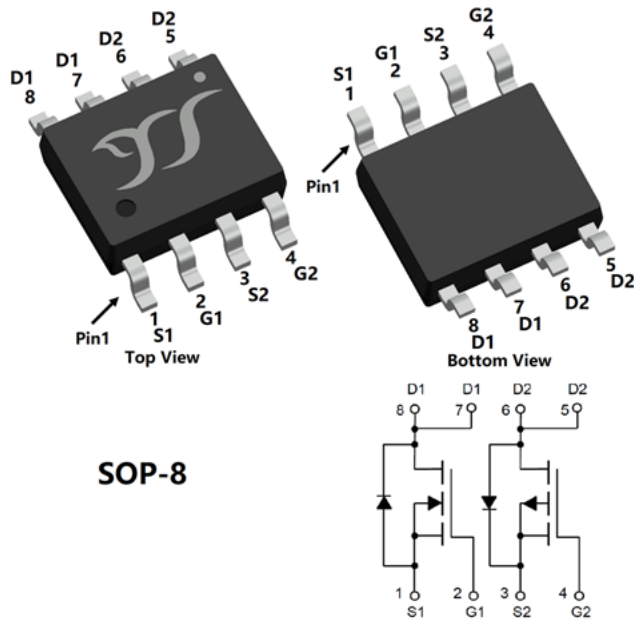


N-Channel and P-Channel Complementary MOSFET



SOP-8

Product Summary

NMOS

• V_{DS}	40V
• I_D	5A
• $R_{DS(ON)}$ (at $V_{GS}=10V$)	<28mΩ
• $R_{DS(ON)}$ (at $V_{GS}=4.5V$)	<46mΩ

PMOS

• V_{DS}	-40V
• I_D	-3A
• $R_{DS(ON)}$ (at $V_{GS}=-10V$)	<74mΩ
• $R_{DS(ON)}$ (at $V_{GS}=-4.5V$)	<118mΩ

General Description

- High density cell design for low $R_{DS(ON)}$
- High Speed switching
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

Applications

- Wireless charger
- Load switch
- Power management

Limiting Values

Parameter	Conditions			Symbol	NMOS		PMOS		Unit	
					Min	Max	Min	Max		
Drain-source Voltage				V _{DS}	-	40	-	-40	V	
Gate-source Voltage				V _{GS}	-20	20	-20	20		
Continuous Drain Current (Note 1,2)	Steady-State	T _A =25°C	NMOS:V _{GS} =10V, PMOS:V _{GS} =-10V	I _D	-	5	-	-3	A	
		T _A =100°C			-	3.1	-	-1.9		
Pulsed Drain Current	T _A =25°C, t _p ≤10μs			I _{DM}	-	40	-	-24		
Maximum Body-Diode Continuous Current	T _A =25°C			I _S	-	1	-	-1		
Total Power Dissipation (Note 1,2)	Steady-State	T _A =25°C		P _D	-	1.27	-	1.27	W	
		T _A =100°C			-	0.51	-	0.51		
Junction and Storage Temperature Range				T _J , T _{STG}	-55	150	-55	150	°C	

Thermal Resistance

Parameter	Symbol	NMOS		PMOS		Units
		Typ	Max	Typ	Max	
Thermal Resistance Junction-to-Ambient (Note 2)	$R_{\theta JA}$	-	98	-	98	$^{\circ}C/W$

Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
YJS028NP04A	F2	028NP04A	4000	8000	64000	13" reel



YJS028NP04A

■ NMOS Electrical Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA, T _j =25℃	40	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =40V, V _{GS} =0V, T _j =25℃	-	-	1	μA
		V _{DS} =40V, V _{GS} =0V, T _j =150℃	-	-	100	
Gate-Source Leakage Current	I _{GSS}	V _{GS} =± 20V, V _{DS} =0V, T _j =25℃	-	-	± 100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA, T _j =25℃	1	1.5	2	V
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =3A, T _j =25℃	-	22	28	mΩ
		V _{GS} =4.5V, I _D =3A, T _j =25℃	-	31	46	
Diode Forward Voltage	V _{SD}	I _S =1A, V _{GS} =0V, T _j =25℃	-	0.75	1.2	V
Gate Resistance	R _G	f=1MHz, T _j =25℃	-	2.7	-	Ω
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{DS} =20V, V _{GS} =0V, f=1MHz, T _j =25℃	-	395	-	pF
Output Capacitance	C _{oss}		-	47	-	
Reverse Transfer Capacitance	C _{rss}		-	37	-	
Switching Parameters						
Total Gate Charge	Q _g	V _{GS} =10V, V _{DS} =20V, I _D =3A, T _j =25℃	-	8.5	-	nC
Gate-Source Charge	Q _{gs}		-	1.3	-	
Gate-Drain Charge	Q _{gd}		-	1.9	-	
Reverse Recovery Charge	Q _{rr}	I _F =3A, di/dt=100A/μs, V _{GS} =0V, V _R =20V, T _j =25℃	-	6.3	-	nC
Reverse Recovery Time	t _{rr}		-	11.9	-	ns
Turn-on Delay Time	t _{D(on)}	V _{GS} =10V, V _{DS} =20V, I _D =3A, R _{GEN} =3Ω, T _j =25℃	-	5.7	-	ns
Turn-on Rise Time	t _r		-	2.7	-	
Turn-off Delay Time	t _{D(off)}		-	14.9	-	
Turn-off Fall Time	t _f		-	2.6	-	



YJS028NP04A

■ PMOS Electrical Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =-250μA, T _j =25℃	-40	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-40V, V _{GS} =0V, T _j =25℃	-	-	-1	μA
		V _{DS} =-40V, V _{GS} =0V, T _j =150℃	-	-	-100	
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V, T _j =25℃	-	-	±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250μA, T _j =25℃	-1.1	-1.6	-2.1	V
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =-10V, I _D =-3A, T _j =25℃	-	57	74	mΩ
		V _{GS} =-4.5V, I _D =-2A, T _j =25℃	-	79	118	
Diode Forward Voltage	V _{SD}	I _S =-1A, V _{GS} =0V, T _j =25℃	-	-0.8	-1.2	V
Gate Resistance	R _G	f=1MHz, T _j =25℃	-	18	-	Ω
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{DS} =-20V, V _{GS} =0V, f=1MHz, T _j =25℃	-	432	-	pF
Output Capacitance	C _{oss}		-	48	-	
Reverse Transfer Capacitance	C _{rss}		-	40	-	
Switching Parameters						
Total Gate Charge	Q _g	V _{GS} =-10V, V _{DS} =-20V, I _D =-3A, T _j =25℃	-	10	-	nC
Gate-Source Charge	Q _{gs}		-	1.5	-	
Gate-Drain Charge	Q _{gd}		-	1.5	-	
Reverse Recovery Charge	Q _{rr}	I _F =-3A, di/dt=100A/us, V _{GS} =0V, V _R =-20V, T _j =25℃	-	13.7	-	nC
Reverse Recovery Time	t _{rr}		-	16.4	-	ns
Turn-on Delay Time	t _{D(on)}	V _{GS} =-10V, V _{DS} =-20V, I _D =-3A, R _{GEN} =3Ω, T _j =25℃	-	5.7	-	ns
Turn-on Rise Time	t _r		-	2.8	-	
Turn-off Delay Time	t _{D(off)}		-	32.6	-	
Turn-off Fall Time	t _f		-	22.9	-	

Note:

1. The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
2. The value of $R_{\theta JA}$ is measured with the device mounted on the 80mm*80mm*1.1mm single layer FR-4 PCB board with 1 in² pad of 2oz. Copper, in the still air environment with $T_A=25^\circ C$. The maximum allowed junction temperature of $150^\circ C$. The value in any given application depends on the user's specific board design.



■ NMOS Typical Electrical and Thermal Characteristics Diagrams

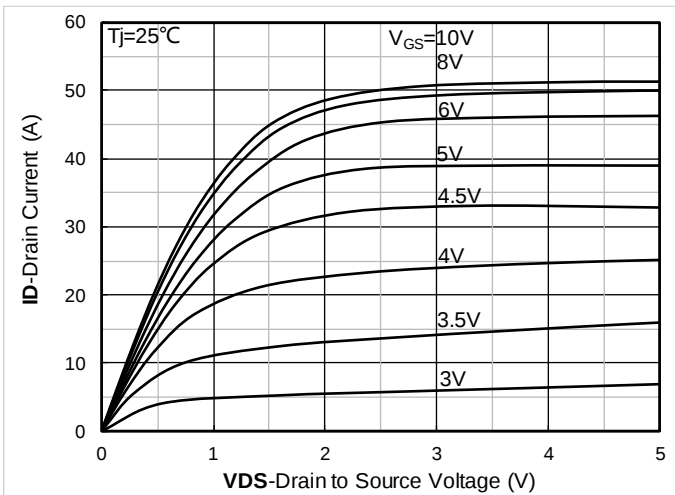


Figure 1. Output Characteristics; typical values

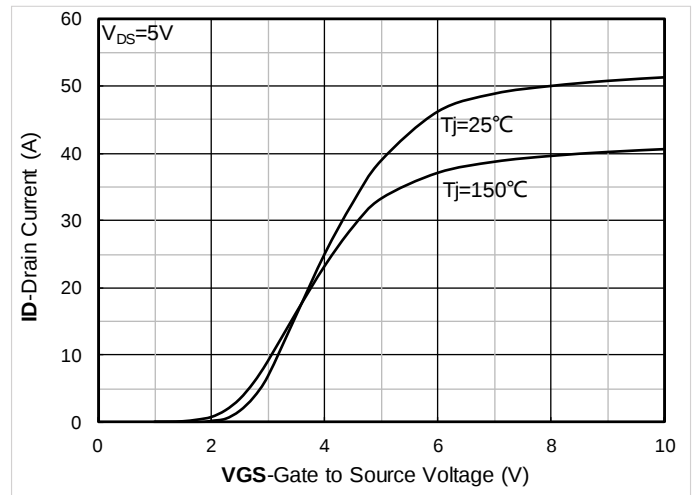


Figure 2. Transfer Characteristics; typical values

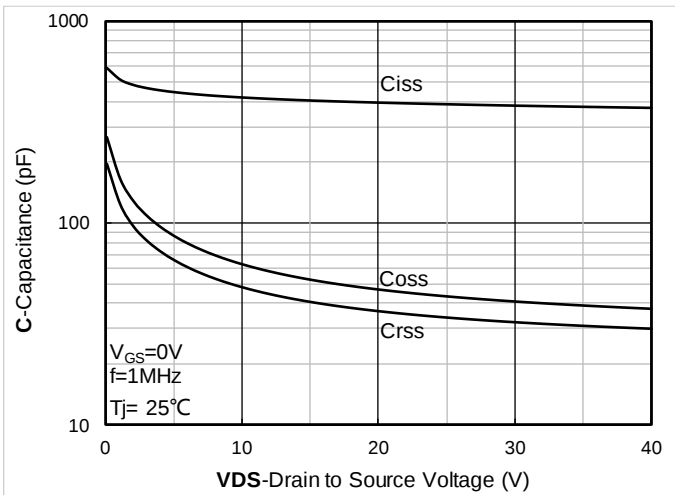


Figure 3. Capacitance Characteristics; typical values

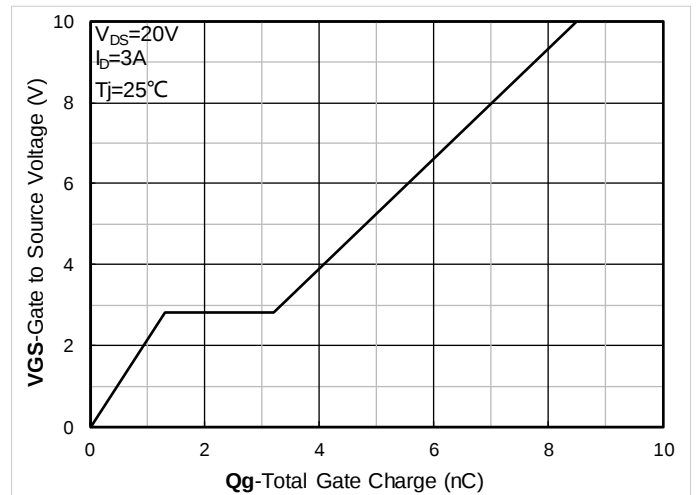


Figure 4. Gate Charge; typical values

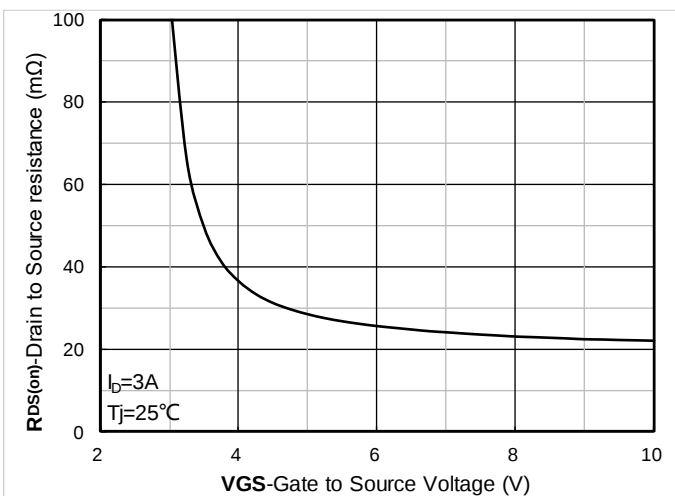


Figure 5. On-Resistance vs. Gate to Source Voltage; typical values

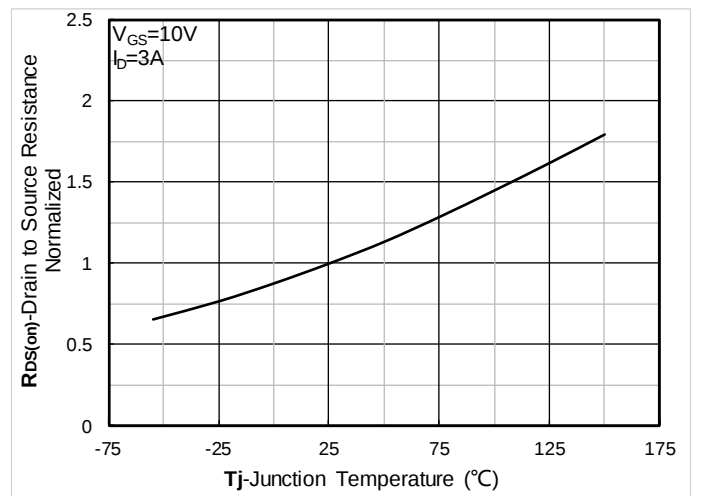


Figure 6. Normalized On-Resistance

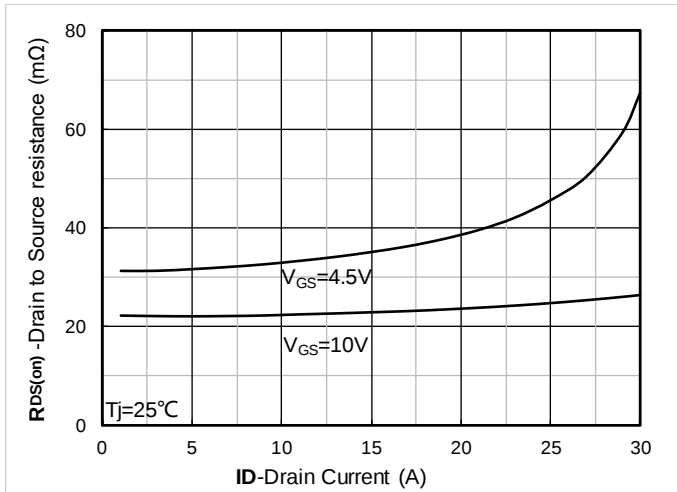


Figure 7. $R_{DS(on)}$ vs. Drain Current; typical values

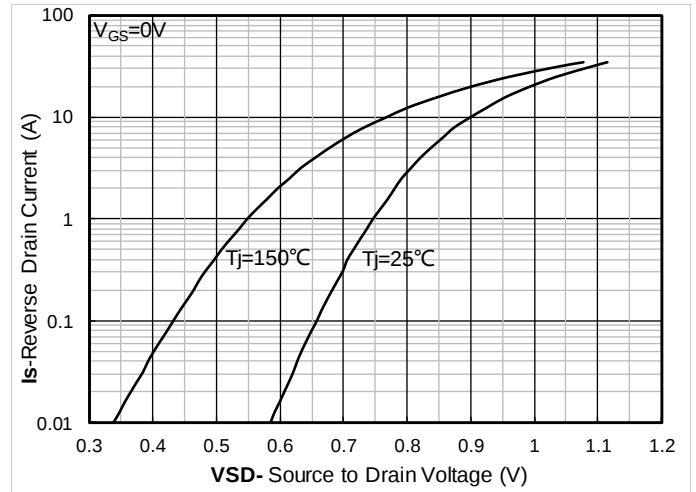


Figure 8. Forward characteristics of reverse diode; typical values

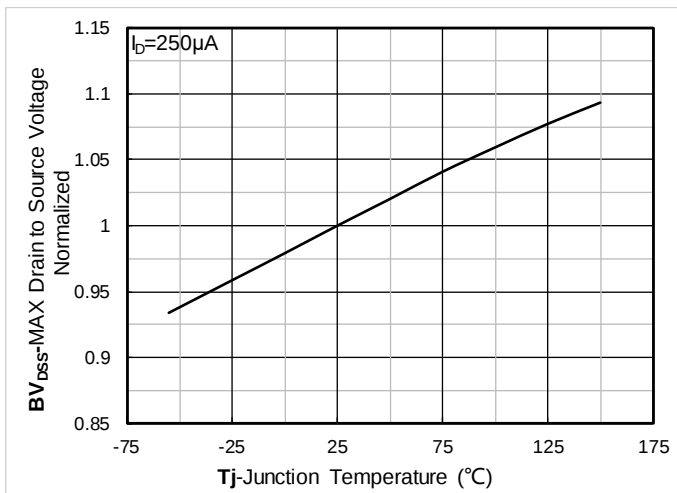


Figure 9. Normalized breakdown voltage

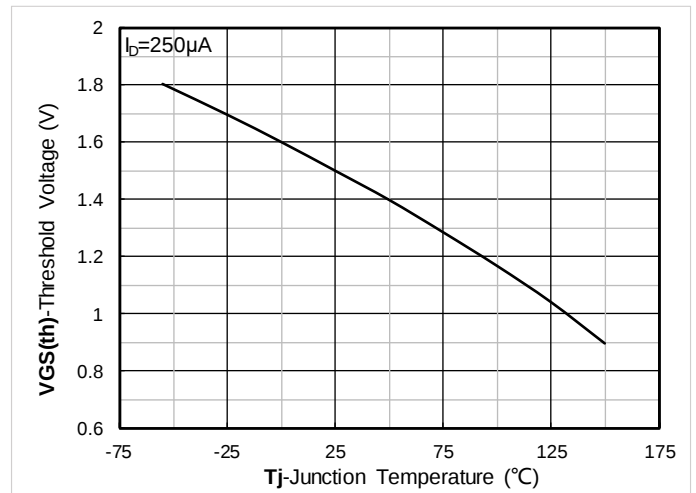


Figure 10. Gate Threshold voltage; typical values

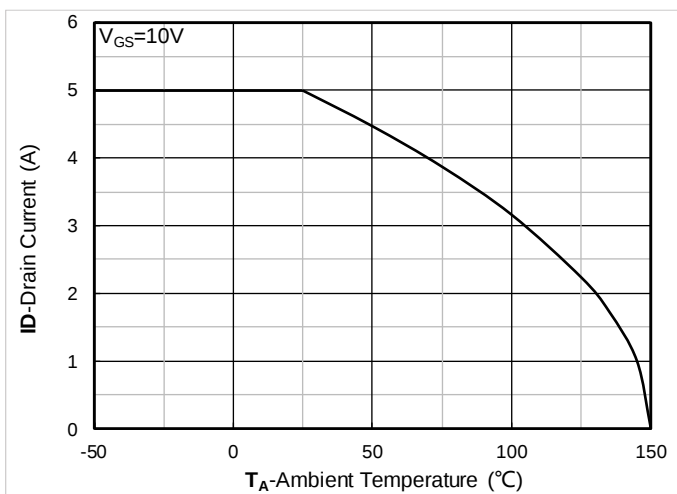


Figure 11. Current dissipation

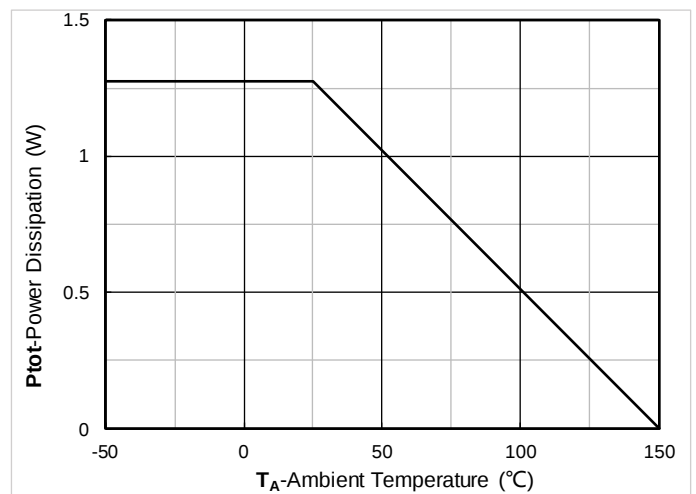


Figure 12. Power dissipation

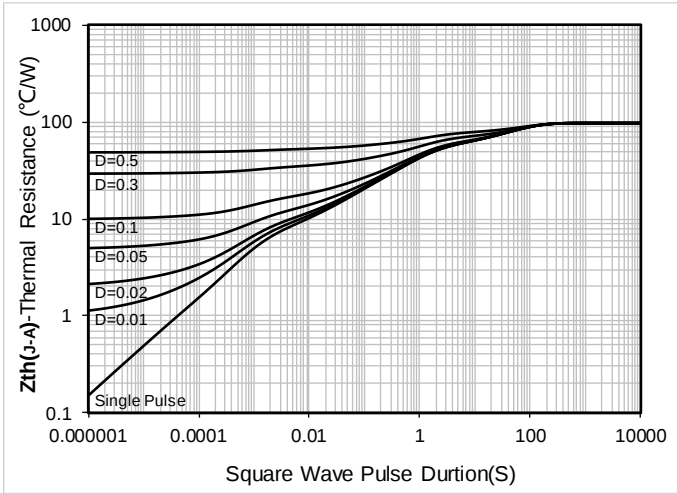


Figure 13. Maximum Transient Thermal Impedance

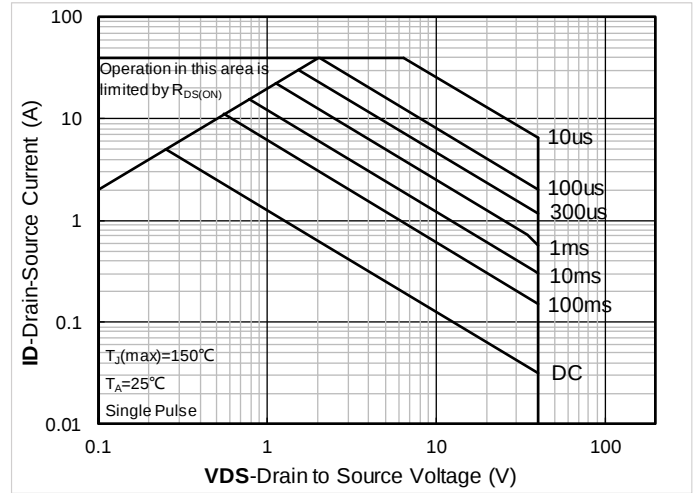


Figure 14. Safe Operation Area

■ PMOS Typical Electrical and Thermal Characteristics Diagrams

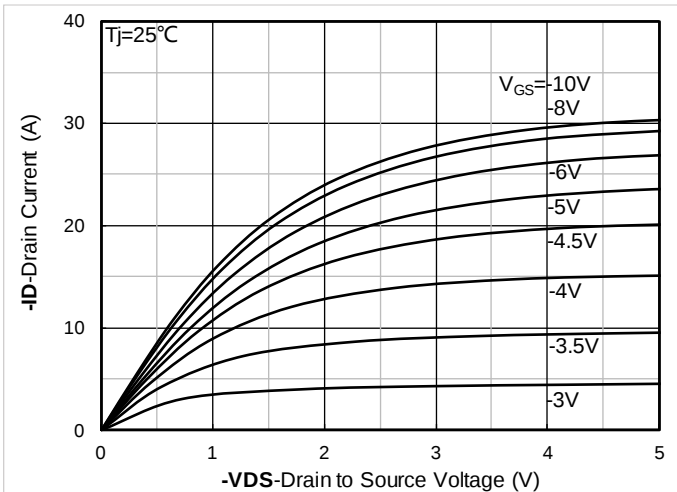


Figure 1. Output Characteristics; typical values

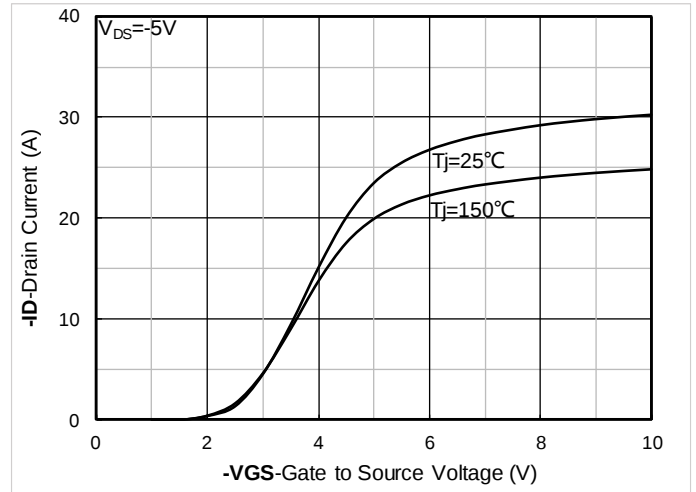


Figure 2. Transfer Characteristics; typical values

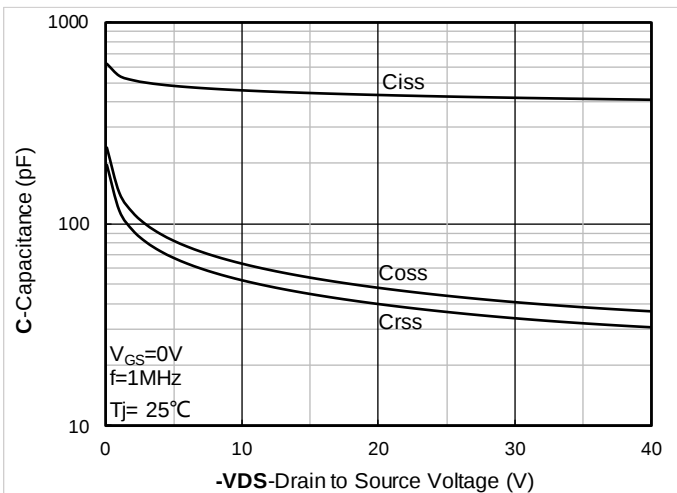


Figure 3. Capacitance Characteristics; typical values

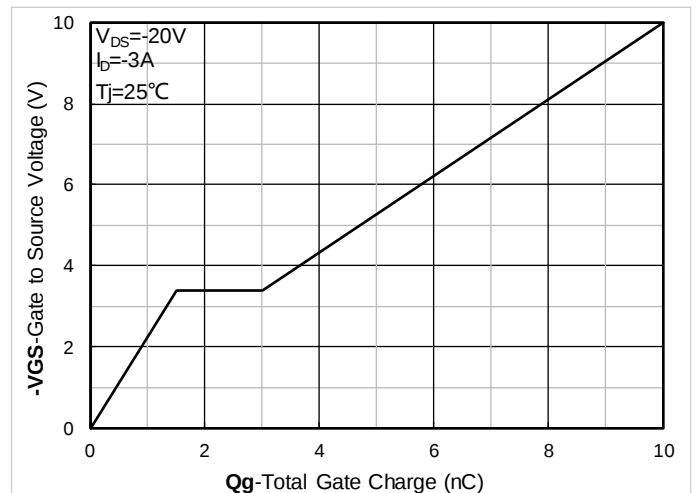


Figure 4. Gate Charge; typical values

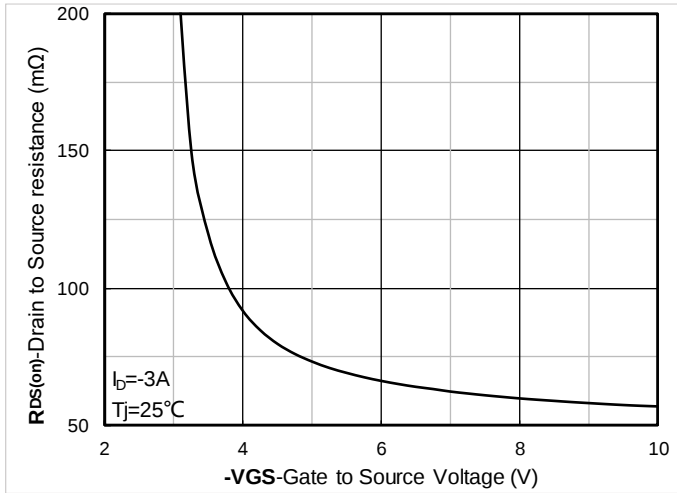


Figure 5. On-Resistance vs. Gate to Source Voltage; typical values

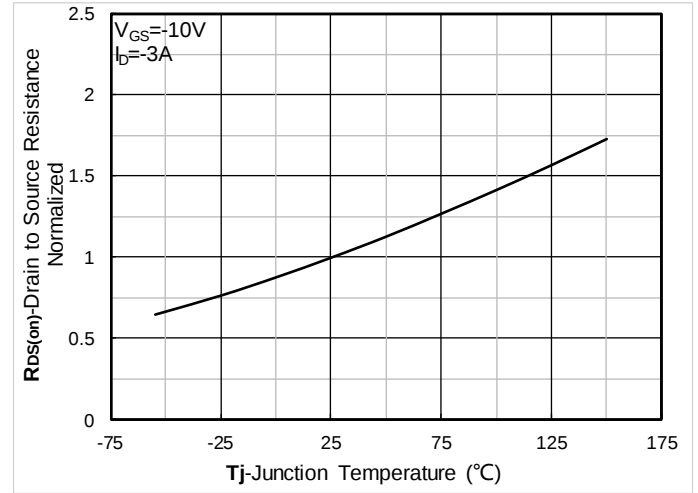


Figure 6. Normalized On-Resistance

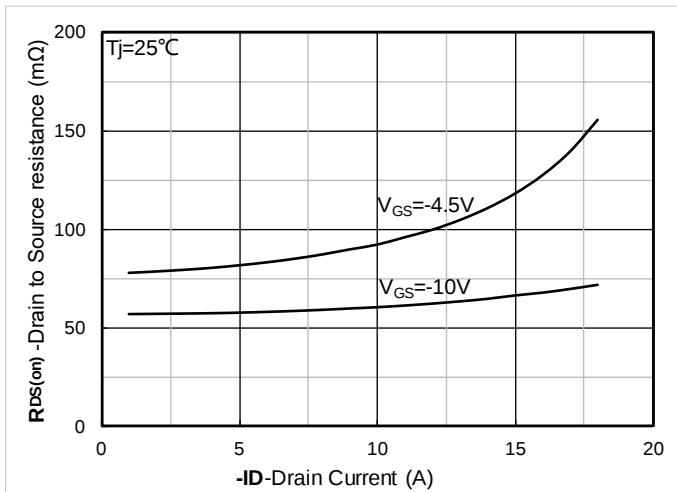


Figure 7. $R_{DS(on)}$ vs. Drain Current; typical values

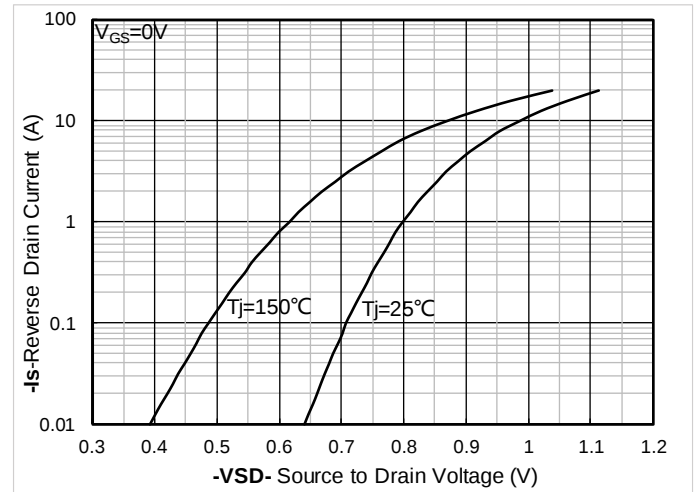


Figure 8. Forward characteristics of reverse diode; typical values

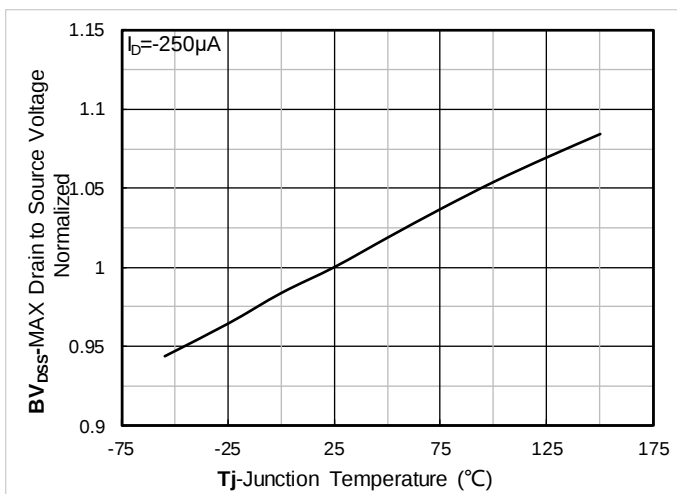


Figure 9. Normalized breakdown voltage

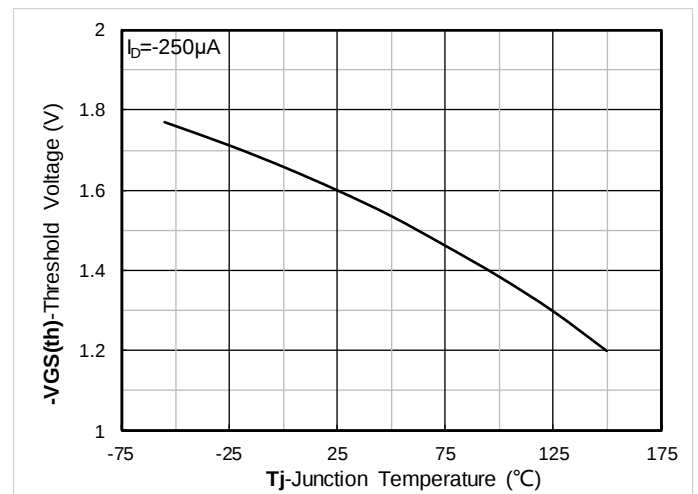


Figure 10. Gate Threshold voltage; typical values

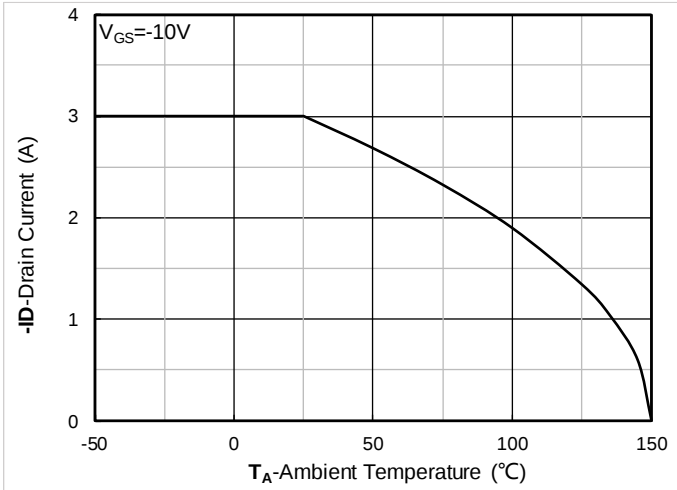


Figure 11. Current dissipation

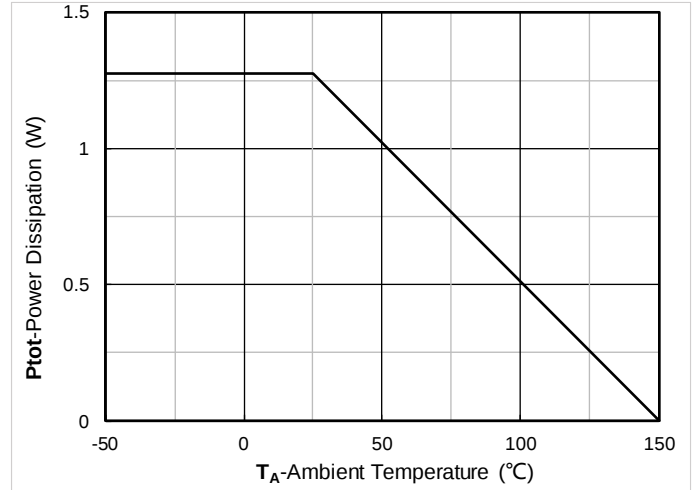


Figure 12. Power dissipation

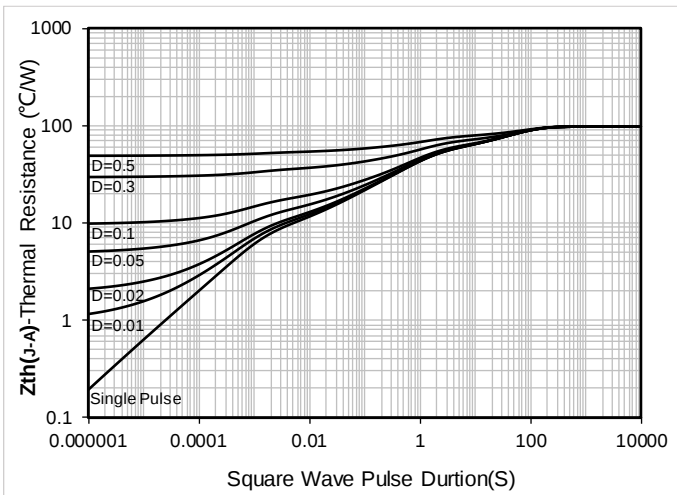


Figure 13. Maximum Transient Thermal Impedance

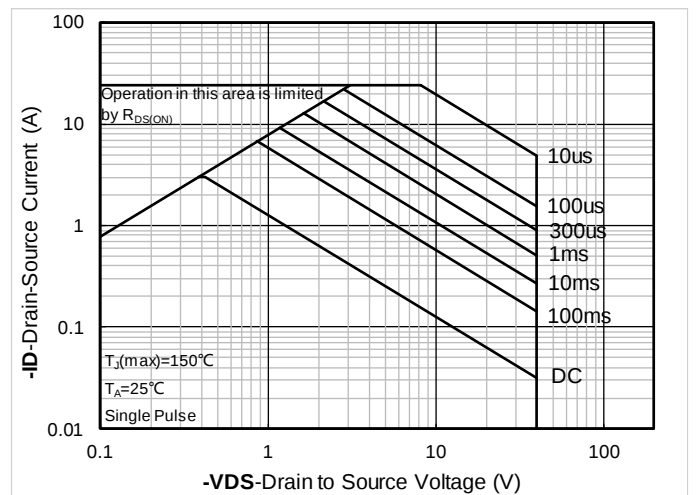
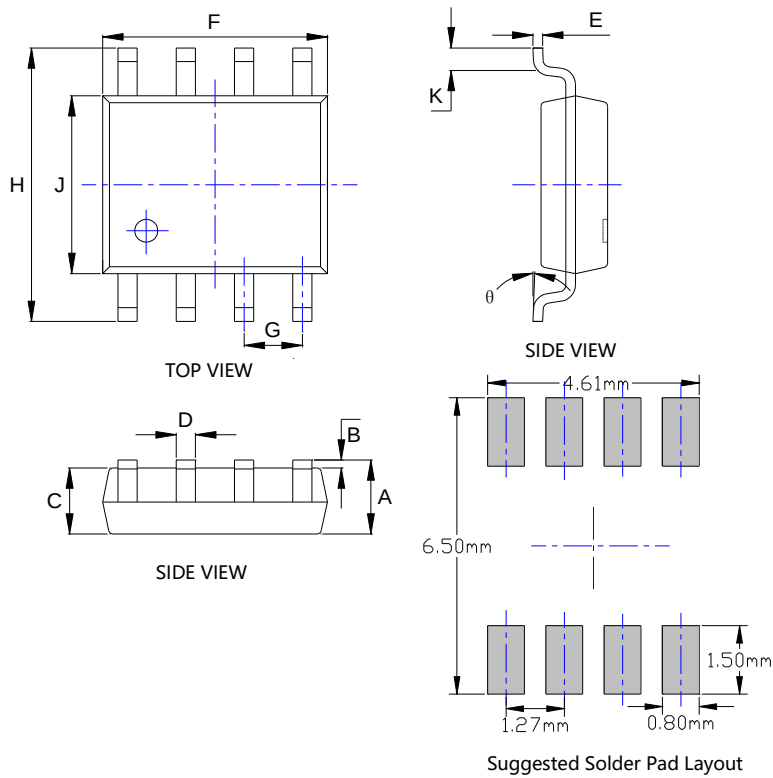


Figure 14. Safe Operation Area

■ SOP-8 Package information

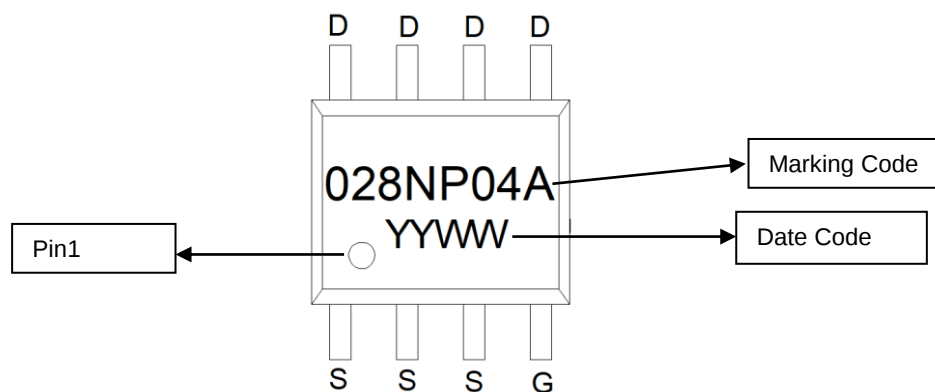


SYMBOL	DIMENSIONS			
	INCHES		Millimeter	
	MIN.	MAX.	MIN.	MAX.
A	0.053	0.069	1.350	1.750
B	0.004	0.010	0.100	0.250
C	0.053	0.061	1.350	1.550
D	0.013	0.020	0.330	0.510
E	0.007	0.010	0.170	0.250
F	0.189	0.197	4.800	5.000
G	0.050BSC		1.270BSC	
H	0.228	0.244	5.800	6.200
J	0.150	0.157	3.800	4.000
K	0.016	0.050	0.400	1.270
θ	0°	8°	0°	8°

Note:

1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.

■ Marking Information



Note:

1. All marking is at middle of the product body
2. All marking is in laser printing
3. 028NP04A is marking code, YYWW is date code, "YY" is year, "WW" is week
4. Body color: Black



Disclaimer

The information presented in this document is for reference only. Yangzhou Yangjie Electronic Technology Co., Ltd. reserves the right to make changes without notice for the specification of the products displayed herein to improve reliability, function or design or otherwise.

The product listed herein is designed to be used with ordinary electronic equipment or devices, and not designed to be used with equipment or devices which require high level of reliability and the malfunction of which would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), Yangjie or anyone on its behalf, assumes no responsibility or liability for any damages resulting from such improper use of sale.

This publication supersedes & replaces all information previously supplied. For additional information, please visit our website <http://www.21yangjie.com> , or consult your nearest Yangjie's sales office for further assistance.