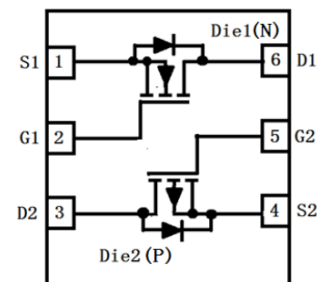
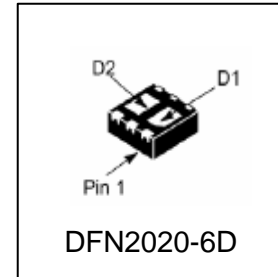


S-LNP2010DT2AG

20 V Complementary Trench MOSFET

1. FEATURES

- P-Channel: $V_{DS} = -20V$
 $R_{DS(ON)}, V_{GS}@-4.5V, I_{DS}@-4.7A \leq 70m\Omega$
 $R_{DS(ON)}, V_{GS}@-2.5V, I_{DS}@-1.0A \leq 110m\Omega$
- N-Channel: $V_{DS} = 20V$
 $R_{DS(ON)}, V_{GS}@2.5V, I_{DS}@5.2A \leq 50m\Omega$
 $R_{DS(ON)}, V_{GS}@4.5V, I_{DS}@6A \leq 40m\Omega$
- We declare that the material of product compliance with RoHS requirements and Halogen Free.
- S- prefix for automotive and other applications requiring unique site and control change requirements; AEC-Q101 qualified and PPAP capable.



2. DEVICE MARKING AND ORDERING INFORMATION

Device	Marking	Shipping
S-LNP2010DT2AG	T2	4000/Tape&Reel

3. MAXIMUM RATINGS($T_a = 25^\circ C$)

Parameter (P-Channel)	Symbol	Limits	Unit
Drain–Source Voltage	V_{DS}	-20	V
Gate–to–Source Voltage – Continuous	V_{GS}	± 12	V
Drain Current			
– Continuous $T_A = 25^\circ C$	I_D	-4.7	A
– Pulsed(Note 1)	I_{DM}	-20	
Avalanche Current	I_{AS}	9.9	A
Avalanche energy($L=0.1mH$)	E_{AS}	4.9	mJ

Parameter (N-Channel)	Symbol	Limits	Unit
Drain–Source Voltage	V_{DS}	20	V
Gate–to–Source Voltage – Continuous	V_{GS}	± 12	V
Drain Current			
– Continuous $T_A = 25^\circ C$	I_D	6	A
– Pulsed(Note 1)	I_{DM}	33	
Avalanche Current	I_{AS}	9.9	A
Avalanche energy($L=0.1mH$)	E_{AS}	4.9	mJ

4. THERMAL CHARACTERISTICS

Parameter	Symbol	Limits	Unit
Maximum Power Dissipation(Note 2)	P_D	1.38	W
Thermal Resistance, Junction–to–Ambient	$R_{\theta JA}$	90	$^\circ C/W$
Junction–to–Case	$R_{\theta JC}$	65	$^\circ C/W$
Junction and Storage temperature	T_J, T_{stg}	$-55 \sim +150$	$^\circ C$

1. Repetitive Rating: Pulse width limited by the Maximum junction temperature.

2. 1-in² 2oz Cu PCB board

5. ELECTRICAL CHARACTERISTICS (Ta= 25°C)

P-Channel

Characteristic	Symbol	Min.	Typ.	Max.	Unit	
STATIC						
Drain–Source Breakdown Voltage (VGS = 0 V, ID = -250 μA)	VBRDSS	-20	-	-	V	
Gate Threshold Voltage (VDS = VGS, ID = -250 μA)	VGS(th)	-0.6	-0.85	-1.4	V	
Zero Gate Voltage Drain Current (VGS = 0, VDS = -20 V)	IDSS	-	-	-1	μA	
Gate-to–Source Leakage Current (VDS = 0 V, VGS = ±12 V)	IGSS	-	-	±100	nA	
Drain-to–Source On Resistance(Note 3) (VGS = -4.5 V, ID = -4.7 A) (VGS = -2.7 V, ID = -3.8 A) (VGS = -2.5 V, ID = -1.0 A)	RDS(on)	-	58 63 75	70 90 110	mΩ	
Forward Voltage (VGS = 0 V, ISD = -1.7 A)	VSD	-	-	-1.2	V	
DYNAMIC						
Total Gate Charge	(VGS = -10 V, VDS = -4.7 V, ID = -4.5 A)	Qg	-	13.9	20.8	nC
Gate-to–Source Gate Charge		Qgs	-	1.02	1.53	
Gate-to–Drain Charge		Qgd	-	1.94	2.9	
Turn-On Delay Time	(VDD = -10 V, RL = 10 Ω, ID = -1 A, VGEN = -4.5 V, RG = 6.2 Ω)	td(on)	-	16.5	-	ns
Rise Time		tr	-	23.4	-	
Turn-Off Delay Time		td(off)	-	66.5	-	
Fall Time		tf	-	33.3	-	
Input Capacitance (VDS = -8 V, VGS = 0 V, f = 1.0 MHz)		Ciss	-	751	-	pF
Output Capacitance (VDS = -8 V, VGS = 0 V, f = 1.0 MHz)		Coss	-	91	-	
Reverse Transfer Capacitance (VDS = -8 V, VGS = 0 V, f = 1.0 MHz)		Crss	-	84	-	

5. ELECTRICAL CHARACTERISTICS (Ta= 25°C)(Con.)

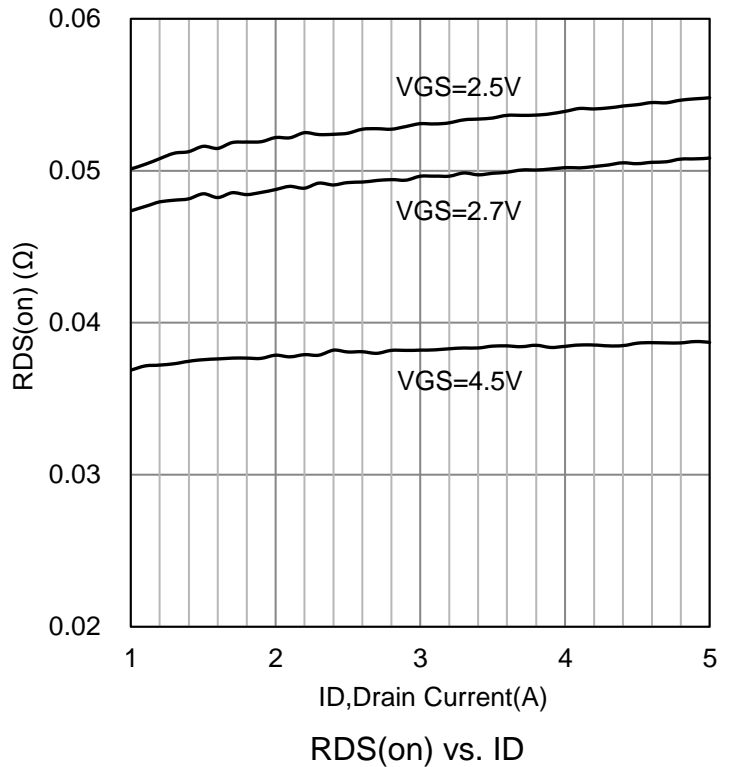
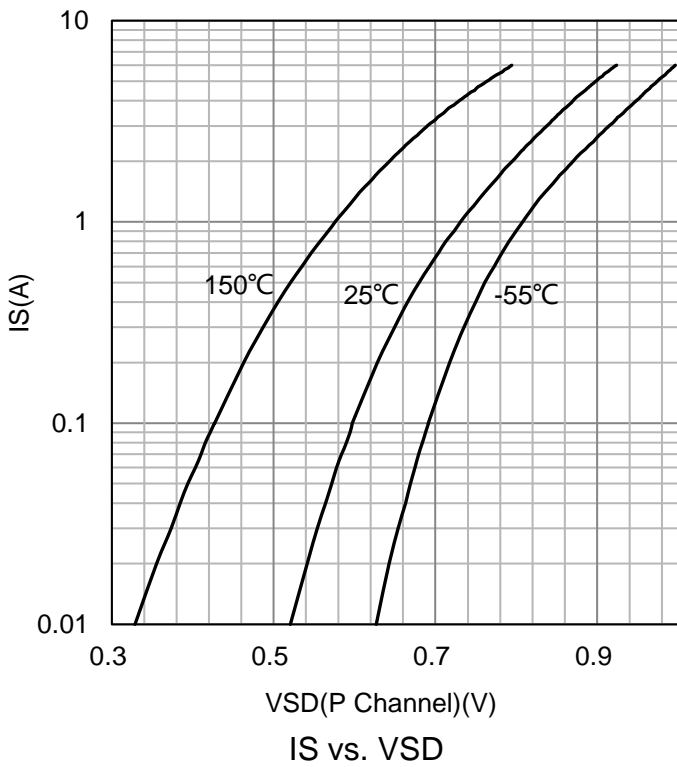
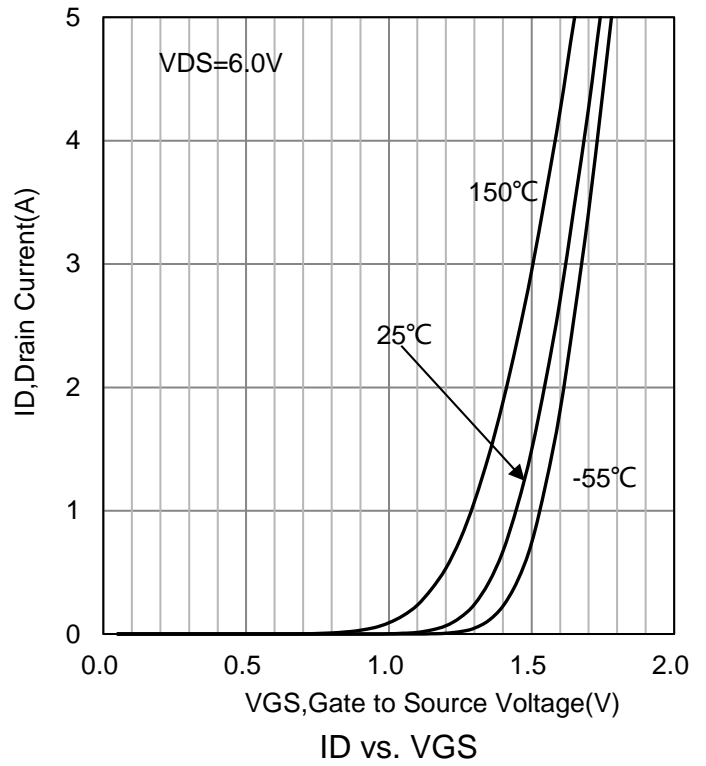
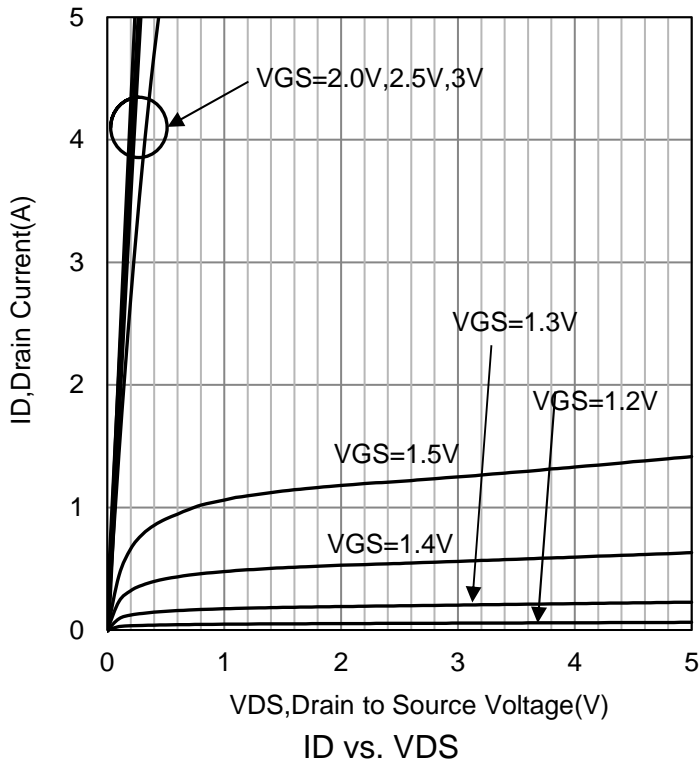
N-Channel

Characteristic	Symbol	Min.	Typ.	Max.	Unit	
Static						
Drain–Source Breakdown Voltage (VGS = 0 V, ID = 250 μA)	V(BR)DSS	20	-	-	V	
Drain-Source On-State Resistance(Note 3) (VGS = 2.5 V, ID= 5.2 A) (VGS = 4.5 V, ID = 6 A)	RDS(on)	- -	42 33	50 40	mΩ	
Gate Threshold Voltage (VDS = VGS, ID = 250 μA)	VGS(th)	0.5	-	1.2	V	
Zero Gate Voltage Drain Current (VDS= 20 V, VGS= 0 V)	IDSS	-	-	1	μA	
Gate Body Leakage (VDS = 0 V, VGS = ±12 V)	IGSS	-	-	±100	nA	
DYNAMIC						
Total Gate Charge	(VDS = 10V, ID = 6 A, VGS = 4.5 V)	Qg	-	6.8	10.2	nC
Gate-to–Source Gate Charge		Qgs	-	1	1.5	
Gate-to–Drain Charge		Qgd	-	2	3	
Turn-On Delay Time	(VDD = 10 V, ID = 1 A, VGS = 4.5 V, RG = 6.2Ω)	td(on)	-	10.8	-	ns
Rise Time		tr	-	15.3	-	
Turn-Off Delay Time		td(off)	-	76.7	-	
Fall Time		tf	-	23.8	-	
Input Capacitance (VDS = 8 V, VGS = 0 V, f = 1.0 MHz)	Ciss	-	636	-	pF	
Output Capacitance (VDS = 8 V, VGS = 0 V, f = 1.0 MHz)	Coss	-	62.8	-		
Reverse Transfer Capacitance (VDS = 8 V, VGS = 0 V, f = 1.0 MHz)	Crss	-	59.6	-		
SOURCE–DRAIN DIODE						
Max. Diode Forward Current	IS	-	-	1.7	A	
Forward Voltage (VGS = 0 V, IS = 1.7 A)	VSD	-	-	1.2	V	

3.Pulse Test: Pulse Width ≤300 μs, Duty Cycle ≤2.0%.

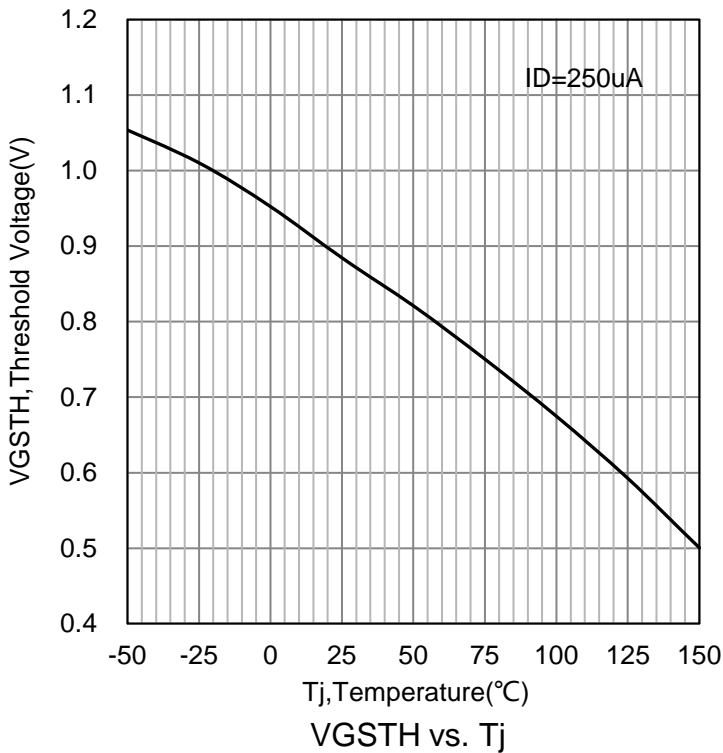
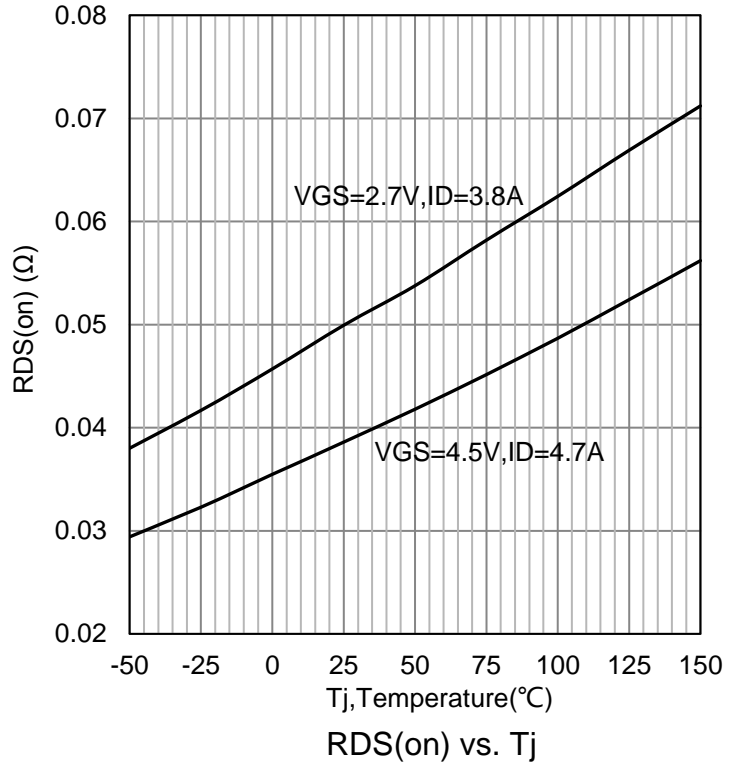
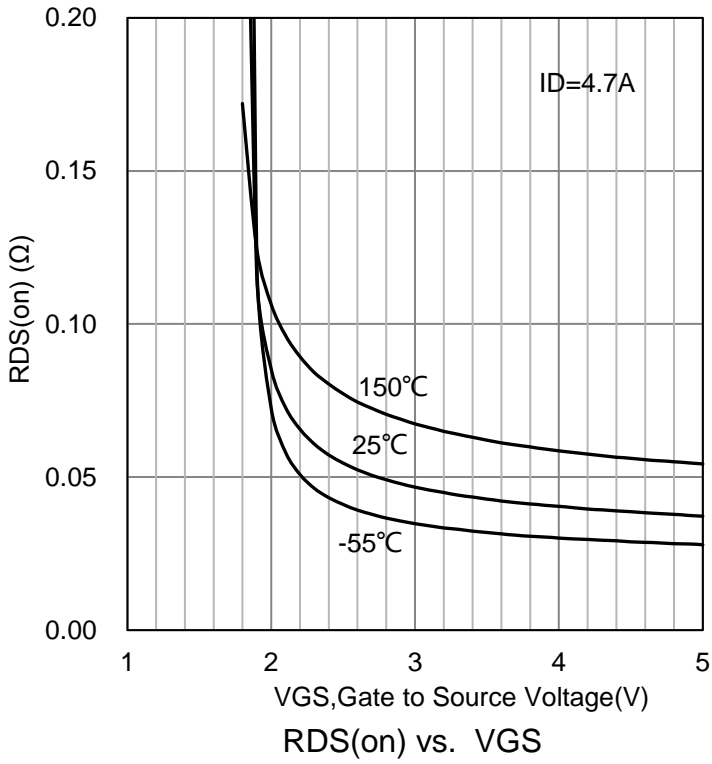
6. ELECTRICAL CHARACTERISTICS CURVES

P-Channel



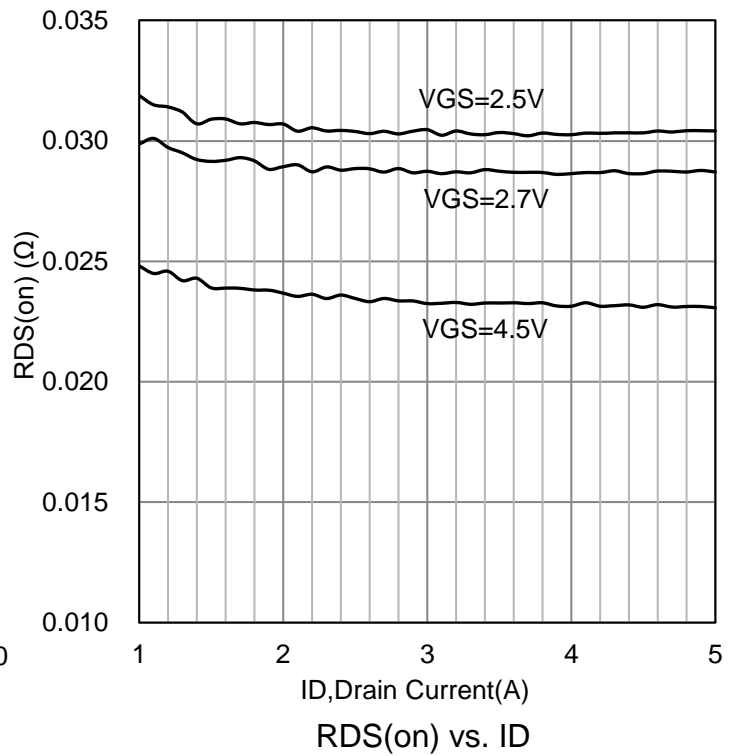
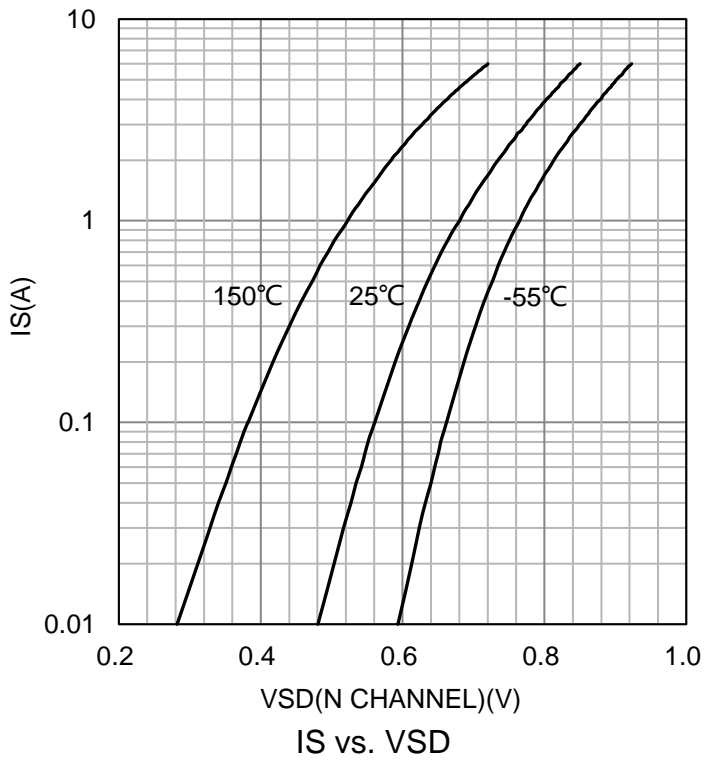
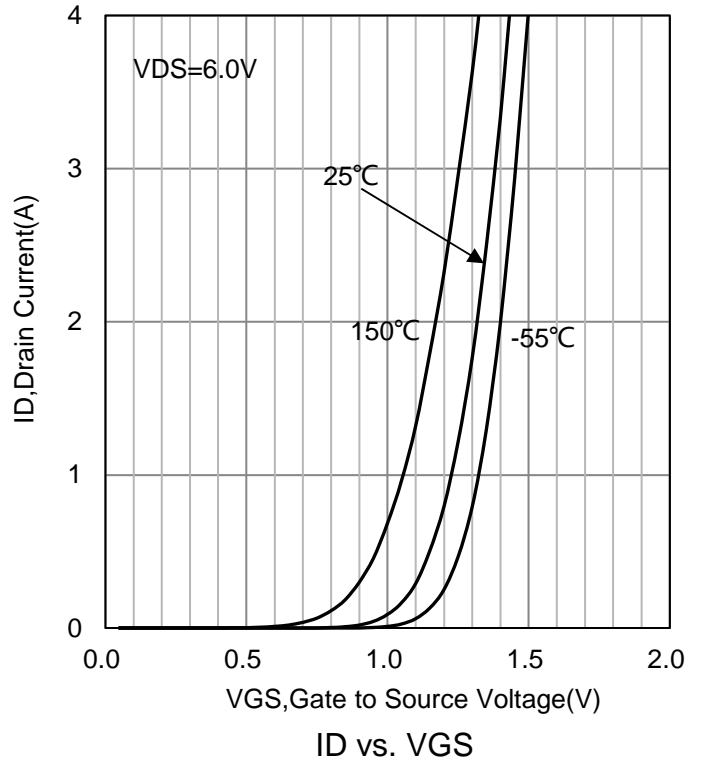
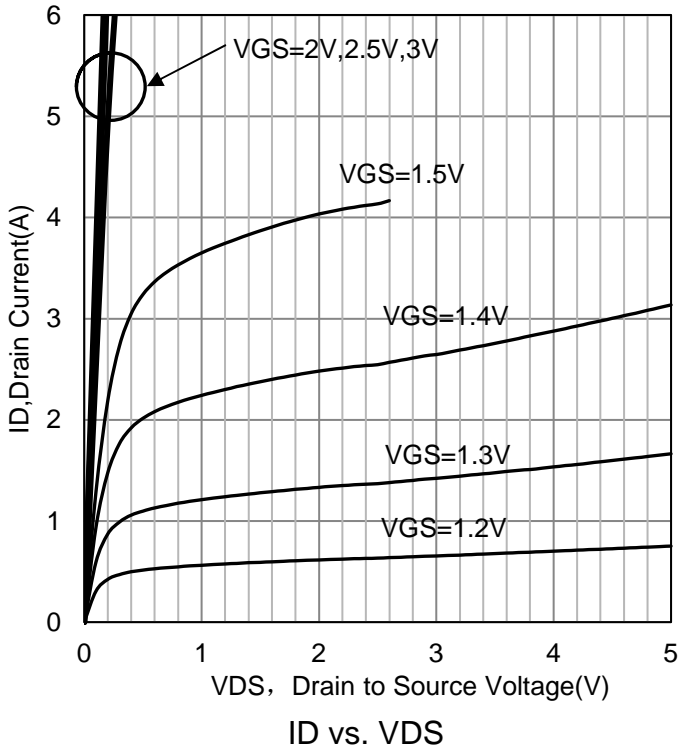
6. ELECTRICAL CHARACTERISTICS CURVES(Con.)

P-Channel



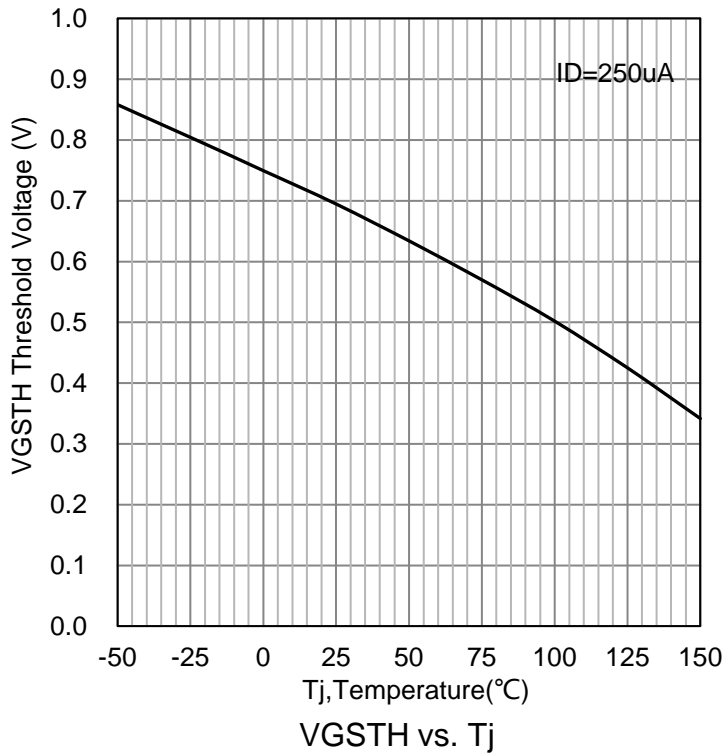
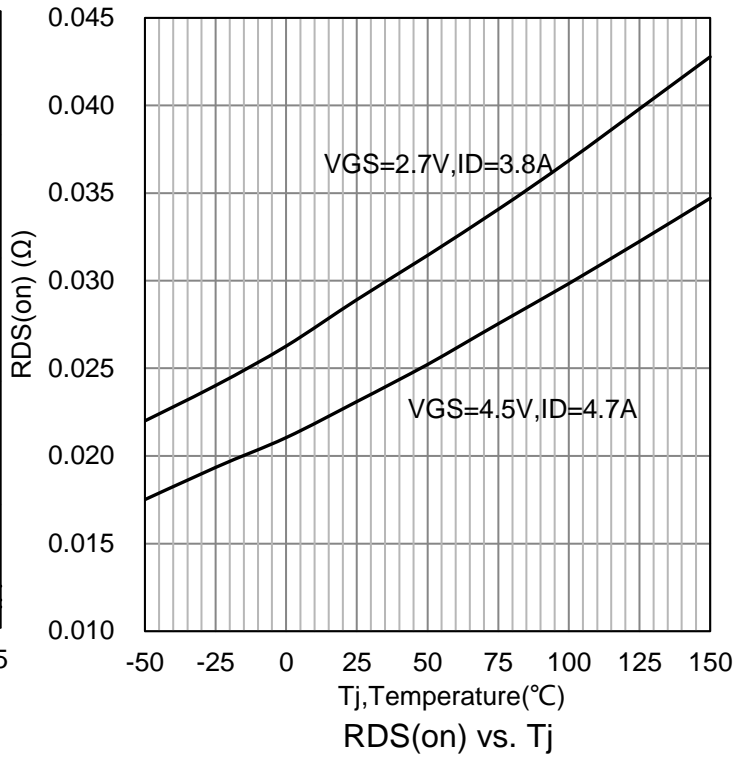
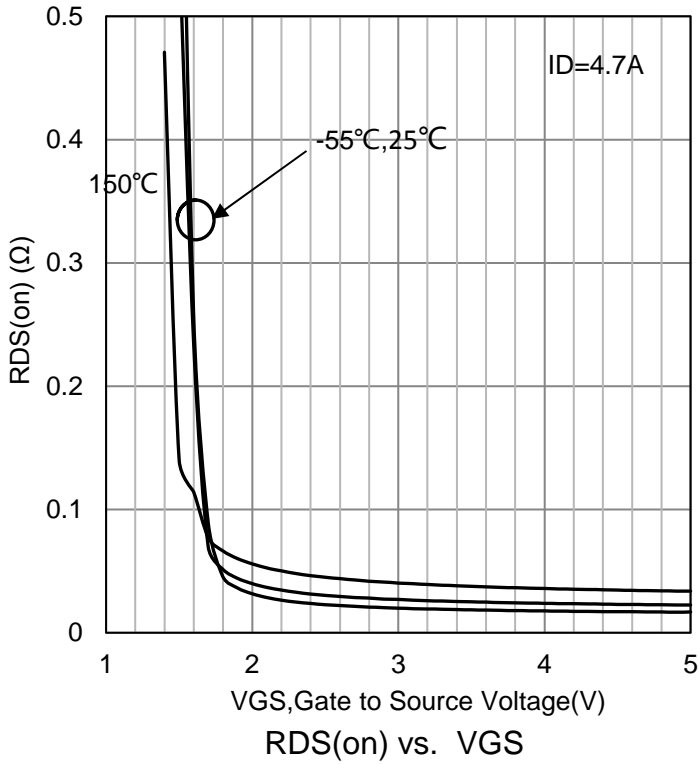
6. ELECTRICAL CHARACTERISTICS CURVES(Con.)

N-Channel

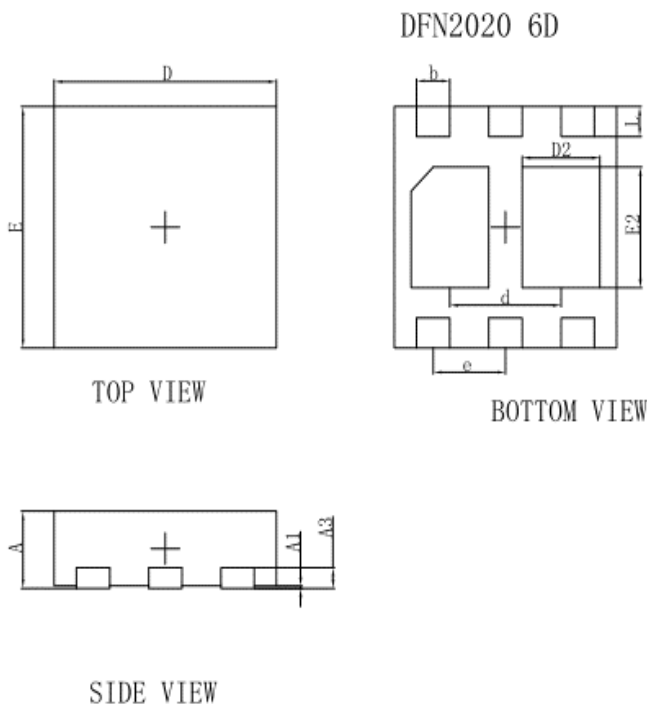


6. ELECTRICAL CHARACTERISTICS CURVES(Con.)

N-Channel

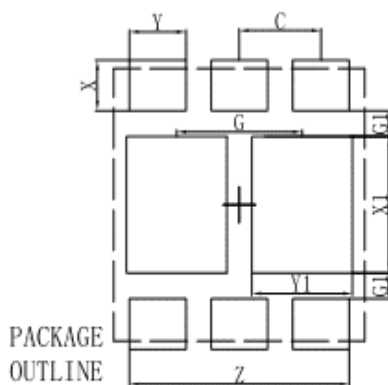


7. OUTLINE AND DIMENSIONS



DFN2020-6D			
Dim	Min	Typ	Max
D	1.95	2	2.05
E	1.95	2	2.05
e	-	0.65	-
L	0.20	0.25	0.30
b	0.25	0.3	0.35
d	-	1	-
A	0.60	0.65	0.70
A1	0.00	0.02	0.05
A3	-	0.152	-
E2	0.95	1	1.05
D2	0.65	0.7	0.75
All Dimensions in mm			

8. SOLDERING FOOTPRINT



Dimensions	(mm)
X	0.37
Y	0.45
X1	1.00
Y1	0.80
C	0.65
G	1.00
G1	0.19
Z	1.75
C	0.65

DISCLAIMER

- Curve guarantee in the specification. The curve of test items with electric parameter is used as quality guarantee. The curve of test items without electric parameter is used as reference only.
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