

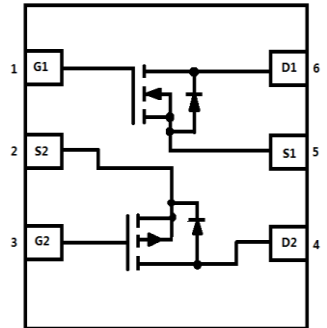
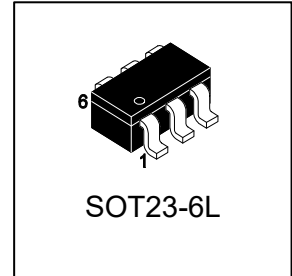
NP3604

S-NP3604

30 V Complementary Trench MOSFET

1. FEATURES

- P-Channel: $V_{DS} = -30V$
 $R_{DS(ON)} \leq 115m\Omega, V_{GS}@-4.5V, I_{DS}@-1.0A$
 $R_{DS(ON)} \leq 150m\Omega, V_{GS}@-2.5V, I_{DS}@-1.0A$
- N-Channel: $V_{DS} = 30V$
 $R_{DS(ON)} \leq 64m\Omega, V_{GS}@4.5V, I_{DS}@1A$
 $R_{DS(ON)} \leq 76m\Omega, V_{GS}@2.5V, I_{DS}@1A$
 $R_{DS(ON)} \leq 148m\Omega, V_{GS}@1.8V, I_{DS}@1A$
- 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
NP3604	M4	3000/Tape&Reel

3. Absolute Maximum Ratings ($T_A = 25^\circ C$ unless otherwise noted)

Parameter (P-Channel)		Symbol	Limits	Unit
Drain-Source Voltage		V_{DS}	-30	V
Gate-Source Voltage		V_{GS}	± 12	V
Drain Current-Continuous		I_D	2.28	A
Drain Current-Pulsed (Note1)		I_{DM}	8.65	A
Maximum Power Dissipation	$T_A = 25^\circ C$	PD	0.89	W
	$T_A = 75^\circ C$		0.54	
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 ~ +150	$^\circ C$
Junction-to-Ambient Thermal Resistance (Note2)		$R_{\theta JA}$	140	$^\circ C/W$

Parameter (N-Channel)		Symbol	Limits	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	± 12	V
Drain Current-Continuous		I_D	3.05	A
Drain Current-Pulsed (Note1)		I_{DM}	11.59	A
Maximum Power Dissipation	$T_A = 25^\circ C$	PD	0.89	W
	$T_A = 75^\circ C$		0.54	
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 ~ +150	$^\circ C$
Junction-to-Ambient Thermal Resistance (Note2)		$R_{\theta JA}$	140	$^\circ C/W$

1. Repetitive Rating: Pulse width limited by the maximum junction temperature
2. 1-in² 2oz Cu PCB board



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

Characteristic	Symbol	Min.	Typ.	Max.	Unit	
STATIC						
Drain–Source Breakdown Voltage (VGS = 0, ID = -250μA)	VBRDSS	-30	-	-	V	
Gate-Source Threshold Voltage (VDS =VGS , ID =-250μA)	VGS(th)	-0.5	-0.9	-1.3	V	
Gate-Body Leakage Current (VDS =0V, VGS =± 12V)	IGSS	-	-	±100	nA	
Zero Gate Voltage Drain Current (VDS = -30 V, VGS = 0 V)	IDSS	-	-	-1	μA	
Drain-Source On-Resistance(Note 3) (VGS = -4.5 V, ID = -1 A) (VGS = -2.5 V, ID = -1 A)	RDS(ON)	-	98.3 127.4	115 150	mΩ	
Diode Forward Voltage(Note 3) (IS = -1 A, VGS = 0 V)	VSD	-	-	-1.5	V	
DYNAMIC						
Total Gate Charge	(VDS = -15 V, VGS = -4.5 V, ID = -4 A)	Qg	-	4.7	-	nC
Gate-Source Charge		Qgs	-	0.9	-	
Gate-Drain Charge		Qgd	-	1.4	-	
Input Capacitance	(VDS = -15 V, VGS = 0 V, f = 1 MHz)	Ciss	-	426	-	pF
Output Capacitance		Coss	-	32.8	-	
Reverse Transfer Capacitance		Crss	-	25.4	-	

3.Pulse test; pulse width ≤ 300μs, duty cycle ≤ 2%



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

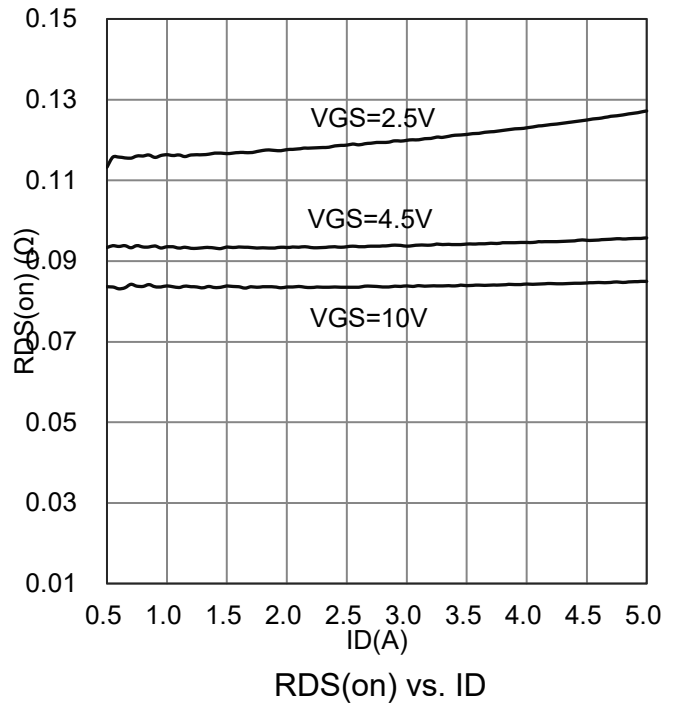
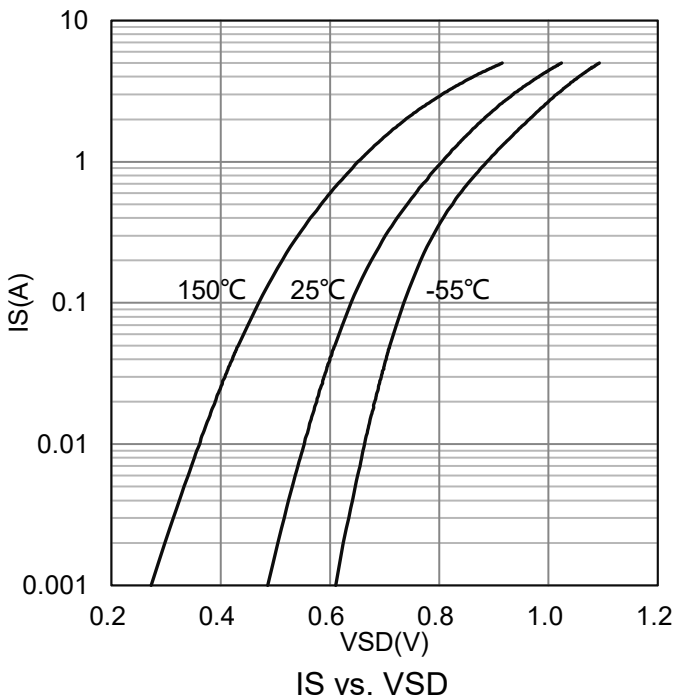
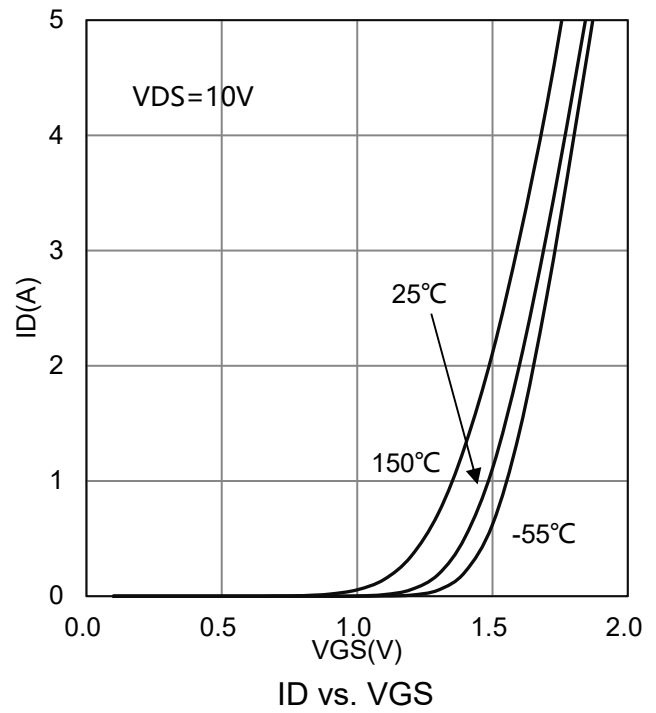
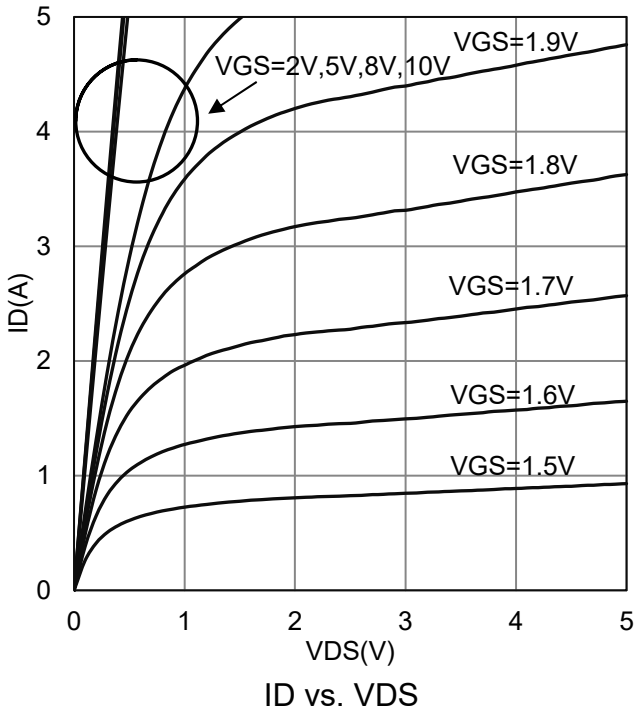
Characteristic	Symbol	Min.	Typ.	Max.	Unit	
STATIC						
Drain–Source Breakdown Voltage (VGS = 0, ID = 250μA)	VBRDSS	30	-	-	V	
Gate-Source Threshold Voltage (VDS =VGS , ID =250μA)	VGS(th)	0.6	0.73	1	V	
Gate-Body Leakage Current (VDS =0V, VGS =± 12V)	IGSS	-	-	±100	nA	
Zero Gate Voltage Drain Current (VDS = 30 V, VGS = 0 V)	IDSS	-	-	1	μA	
Drain-Source On-Resistance(Note 3) (VGS = 4.5 V, ID = 1 A) (VGS = 2.5 V, ID = 1 A) (VGS = 1.8 V, ID = 1 A)	RDS(ON)	-	36.1 43.6 56.5	64 76 148	mΩ	
Diode Forward Voltage(Note 3) (IS = 1 A, VGS = 0 V)	VSD	-	-	1.5	V	
DYNAMIC						
Total Gate Charge	(VDS = 15 V, VGS = 4.5 V, ID = 4 A)	Qg	-	2.4	-	nC
Gate-Source Charge		Qgs	-	0.55	-	
Gate-Drain Charge		Qgd	-	0.7	-	
Input Capacitance	(VDS = 15 V, VGS = 0 V, f = 1 MHz)	Ciss	-	239.2	-	pF
Output Capacitance		Coss	-	22.7	-	
Reverse Transfer Capacitance		Crss	-	19	-	

3.Pulse test; pulse width≤300μs, duty cycle≤ 2%



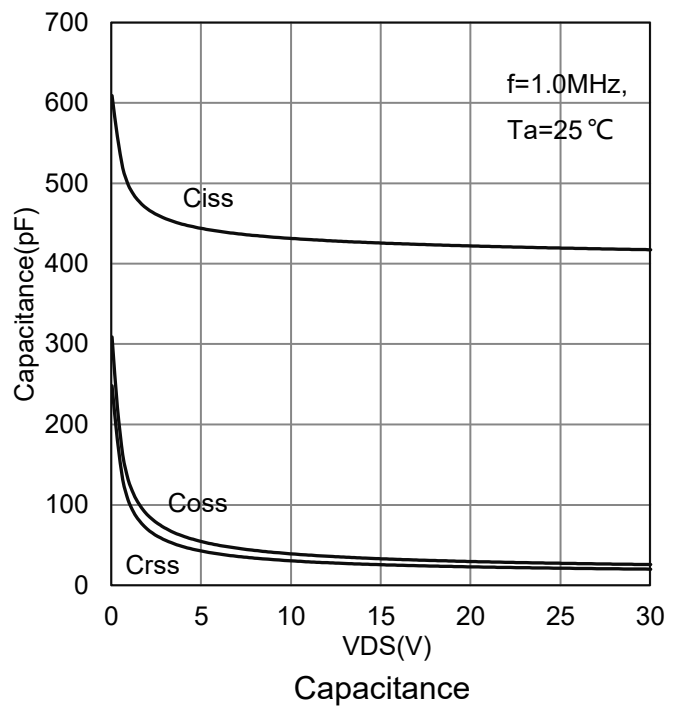
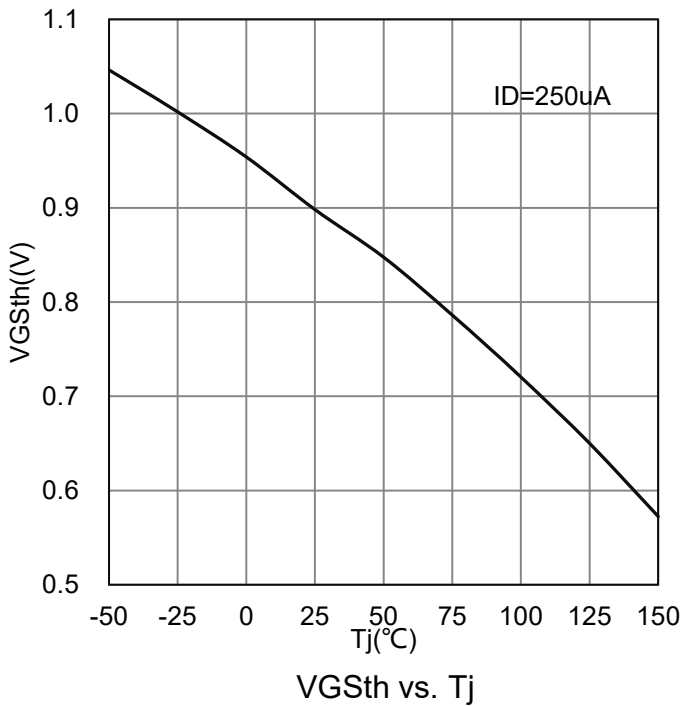
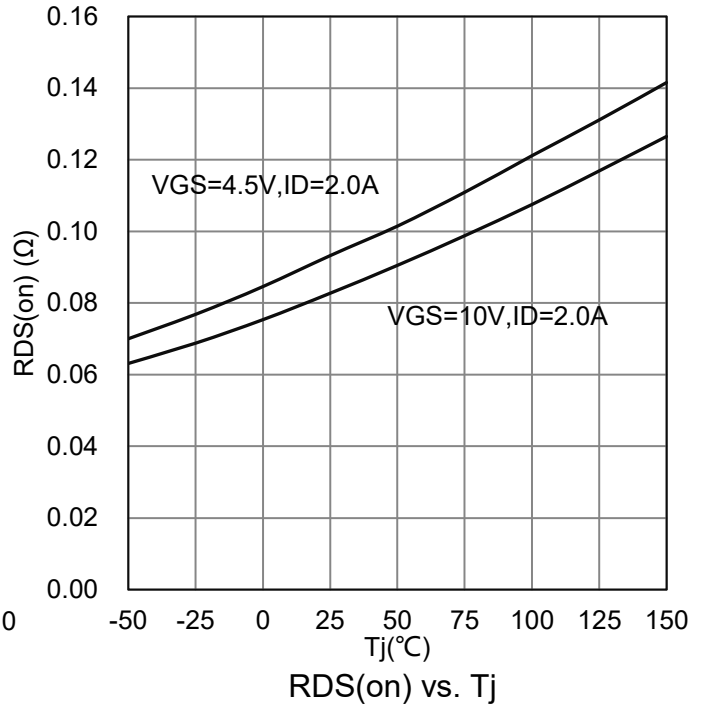
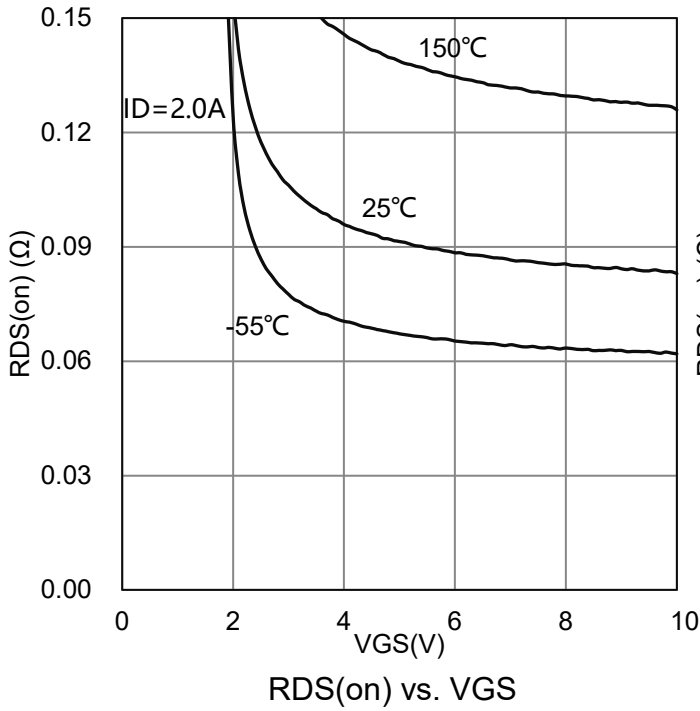
5. ELECTRICAL CHARACTERISTICS CURVES

P-Channel

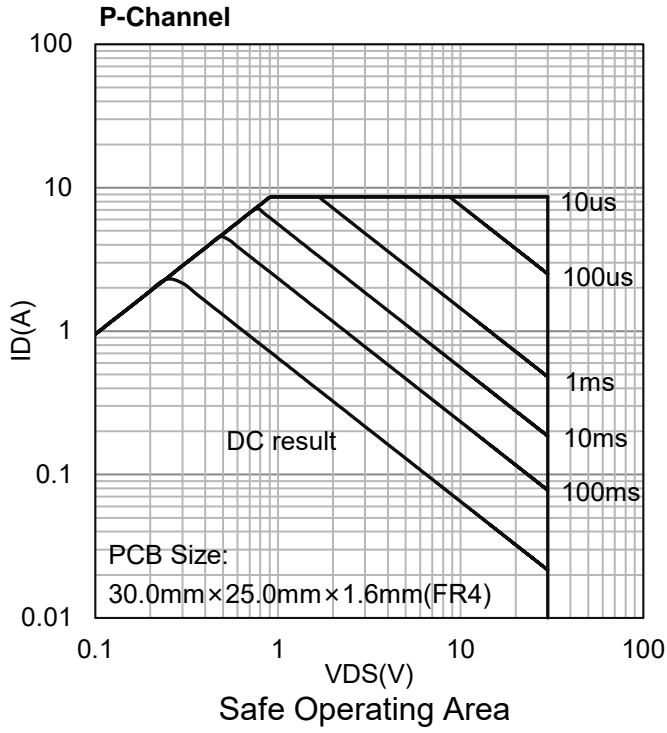


5. ELECTRICAL CHARACTERISTICS CURVES(Con)

P-Channel

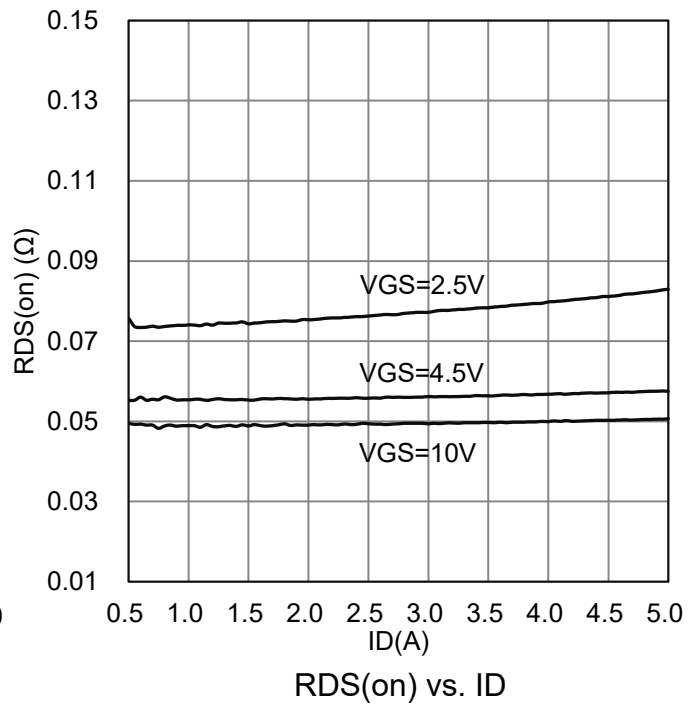
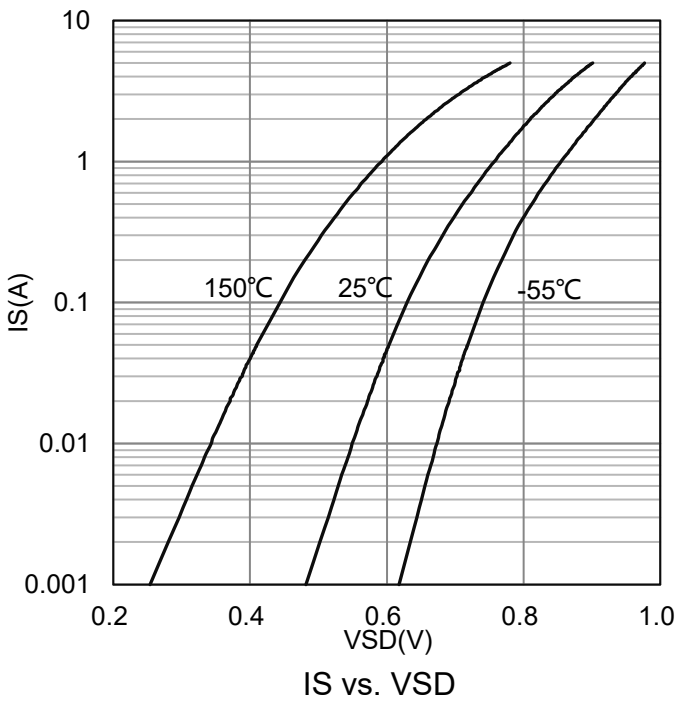
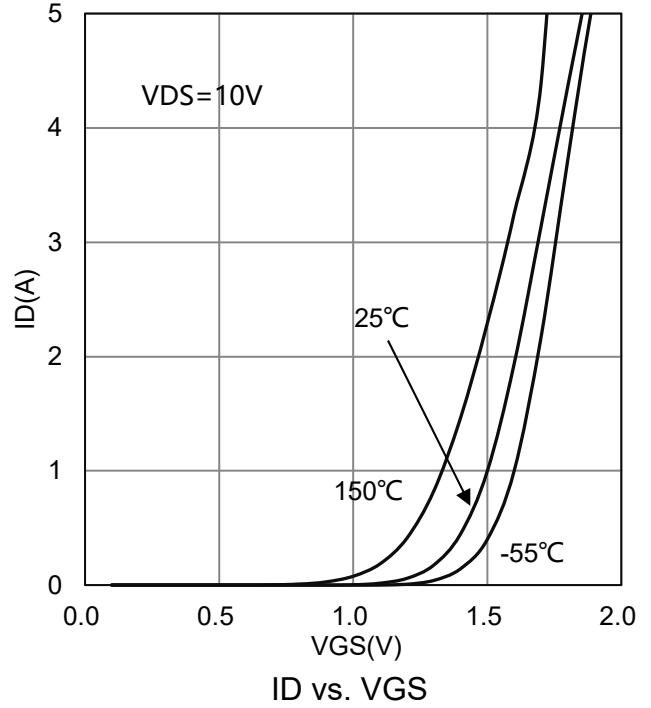
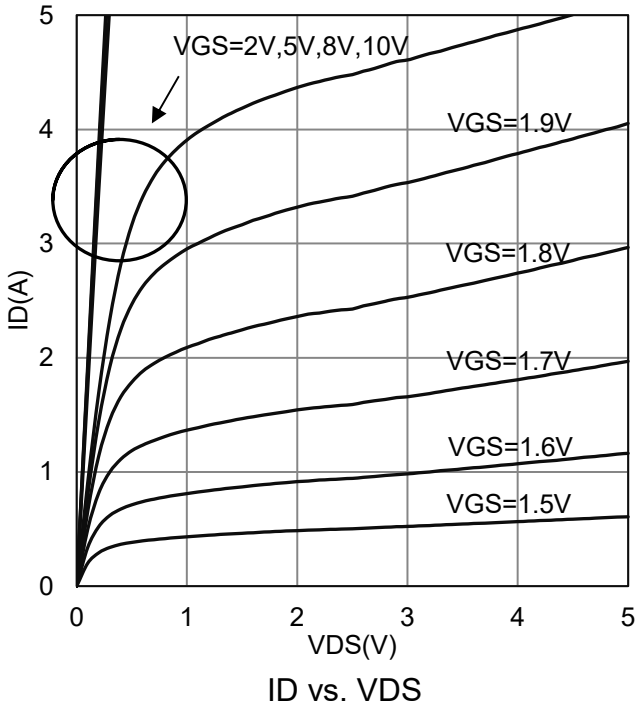


5. ELECTRICAL CHARACTERISTICS CURVES(Con.)



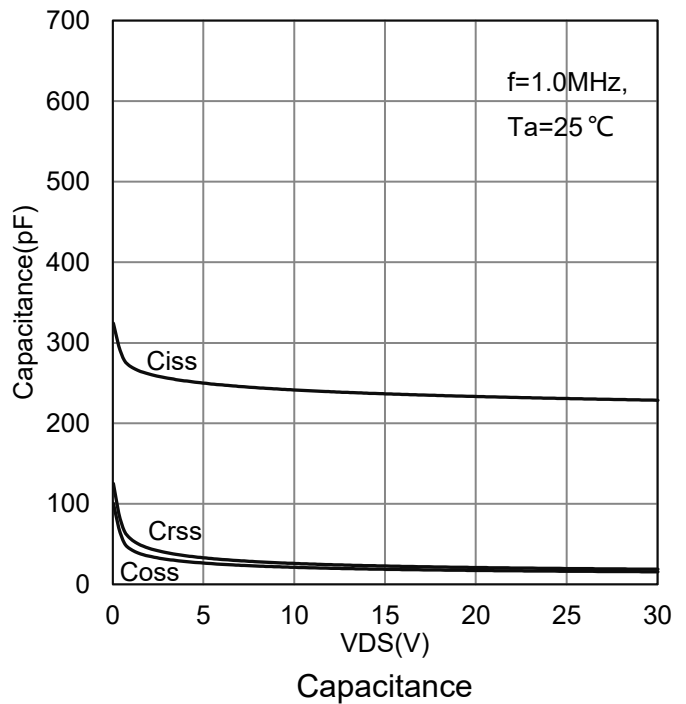
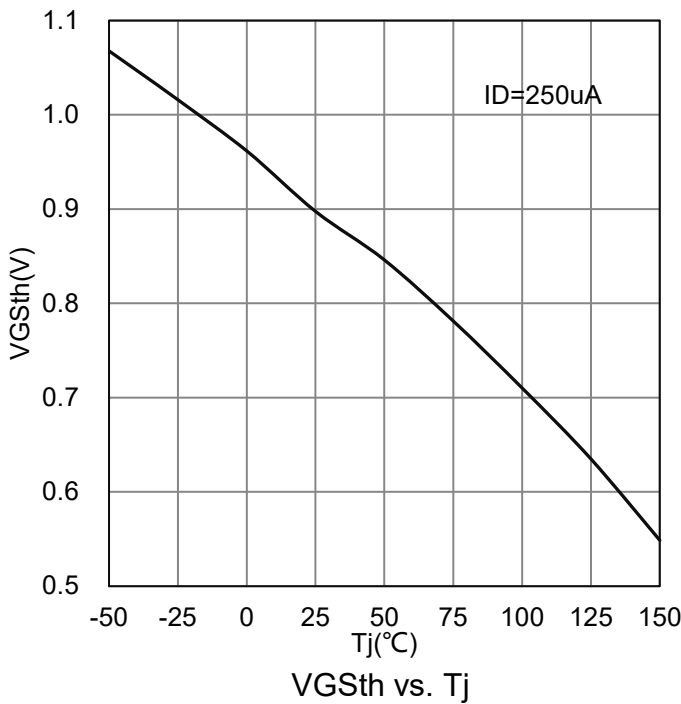
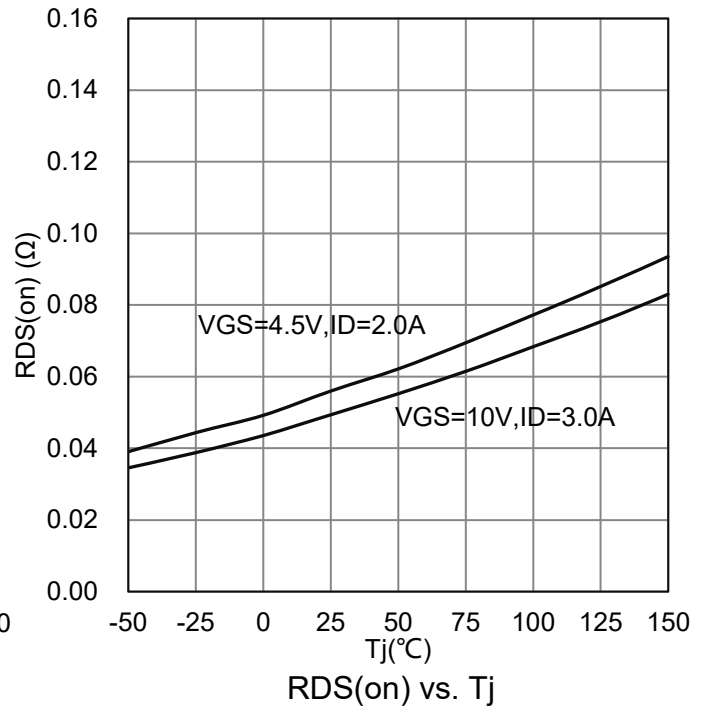
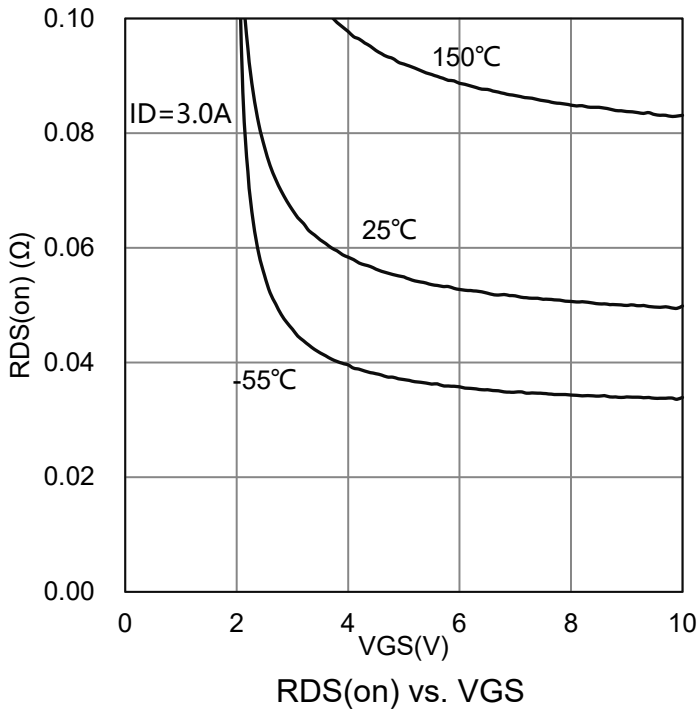
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N-Channel

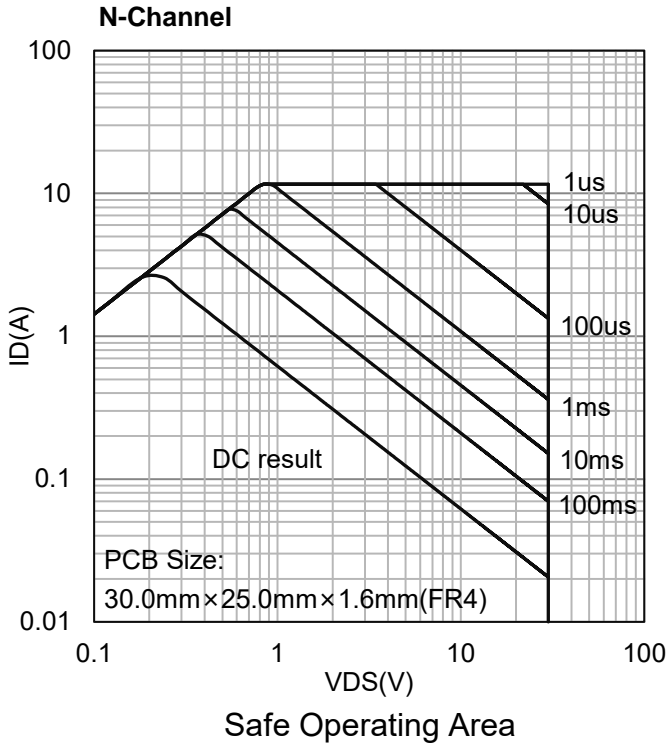


5. ELECTRICAL CHARACTERISTICS CURVES(Con.)

N-Channel



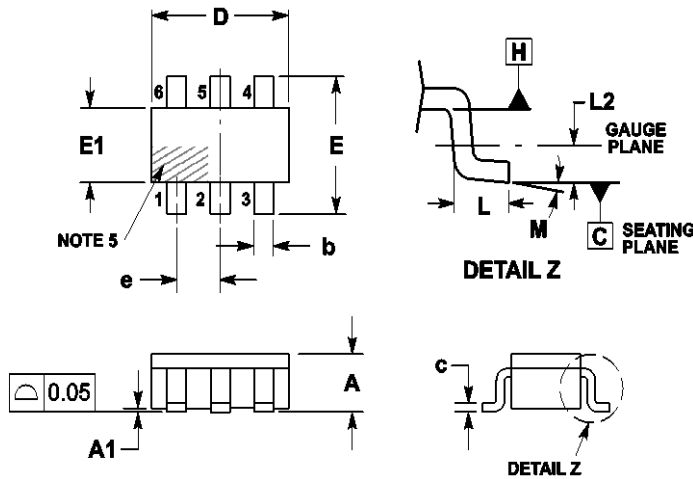
5. ELECTRICAL CHARACTERISTICS CURVES(Con.)



6. OUTLINE AND DIMENSIONS

Notes:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.



DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.90	1.00	1.10	0.035	0.039	0.043
A1	0.01	0.06	0.10	0.0004	0.002	0.004
b	0.25	0.38	0.50	0.010	0.015	0.020
c	0.10	0.18	0.26	0.004	0.007	0.010
D	2.90	3.00	3.10	0.114	0.118	0.122
E	2.50	2.75	3.00	0.098	0.108	0.118
E1	1.30	1.50	1.70	0.051	0.059	0.067
e	0.85	0.95	1.05	0.033	0.037	0.041
L	0.20	0.40	0.60	0.008	0.016	0.024
L2	0.25REF			0.010REF		
M	0°	---	10°	0°	---	10°

7. SOLDERING FOOTPRINT

