

Features

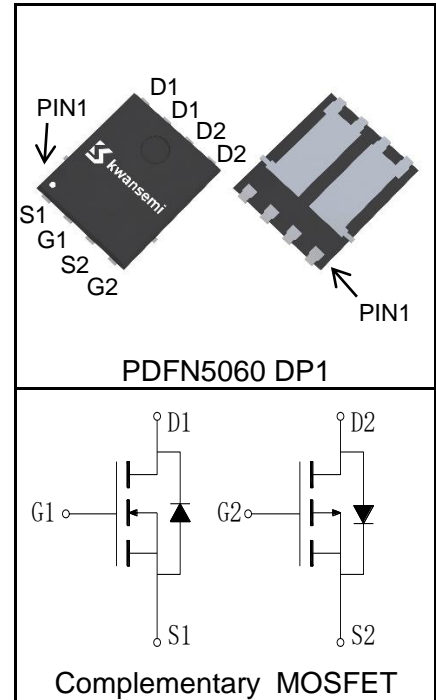
- N-Channel
100V/11A,
 $R_{DS(ON)} = 90m\Omega(Typ.) @ V_{GS}=10V$
 $R_{DS(ON)} = 95m\Omega(Typ.) @ V_{GS}=4.5V$
- P-Channel
-100V/-13A,
 $R_{DS(ON)} = 90m\Omega(Typ.) @ V_{GS}=-10V$
 $R_{DS(ON)} = 95m\Omega(Typ.) @ V_{GS}=-4.5V$
- Very low on-resistance
- Fast Switching

Applications

- Motor Drive Applications



Pin Description



Absolute Maximum Ratings

Symbol	Parameter	N-Channel	P-Channel	Unit	
Common Ratings ($T_A=25^\circ C$ Unless Otherwise Noted)					
V_{DSS}	Drain-Source Voltage	100	-100	V	
V_{GSS}	Gate-Source Voltage	± 20	± 20	V	
T_{Jmax}	Maximum Junction Temperature	150	150	$^\circ C$	
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to 150	-55 to 150	$^\circ C$	
I_S	Diode Continuous Forward Current	$T_C=25^\circ C$	11	-13	A
Mounted on Large Heat Sink					
$I_{DP}^{①}$	300 μs Pulse Drain Current Tested	$T_C=25^\circ C$	44	-52	A
$I_D^{②}$	Continuous Drain Current@ $T_C(V_{GS}=\pm 10V)$	$T_C=25^\circ C$	11	-13	A
		$T_C=100^\circ C$	7	-8	
	Continuous Drain Current@ $T_A(V_{GS}=\pm 10V)^{③}$	$T_A=25^\circ C$	4	-4	
		$T_A=70^\circ C$	3	-3	
P_D	Maximum Power Dissipation@ T_C	$T_C=25^\circ C$	24	30	W
		$T_C=100^\circ C$	10	12	
	Maximum Power Dissipation@ $T_A^{③}$	$T_A=25^\circ C$	3.1	3.1	
		$T_A=70^\circ C$	2	2	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		5.2	4.1	$^\circ C/W$
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient		40	40	$^\circ C/W$
Drain-Source Avalanche Ratings					
$E_{AS}^{④}$	Avalanche Energy, Single Pulsed		12	132	mJ

Electrical Characteristics ($T_A=25^\circ\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Test Condition	KS1614NA			Unit	
			Min.	Typ.	Max.		
Static Characteristics							
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\mu A$	N	100		V	
		$V_{GS}=0V, I_{DS}=-250\mu A$	P	-100			
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=100V, V_{GS}=0V$	N		1	μA	
		$T_J=125^\circ C$			30		
		$V_{DS}=-100V, V_{GS}=0V$	P		-1		
		$T_J=125^\circ C$			-30		
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	N	1.2	1.7	2.1	V
		$V_{DS}=V_{GS}, I_{DS}=-250\mu A$	P	-1.2	-1.7	-2.1	
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	N			± 100	nA
		$V_{GS}=\pm 20V, V_{DS}=0V$	P			± 100	
$R_{DS(ON)}^{(5)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=10A$	N		90	110	m Ω
		$V_{GS}=-10V, I_{DS}=-10A$	P		90	105	
		$V_{GS}=4.5V, I_{DS}=5A$	N		95	120	
		$V_{GS}=-4.5V, I_{DS}=-5A$	P		95	120	
Diode Characteristics							
$V_{SD}^{(5)}$	Diode Forward Voltage	$I_{SD}=10A, V_{GS}=0V$	N		0.9	1.2	V
		$I_{SD}=-10A, V_{GS}=0V$	P		-0.9	-1.2	
t_{rr}	Reverse Recovery Time	N-Channel $I_{SD}=10A, di_{SD}/dt=100A/\mu s$	N		25		ns
			P		33		
Q_{rr}	Reverse Recovery Charge	P-Channel $I_{SD}=-10A, di_{SD}/dt=100A/\mu s$	N		48		nC
			P		61		
Dynamic Characteristics⁽⁶⁾							
R_G	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1MHz$	N		3		Ω
			P		13		
C_{iss}	Input Capacitance	N-Channel $V_{GS}=0V, V_{DS}=50V,$ Frequency=1.0MHz	N		715		pF
			P		1060		
C_{oss}	Output Capacitance	P-Channel $V_{GS}=0V, V_{DS}=-50V,$ Frequency=1.0MHz	N		35		
			P		120		
C_{rss}	Reverse Transfer Capacitance		N		20		
			P		10		

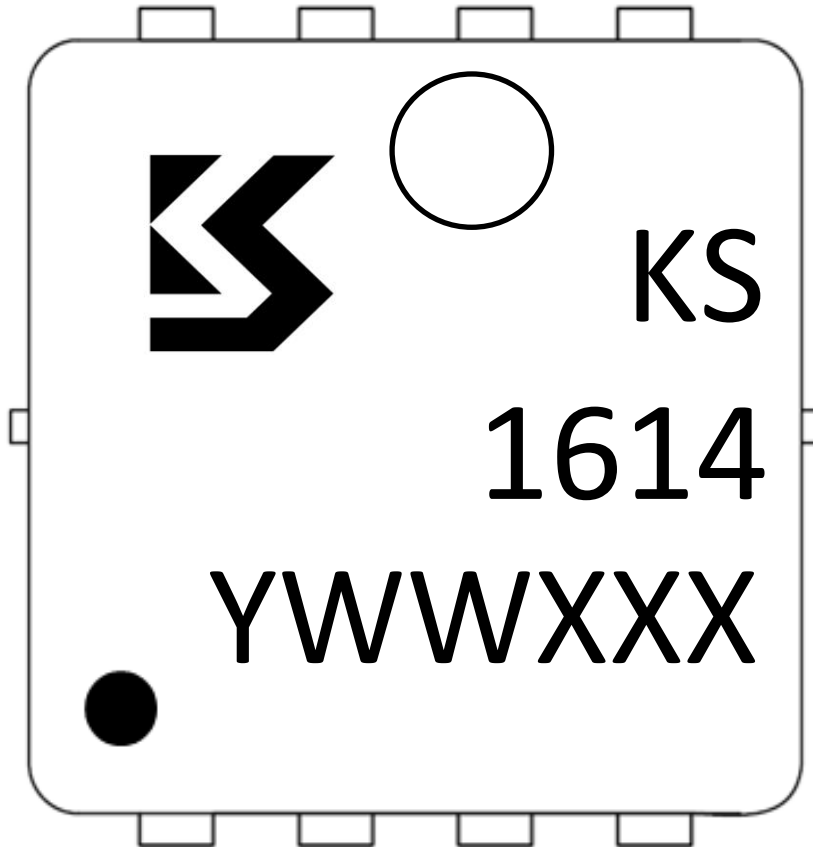
Electrical Characteristics ($T_A=25^\circ\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Test Condition	KS1614NA			Unit	
			Min.	Typ.	Max.		
Dynamic Characteristics ^⑥							
$t_{d(ON)}$	Turn-on Delay Time	N-Channel $V_{DD}=50\text{V}$, $I_{DS}=10\text{A}$, $V_{GEN}=10\text{V}$, $R_G=3\Omega$ P-Channel $V_{DD}=-50\text{V}$, $I_{DS}=-10\text{A}$, $V_{GEN}=-10\text{V}$, $R_G=3\Omega$	N		8		ns
			P		11		
t_r	Turn-on Rise Time		N		19		
			P		24		
$t_{d(OFF)}$	Turn-off Delay Time		N		35		
			P		50		
t_f	Turn-off Fall Time		N		9		
			P		44		
Gate Charge Characteristics ^⑥							
Q_g	Total Gate Charge	N-Channel $V_{DS}=50\text{V}$, $V_{GS}=10\text{V}$, $I_{DS}=10\text{A}$ P-Channel $V_{DS}=-50\text{V}$, $V_{GS}=-10\text{V}$, $I_{DS}=-10\text{A}$	N		16		nC
			P		21		
Q_{gs}	Gate-Source Charge		N		2		
			P		4		
Q_{gd}	Gate-Drain Charge		N		4		
			P		5		

- Notes:
- ① Pulse width limited by safe operating area.
 - ② Calculated continuous current based on maximum allowable junction temperature.
 - ③ When mounted on 1 inch square copper board, $t \leq 10\text{sec}$. The value in any given application depends on the user's specific board design.
 - ④ Limited by T_{Jmax} . Starting $T_J = 25^\circ\text{C}$, N Channel: $I_{ASmax} = 7\text{A}$, $L=0.5\text{mH}$, $V_{DD} = 20\text{V}$, $R_G = 25\Omega$, $V_{GS}=10\text{V}$. Part not recommended for use above this value. 100% Final Test at $I_{AS}=4\text{A}$, $L=0.5\text{mH}$. P-Channel: $I_{ASmax} = -23\text{A}$, $L=0.5\text{mH}$, $V_{DD} = -20\text{V}$, $R_G = 25\Omega$, $V_{GS}=-10\text{V}$. Part not recommended for use above this value. 100% Final Test at $I_{AS}=-10\text{A}$, $L=0.5\text{mH}$.
 - ⑤ Pulse test; Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
 - ⑥ Guaranteed by design, not subject to production testing.

Ordering and Marking Information

Device	Package	Packaging	Quantity	Reel Size	Tape width
KS1614NA	PDFN5060 DP1	Tape&Reel	5000	13"	12mm

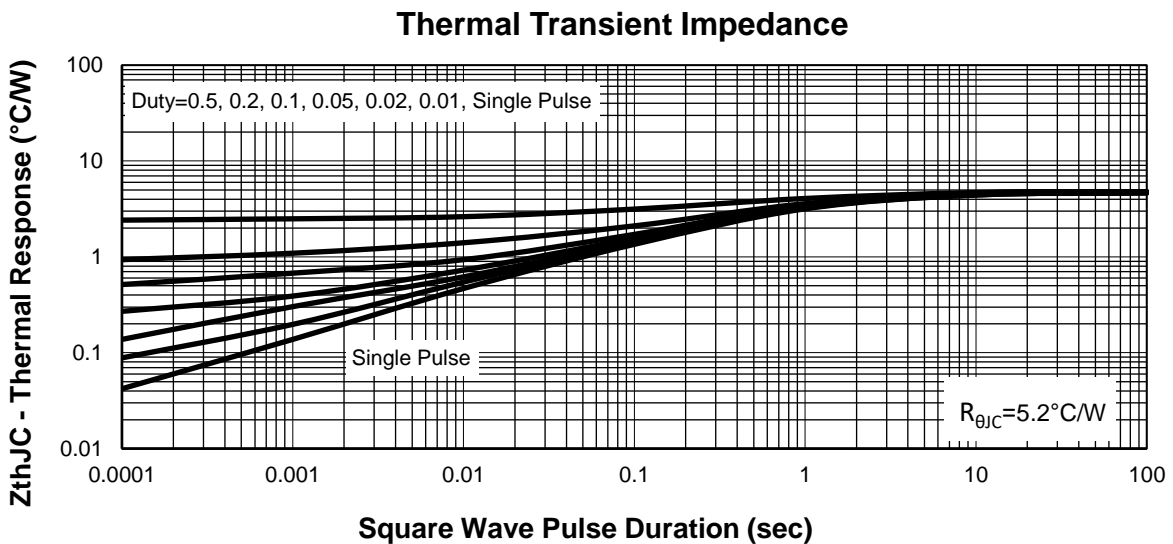
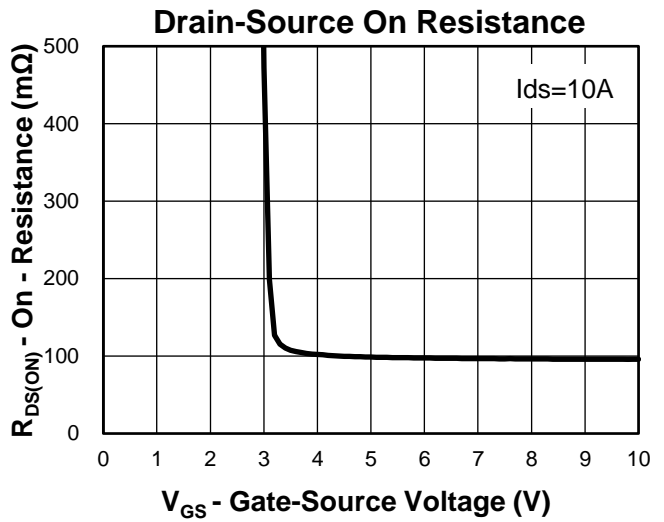
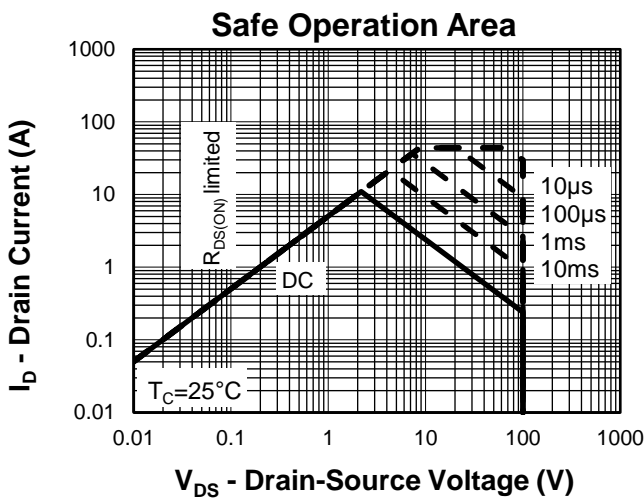
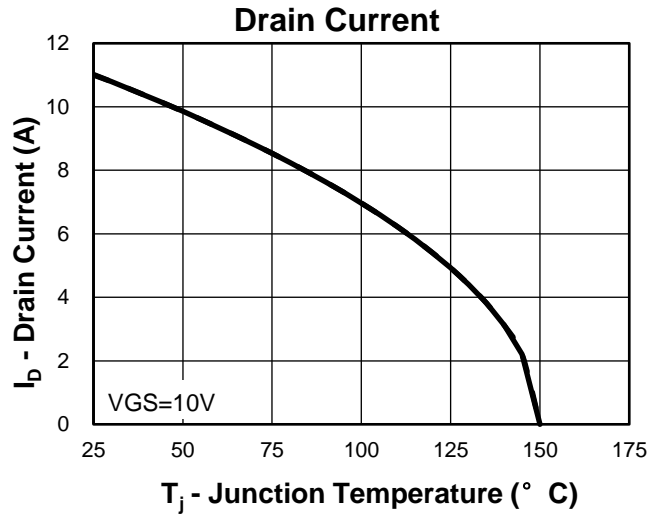
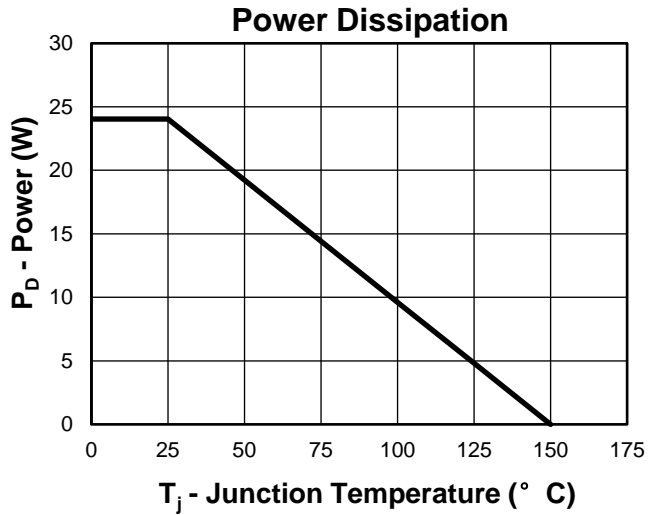


1st Line: Kwansemi LOGO, Kwansemi Code(KS)

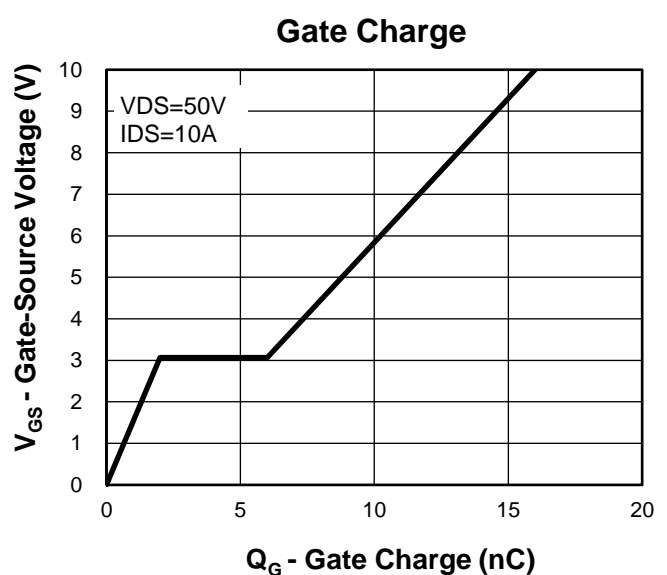
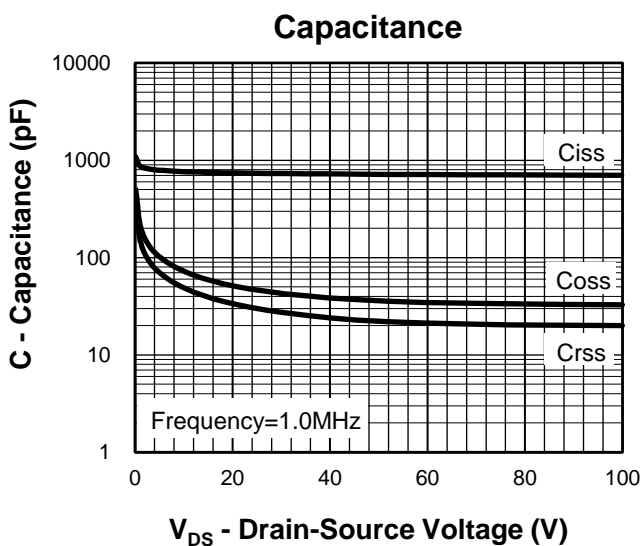
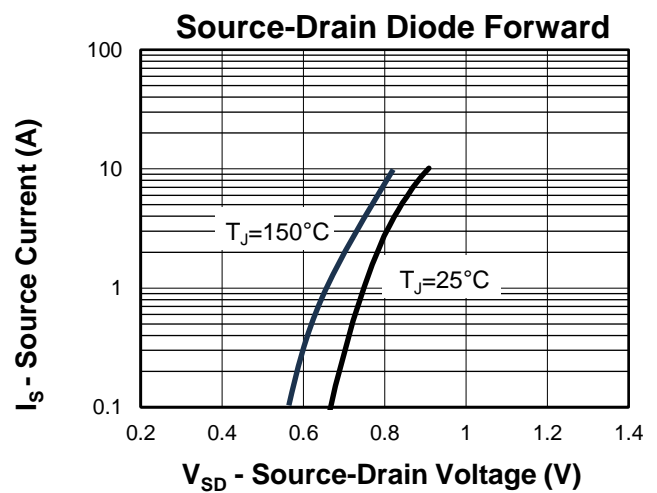
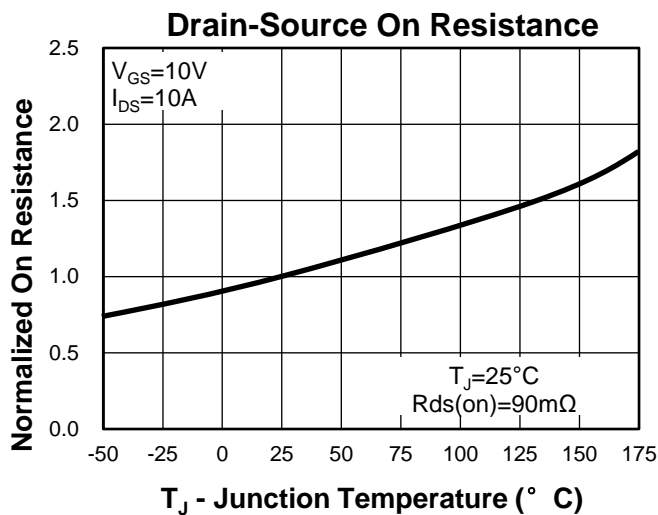
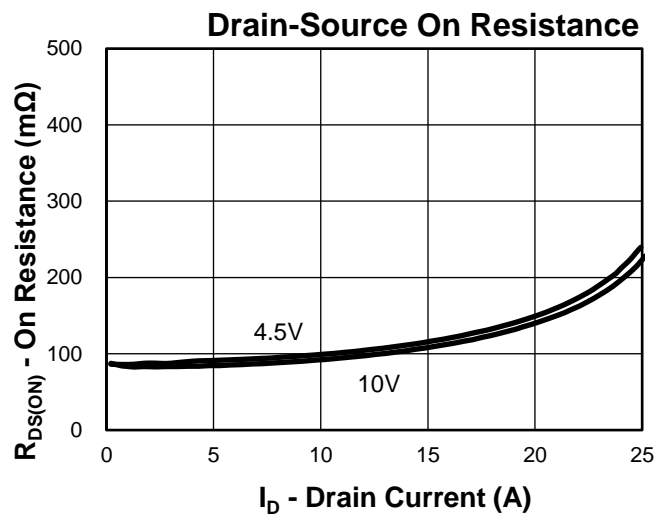
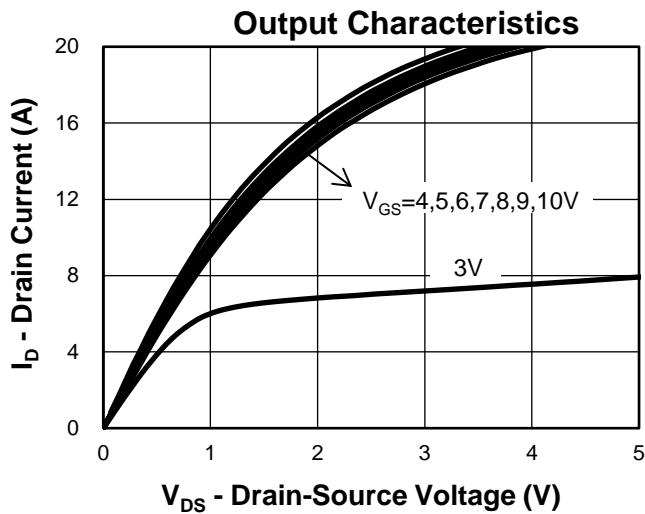
2nd Line: Part Number(1614)

3rd Line: Lot Number(YWWXXX)

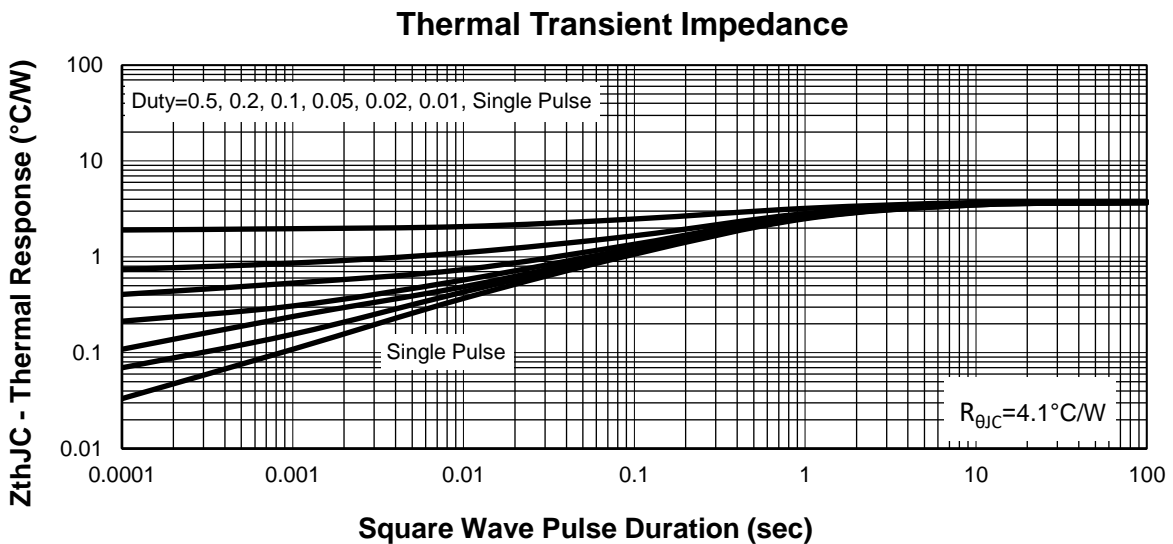
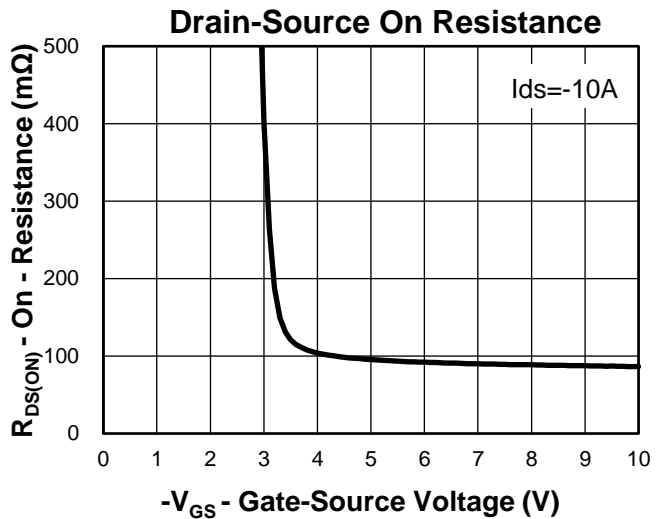
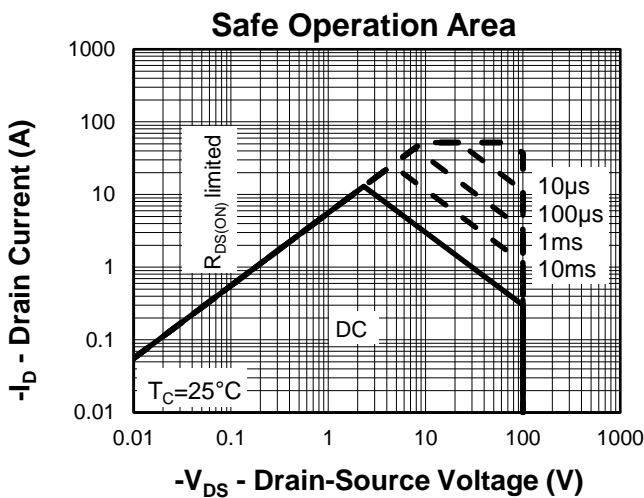
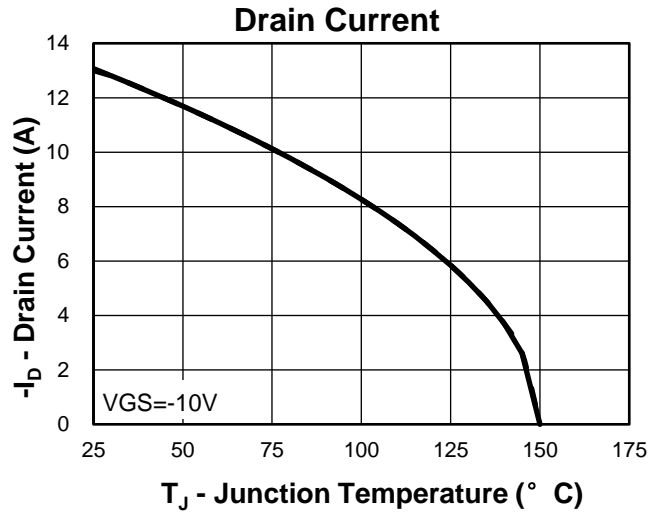
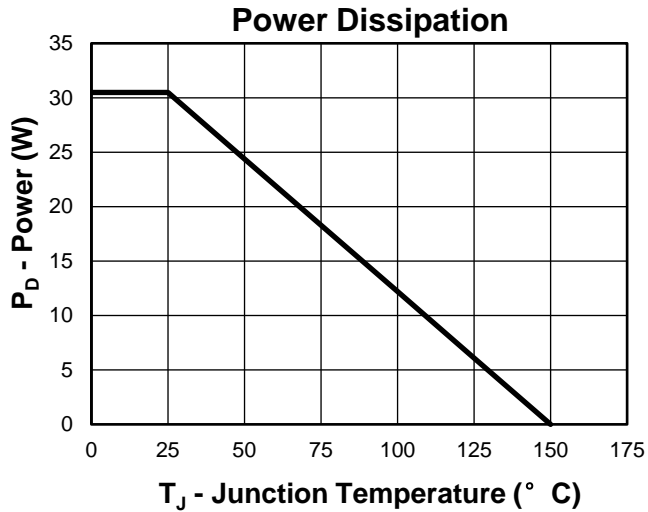
Typical Characteristics(N-Channel)



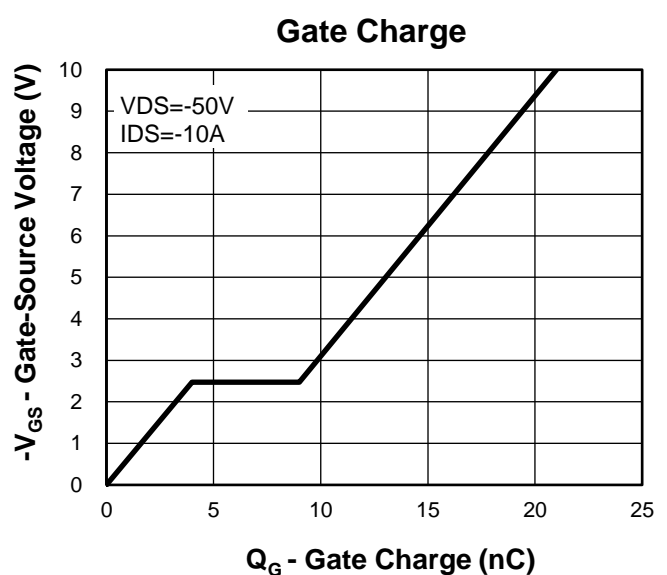
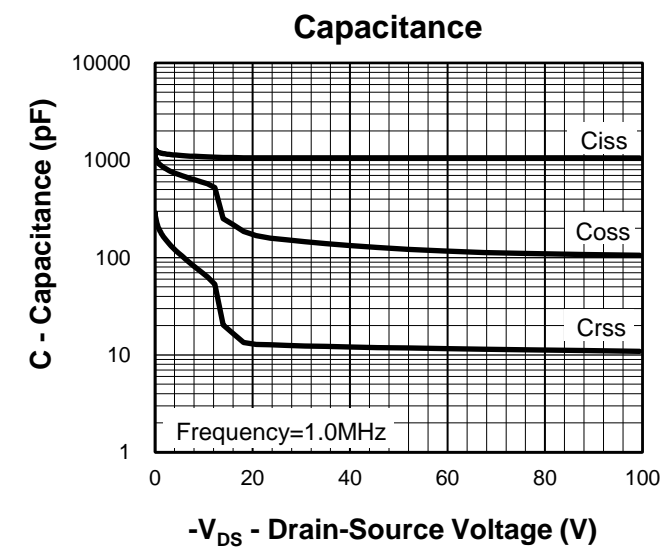
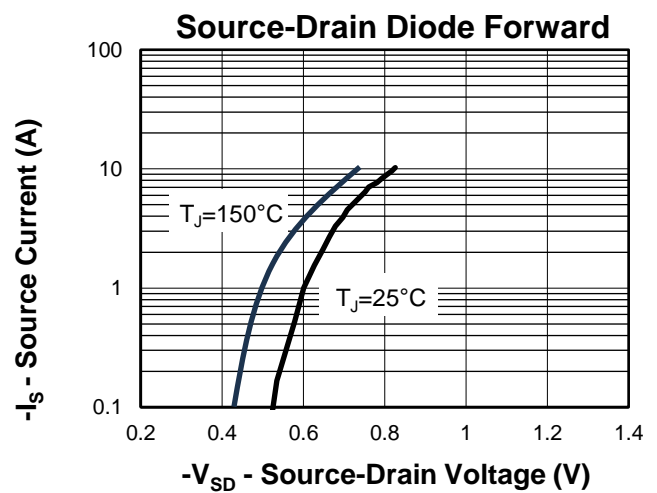
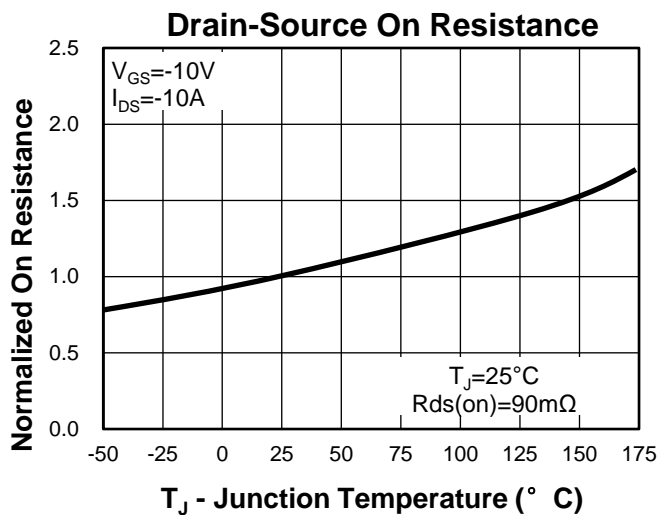
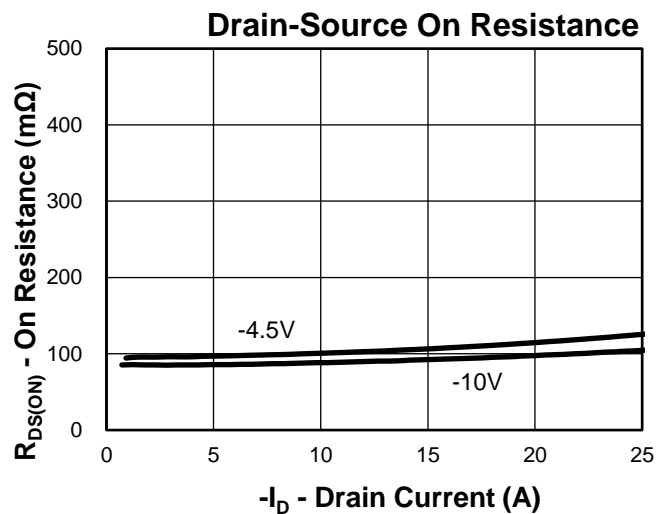
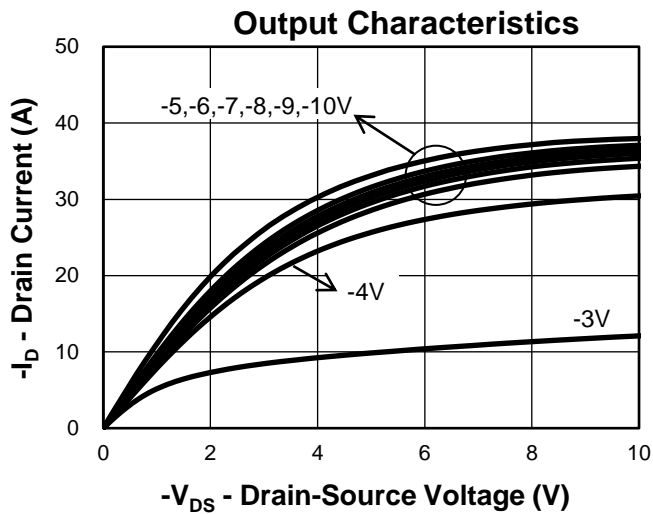
Typical Characteristics(N-Channel)

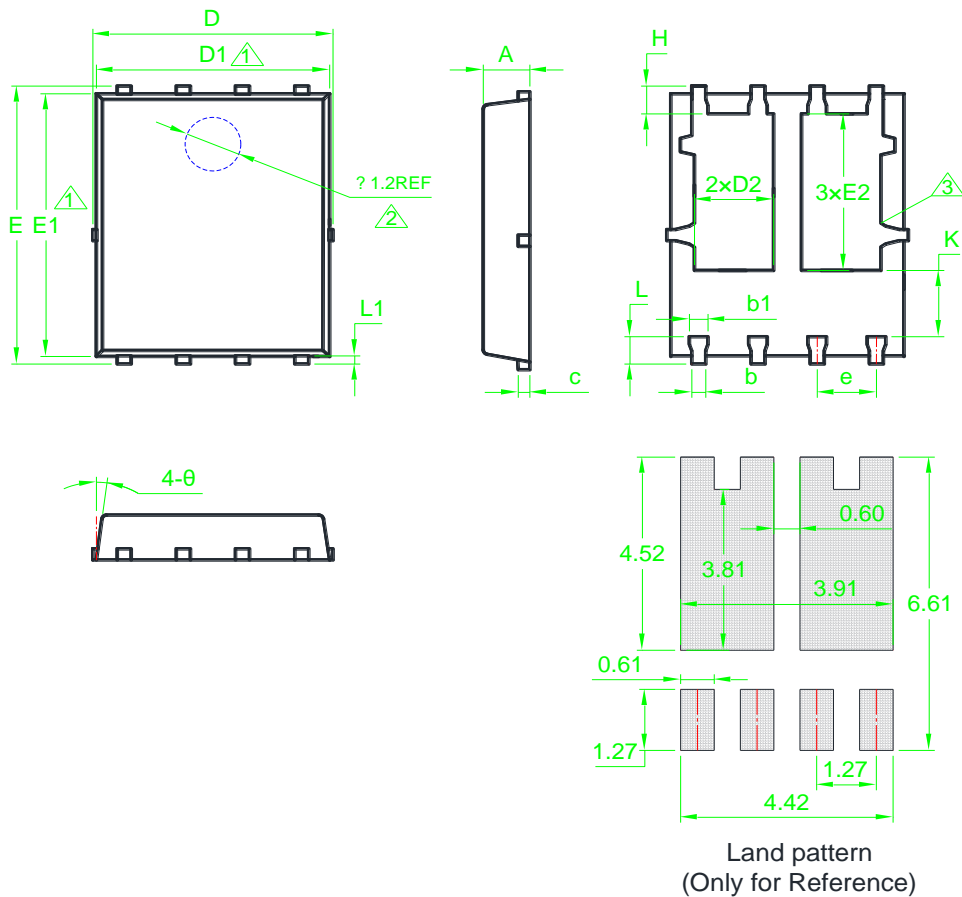


Typical Characteristics(P-Channel)



Typical Characteristics(P-Channel)

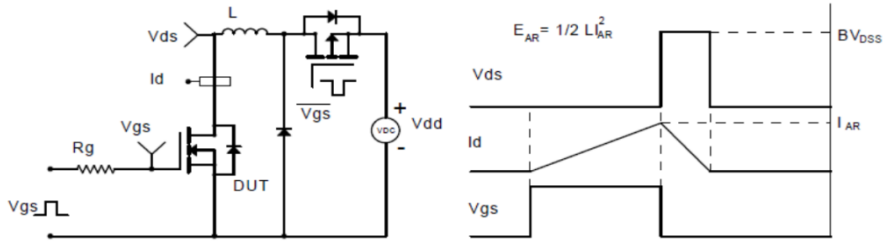


Package Information
PDFN5060 DP1


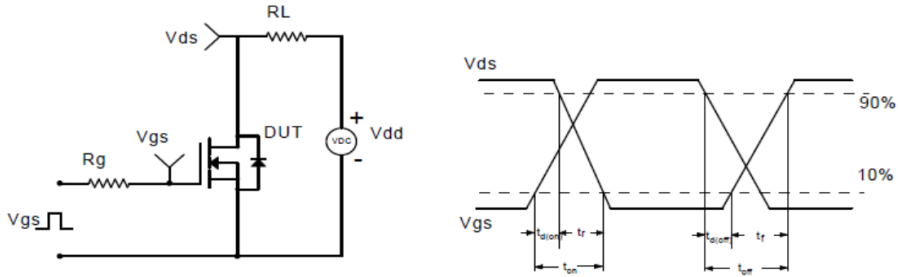
SYMBOL	MM			INCH			SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX		MIN	NOM	MAX	MIN	NOM	MAX
A	0.90	1.00	1.20	0.035	0.039	0.047	E1	5.45	*	5.95	0.215	*	0.234
A1	0.00	*	0.05	0.000	*	0.002	E2	3.35	3.50	3.80	0.132	0.138	0.150
b	0.25	*	0.50	0.010	*	0.020	e	1.27BSC			0.050BSC		
c	0.20	0.25	0.30	0.008	0.010	0.012	H	0.41	0.51	0.71	0.016	0.020	0.028
D	5.15BSC			0.203BSC			K	1.10	*	1.50	0.043	*	0.059
D1	4.80	*	5.30	0.189	*	0.209	L	0.51	0.61	0.71	0.020	0.024	0.028
D2	1.50	1.70	1.90	0.059	0.067	0.075	L1	0.06	0.13	0.20	0.002	0.005	0.008
E	5.90	6.05	6.25	0.232	0.238	0.246	θ	0°	*	12°	0°	*	12°

- ① Dimensions D1 and E1 do not include mold flash protrusions or gate burrs.
- ② The existence and size of demolding hole are variable depending on mold.
- ③ The size and shape of exposed pad are variable depending on mold.

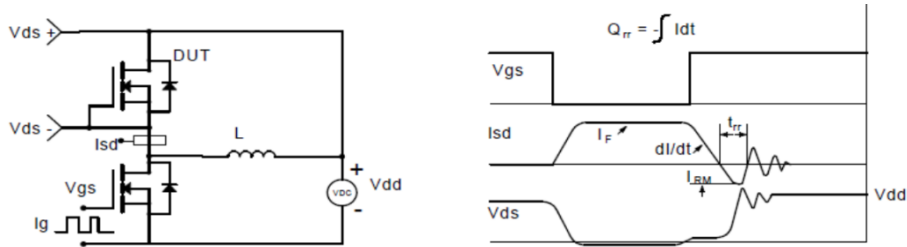
Avalanche Test Circuit and Waveforms(N-Channel)



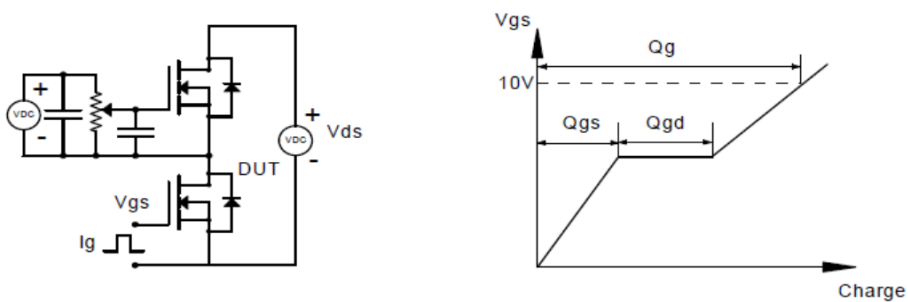
Switching Time Test Circuit and Waveforms(N-Channel)

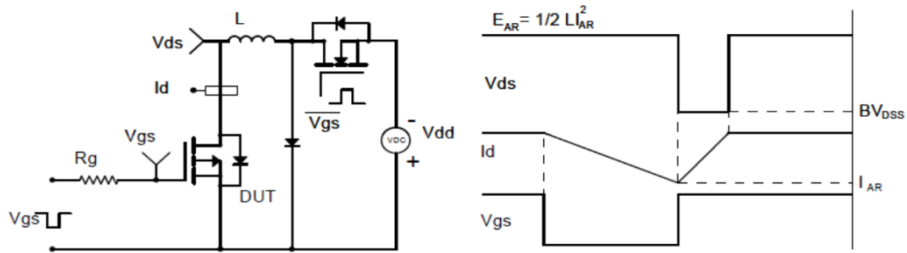
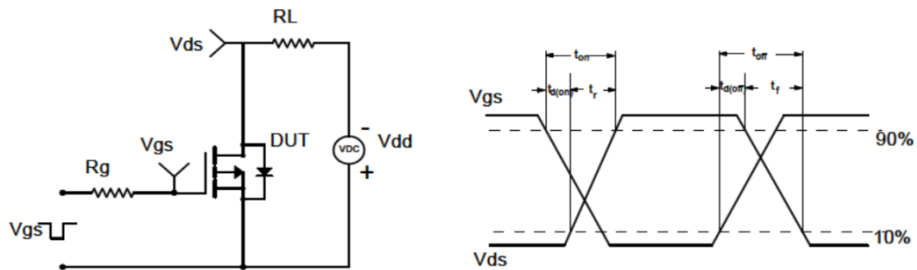
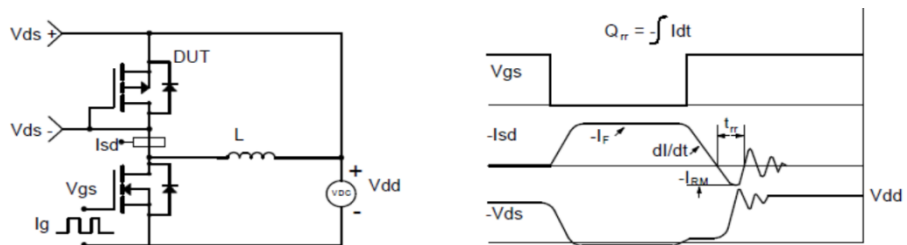
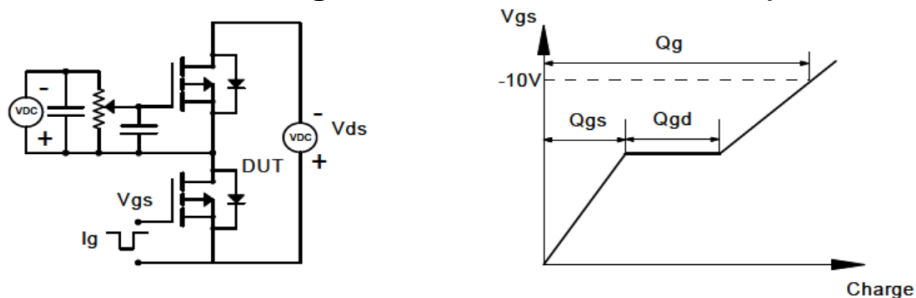


Diode Recovery Test Circuit and Waveforms(N-Channel)



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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