V _{GS} = 10V, I _D = 12A	-	7	9	mΩ
		V _{GS} = 4.5V, I _D = 10A	-	12	16	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	1	1.7	2.5	V
R _G	Gate Resistance	V _{GS} = 0V, f = 1MHz	-	3.3	-	Ω
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{GS} = 0V	-	650	-	pF
C _{OSS}	Output Capacitance	V _{DS} = 20V	-	120	-	
C _{RSS}	Reverse Transfer Capacitance	f = 1.0MHz	-	113	-	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time	V _{DD} = 30V	-	11	-	ns
t _r	Turn-on Rise Time	V _{GS} = 15V	-	61	-	
t _{d(OFF)}	Turn-Off Delay Time	I _D = 20A	-	30	-	
t _f	Turn-Off Fall Time	R _G = 3.3Ω	-	13	-	
Q _G	Total Gate-Charge	V _{DD} = 20V	-	9.8	-	nC
Q _{GS}	Gate to Source Charge	V _{GS} = 4.5V	-	1.8	-	
Q _{GD}	Gate to Drain (Miller) Charge	I _D = 12A	-	5.8	-	
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage *2	I _{SD} = 1A, V _{GS} = 0V	-	0.7	1	V
t _{rr}	Reverse Recovery Time	I _{SD} = 15A, V _{GS} = 0V	-	21	-	nS
Q _{rr}	Reverse Recovery Charge	dI/dt = 100A/μs	-	8.3	-	nC

Notes:

1. Surface mounted on a 1 inch² FR-4 board with 20Z copper
2. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
3. The E_{AS} data shows Max. rating. The test condition is $V_{DD} = 25V, V_{GS} = 10V, L = 0.1mH$

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

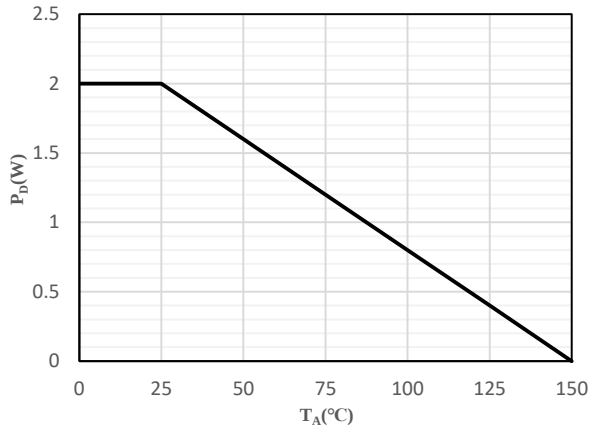


Fig 1 Power Dissipation

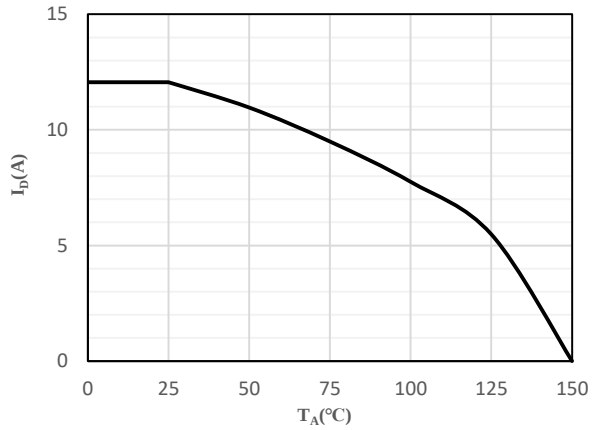


Fig 2 Drain Current

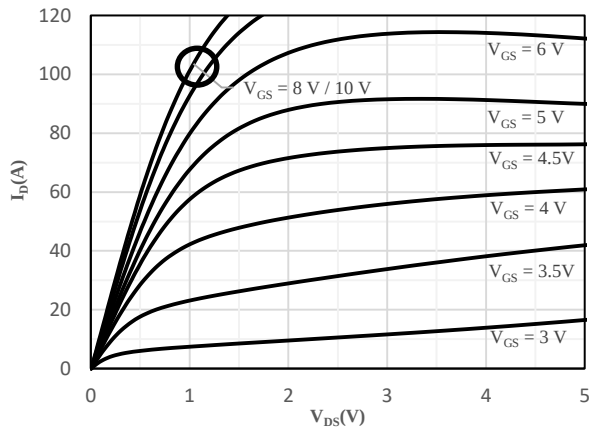


Fig 3 Typical Output Characteristics

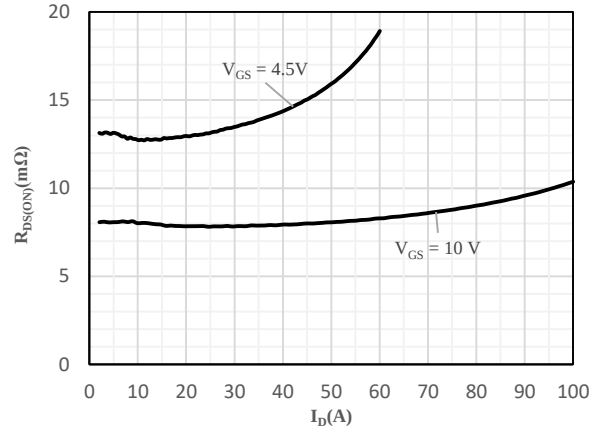


Fig 4 On-Resistance vs. Drain Current
and Gate Voltage

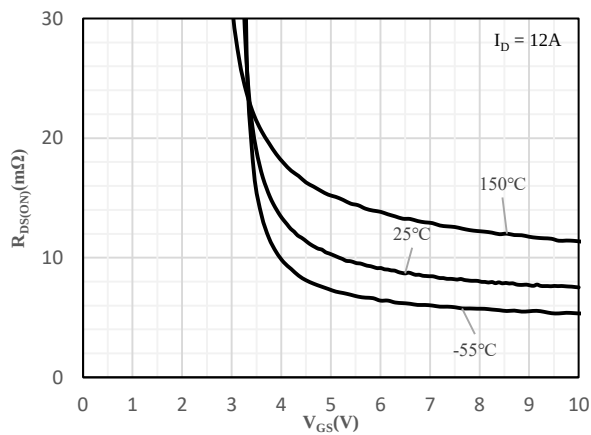


Fig 5 On-Resistance vs. Gate-Source Voltage

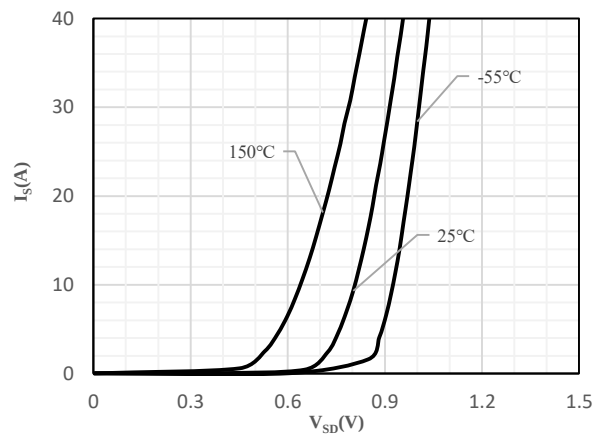


Fig 6 Body-Diode Characteristics

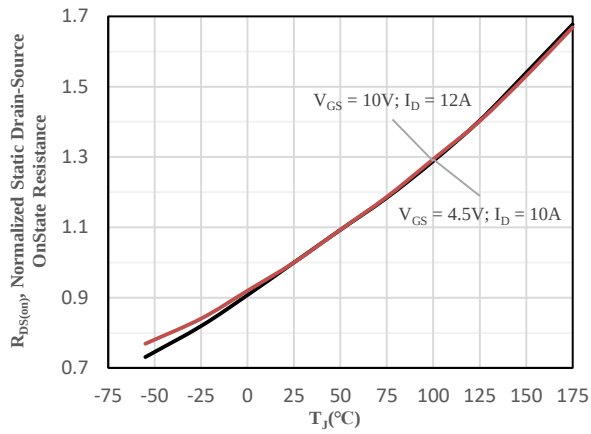


Fig 7 Normalized On-Resistance vs. Junction Temperature

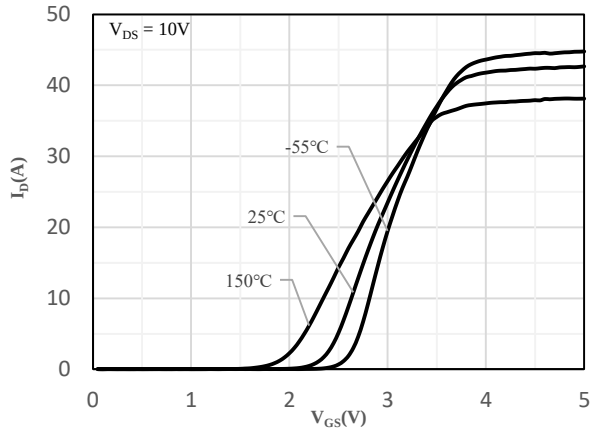


Fig 8 Transfer Characteristics

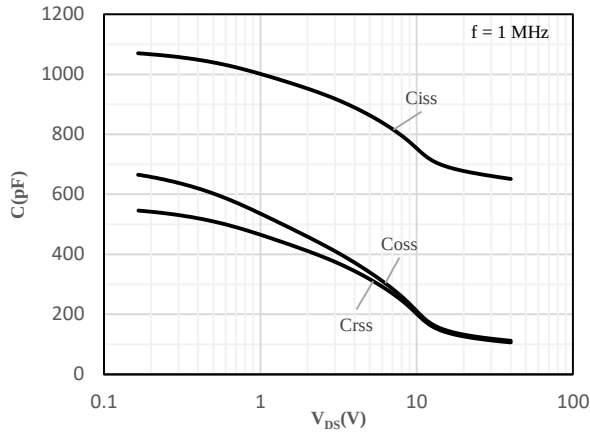


Fig 9 Capacitance Characteristics

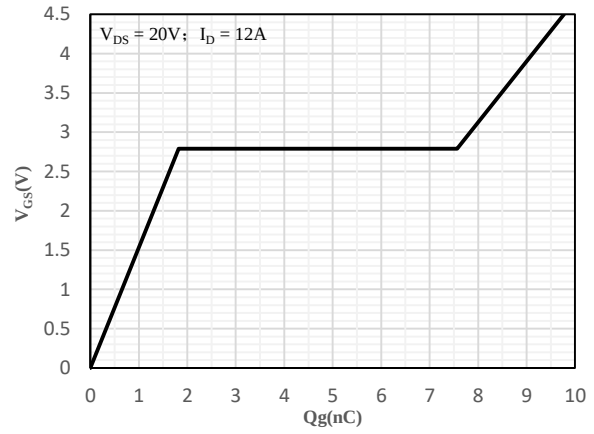


Fig 10 Gate-Charge Characteristics

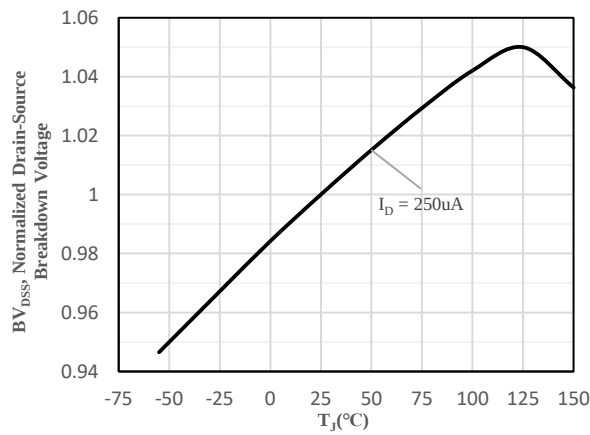


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

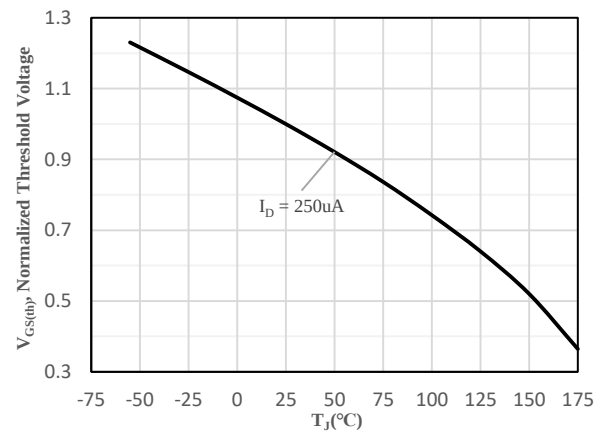
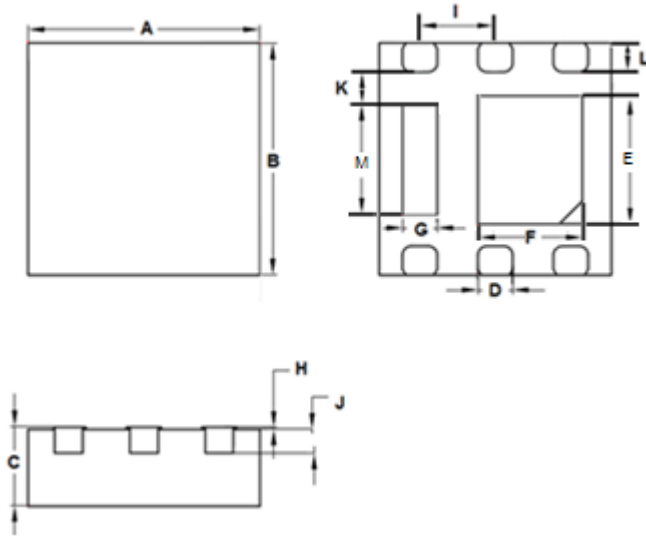


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature

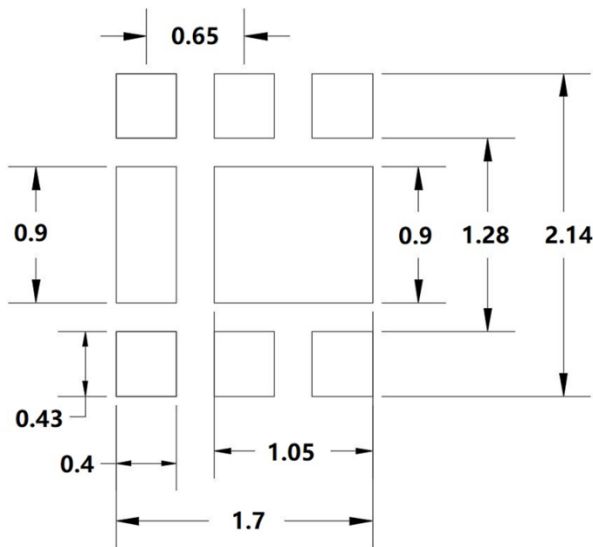
Package Outline Dimensions (Unit: mm)



DFN2020-6L		
Dimension	Min.	Max.
A	1.924	2.076
B	1.924	2.076
C	0.500	0.600
D	0.250	0.350
E	0.900	1.100
F	0.850	1.050
G	0.200	0.400
H	0.000	0.050
I	0.550	0.750
J	0.103	0.303
K	0.150	0.350
L	0.200	0.400
M	0.700	0.900

Mounting Pad Layout (Unit: mm)

DFN2020-6L



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