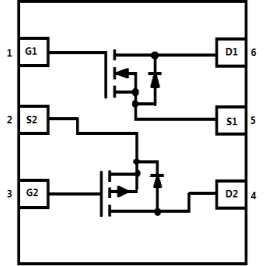
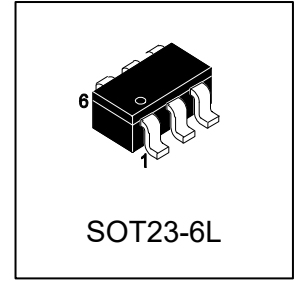


NP3709

30 V Complementary Trench MOSFET



1. FEATURES

- P-Channel: $V_{DS} = -30V$
 $R_{DS(ON)} \leq 100m\Omega, V_{GS@-10V}, I_{DS@-3A}$
 $R_{DS(ON)} \leq 150m\Omega, V_{GS@-4.5V}, I_{DS@-2A}$
- N-Channel: $V_{DS} = 30V$
 $R_{DS(ON)} \leq 50m\Omega, V_{GS@10V}, I_{DS@4A}$
 $R_{DS(ON)} \leq 60m\Omega, V_{GS@4.5V}, I_{DS@2A}$
- We declare that the material of product compliance with RoHS requirements and Halogen Free.

2. DEVICE MARKING AND ORDERING INFORMATION

Device	Marking	Shipping
NP3709	9T	3000/Tape&Reel

3. Absolute Maximum Ratings (TA =25 °C unless otherwise noted)

Parameter (P-Channel)	Symbol	Limits	Unit
Drain–Source Voltage	VDS	-30	V
Gate–Source Voltage	VGS	±20	V
Drain Current-Continuous	ID	-2.5	A
Drain Current-Pulsed (Note1)	IDM	-10	A
Avalanche Current(L=0.1mH)	IAS	6	A
Avalanche energy(L=0.1mH)	EAS	1.8	mJ

Parameter (N-Channel)	Symbol	Limits	Unit
Drain–Source Voltage	VDS	30	V
Gate–Source Voltage	VGS	±20	V
Drain Current-Continuous	ID	3.5	A
Drain Current-Pulsed (Note1)	IDM	14	A
Avalanche Current(L=0.1mH)	IAS	9	A
Avalanche energy(L=0.1mH)	EAS	4.05	mJ

4. THERMAL CHARACTERISTICS

Parameter	Symbol	Limits	Unit	
Maximum Power Dissipation(Note 2)	PD	TA = 25 °C	0.8	W
		TA = 75 °C	0.5	
Thermal Resistance Junction–to–Ambient	RθJA	(Steady-State)	200	°C/W
		(t ≤ 10s)	150	
Thermal Resistance Junction–to–Case	RθJC	100	°C/W	
Operating Junction Temperature	Tj	150	°C	
Storage Temperature Range	Tstg	-50~+150	°C	

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

2.Surface mounted on "1.5 x 1.5" FR4 board using 1 sq in pad, 2 oz Cu.



5. ELECTRICAL CHARACTERISTICS (Ta= 25°C)
P-Channel

Parameter	Symbol	Min.	Typ.	Max.	Unit
Static					
Drain-Source Breakdown Voltage (VGS = 0V ID = -250μA)	BVDSS	-30	-	-	V
Gate Threshold Voltage (VDS = VGS, ID = -250uA)	VGS(th)	-1	-	-2.5	V
Zero Gate Voltage Drain Current (VDS = -27V, VGS = 0V)	IDSS	-	-	-1	uA
Gate Body Leakage (VGS = ±20V, VDS = 0V)	IGSS	-	-	±100	nA
Drain-Source On-State Resistance (VGS = -10V, ID = -3A) (VGS = -4.5V, ID = -2A)	RDS(on)	- -	- -	100 150	mΩ
Dynamic					
Input Capacitance (VGS = 0 V, f = 1.0MHz, VDS = -15 V)	Ciss	-	305	-	pF
Output Capacitance (VGS = 0 V, f = 1.0MHz, VDS = -15 V)	Coss	-	40	-	
Reverse Transfer Capacitance (VGS = 0 V, f = 1.0MHz, VDS = -15 V)	Crss	-	36	-	
Turn-On Delay Time	(VDD = -15V, ID = -1A VGS = -10V, RG = 6Ω)	td(on)	-	6	ns
Rise Time		tr	-	8.7	
Turn-Off Delay Time		td(off)	-	33	
Fall Time		tf	-	3.7	
Total Gate Charge (VGS = -4.5V, VDS = -24V, ID = -2A)	Qg	-	3.4	-	nC
Gate-to-Source Gate Charge (VGS = -4.5V, VDS = -24V, ID = -2A)	Qgs	-	0.9	-	
Gate-to-Drain Charge (VGS = -4.5V, VDS = -24V, ID = -2A)	Qgd	-	1.6	-	
Diode Forward Voltage (IS = -1A, VGS = 0V)	VSD	-	-	-1	V

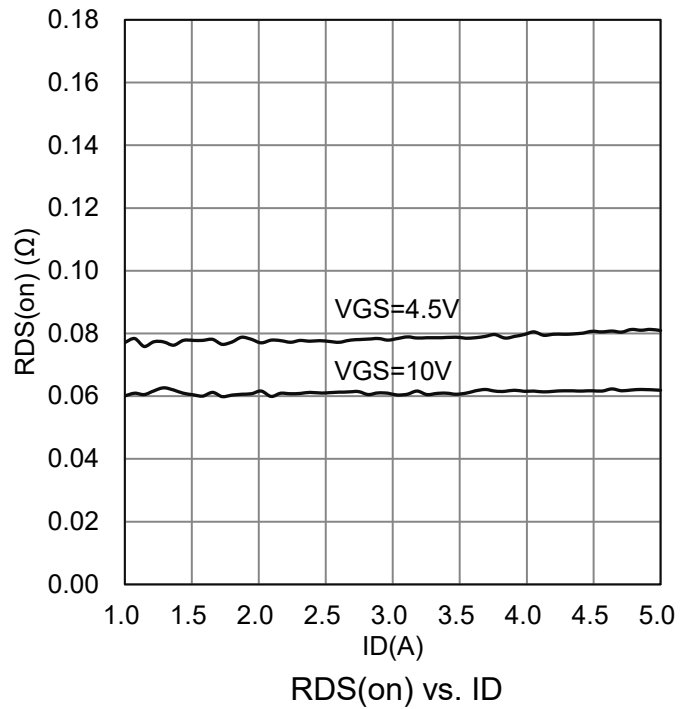
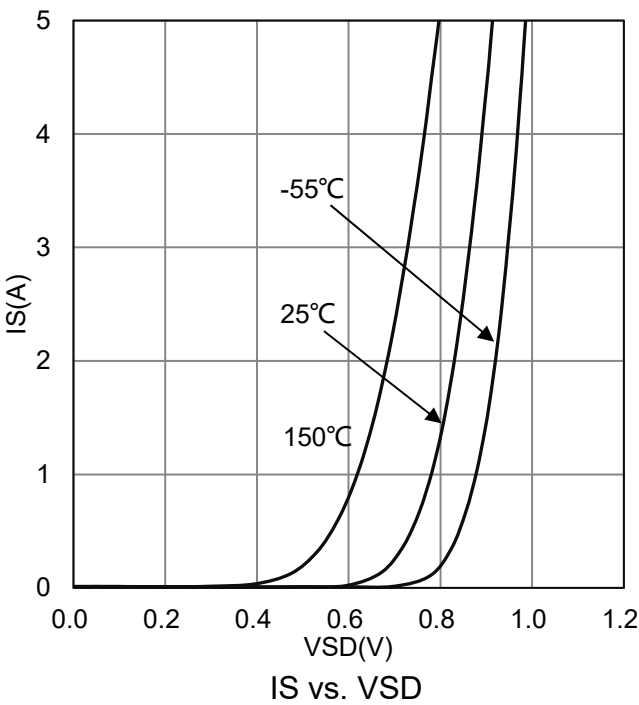
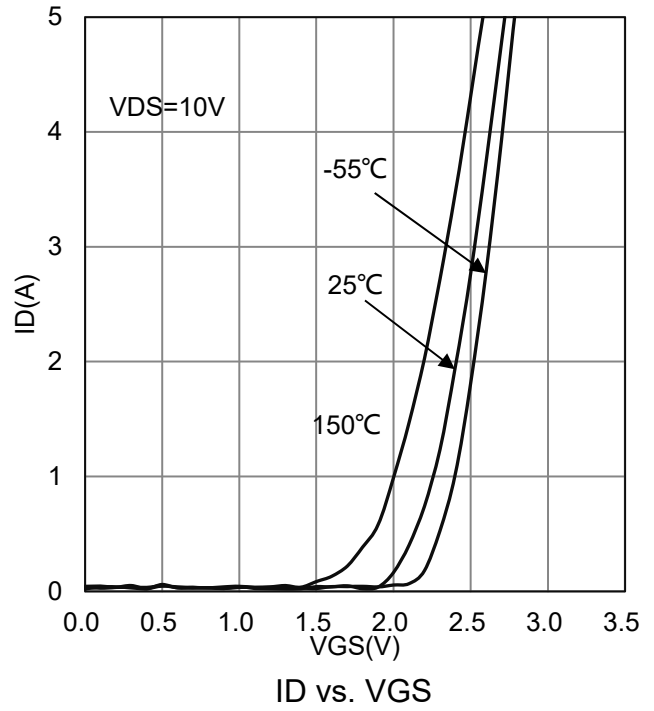
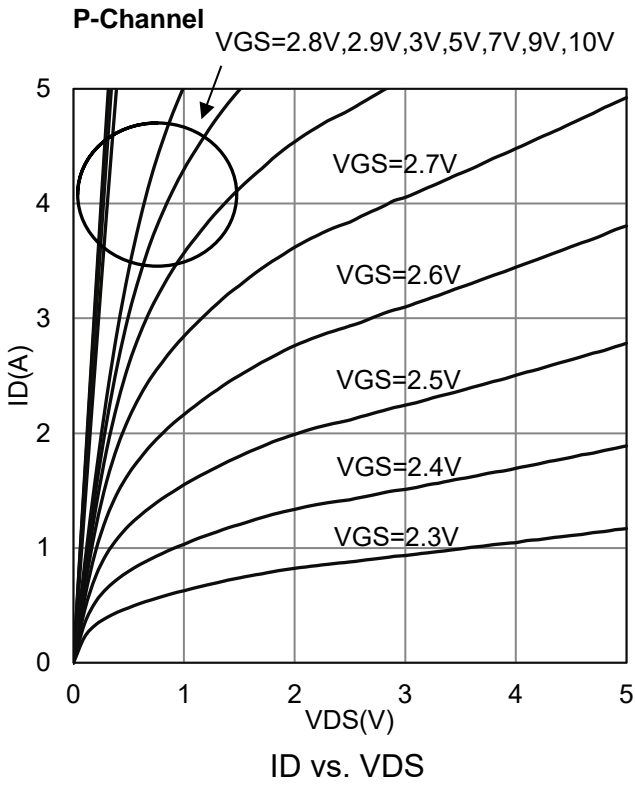


5. ELECTRICAL CHARACTERISTICS (Ta= 25°C)(Con.)
N-Channel

Parameter	Symbol	Min.	Typ.	Max.	Unit
Static					
Drain-Source Breakdown Voltage (VGS = 0V ID = 250μA)	BVDSS	30	-	-	V
Gate Threshold Voltage (VDS = VGS, ID = 250uA)	VGS(th)	1	-	3	V
Zero Gate Voltage Drain Current (VDS = 30V, VGS = 0V)	IDSS	-	-	1	uA
Gate Body Leakage (VGS = ±20V, VDS = 0V)	IGSS	-	-	±1	uA
Drain-Source On-State Resistance (VGS=10V, ID=4A) (VGS=4.5V, ID=2.0A)	RDS(on)	- -	35 45	50 60	mΩ
Dynamic					
Input Capacitance (VGS = 0 V, f = 1.0MHz, VDS= 15 V)	Ciss	-	450	-	pF
Output Capacitance (VGS = 0 V, f = 1.0MHz, VDS= 15 V)	Coss	-	54	-	
Reverse Transfer Capacitance (VGS = 0 V, f = 1.0MHz, VDS= 15 V)	Crss	-	48	-	
Turn-On Delay Time	(VDD = 15V, RL = 2.7Ω ID = 1A, VGEN = 10V, RG = 3Ω)	td(on)	-	2	ns
Rise Time		tr	-	4	
Turn-Off Delay Time		td(off)	-	16	
Fall Time		tf	-	4	
Total Gate Charge (VGS = 4.5V, VDS = 15V, ID = 3A)	Qg	-	4.5	-	nC
Gate-to-Source Gate Charge (VGS = 4.5V, VDS = 15V, ID = 3A)	Qgs	-	1.4	-	
Gate-to-Drain Charge (VGS = 4.5V, VDS = 15V, ID = 3A)	Qgd	-	1.8	-	
Diode Forward Voltage (IS = 1.0A, VGS = 0V)	VSD	-	0.7	1.5	V

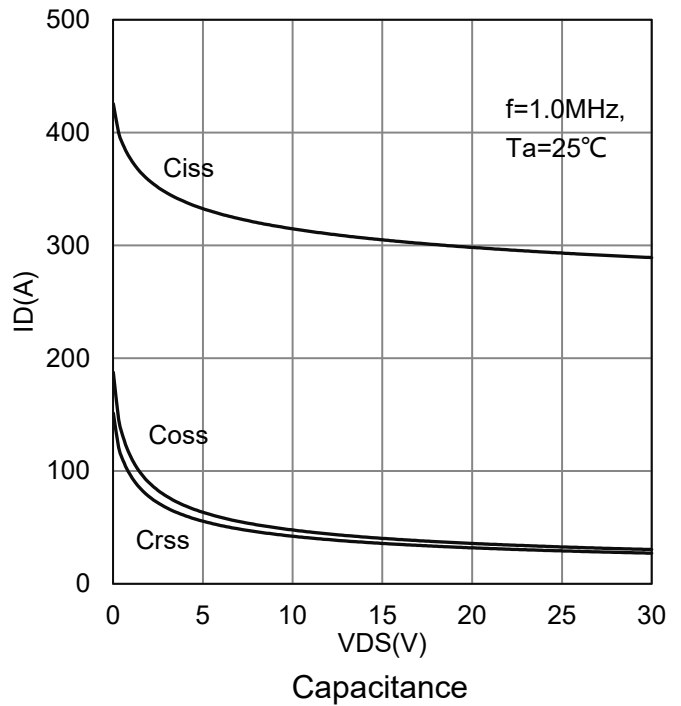
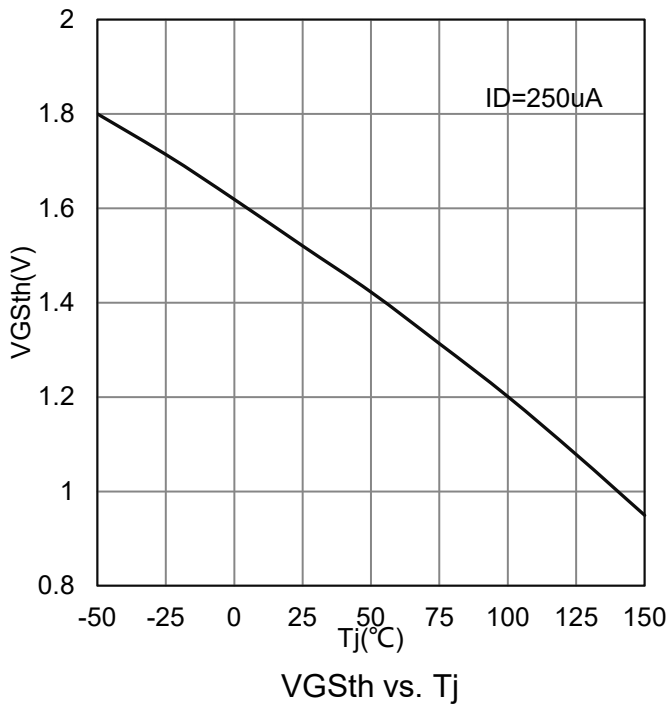
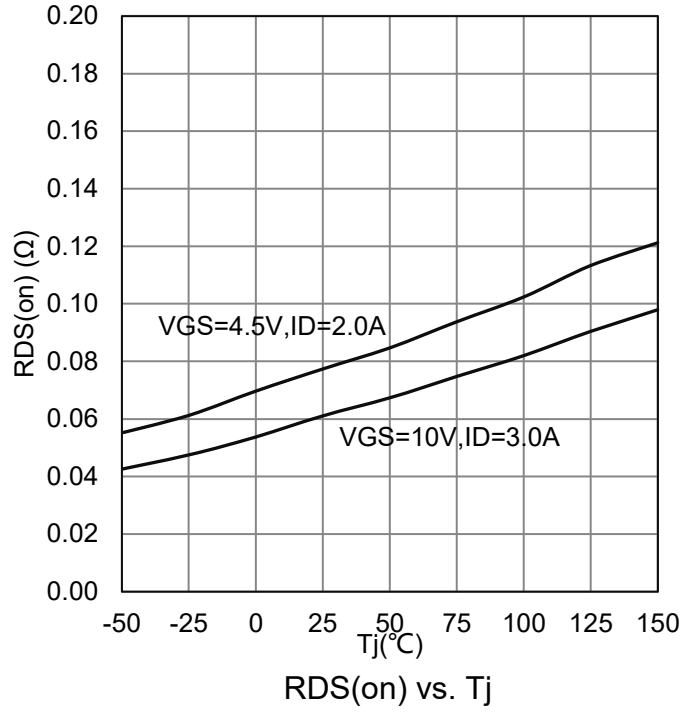
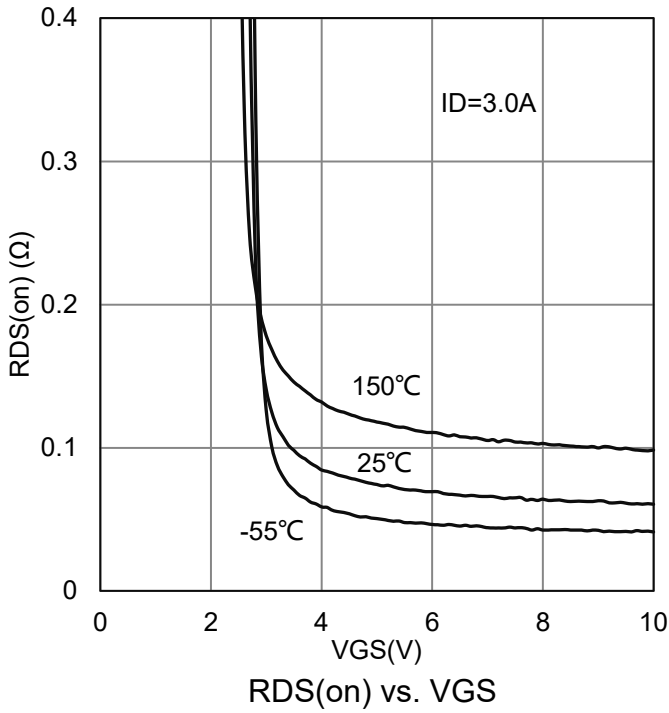


7. ELECTRICAL CHARACTERISTICS CURVES



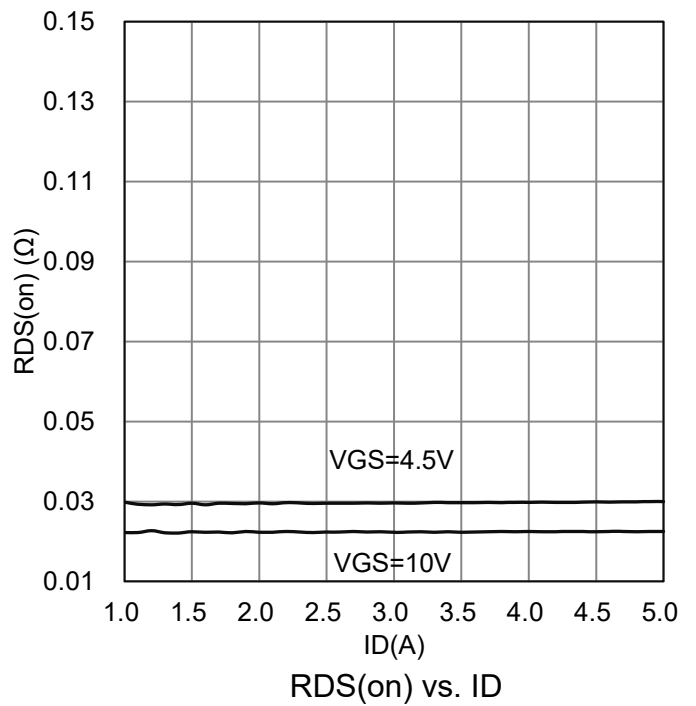
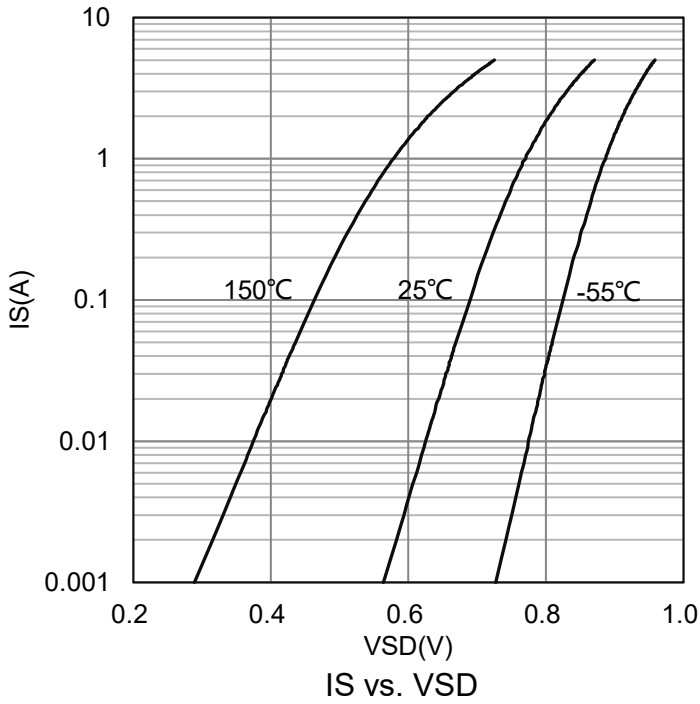
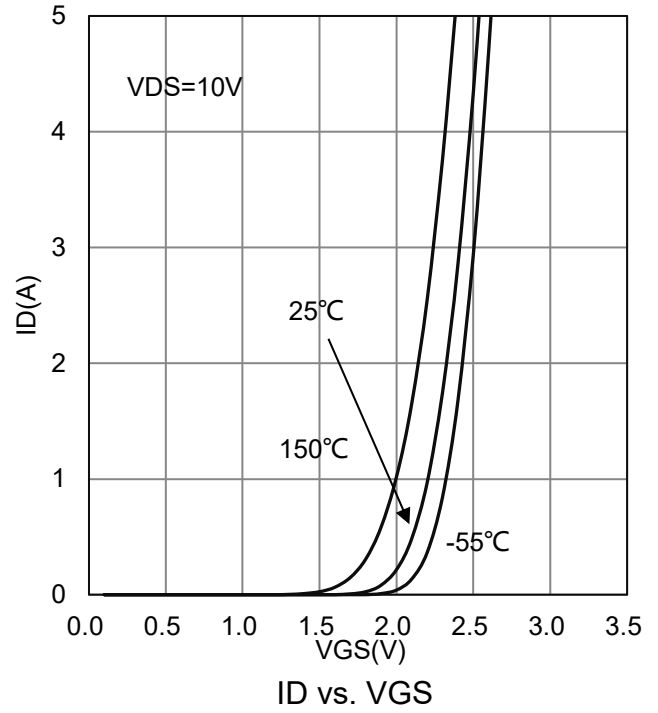
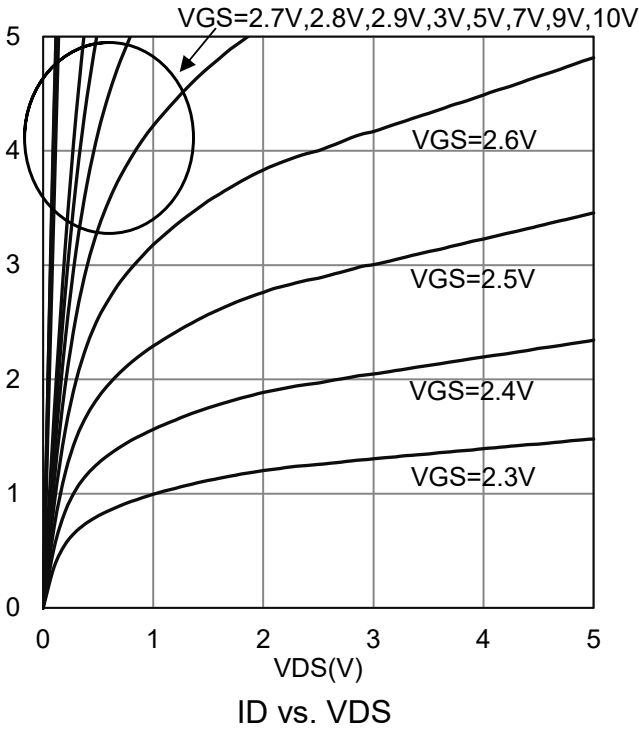
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P-Channel



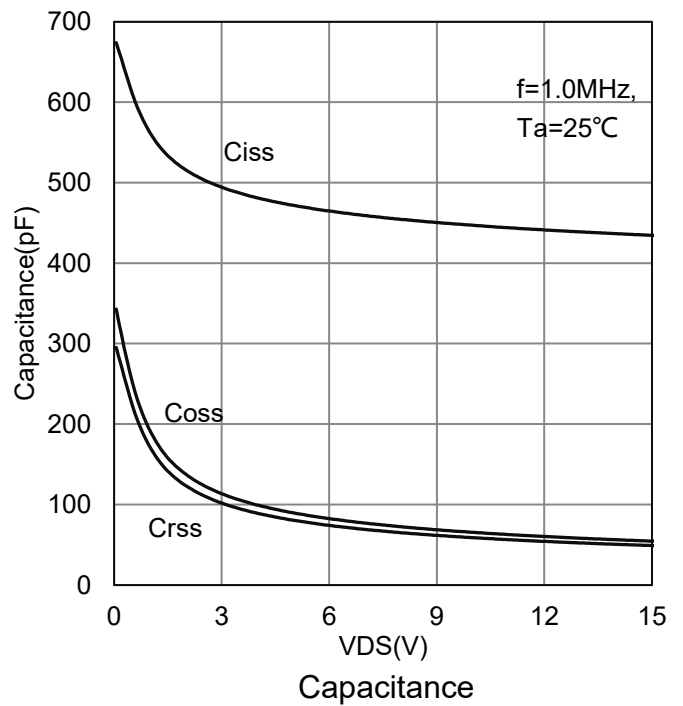
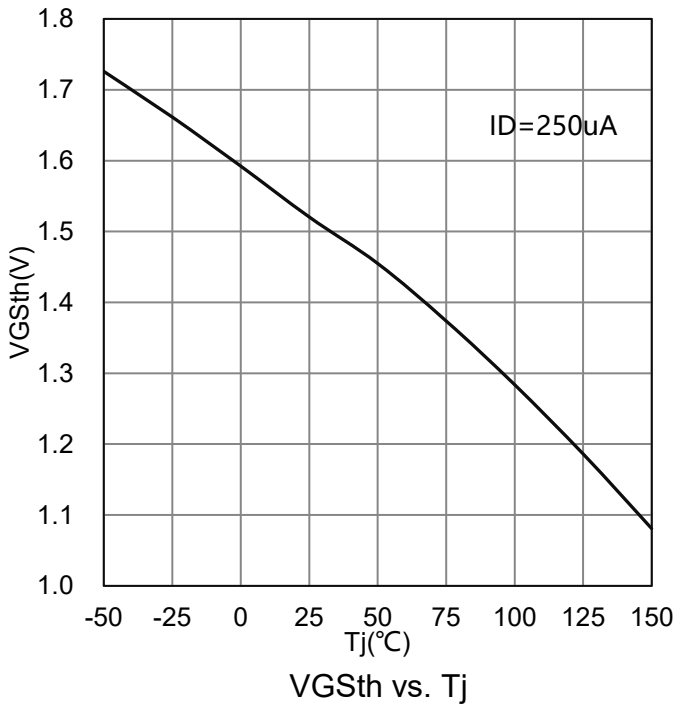
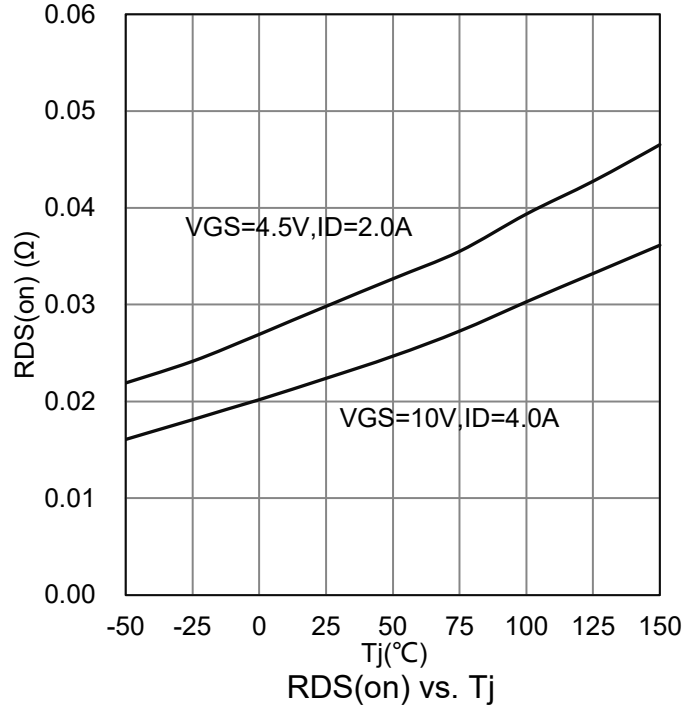
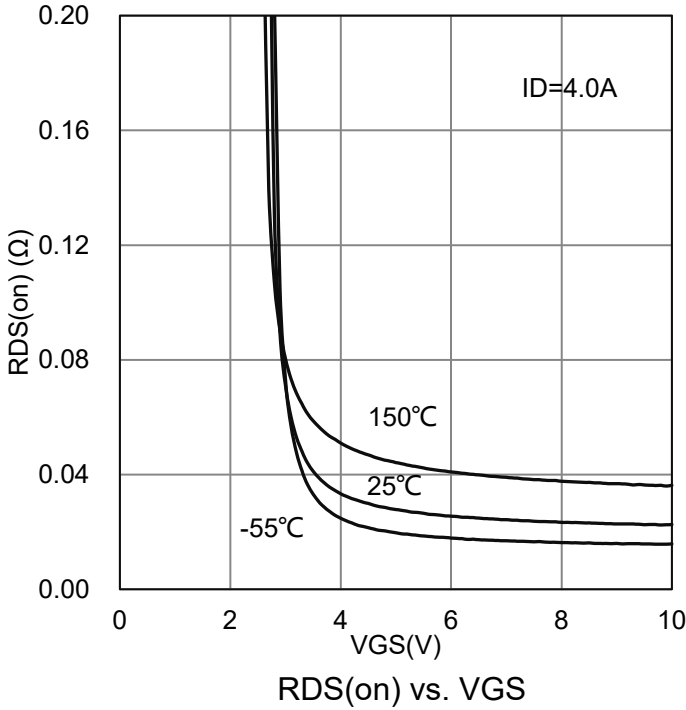
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N-Channel



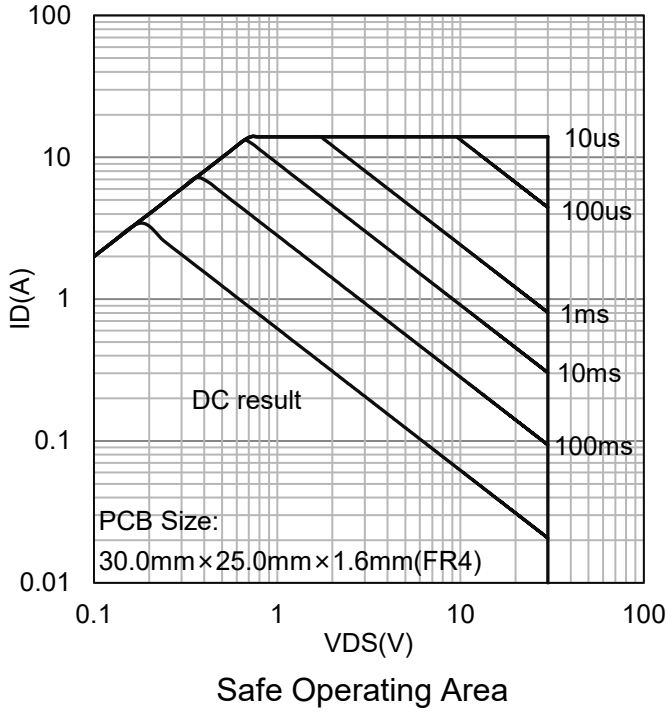
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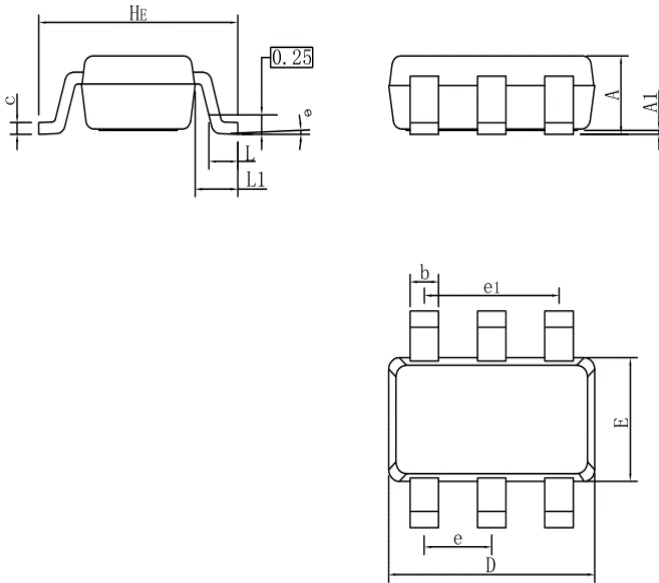
N-Channel



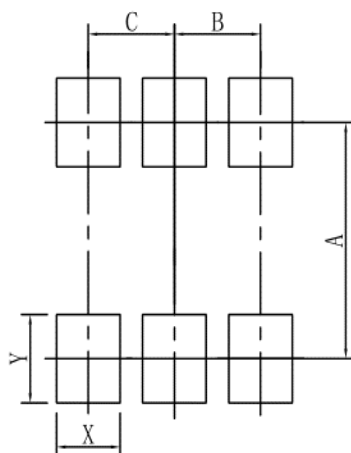
7. ELECTRICAL CHARACTERISTICS CURVES(Con.)

N-Channel



8. OUTLINE AND DIMENSIONS


SOT23-6L			
DIM	MIN	NOR	MAX
A	0.90	1.00	1.10
A1	0.01	0.06	0.10
b	0.30	0.40	0.50
c	0.10	0.17	0.20
D	2.80	2.90	3.00
E	1.50	1.60	1.70
e	0.85	0.95	1.05
e1	1.80	1.90	2.00
L	0.20	0.40	0.60
L1	0.60REF		
HE	2.60	2.80	3.00
θ	0°	-	10°

9. SOLDERING FOOTPRINT


SOT23-6L	
DIM	(mm)
X	0.70
Y	0.90
A	2.40
B	0.95
C	0.95

