

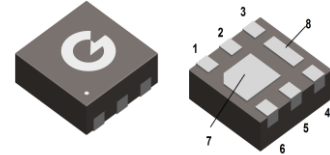
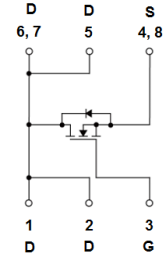
Features

- Lower $R_{DS(on)}$
- Good stability and uniformity
- Halogen free
- Qualified to AEC-Q101 standards for high reliability

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
TBL250N04DF1	DFN2020-6L	3000 pcs / Tape & Reel	250N04

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

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DS}	40	V
Gate-to-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_C = 25^\circ\text{C}$)	I_D	16	A
Continuous Drain Current ($T_A = 25^\circ\text{C}$) *1		6.4	A
Continuous Drain Current ($T_A = 100^\circ\text{C}$) *1		4	A
Pulsed Drain Current ($t_p = 10\mu\text{s}$, $T_A = 25^\circ\text{C}$)	I_{DM}	64	A
Single Pulse Avalanche Energy *3	E_{AS}	30	mJ
Power Dissipation ($T_C = 25^\circ\text{C}$)	P_D	12.5	W
Power Dissipation ($T_A = 25^\circ\text{C}$) *1		2	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	$R_{\theta JC}$	-	-	10	$^\circ\text{C/W}$
Thermal Resistance Junction-to-Air *1	$R_{\theta JA}$	-	52	62	$^\circ\text{C/W}$

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
V _{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)}	Drain-Source On-resistance *2	V _{GS} = 10V, I _D = 8A	-	17	25	mΩ
		V _{GS} = 4.5V, I _D = 5A	-	21	30	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	1	1.4	2.5	V
R _G	Gate Resistance	V _{GS} = 0V, f = 1MHz	-	4.5	-	Ω
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{GS} = 0V	-	732	-	pF
C _{OSS}	Output Capacitance	V _{DS} = 20V	-	59	-	
C _{RSS}	Reverse Transfer Capacitance	f = 1.0MHz	-	46	-	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time *4	V _{DD} = 20V, V _{GS} = 10V R _G = 3Ω, R _L = 1Ω I _D = 8A	-	10	-	ns
t _r	Turn-on Rise Time *4		-	12	-	
t _{d(OFF)}	Turn-Off Delay Time *4		-	32	-	
t _f	Turn-Off Fall Time *4		-	8	-	
Q _G	Total Gate-Charge	V _{DD} = 20V	-	16.7	-	nC
Q _{GS}	Gate to Source Charge	V _{GS} = 10V	-	2.6	-	
Q _{GD}	Gate to Drain (Miller) Charge	I _D = 5A	-	2.5	-	
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage *2	I _{SD} = 8A, V _{GS} = 0V	-	0.8	1.2	V
t _{rr}	Reverse Recovery Time	I _F = 8A, V _{GS} = 0V	-	17	-	ns
Q _{rr}	Reverse Recovery Charge	dI _F /dt = 100A/us	-	6.2	-	nC

Notes:

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ 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 $V_{DD} = 20V, V_{GS} = 10V, L = 10mH$
4. Guaranteed by design, not subject to production

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

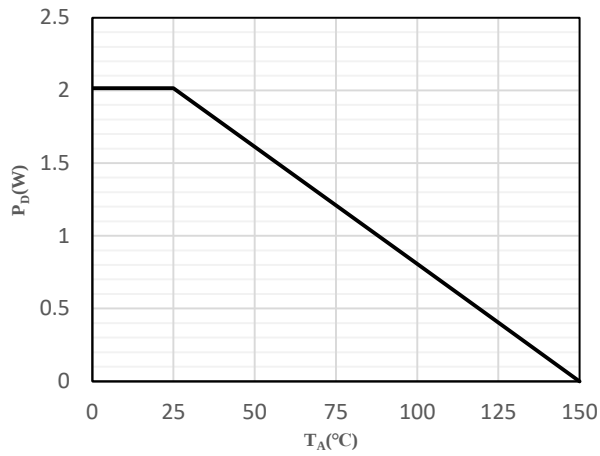


Fig 1 Power Dissipation

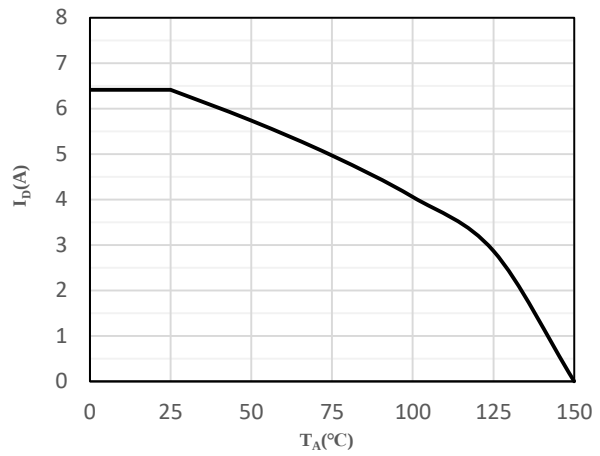


Fig 2 Drain Current

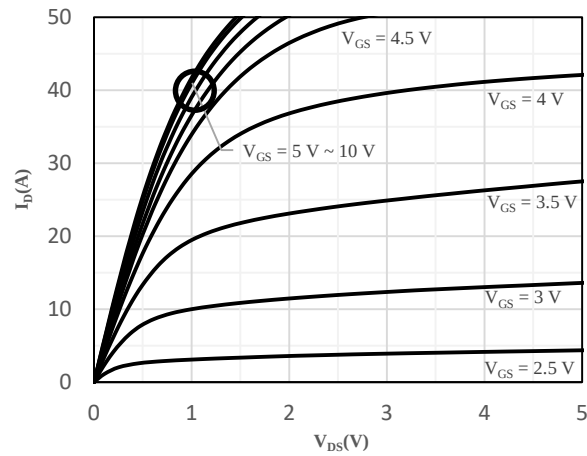


Fig 3 Typical Output Characteristics

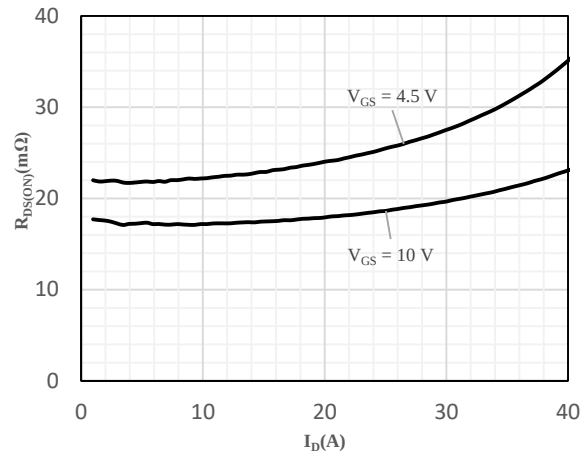


Fig 4 On-Resistance vs. Drain Current and Gate Voltage

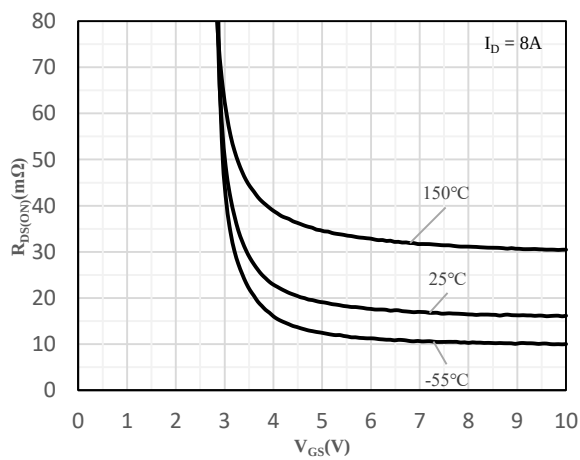


Fig 5 On-Resistance vs. Gate-Source Voltage

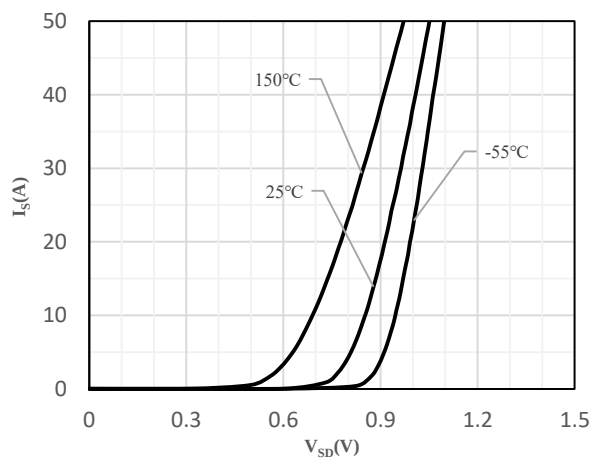


Fig 6 Body-Diode Characteristics

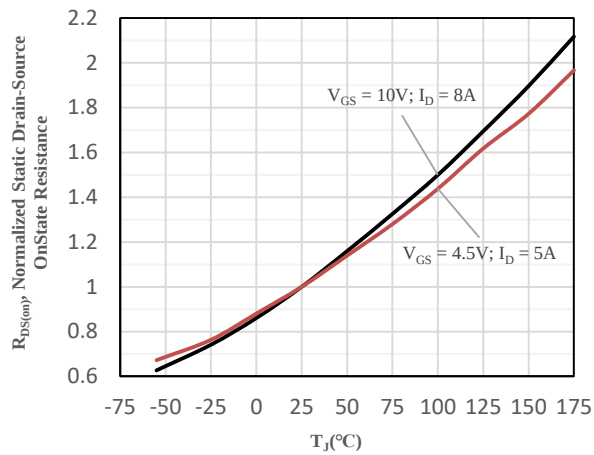


Fig 7 Normalized On-Resistance vs. Junction Temperature

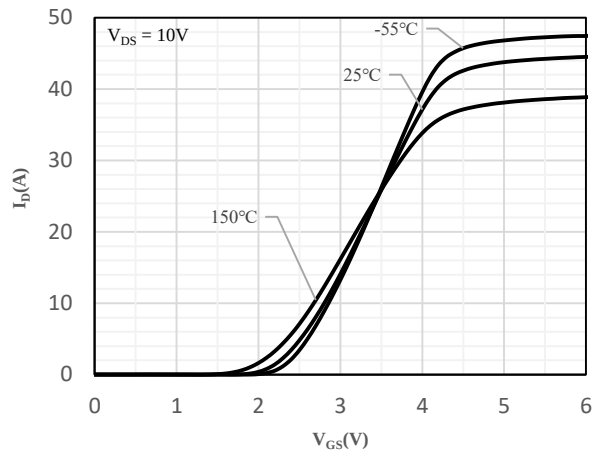


Fig 8 Transfer Characteristics

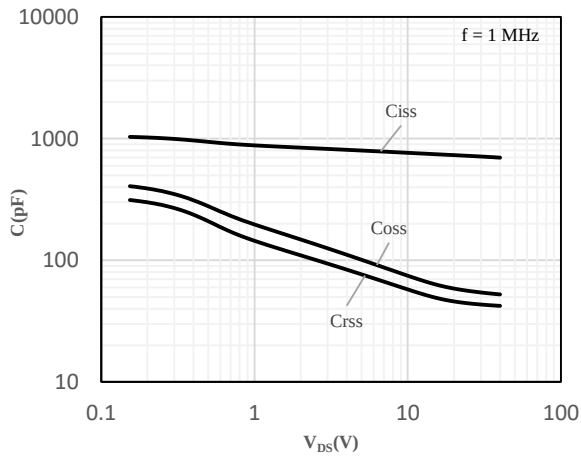


Fig 9 Capacitance Characteristics

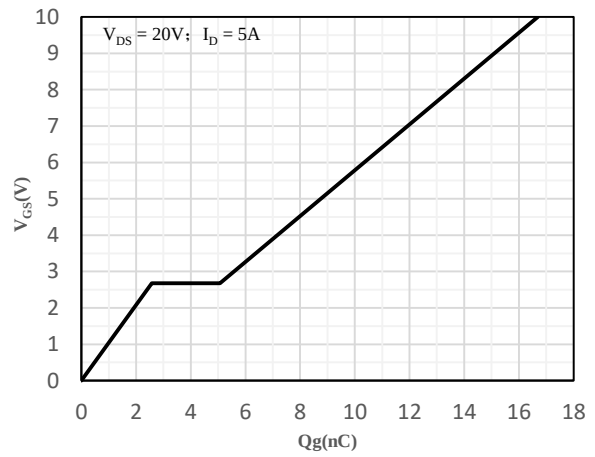


Fig 10 Gate-Charge Characteristics

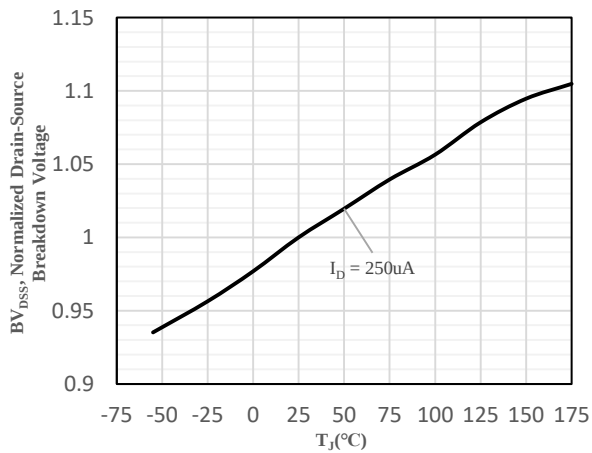


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

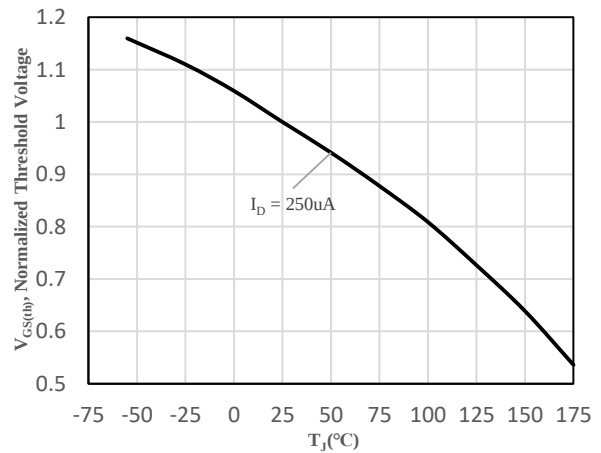
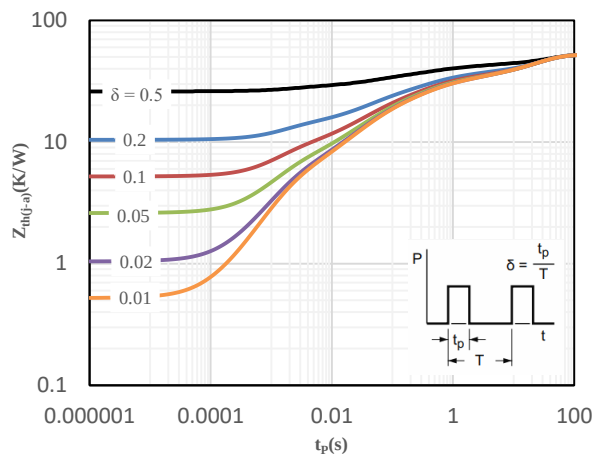
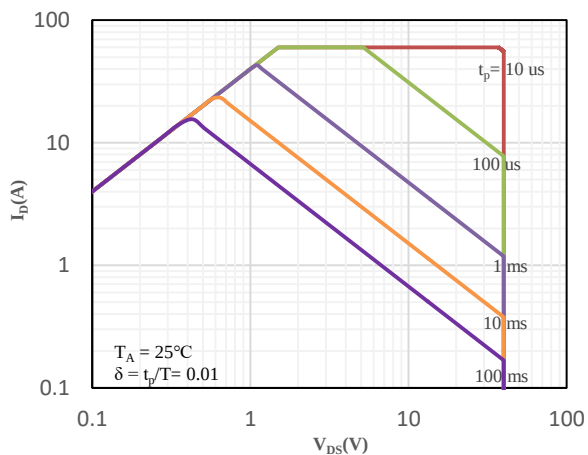
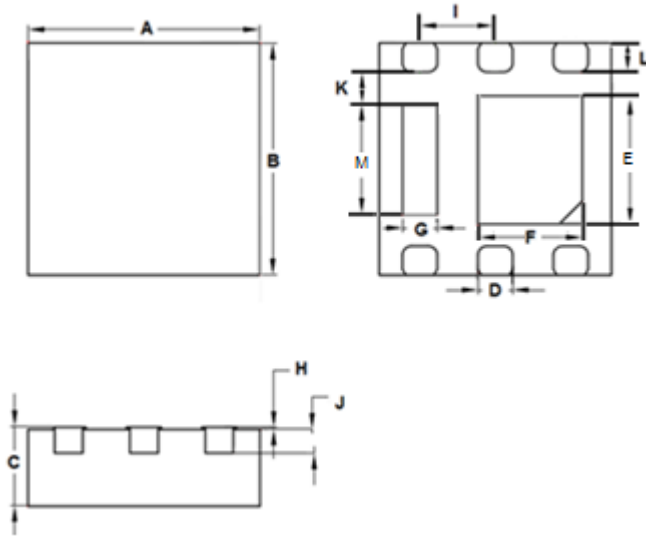


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature



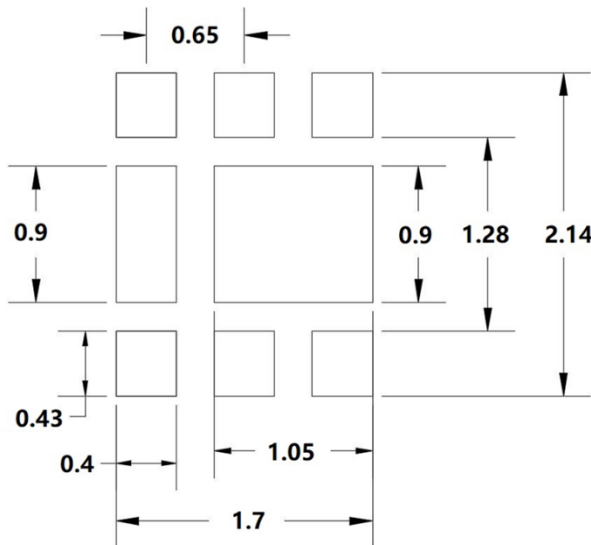
Package Outline Dimensions (Unit: mm)



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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