KS3610NB

Complementary Advanced Power MOSFET

Features

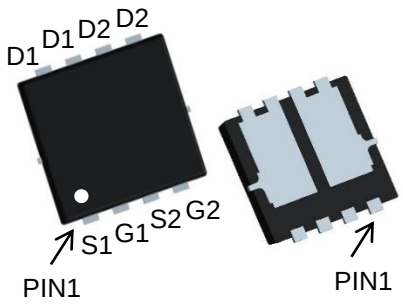
• N-Channel
30V/45A,
$R_{DS\ (ON)}$ =6.5mΩ(Typ.) @ V_{GS}=10V
$R_{DS\ (ON)}$ =9mΩ(Typ.) @ V_{GS}=4.5V
• P-Channel
-30V/-40A,
$R_{DS\ (ON)}$ =9mΩ (Typ.) @ V_{GS}=-10V
$R_{DS\ (ON)}$ =12mΩ (Typ.) @ V_{GS}=-4.5V
• Very low on-resistance
• Fast Switching

Applications

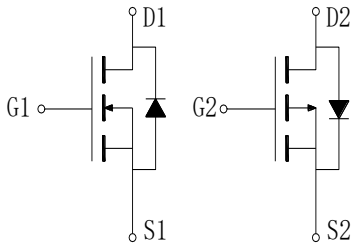
• Motor Drive Applications

RoHS Pb HF Halogen-Free

Pin Description



PDFN5060 DP1



Complementary MOSFET

Absolute Maximum Ratings

Symbol	Parameter		N-Channel	P-Channel	Unit
Common Ratings (T_A=25°C Unless Otherwise Noted)					
V_{DSS}	Drain-Source Voltage		30	-30	V
V_{GSS}	Gate-Source Voltage		±20	±20	
T_J	Maximum Junction Temperature		150	150	°C
T_{STG}	Storage Temperature Range		-55 to 150	-55 to 150	°C
I_S	Diode Continuous Forward Current	T_C=25°C	45	-40	A
Mounted on Large Heat Sink					
I_{DP} ①	300μs Pulse Drain Current Tested	T_C=25°C	180	-160	A
I_D ②	Continuous Drain Current@T_C(V_{GS}=±10V)	T_C=25°C	45	-40	A
		T_C=100°C	29	-25	
	Continuous Drain Current@T_A(V_{GS}=±10V) ③	T_A=25°C	14	-12	
		T_A=70°C	11	-9	
P_D	Maximum Power Dissipation@T_C	T_C=25°C	27	30	W
		T_C=100°C	11	12	
	Maximum Power Dissipation@T_A ③	T_A=25°C	3.1	3.1	
		T_A=70°C	2	2	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		4.6	4.2	°C/W
$R_{\theta JA}$ ③	Thermal Resistance-Junction to Ambient		40	40	°C/W
Drain-Source Avalanche Ratings					
E_{AS} ④	Avalanche Energy, Single Pulsed		56	25	mJ

Electrical Characteristics (T_A=25°C Unless Otherwise Noted)

Symbol	Parameter	Test Condition		KS3610NB Min.	KS3610NB Typ.	KS3610NB Max.	Unit
Static Characteristics							
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250μA	N	30			V
		V_{GS}=0V, I_{DS}=-250μA	P	-30			
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V, V_{GS}=0V	N			1	μA
		T_J=125°C	N			30	
		V_{DS}=-30V, V_{GS}=0V	P			-1	
		T_J=125°C	P			-30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	N	1.2	1.6	2.3	V
		V_{DS}=V_{GS}, I_{DS}=-250μA	P	-1.3	-1.7	-2.3	
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V	N			±100	nA
		V_{GS}=±20V, V_{DS}=0V	P			±100	
$R_{DS(ON)}$ ⑤	Drain-Source On-state Resistance	V_{GS}=10V, I_{DS}=20A	N		6.5	8	mΩ
		V_{GS}=-10V, I_{DS}=-20A	P		9	11	
		V_{GS}=4.5V, I_{DS}=16A	N		9	12	
		V_{GS}=-4.5V, I_{DS}=-16A	P		12	15	
Diode Characteristics							
V_{SD} ⑤	Diode Forward Voltage	I_{SD}=20A, V_{GS}=0V	N		0.88	1.2	V
		I_{SD}=-20A, V_{GS}=0V	P		-0.89	-1.2	
t_{rr}	Reverse Recovery Time	N-Channel I_{SD}=20A, dI_{SD}/dt=100A/μs	N		15		ns
			P		34		
Q_{rr}	Reverse Recovery Charge	P-Channel I_{SD}=-20A, dI_{SD}/dt=100A/μs	N		79		nC
			P		6		
Dynamic Characteristics ⑥							
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz	N		3.2		Ω
			P		3.4		
C_{iss}	Input Capacitance	N-Channel V_{GS}=0V,V_{DS}=15V, Frequency=1.0MHz	N		1980		pF
			P		4750		
C_{oss}	Output Capacitance	P-Channel V_{GS}=0V,V_{DS}=-15V, Frequency=1.0MHz	N		320		
			P		545		
C_{rss}	Reverse Transfer Capacitance		N		240		
			P		490		

Electrical Characteristics (T_A=25°C Unless Otherwise Noted)

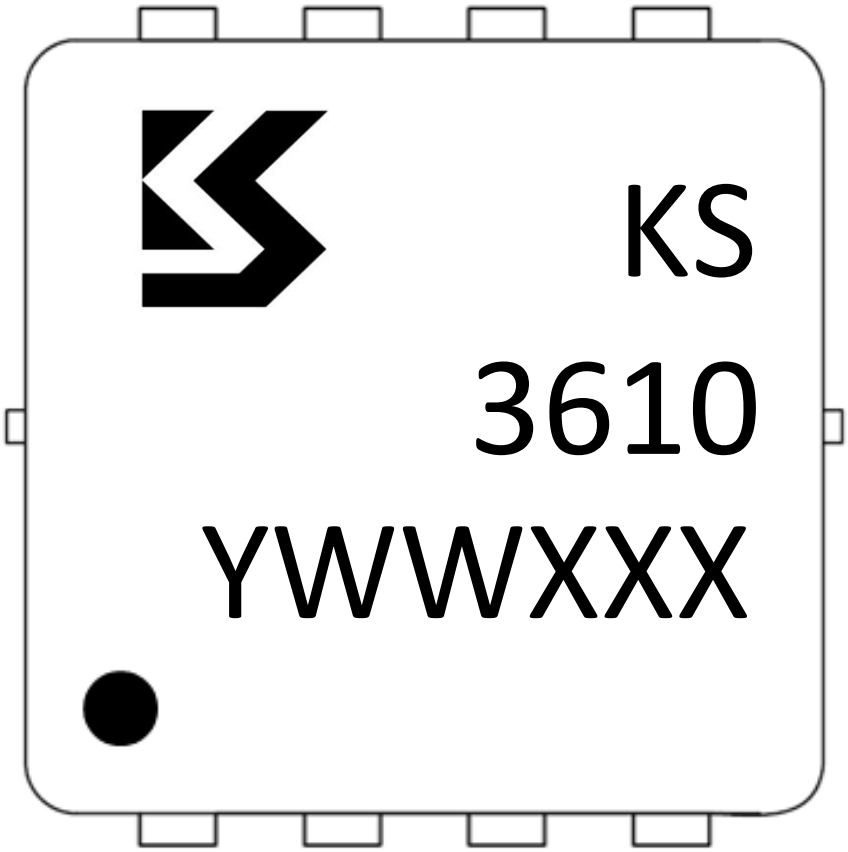
Symbol	Parameter	Test Condition		KS3610NB			Unit
				Min.	Typ.	Max.	
Dynamic Characteristics⑥							
$t_{d(ON)}$	Turn-on Delay Time	N-Channel V_{DD}=15V, I_{DS}=20A, V_{GEN}=10V, R_G=3Ω P-Channel V_{DD}=-15V, I_{DS}=-20A, V_{GEN}= -10V, R_G=3Ω	N		12		ns
			P		23		
t_r	Turn-on Rise Time		N		36		
			P		65		
$t_{d(OFF)}$	Turn-off Delay Time		N		49		
			P		52		
t_f	Turn-off Fall Time		N		12		
			P		19		
Gate Charge Characteristics⑥							
Q_g	Total Gate Charge	N-Channel V_{DS}=15V, V_{GS}=10V, I_{DS}=20A P-Channel V_{DS}=-15V, V_{GS}= -10V, I_{DS}=-20A	N		45		nC
			P		89		
Q_{gs}	Gate-Source Charge		N		3		
			P		14		
Q_{gd}	Gate-Drain Charge		N		15		
			P		19		

Notes:

①Pulse width limited by safe operating area.
②Calculated continuous current based on maximum allowable junction temperature.
③When mounted on 1 inch square copper board, t≤10sec. The value in any given application depends on the user's specific board design.
④Limited by $T_{Jmax.}$ Starting T_J = 25°C, N Chanel: L = 0.5mH,R_G = 25Ω, I_{AS} = 15A, V_{GS} =10V, P-Chanel: L = 0.5mH, R_G = 25Ω, I_{AS} = -10A, V_{GS} =-10V, Part not recommended for use above this value.
⑤Pulse test;Pulse width≤300μs, duty cycle≤2%.
⑥Guaranteed by design, not subject to production testing.

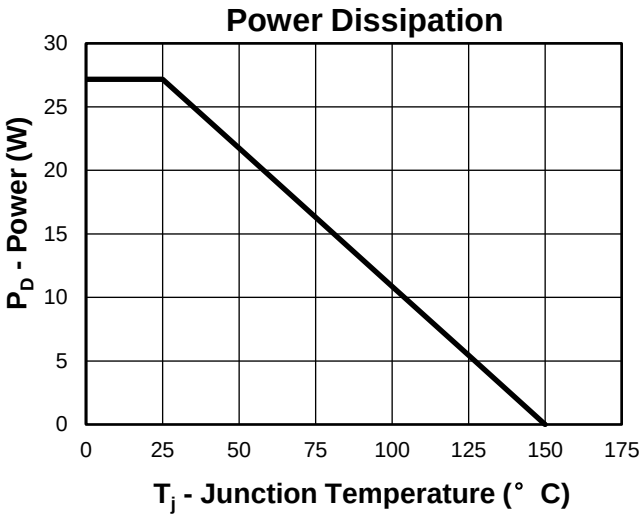
Ordering and Marking Information

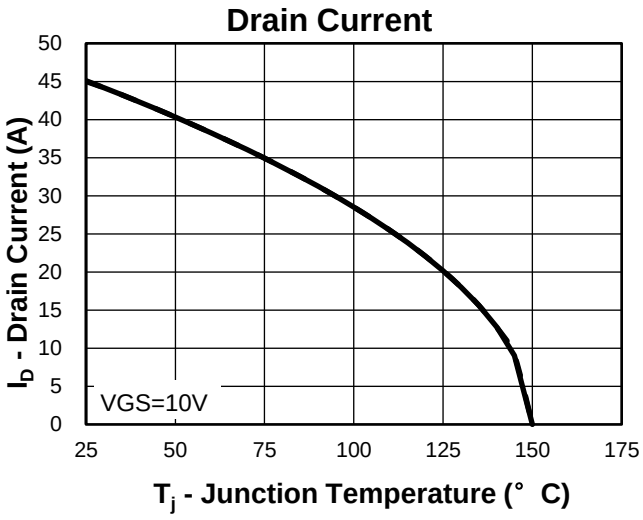
Device	Package	Packaging	Quantity	Reel Size	Tape width
KS3610NB	PDFN5060 DP1	Tape&Reel	5000	13"	12mm

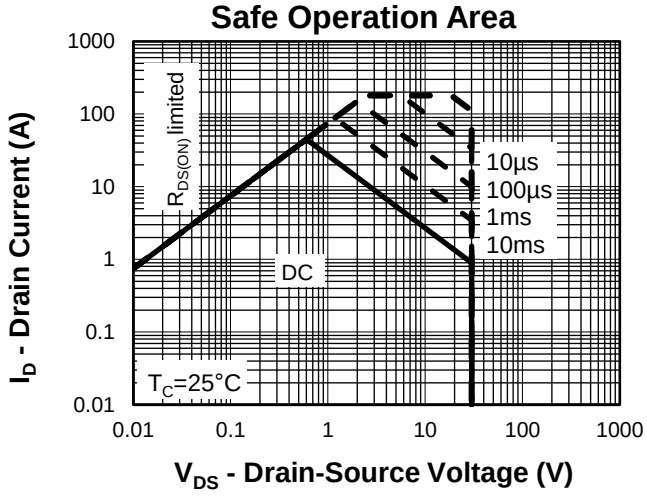


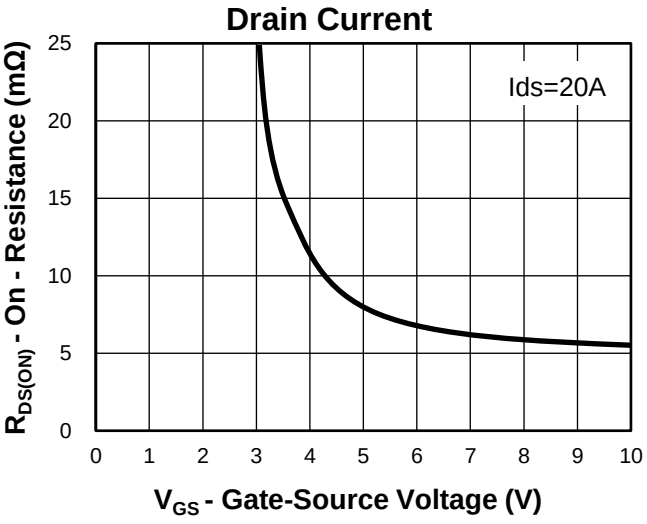
Y =Year,2017-A,2018-B,etc.
WW =Week.
XXX =Lot number.

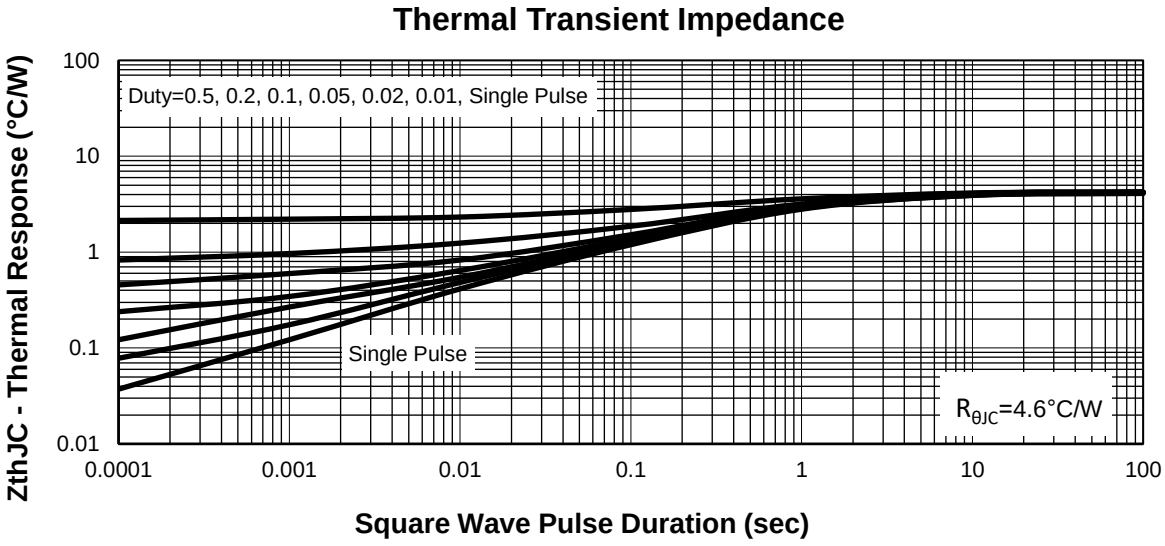
Typical Characteristics(N-Channel)





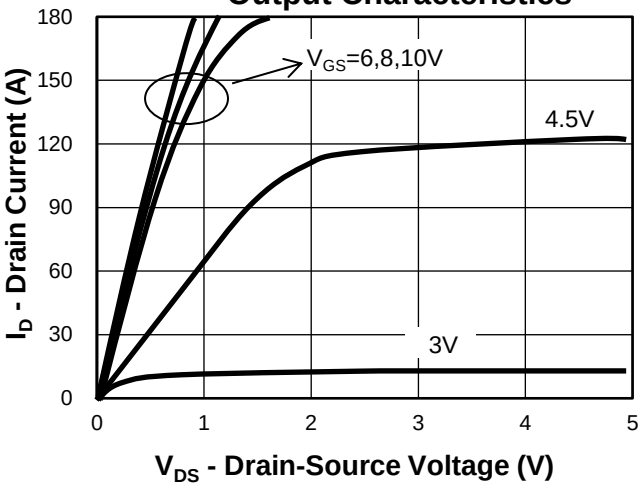




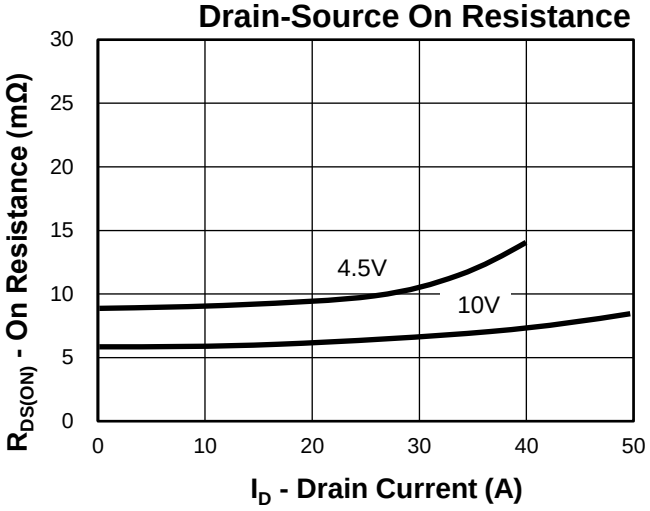


Typical Characteristics(N-Channel)

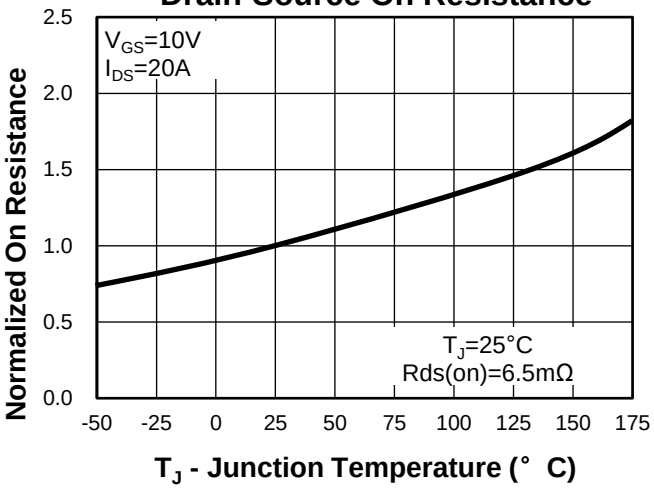
Output Characteristics



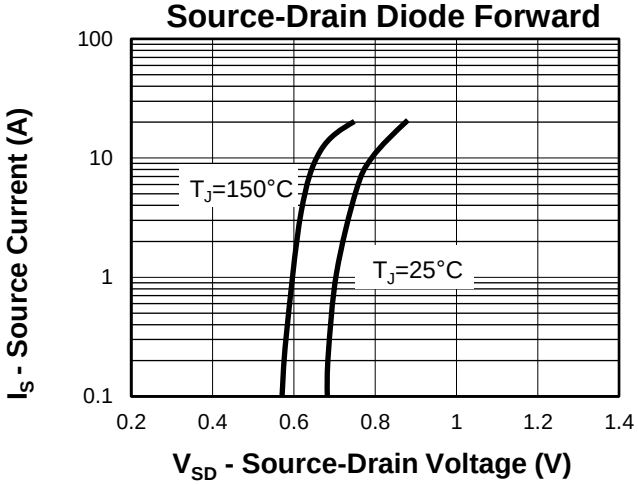
Drain-Source On Resistance



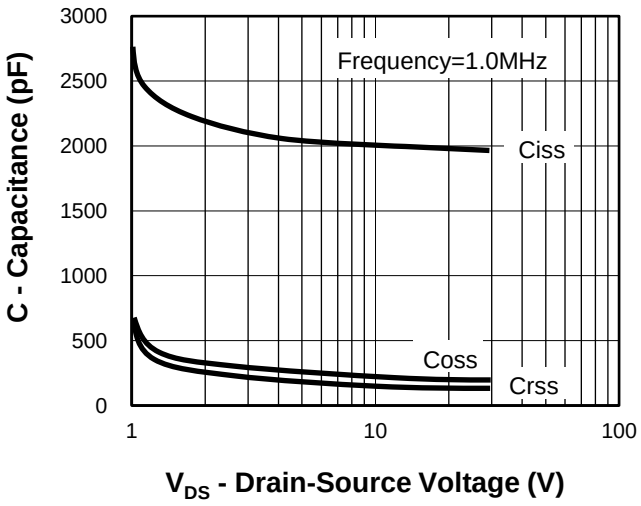
Drain-Source On Resistance



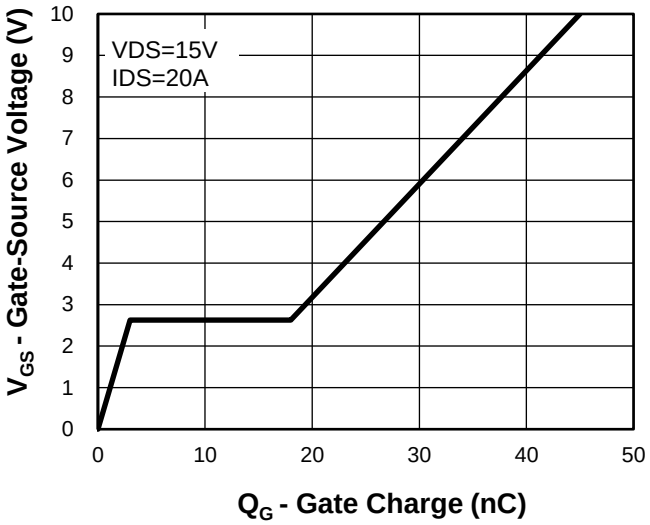
Source-Drain Diode Forward



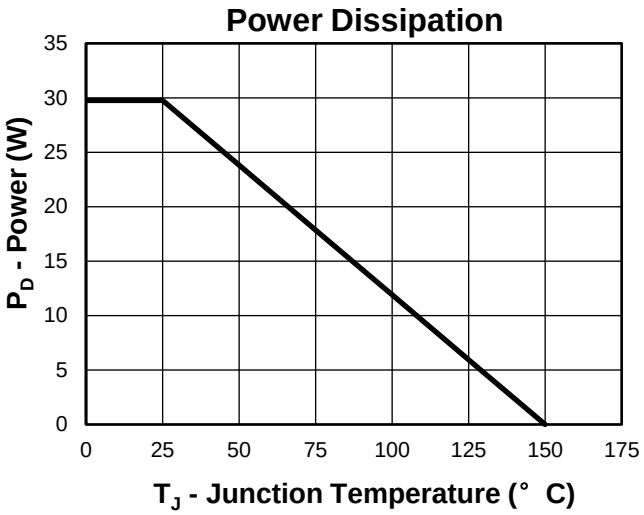
Capacitance

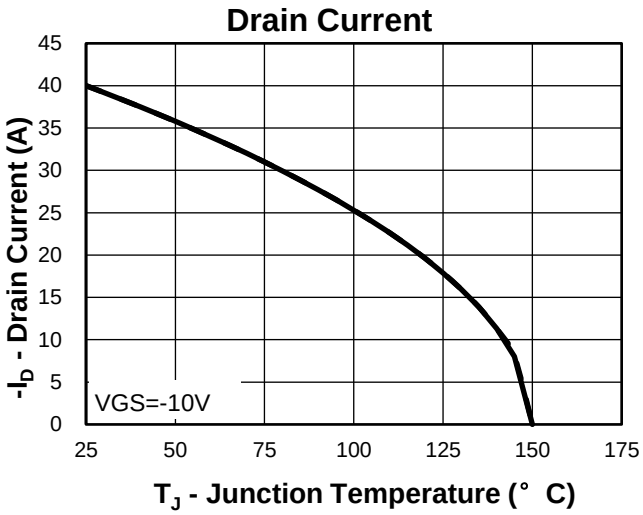


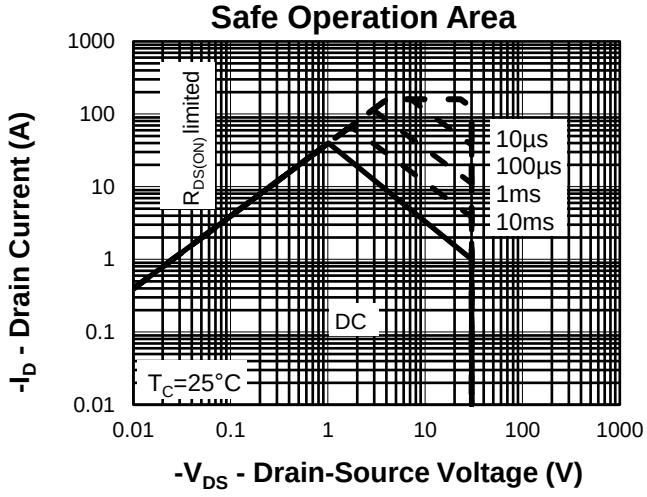
Gate Charge

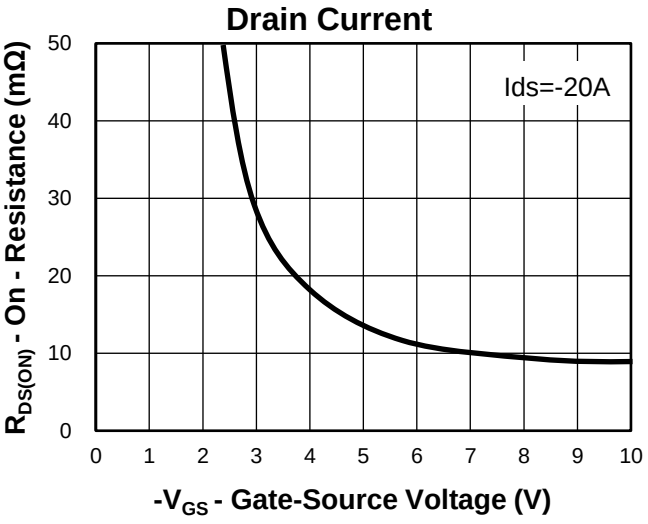


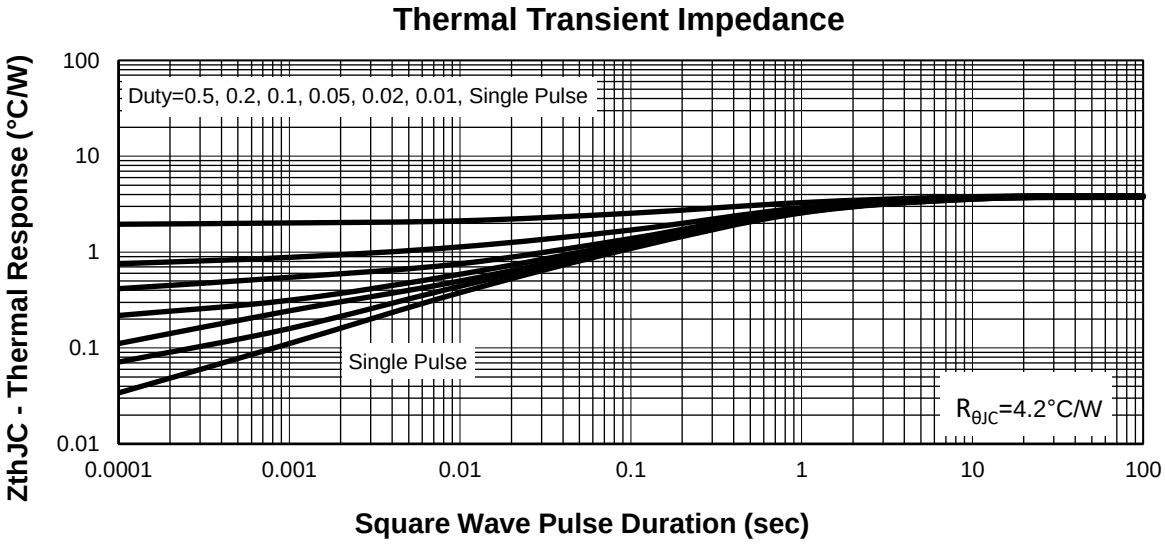
Typical Characteristics(P-Channel)



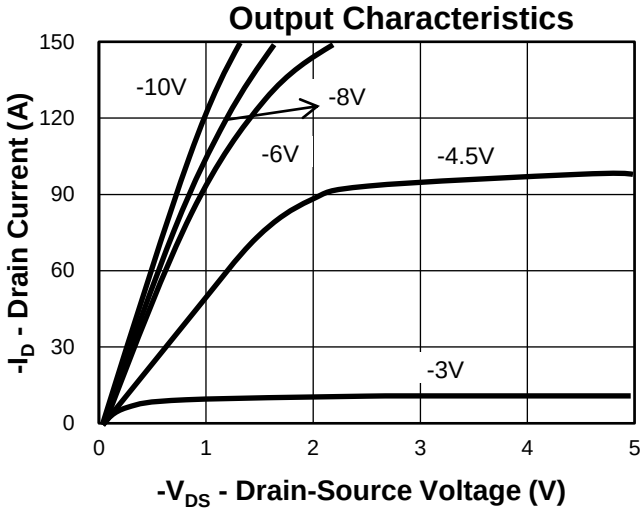


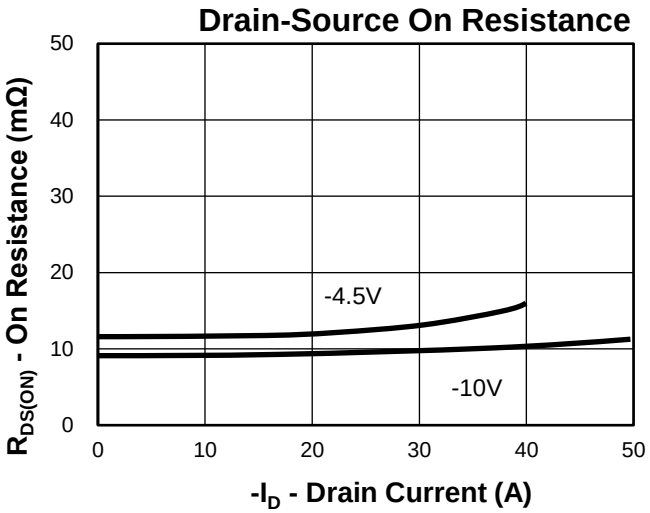


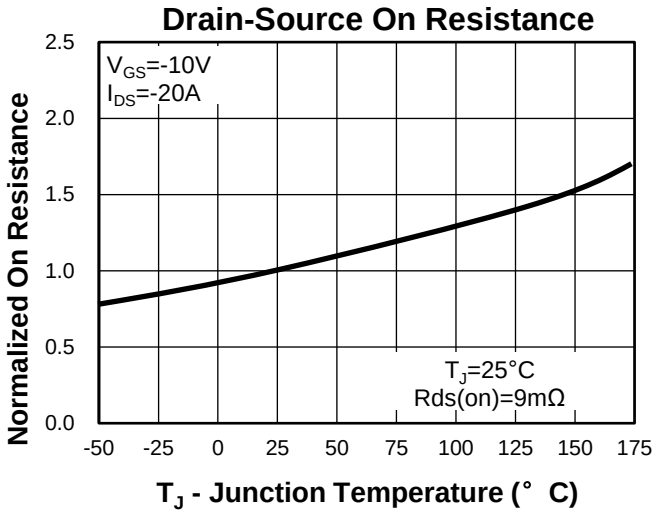


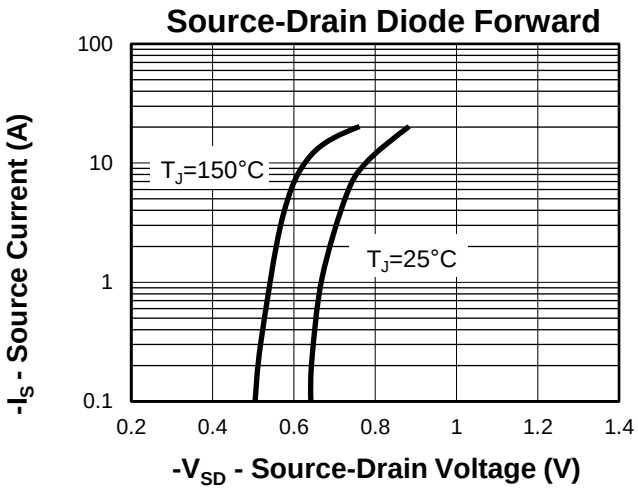


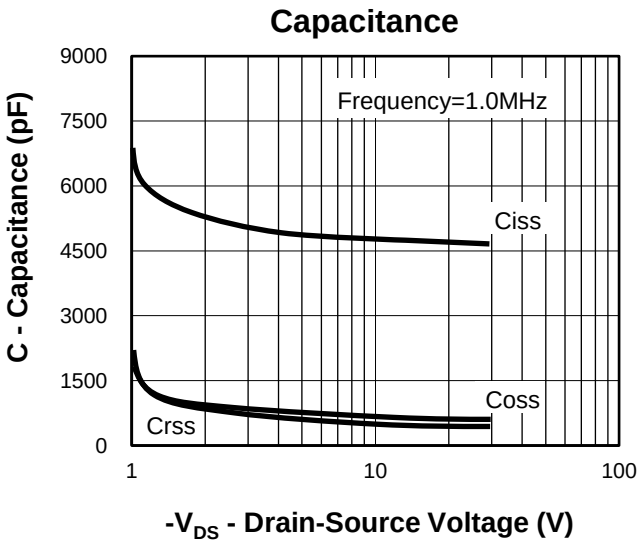
Typical Characteristics(P-Channel)

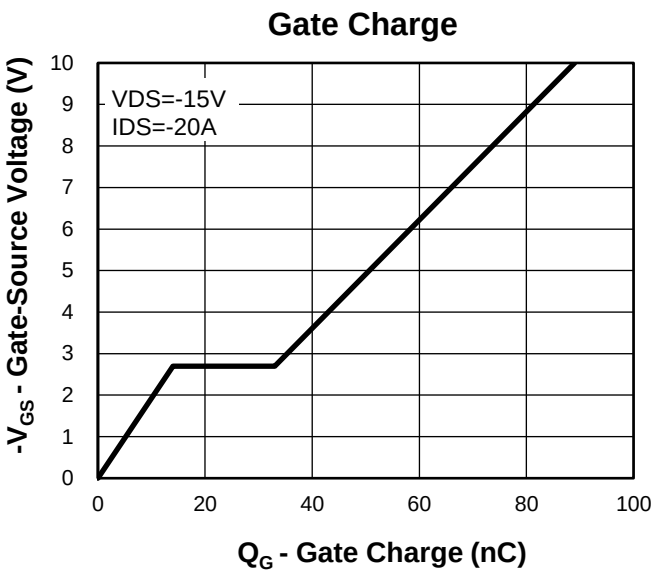






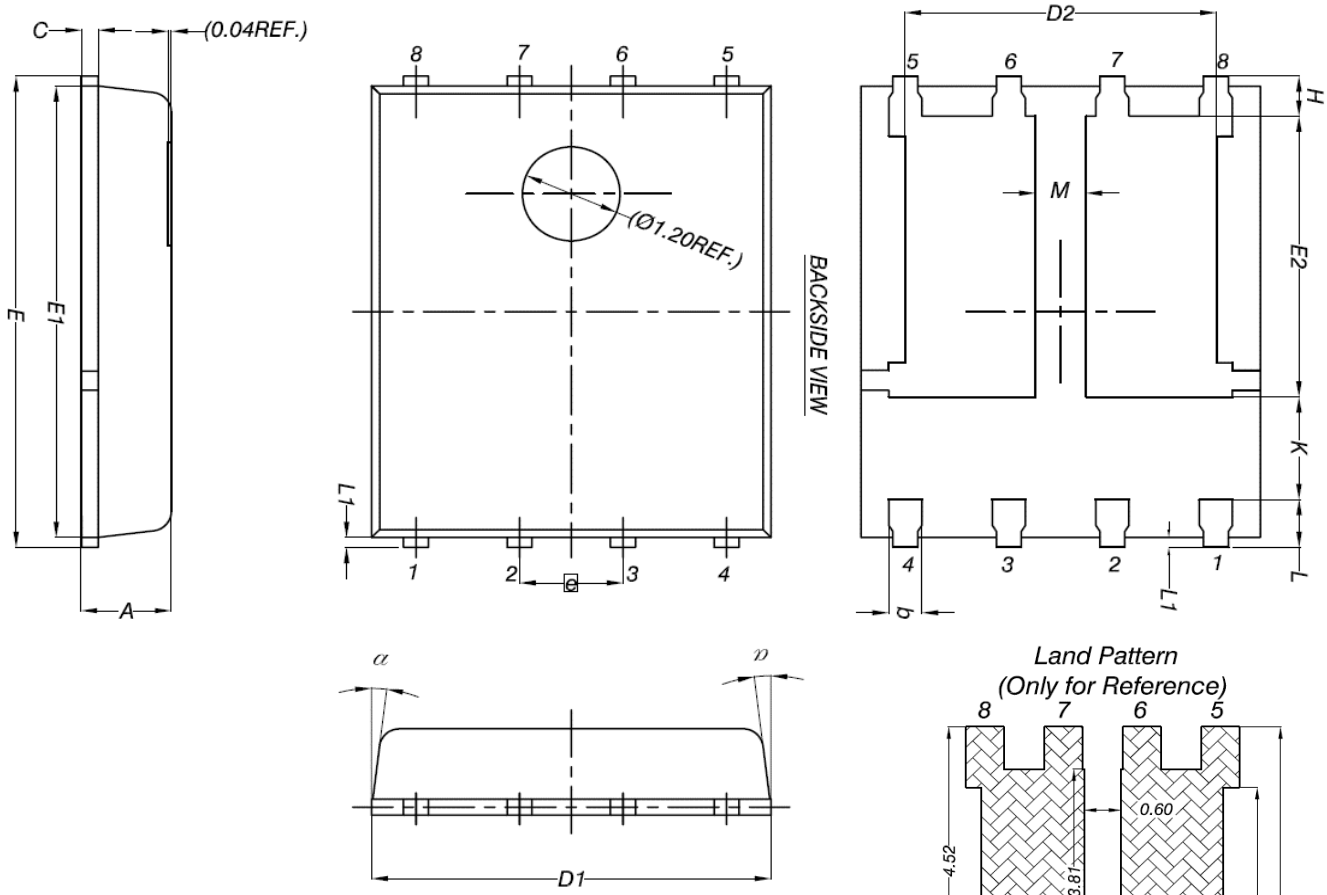






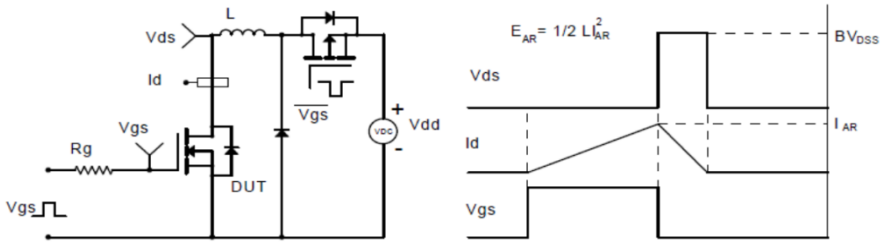
Package Information

PDFN5060 DP1

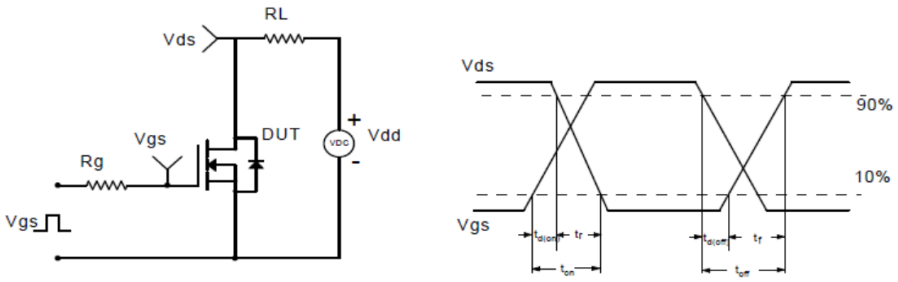


SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.90	1.00	1.10	0.035	0.039	0.043
b	0.33	0.42	0.51	0.013	0.017	0.020
c	0.20	0.25	0.30	0.008	0.010	0.012
D1	4.80	4.90	5.00	0.189	0.193	0.197
D2	3.61	3.79	3.96	0.142	0.149	0.156
E	5.90	6.00	6.10	0.232	0.236	0.240
E1	5.65	5.75	5.85	0.222	0.226	0.230
E2	3.38	3.58	3.78	0.133	0.141	0.149
e	1.27 BSC			0.050 BSC		
H	0.41	0.51	0.61	0.016	0.020	0.024
k	1.10			0.043		
L	0.51	0.61	0.71	0.020	0.024	0.028
L1	0.06	0.13	0.20	0.002	0.005	0.008
M	0.50			0.020		
a	0°		12°	0°		12°

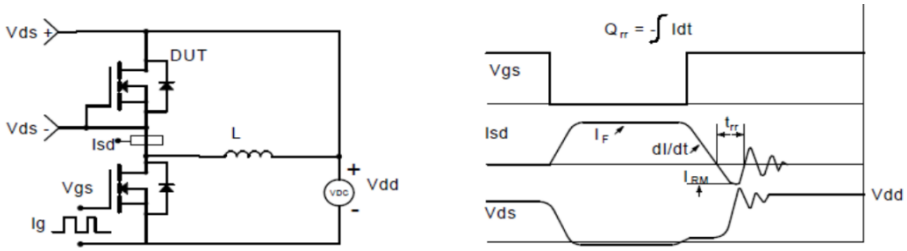
Avalanche Test Circuit and Waveforms(N-Channel)



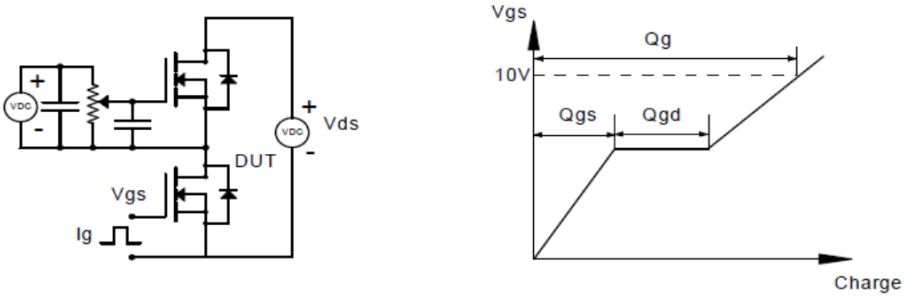
Switching Time Test Circuit and Waveforms(N-Channel)



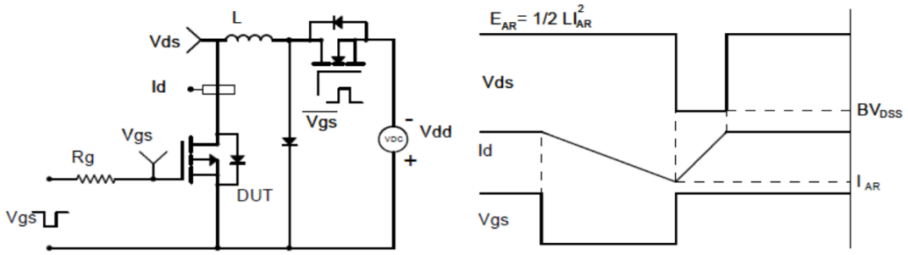
Diode Recovery Test Circuit and Waveforms(N-Channel)



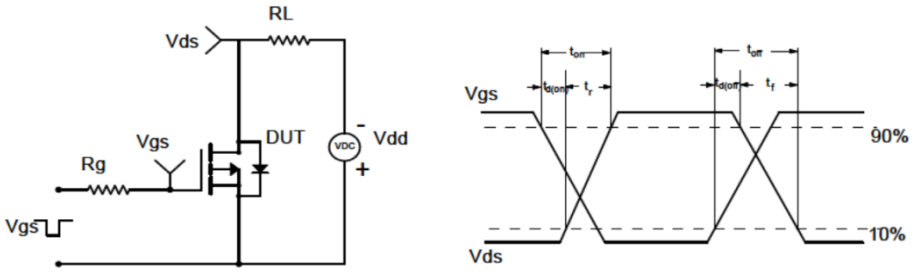
Gate Charge Test Circuit and Waveform(N-Channel)



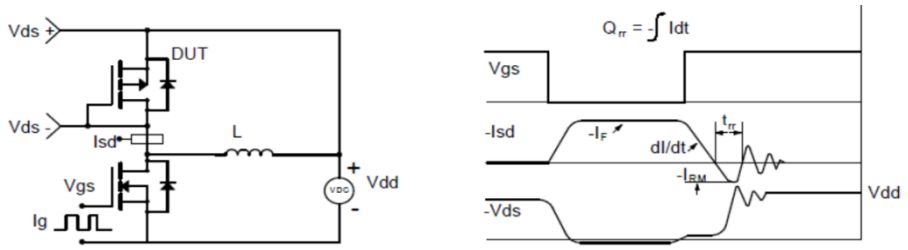
Avalanche Test Circuit and Waveforms(P-Channel)



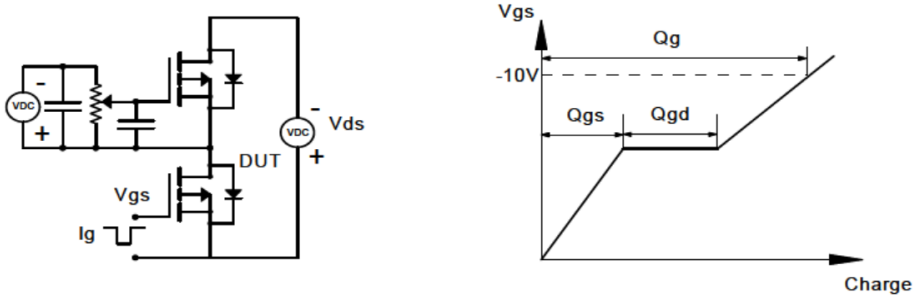
Switching Time Test Circuit and Waveforms(P-Channel)



Diode Recovery Test Circuit and Waveforms(P-Channel)



Gate Charge Test Circuit and Waveform(P-Channel)



Customer Service

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