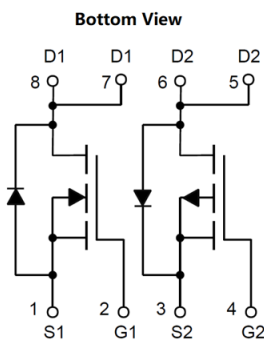
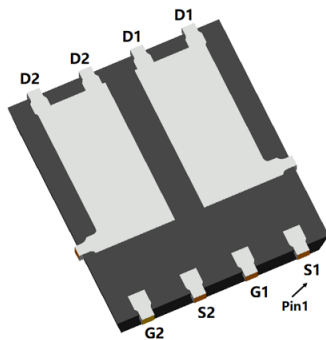
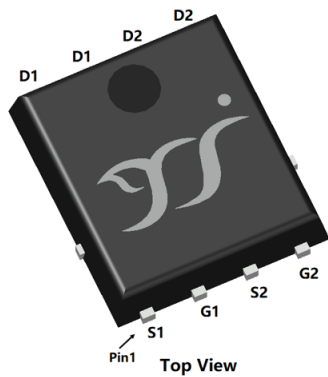


N-Channel and P-Channel Complementary MOSFET



PDFN5060-8L

Product Summary

NMOS

- V_{DS} 60V
- I_D 20A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) $<32m\Omega$
- $R_{DS(ON)}$ (at $V_{GS}=4.5V$) $<37m\Omega$

PMOS

- V_{DS} -60V
- I_D -12A
- $R_{DS(ON)}$ (at $V_{GS}=-10V$) $<110m\Omega$
- $R_{DS(ON)}$ (at $V_{GS}=-4.5V$) $<135m\Omega$

- 100% EAS Tested
- 100% ∇V_{DS} Tested

General Description

- Trench Power LV MOSFET technology
- Excellent package for heat dissipation
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

Applications

- Power Management
- DC Motor Control

Absolute Maximum Ratings ($T_J=25^\circ C$ unless otherwise noted)

Parameter		Symbol	NMOS	PMOS	Unit	
Drain-source Voltage		V_{DS}	60	-60	V	
Gate-source Voltage		V_{GS}	± 20	± 20	V	
Continuous Drain Current (Note 1,2)	Steady-State	I_D	$T_A=25^\circ C$	5	-3	A
			$T_A=100^\circ C$	3	-1.9	
Continuous Drain Current (Note 1,3)	Steady-State	I_D	$T_C=25^\circ C$	20	-12	A
			$T_C=100^\circ C$	12.5	-7.5	
Pulsed Drain Current	$T_C=25^\circ C, t_p=100\mu s$	I_{DM}	60	-30	A	
Avalanche energy	NMOS: $V_G=10V, R_G=25\Omega, L=0.5mH, I_{AS}=12A$		EAS	36	36	mJ
	PMOS: $V_G=-10V, R_G=25\Omega, L=0.5mH, I_{AS}=-12A$					
Total Power Dissipation (Note 1,2)	Steady-State	P_D	$T_A=25^\circ C$	2	2	W
			$T_A=100^\circ C$	0.8	0.8	
Total Power Dissipation (Note 1,3)	Steady-State	P_D	$T_C=25^\circ C$	41	31	W
			$T_C=100^\circ C$	16	12.5	
Junction and Storage Temperature Range		T_J, T_{STG}	-55~+150	-55~+150	$^\circ C$	

Thermal resistance

Parameter		Symbol	NMOS		PMOS		Units
			Typ	Max	Typ	Max	
Thermal Resistance Junction-to-Ambient (Note 2)	Steady-State	$R_{\theta JA}$	50	60	50	60	$^\circ C/W$
Thermal Resistance Junction-to-Case	Steady-State	$R_{\theta JC}$	2.5	3	3.2	4	

Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
YJG12NP06AJ	F1	YJG12NP06AJ	5000	10000	100000	13" reel



YJG12NP06AJ

■ NMOS Electrical Characteristics (T_J=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	60	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =60V, V _{GS} =0V	-	-	1	μA
		V _{DS} =60V, V _{GS} =0V, T _J =150°C	-	-	100	
Gate-Body Leakage Current	I _{GSS}	V _{GS} = ±20V, V _{DS} =0V	-	-	±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =250μA	1	1.5	2.0	V
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =20A	-	24	32	mΩ
		V _{GS} =4.5V, I _D =10A	-	27	37	
Diode Forward Voltage	V _{SD}	I _S =20A, V _{GS} =0V	-	-	1.2	V
Gate resistance	R _G	f=1MHz	-	1.7	-	Ω
Maximum Body-Diode Continuous Current	I _S		-	-	20	A
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{DS} =30V, V _{GS} =0V, f=1MHz	-	1150	-	pF
Output Capacitance	C _{oss}		-	65	-	
Reverse Transfer Capacitance	C _{rss}		-	55	-	
Switching Parameters						
Total Gate Charge	Q _g	V _{GS} =10V, V _{DS} =30V, I _D =20A	-	23	-	nC
Gate-Source Charge	Q _{gs}		-	3.8	-	
Gate-Drain Charge	Q _{gd}		-	4.8	-	
Reverse Recovery Charge	Q _{rr}	I _F =20A, di/dt=100A/us	-	21	-	nC
Reverse Recovery Time	t _{rr}		-	27	-	ns
Turn-on Delay Time	t _{D(on)}	V _{GS} =10V, V _{DD} =30V, I _D =20A R _{GEN} =2.2Ω	-	10	-	ns
Turn-on Rise Time	t _r		-	44	-	
Turn-off Delay Time	t _{D(off)}		-	21	-	
Turn-off fall Time	t _f		-	2.5	-	



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■ PMOS Electrical Characteristics (T_J=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D =-250μA	-60	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-60V, V _{GS} =0V	-	-	-1	μA
		V _{DS} =-60V, V _{GS} =0V, T _J =150°C	-	-	-100	
Gate-Body Leakage Current	I _{GSS}	V _{GS} = ±20V, V _{DS} =0V	-	-	±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =-250μA	-1.2	-1.7	-2.2	V
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =-10V, I _D =-12A	-	85	110	mΩ
		V _{GS} =-4.5V, I _D =-6A	-	100	135	
Diode Forward Voltage	V _{SD}	I _S =-12A, V _{GS} =0V	-	-	-1.2	V
Gate resistance	R _G	f=1MHz	-	5.3	-	Ω
Maximum Body-Diode Continuous Current	I _S		-	-	-12	A
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{DS} =-30V, V _{GS} =0V, f=1MHz	-	900	-	pF
Output Capacitance	C _{oss}		-	44	-	
Reverse Transfer Capacitance	C _{rss}		-	34	-	
Switching Parameters						
Total Gate Charge	Q _g	V _{GS} =-10V, V _{DS} =-30V, I _D =-12A	-	17.3	-	nC
Gate-Source Charge	Q _{gs}		-	1.7	-	
Gate-Drain Charge	Q _{gd}		-	2.7	-	
Reverse Recovery Charge	Q _{rr}	I _F =-12A, di/dt=100A/us	-	21.3	-	nC
Reverse Recovery Time	t _{rr}		-	20.6	-	ns
Turn-on Delay Time	t _{D(on)}	V _{GS} =-10V, V _{DD} =-30V, I _D =-12A R _{GEN} =2.7Ω	-	20.8	-	ns
Turn-on Rise Time	t _r		-	7.4	-	
Turn-off Delay Time	t _{D(off)}		-	49.6	-	
Turn-off fall Time	t _f		-	5.9	-	

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_{θJA} is measured with the device mounted on the 40mm*40mm*1.1mm single layer FR-4 PCB board with 1 in² pad of 2oz. Copper, in the still air environment with TA =25°C. The maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.
3. Thermal resistance from junction to soldering point (on the exposed drain pad).



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■ NMOS Typical Electrical and Thermal Characteristics Diagrams

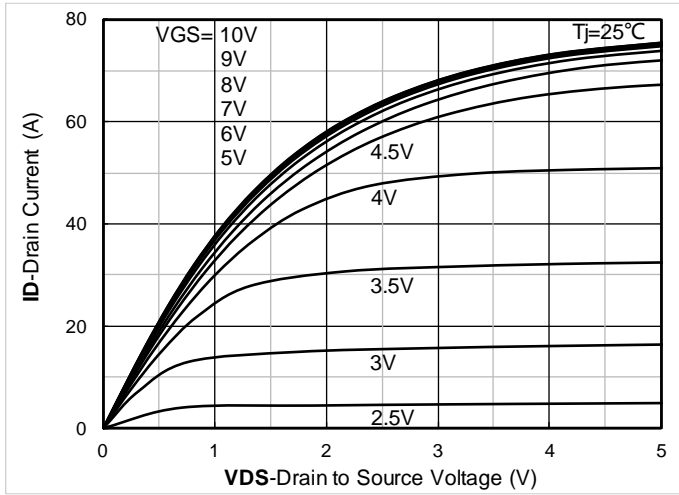


Figure 1. Output Characteristics

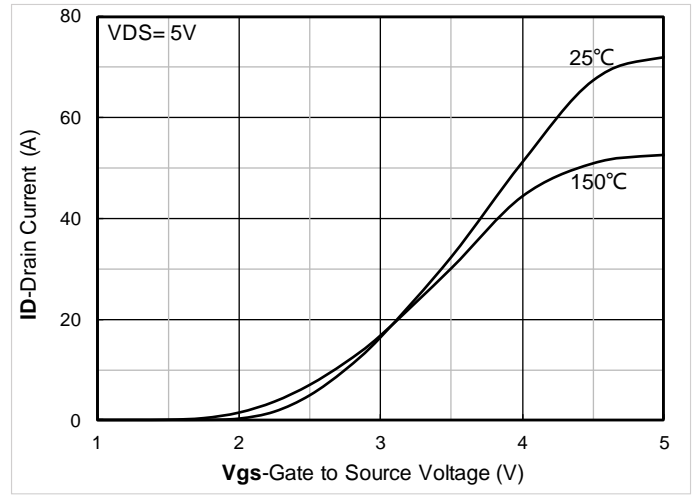


Figure 2. Transfer Characteristics

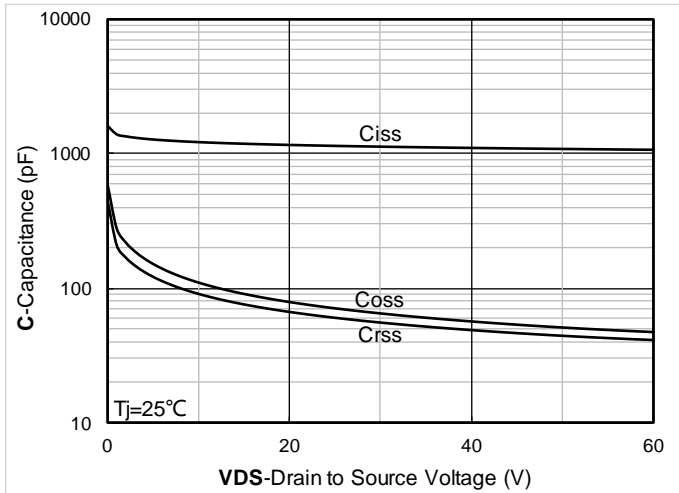


Figure 3. Capacitance Characteristics

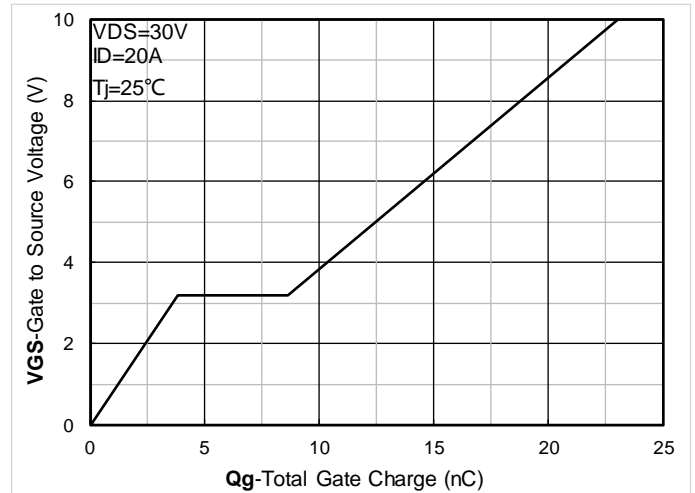


Figure 4. Gate Charge

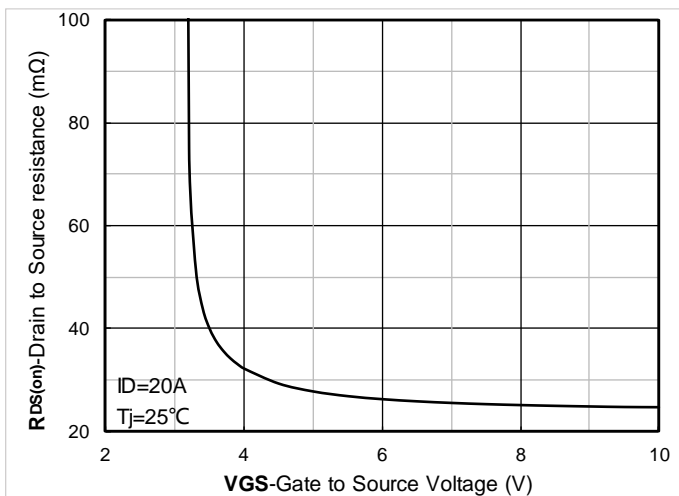


Figure 5. On-Resistance vs Gate to Source Voltage

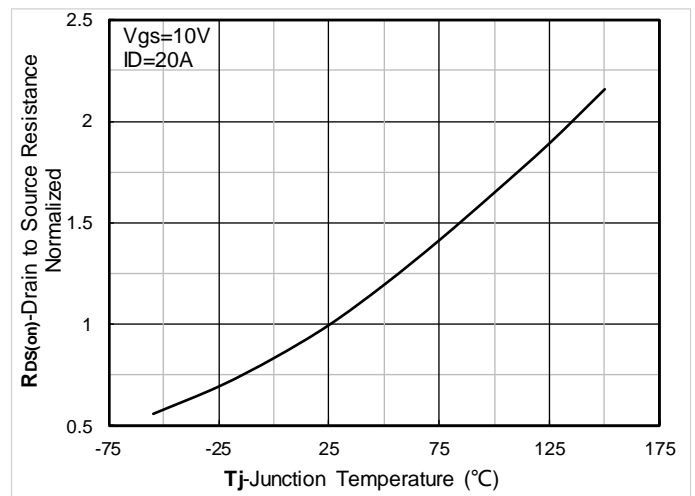


Figure 6. Normalized On-Resistance



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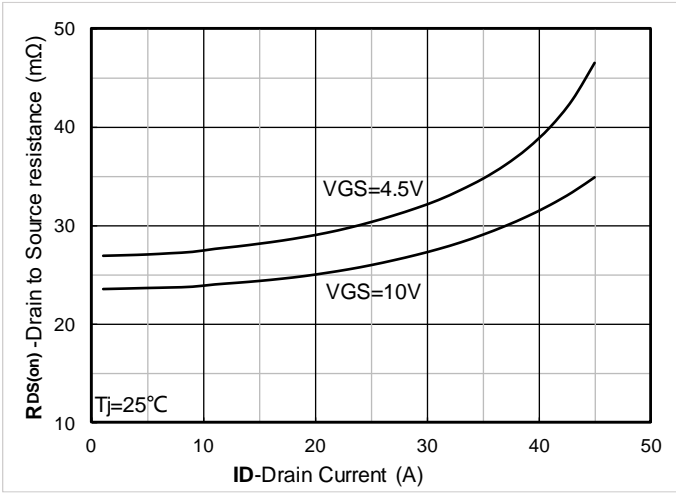


Figure 7. $R_{DS(on)}$ VS Drain Current

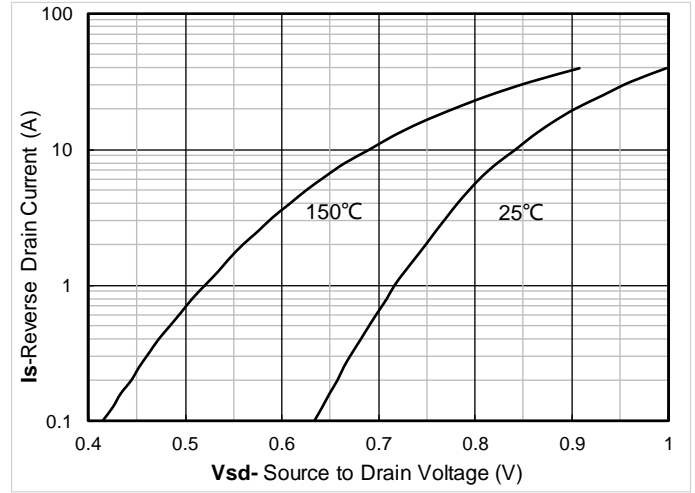


Figure 8. Forward characteristics of reverse diode

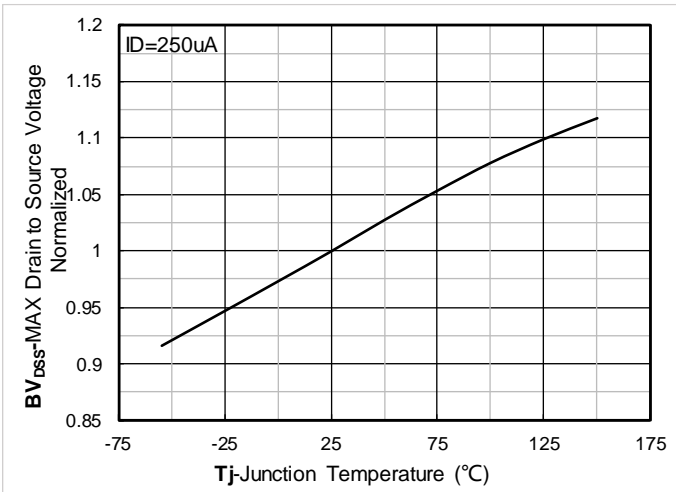


Figure 9. Normalized breakdown voltage

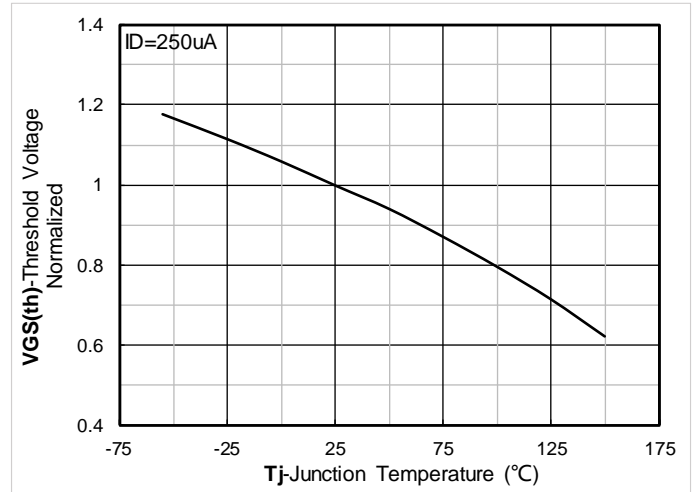


Figure 10. Normalized Threshold voltage

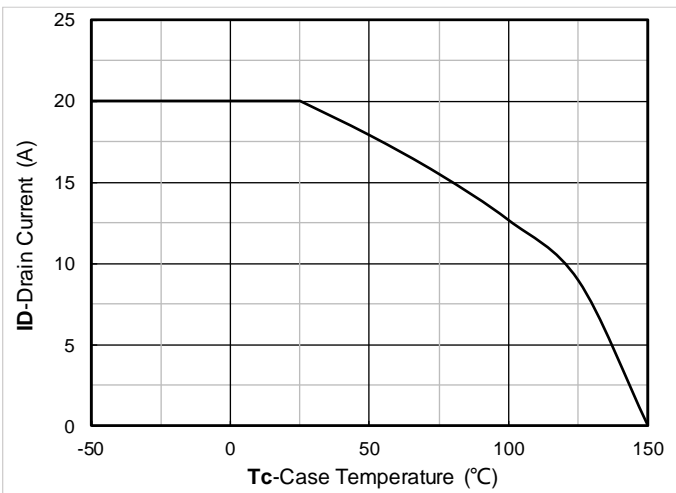


Figure 11. Current dissipation

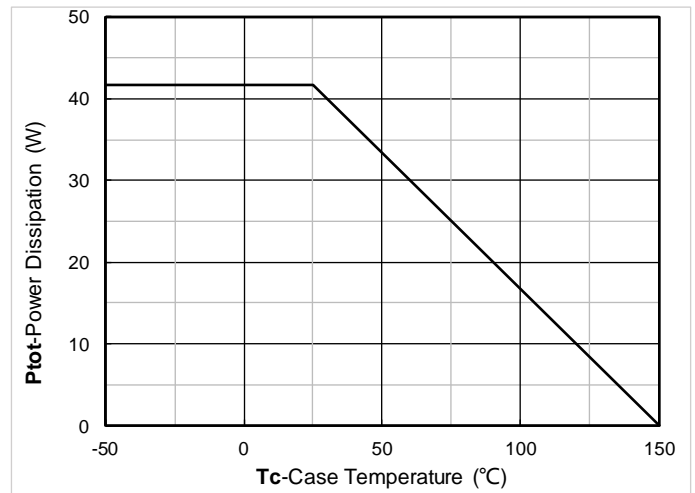


Figure 12. Power dissipation

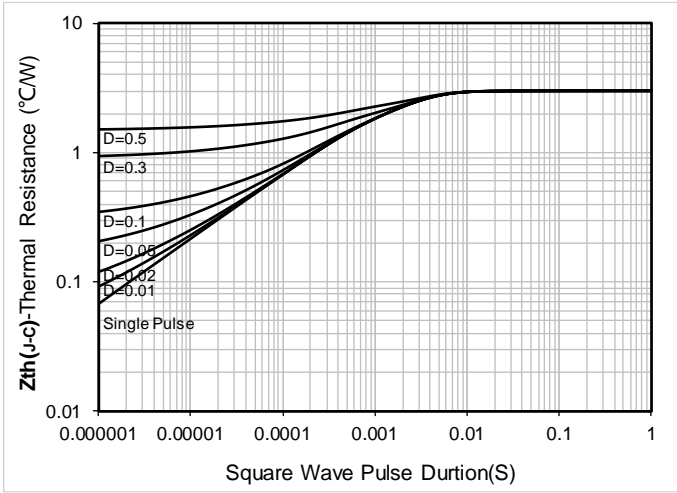


Figure 13. Maximum Transient Thermal Impedance

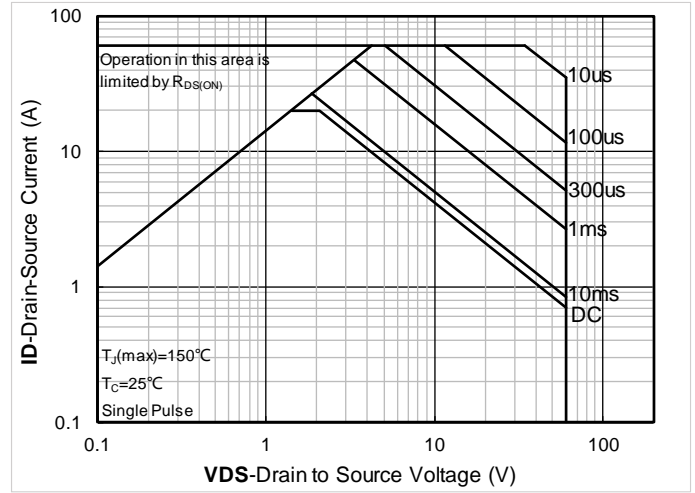


Figure 14. Safe Operation Area

PMOS Typical Electrical and Thermal Characteristics Diagrams

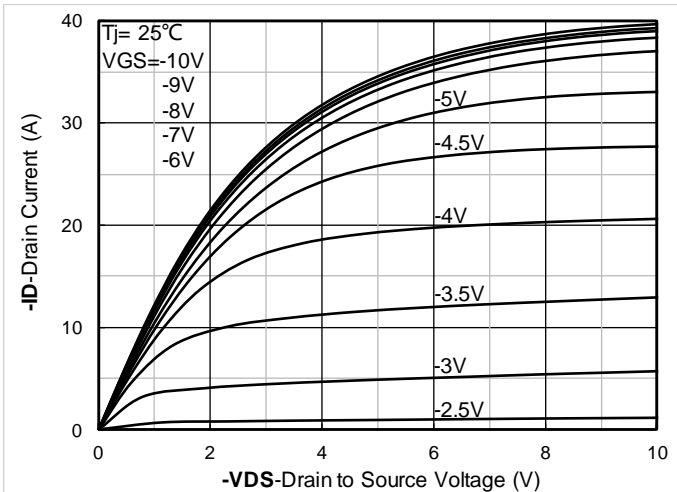


Figure 1. Output Characteristics

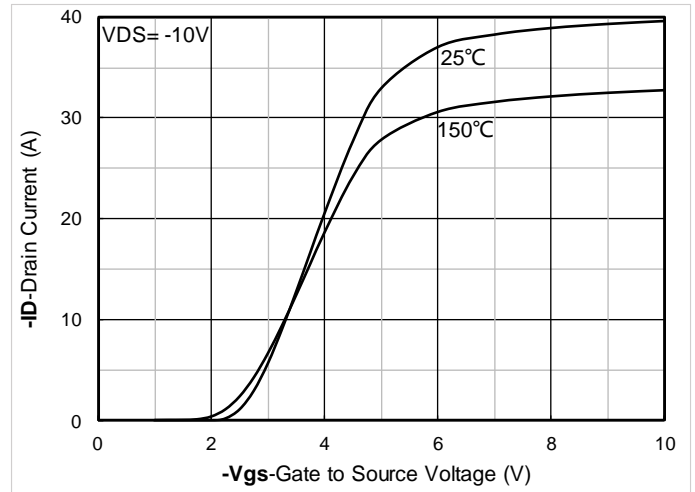


Figure 2. Transfer Characteristics

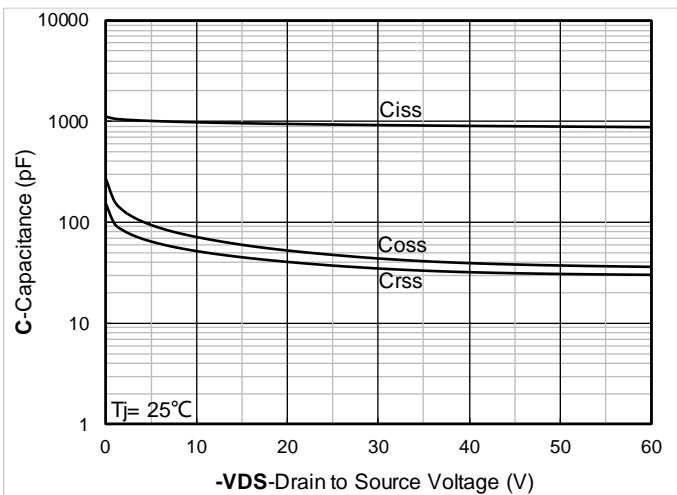


Figure 3. Capacitance Characteristics

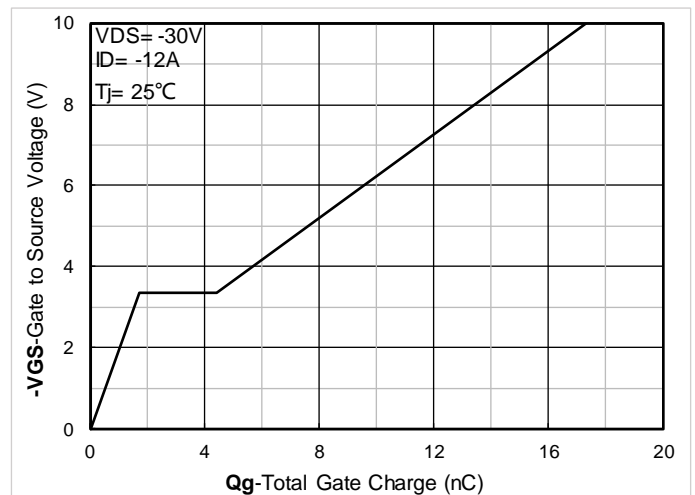


Figure 4. Gate Charge



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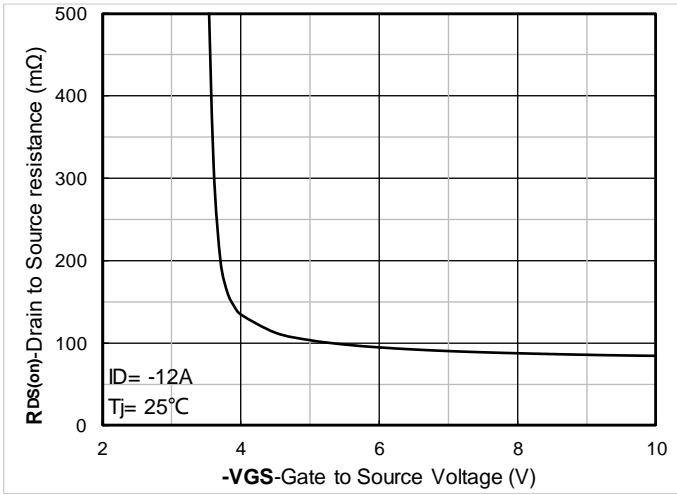


Figure 5. On-Resistance vs Gate to Source Voltage

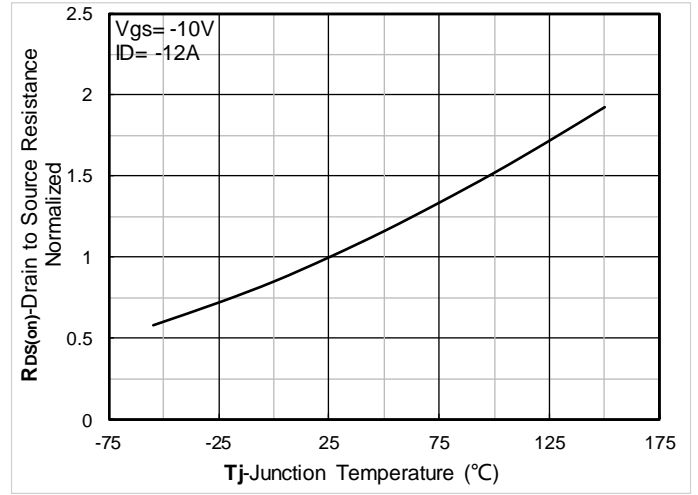


Figure 6. Normalized On-Resistance

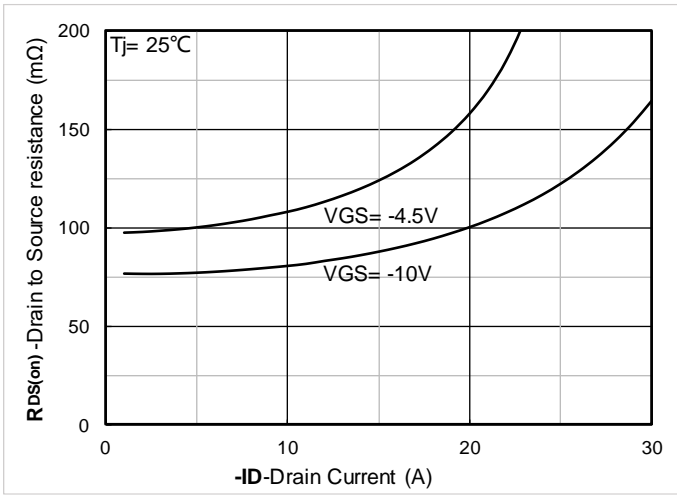


Figure 7. RDS(on) VS Drain Current

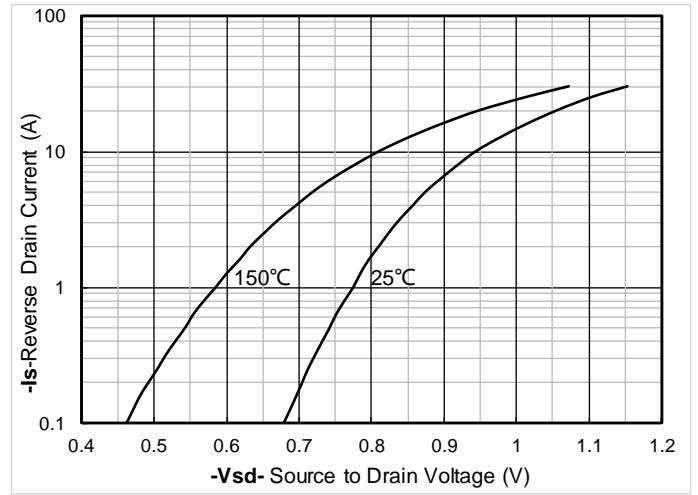


Figure 8. Forward characteristics of reverse diode

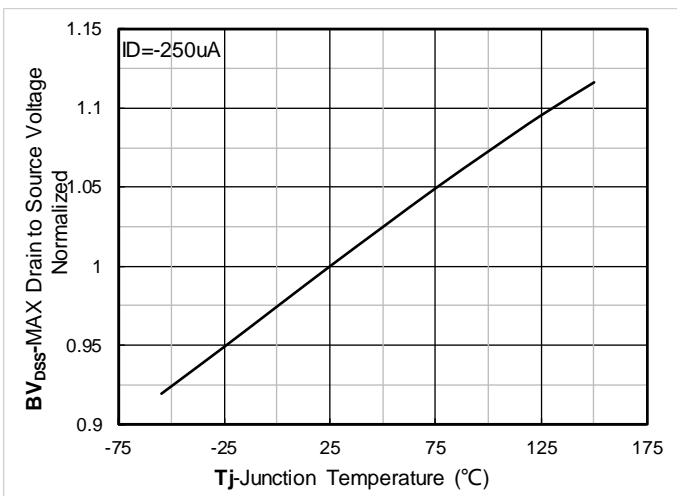


Figure 9. Normalized breakdown voltage

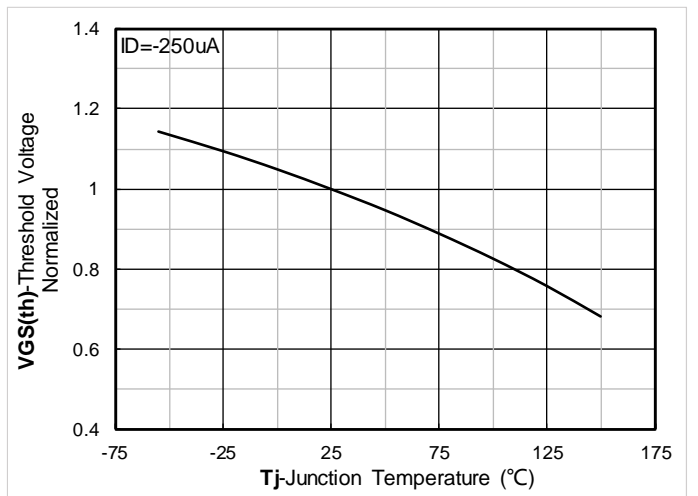


Figure 10. Normalized Threshold voltage



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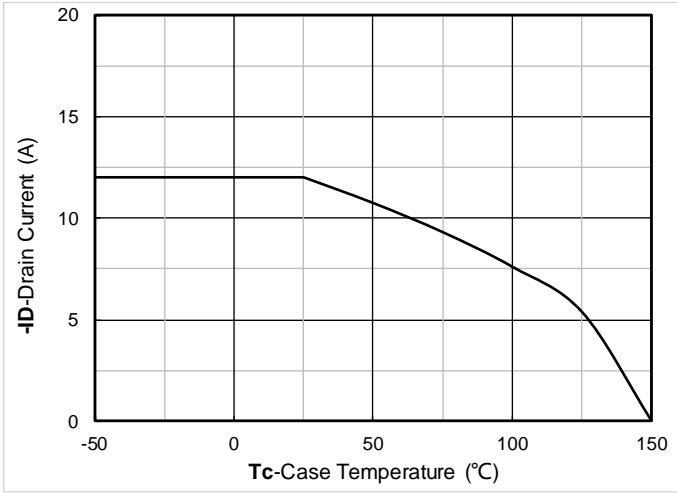


Figure 11. Current dissipation

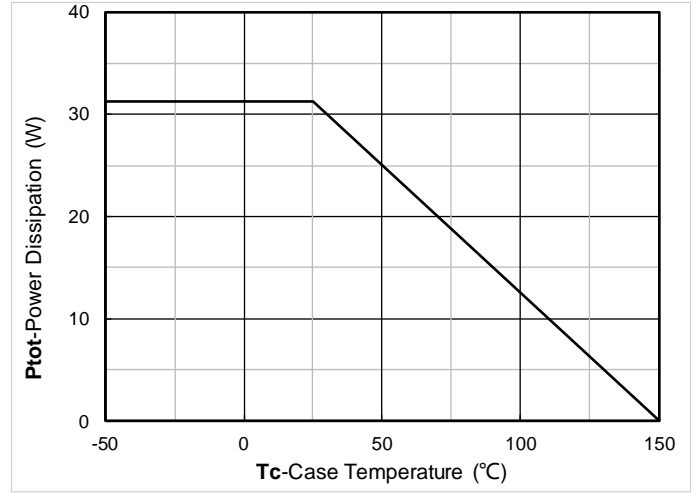


Figure 12. Power dissipation

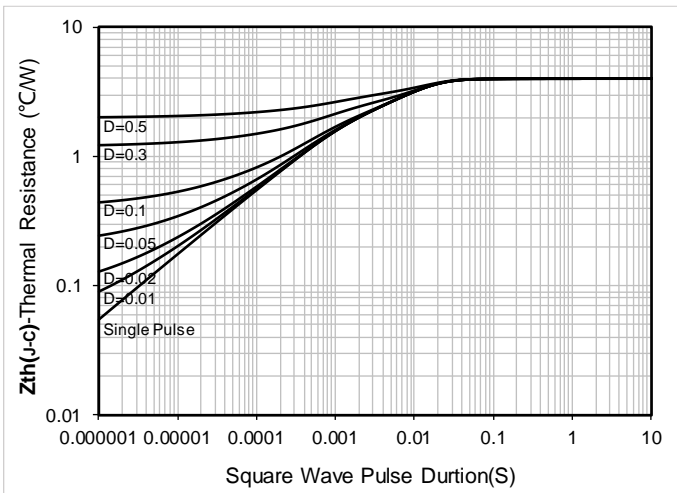


Figure 13. Maximum Transient Thermal Impedance

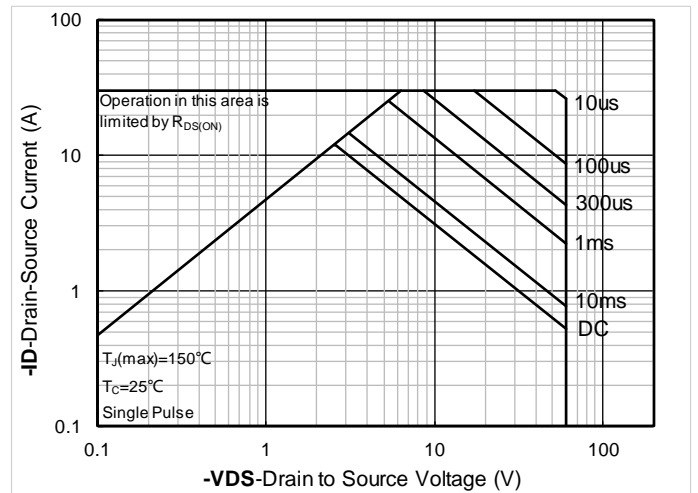
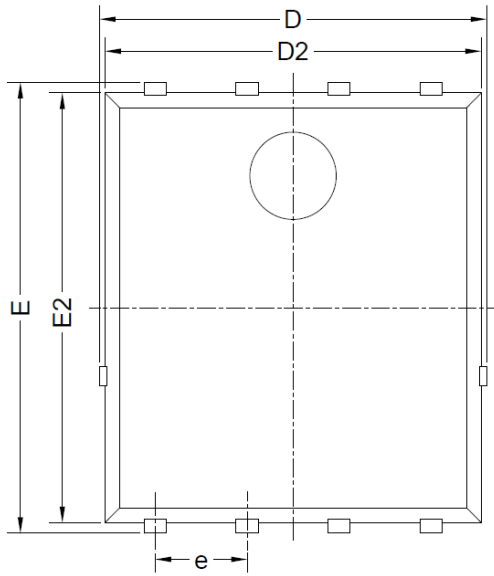


Figure 14. Safe Operation Area

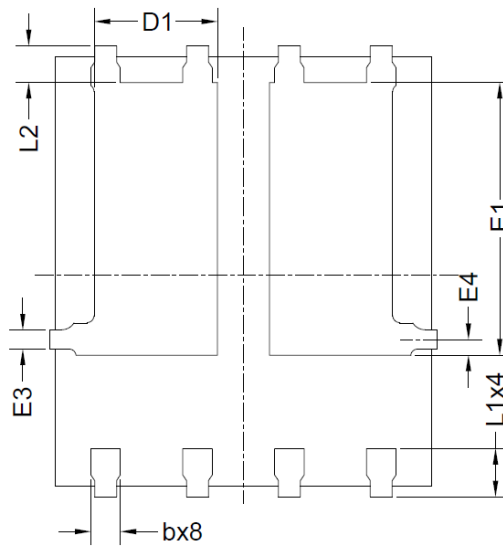


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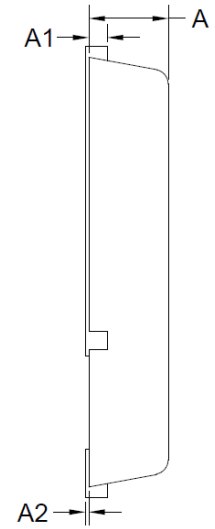
■ PDFN5060-8L-E-1.1MM Package information



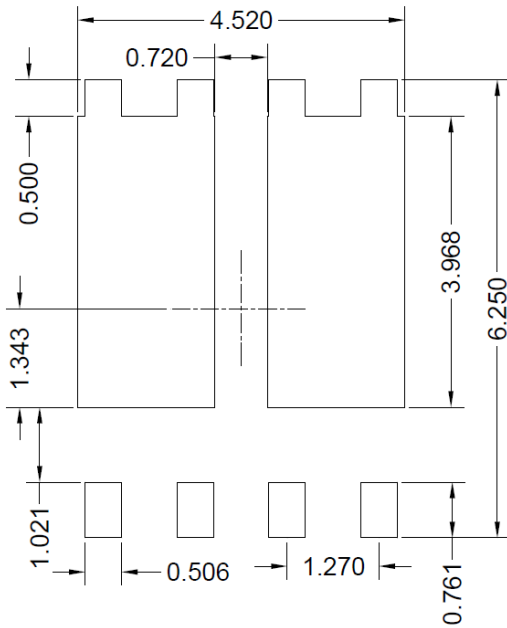
Top View
正面视图



Bottom View
背面视图



Side View
侧面视图



Suggested Solder Pad Layout
Top View

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
D	5.15	5.35	5.55
E	5.95	6.15	6.35
A	1.00	1.10	1.20
A1	0.254 BSC		
A2			0.10
D1	1.50	1.70	1.90
E1	3.52	3.72	3.92
D2	5.00	5.20	5.40
E2	5.66	5.86	6.06
E3	0.254REF		
E4	0.21REF		
L1	0.56	0.66	0.76
L2	0.50 BSC		
b	0.31	0.41	0.51
e	1.27 BSC		

Note:

1. Controlling dimension: in millimeters.
2. General tolerance: ± 0.10 mm.
3. The pad layout is for reference purposes only.



YJG12NP06AJ

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