

Features

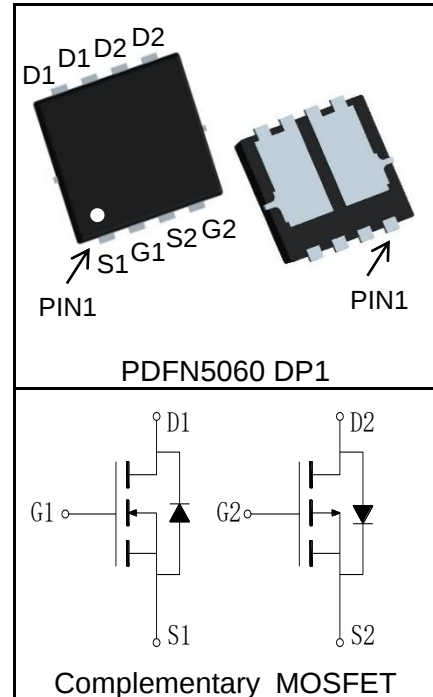
- N-Channel
30V/50A,
 $R_{DS(ON)} = 5m\Omega (Typ.) @ V_{GS} = 10V$
 $R_{DS(ON)} = 7m\Omega (Typ.) @ V_{GS} = 4.5V$
- P-Channel
-30V/-40A,
 $R_{DS(ON)} = 9m\Omega (Typ.) @ V_{GS} = -10V$
 $R_{DS(ON)} = 12m\Omega (Typ.) @ V_{GS} = -4.5V$
- Very low on-resistance
- Fast Switching

Applications

- Motor Drive Applications



Pin Description



Absolute Maximum Ratings

Symbol	Parameter		N-Channel	P-Channel	Unit
Common Ratings (T _A =25°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	50	-40	A
Mounted on Large Heat Sink					
I _{DP} ^①	300μs Pulse Drain Current Tested	T _C =25°C	200	-160	A
I _D ^②	Continuous Drain Current@T _C (V _{GS} =±10V)	T _C =25°C	50	-40	A
		T _C =100°C	32	-25	
	Continuous Drain Current@T _A (V _{GS} =±10V) ^③	T _A =25°C	16	-13	
		T _A =70°C	13	-10	
P _D	Maximum Power Dissipation@T _C	T _C =25°C	29	29	W
		T _C =100°C	12	12	
	Maximum Power Dissipation@T _A ^③	T _A =25°C	3.1	3.1	
		T _A =70°C	2	2	
R _{θJC}	Thermal Resistance-Junction to Case		4.3	4.3	°C/W
R _{θJA} ^③	Thermal Resistance-Junction to Ambient		40	40	°C/W
Drain-Source Avalanche Ratings					
E _{AS} ^④	Avalanche Energy, Single Pulsed		25	25	mJ

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

Symbol	Parameter	Test Condition	KS3608NA			Unit	
			Min.	Typ.	Max.		
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			
		V _{DS} =-30V, V _{GS} =0V	P			-1	
				T _J =125°C			
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	N	1.1	1.5	2.3	V
		V _{DS} =V _{GS} , I _{DS} =-250μA	P	-1.1	-1.5	-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		5	6.5	mΩ
		V _{GS} =-10V, I _{DS} =-20A	P		9	11	
		V _{GS} =4.5V, I _{DS} =16A	N		7	9	
		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		0.85	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		29		ns
			P		39		
Q _{rr}	Reverse Recovery Charge	P-Channel I _{SD} =-20A, dI _{SD} /dt=100A/μs	N		55		nC
			P		21		
Dynamic Characteristics ^⑥							
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	N		0.9		Ω
			P		3.1		
C _{iss}	Input Capacitance	N-Channel V _{GS} =0V, V _{DS} =15V, Frequency=1.0MHz	N		2600		pF
			P		4210		
C _{oss}	Output Capacitance		N		420		
			P		505		
C _{rss}	Reverse Transfer Capacitance	P-Channel V _{GS} =0V, V _{DS} =-15V, Frequency=1.0MHz	N		285		
			P		430		

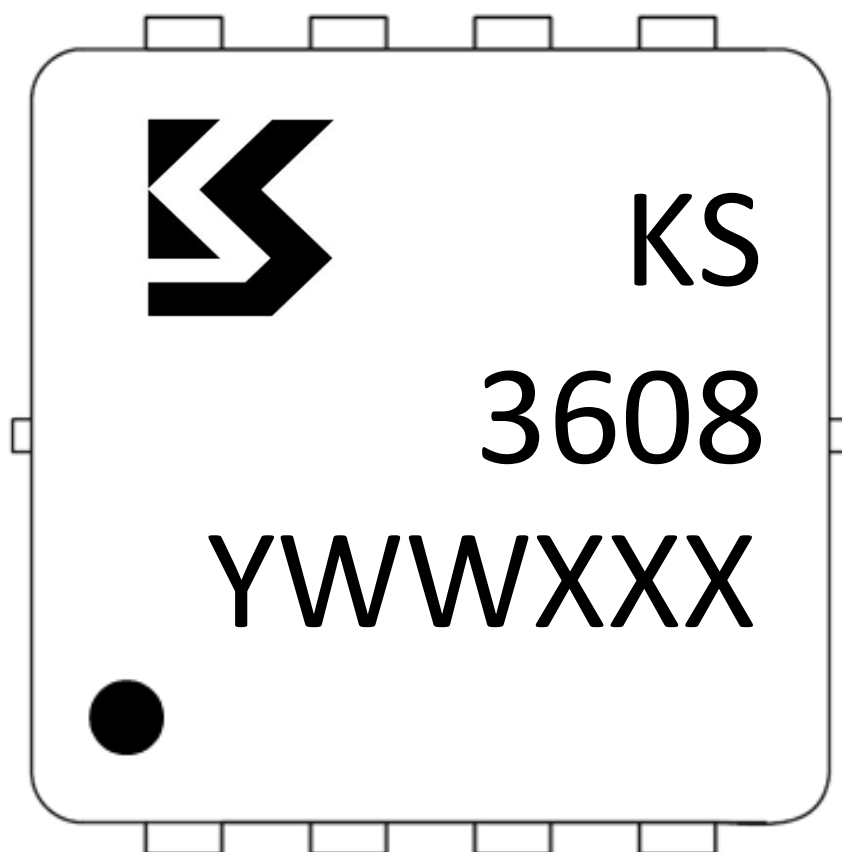
Electrical Characteristics ($T_A=25^{\circ}\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Test Condition	KS3608NA			Unit
			Min.	Typ.	Max.	
Dynamic Characteristics ^⑥						
t _{d(ON)}	Turn-on Delay Time	N-Channel V _{DD} =15V, I _{DS} =20A, V _{GEN} =10V, R _G =3Ω	N		18	ns
t _r	Turn-on Rise Time		P		21	
			N		15	
t _{d(OFF)}	Turn-off Delay Time		P		53	
		N		39		
t _f	Turn-off Fall Time	P		42		
		N		16		
		P		17		
Gate Charge Characteristics ^⑥						
Q _g	Total Gate Charge	N-Channel V _{DS} =15V, V _{GS} =10V, I _{DS} =20A	N		42	nC
Q _{gs}	Gate-Source Charge		P		75	
		N		5		
Q _{gd}	Gate-Drain Charge	P-Channel V _{DS} =-15V, V _{GS} = -10V, I _{DS} =-20A	P		12	
		N		8		
		P		15		

- 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: $L = 0.5\text{mH}$, $R_G = 25\Omega$, $I_{AS} = 10\text{A}$, $V_{GS} = 10\text{V}$, P-Channel: $L = 0.5\text{mH}$, $R_G = 25\Omega$, $I_{AS} = -10\text{A}$, $V_{GS} = -10\text{V}$, Part not recommended for use above this value.
 - 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
KS3608NA	PDFN5060 DP1	Tape&Reel	5000	13"	12mm

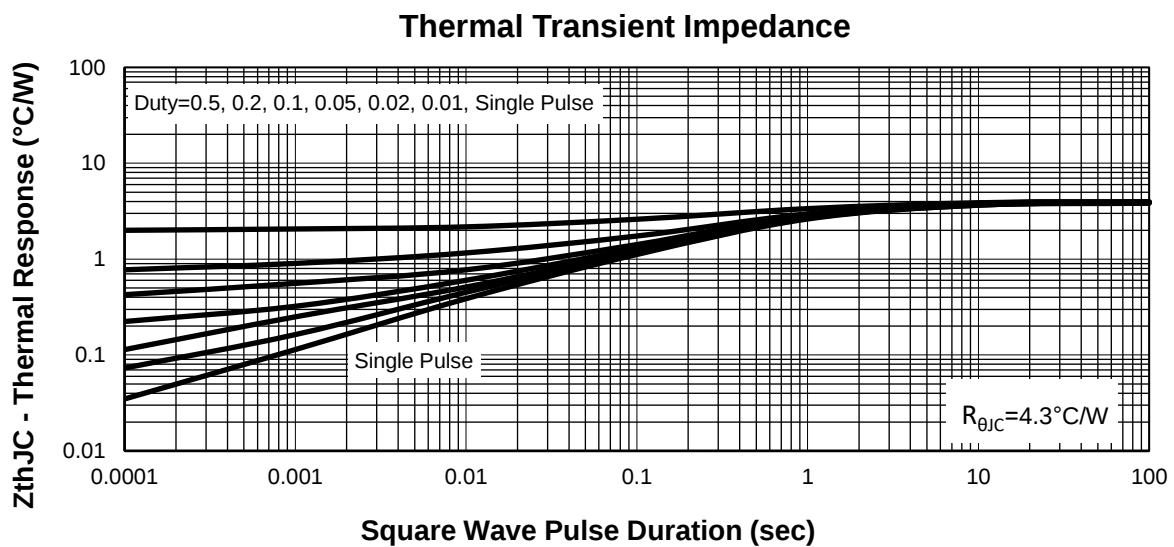
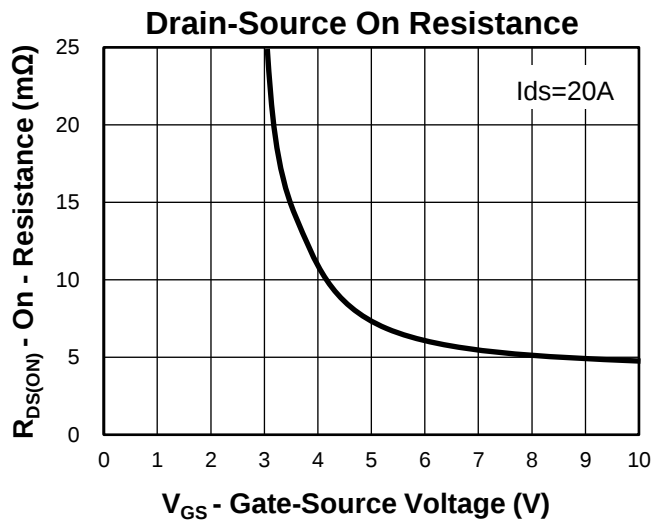
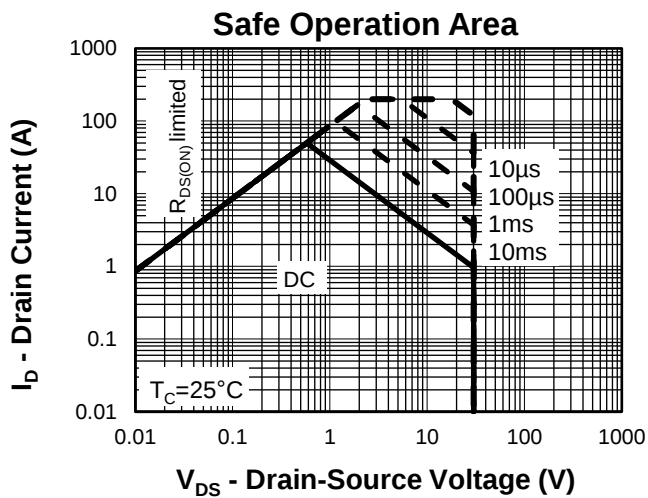
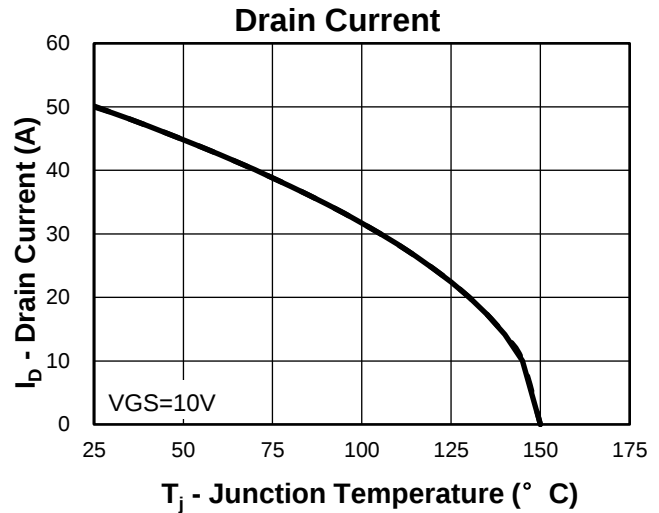
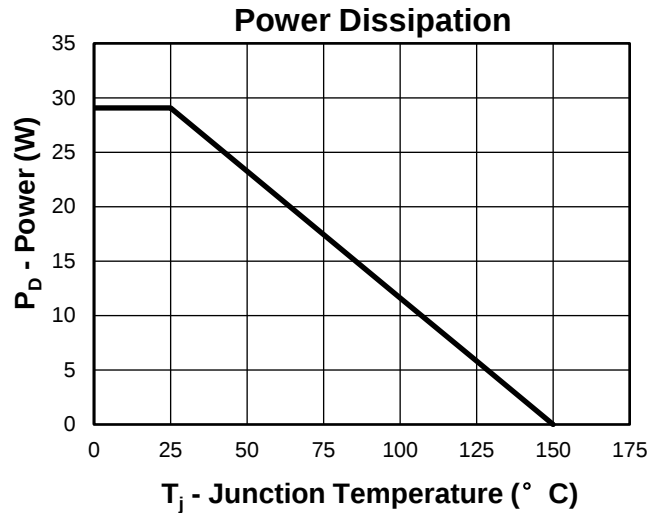


1st Line: Kwansemi LOGO, Kwansemi Code(KS)

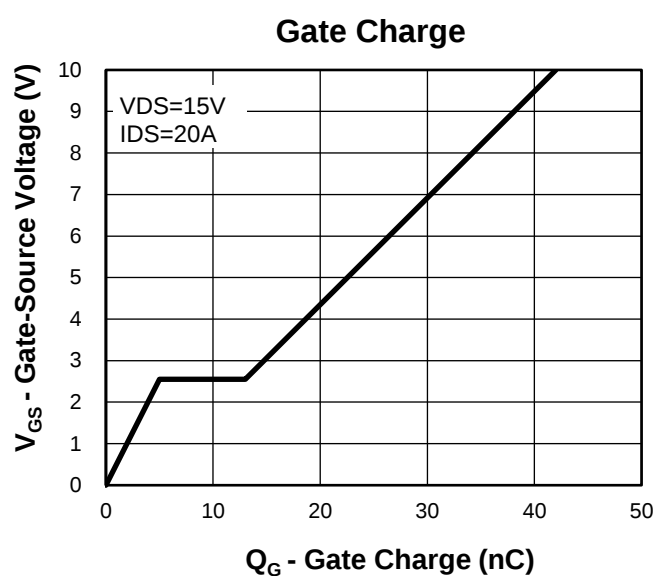
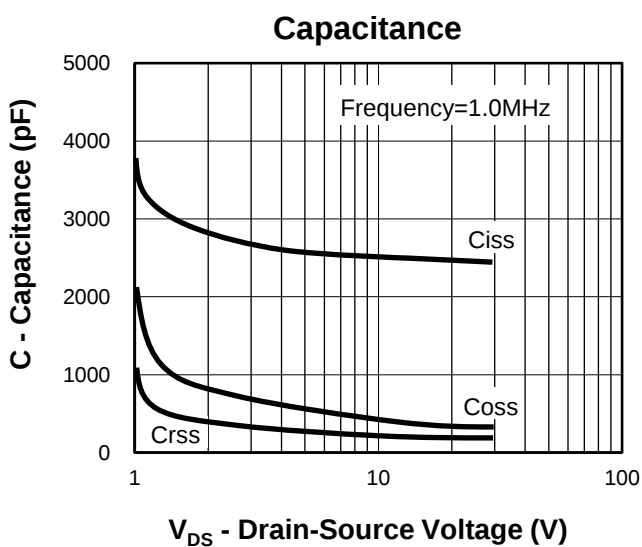
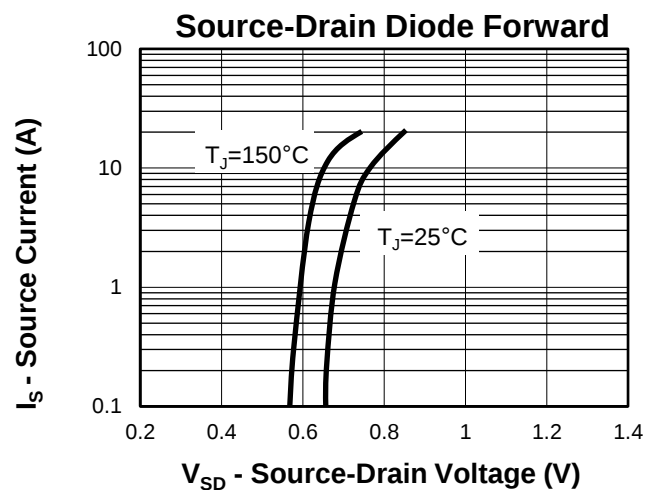
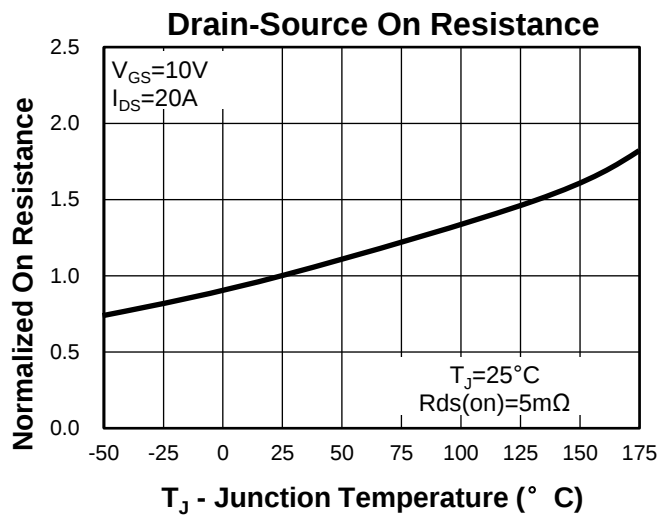
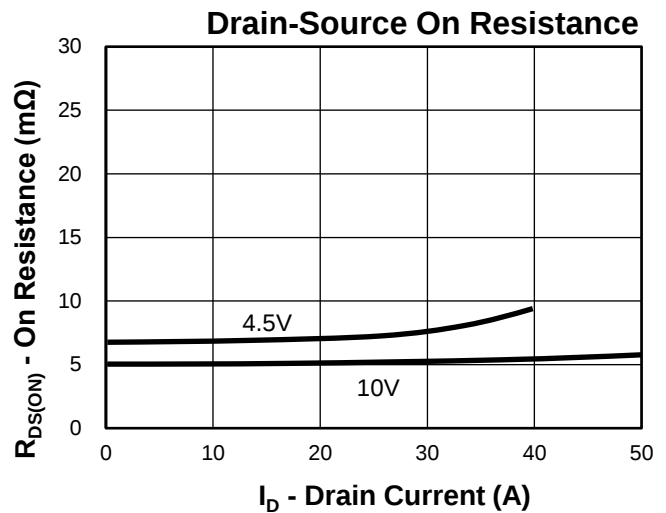
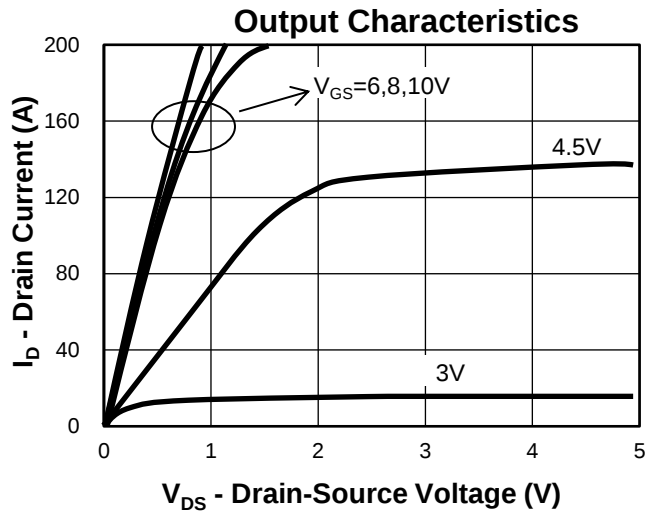
2nd Line: Part Number(3608)

3rd Line: Lot Number(YWWXXX)

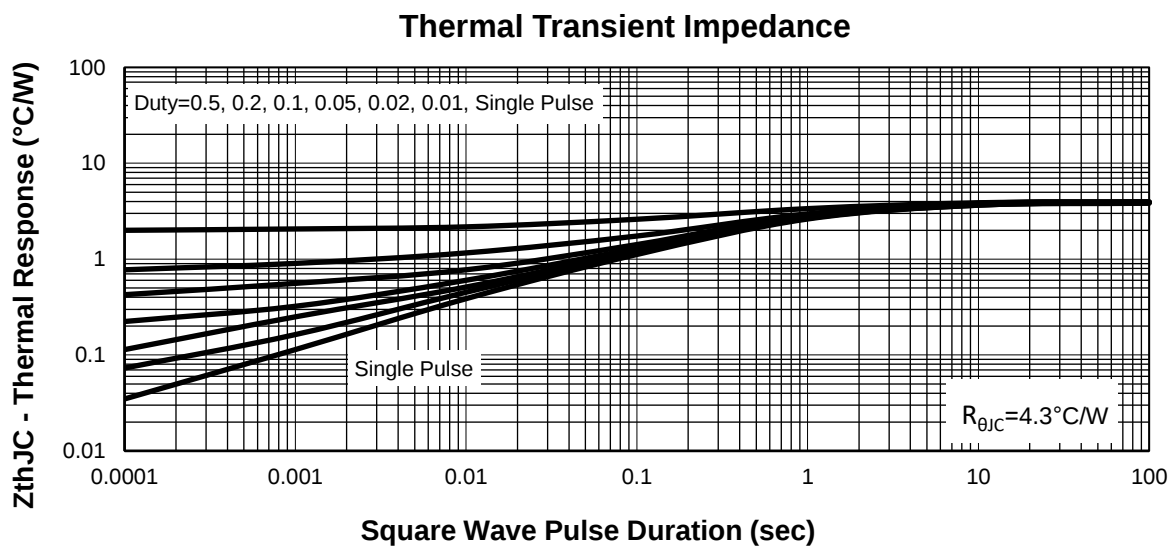
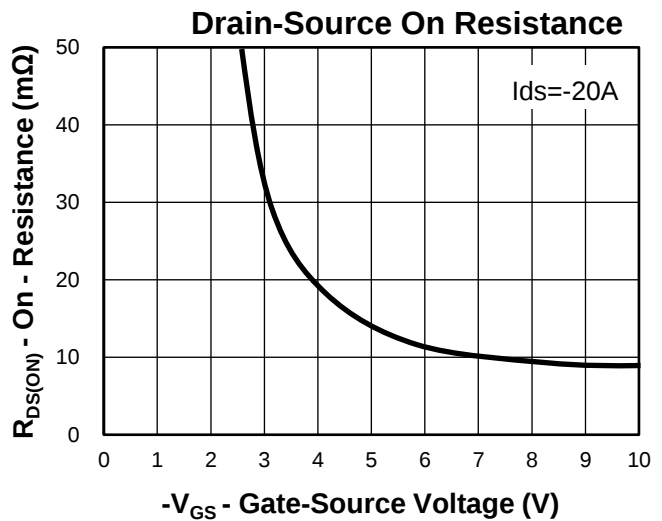
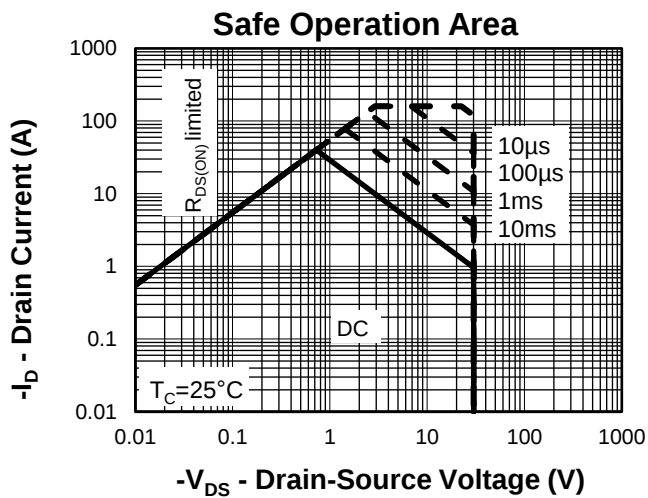
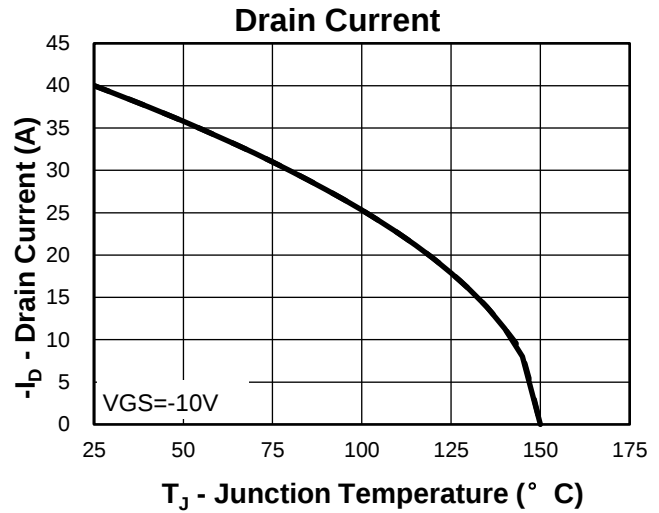
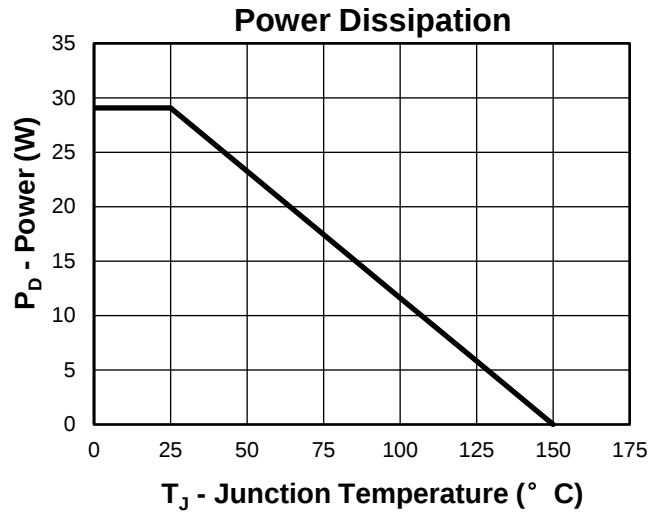
Typical Characteristics(N-Channel)



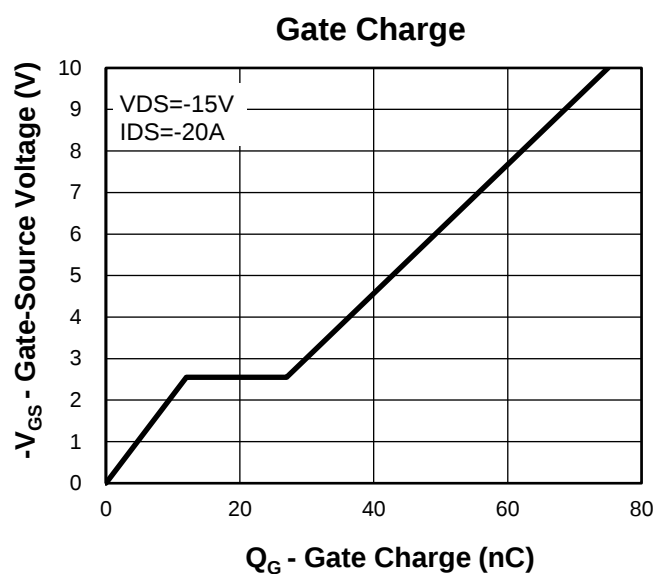
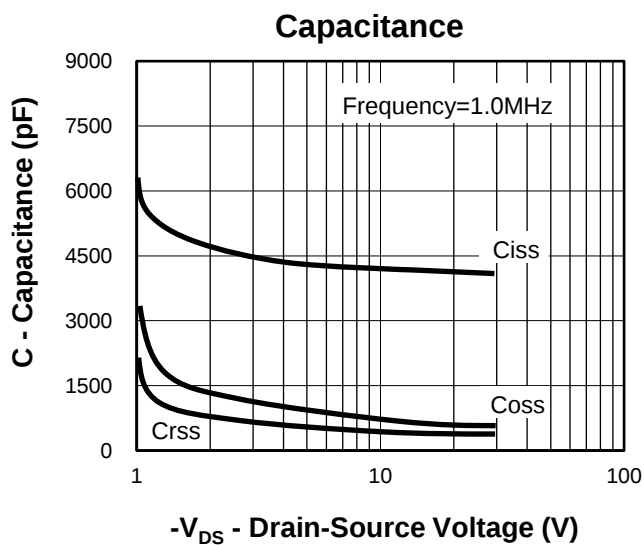
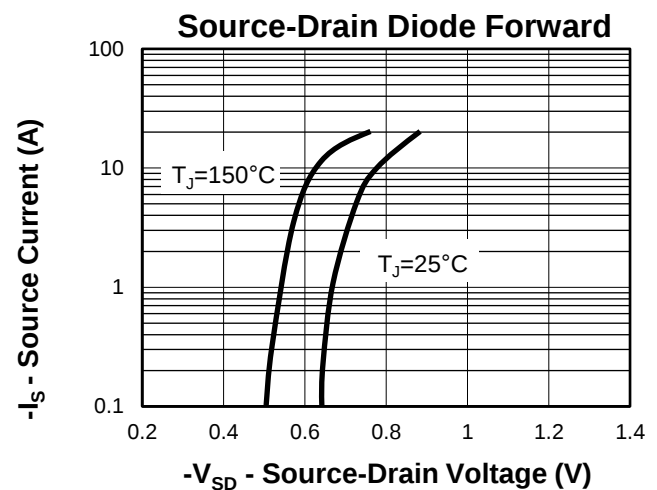
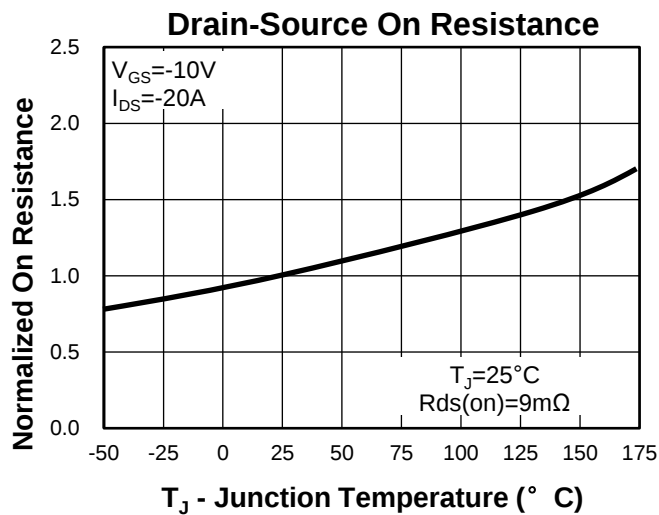
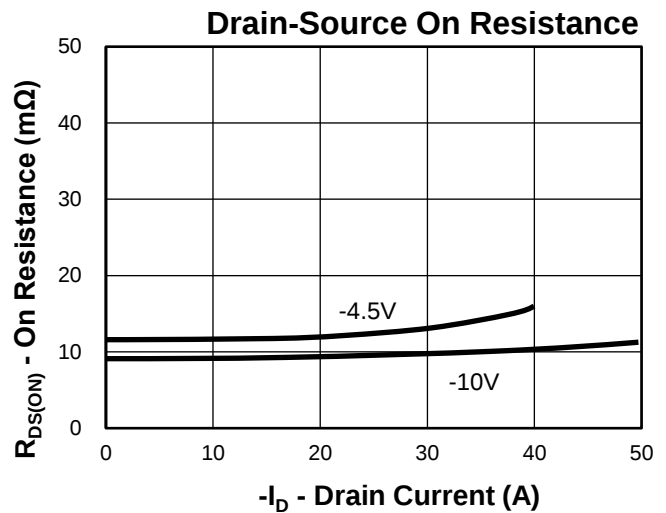
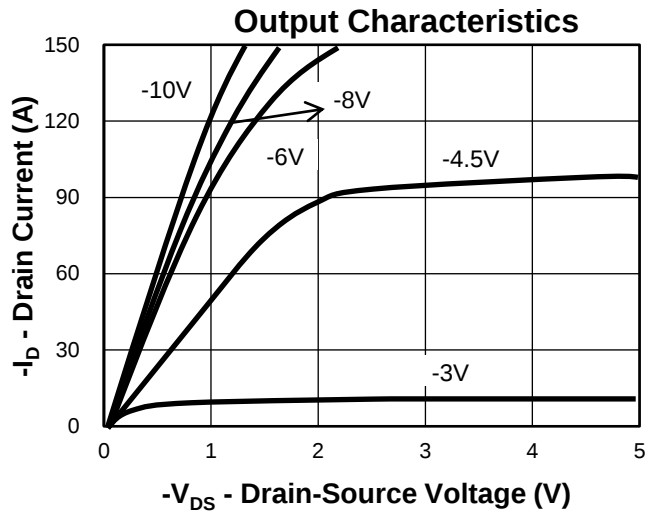
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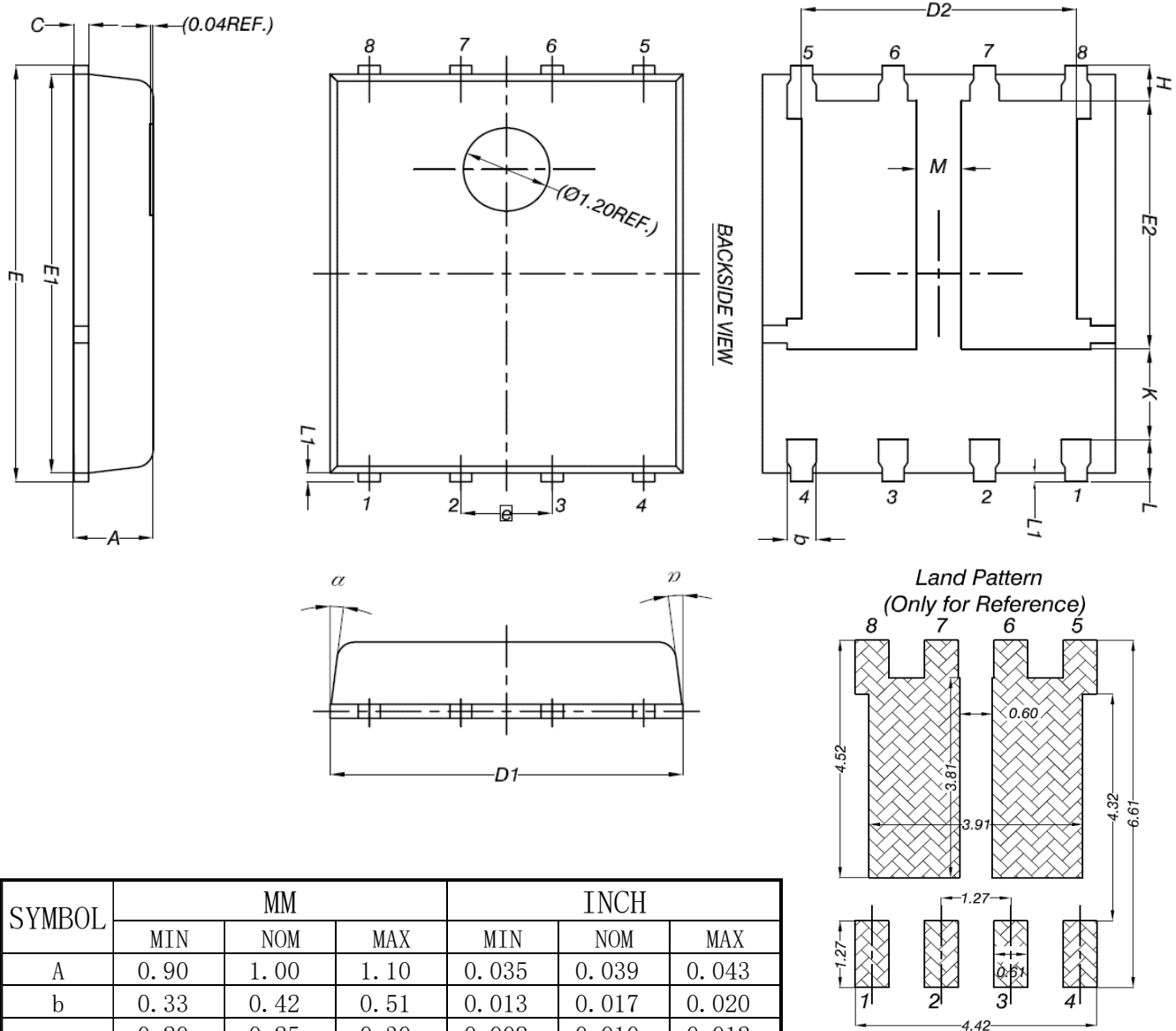


Typical Characteristics(P-Channel)



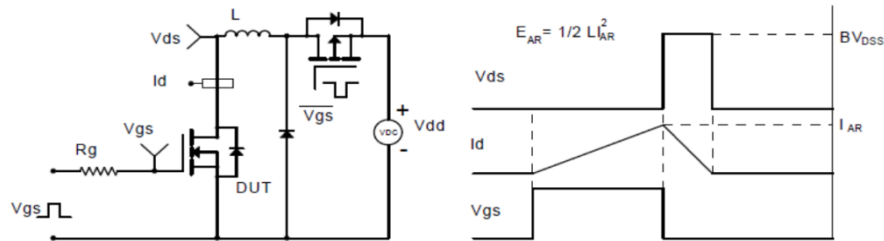
Typical Characteristics(P-Channel)



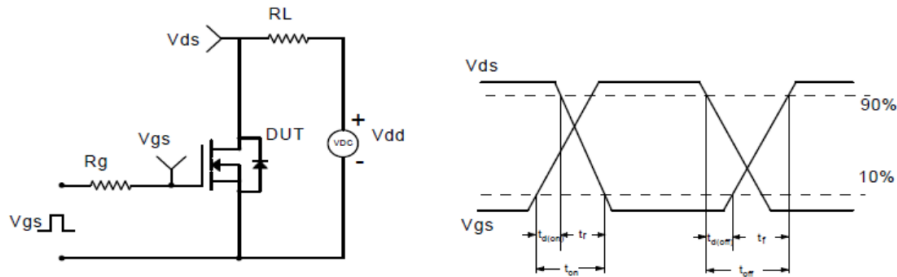
Package Information
PDFN5060 DP1


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°

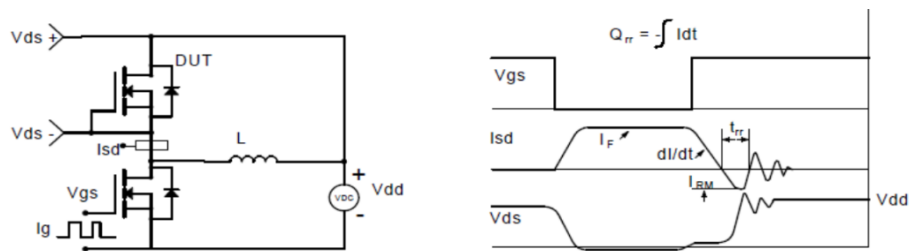
Avalanche Test Circuit and Waveforms(N-Channel)



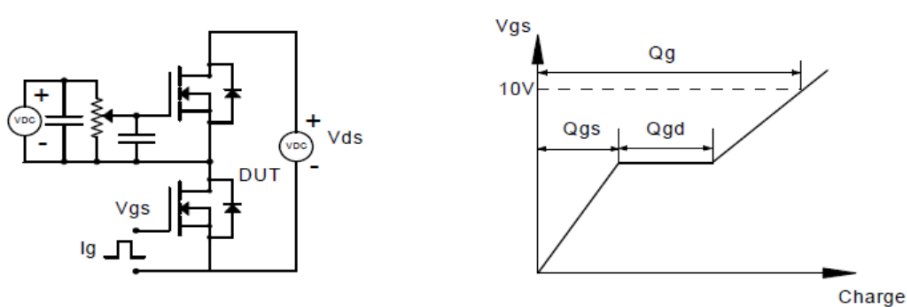
Switching Time Test Circuit and Waveforms(N-Channel)



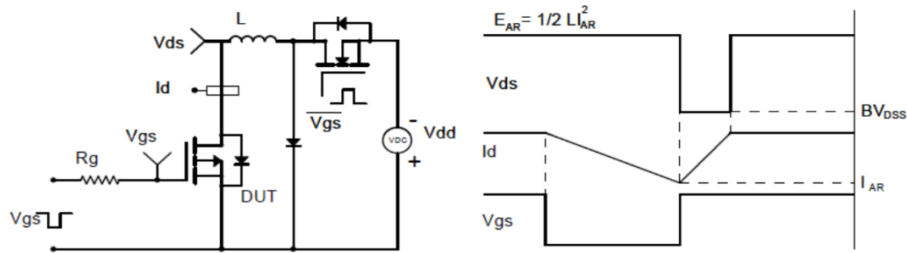
Diode Recovery Test Circuit and Waveforms(N-Channel)



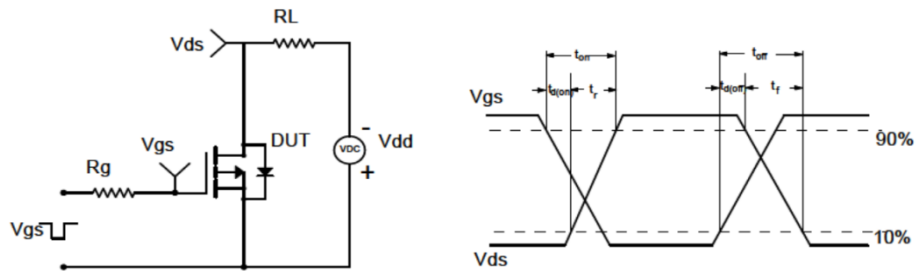
Gate Charge Test Circuit and Waveform(N-Channel)



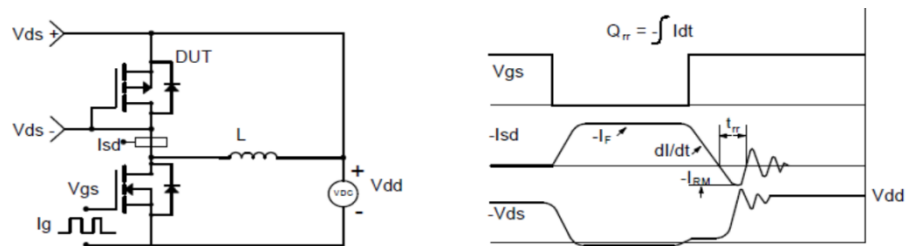
Avalanche Test Circuit and Waveforms(P-Channel)



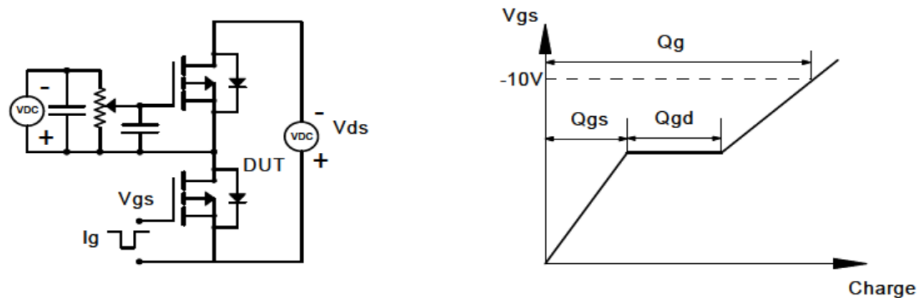
Switching Time Test Circuit and Waveforms(P-Channel)



Diode Recovery Test Circuit and Waveforms(P-Channel)



Gate Charge Test Circuit and Waveform(P-Channel)



Customer Service

Kwansemi Semiconductor Co.,Ltd

Email:Sales@kwansemi.com

Web:www.kwansemi.com

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