

Features

- N-Channel
30V/23A,
 $R_{DS(ON)} = 15m\Omega (Typ.) @ V_{GS} = 10V$
 $R_{DS(ON)} = 20m\Omega (Typ.) @ V_{GS} = 4.5V$
- P-Channel
-30V/-25A,
 $R_{DS(ON)} = 18m\Omega (Typ.) @ V_{GS} = -10V$
 $R_{DS(ON)} = 28m\Omega (Typ.) @ V_{GS} = -4.5V$
- Very low on-resistance
- Fast Switching

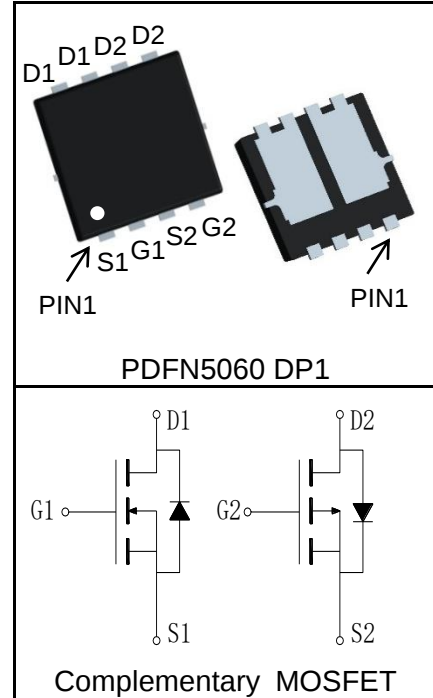
Applications

- Motor Drive Applications



Halogen-Free

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	23	-25	A
Mounted on Large Heat Sink					
I _{DP} ^①	300μs Pulse Drain Current Tested	T _C =25°C	92	-100	A
I _D ^②	Continuous Drain Current@T _C (V _{GS} =±10V)	T _C =25°C	23	-25	A
		T _C =100°C	15	-16	
	Continuous Drain Current@T _A (V _{GS} =±10V) ^③	T _A =25°C	10	-9	
		T _A =70°C	8	-7	
P _D	Maximum Power Dissipation@T _C	T _C =25°C	18	26	W
		T _C =100°C	7	10	
	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		7	4.8	°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		9	20	mJ

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

Symbol	Parameter	Test Condition	KS3640NB			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	1.8	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} =8A	N		15	20	mΩ
		V _{GS} =-10V, I _{DS} =-8A	P		18	25	
		V _{GS} =4.5V, I _{DS} =6A	N		20	28	
		V _{GS} =-4.5V, I _{DS} =-6A	P		28	35	
Diode Characteristics							
V _{SD} ^⑤	Diode Forward Voltage	I _{SD} =7A, V _{GS} =0V	N		0.85	1.2	V
		I _{SD} =-7A, V _{GS} =0V	P		-0.86	-1.2	
t _{rr}	Reverse Recovery Time	N-Channel I _{SD} =7A, dI _{SD} /dt=100A/μs	N		9		ns
			P		15		
Q _{rr}	Reverse Recovery Charge	P-Channel I _{SD} =-7A, dI _{SD} /dt=100A/μs	N		12		nC
			P		26		
Dynamic Characteristics ^⑥							
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	N		1.8		Ω
			P		4.5		
C _{iss}	Input Capacitance	N-Channel V _{GS} =0V, V _{DS} =15V, Frequency=1.0MHz	N		460		pF
			P		1190		
C _{oss}	Output Capacitance		N		70		
			P		175		
C _{rss}	Reverse Transfer Capacitance	P-Channel V _{GS} =0V, V _{DS} =-15V, Frequency=1.0MHz	N		45		
			P		120		

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

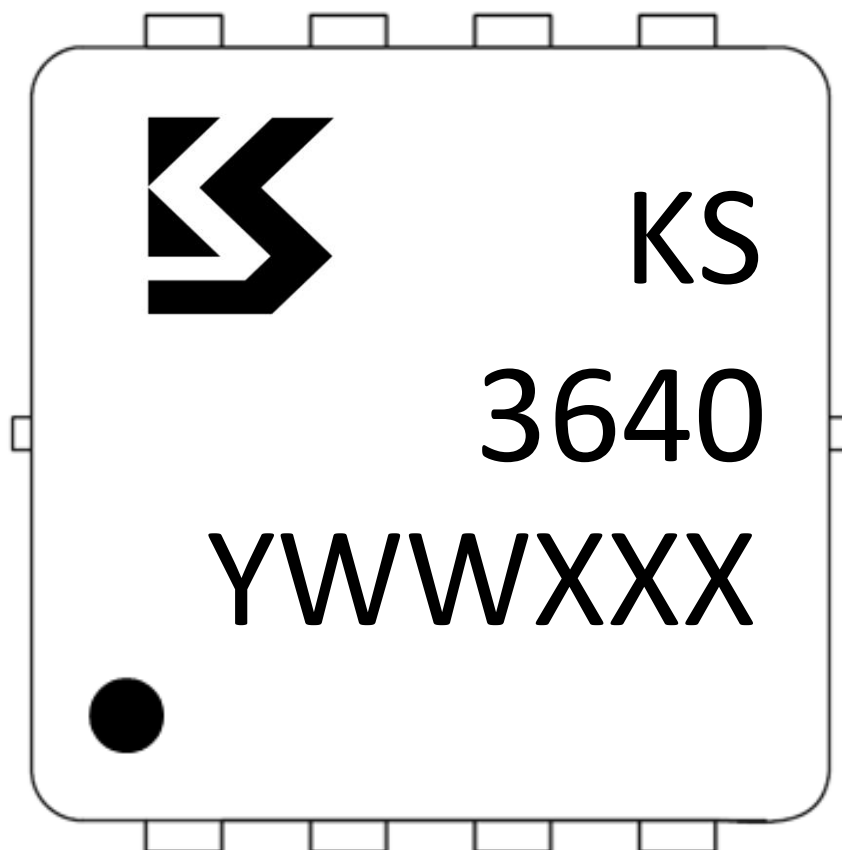
Symbol	Parameter	Test Condition	KS3640NB			Unit	
			Min.	Typ.	Max.		
Dynamic Characteristics ^⑥							
t _{d(ON)}	Turn-on Delay Time	N-Channel V _{DD} =15V, I _{DS} =7A, V _{GEN} =10V, R _G =3Ω	N		8	ns	
t _r	Turn-on Rise Time		P		13		
			N		11		
			P		25		
		t _{d(OFF)}	Turn-off Delay Time	P-Channel V _{DD} =-15V, I _{DS} =-7A, V _{GEN} = -10V, R _G =3Ω	N		
P				32			
t _f	Turn-off Fall Time			N			9
				P			14
Gate Charge Characteristics ^⑥							
Q _g	Total Gate Charge	N-Channel V _{DS} =15V, V _{GS} =10V, I _{DS} =7A	N		10	nC	
Q _{gs}	Gate-Source Charge		P		23		
		P-Channel V _{DS} =-15V, V _{GS} = -10V, I _{DS} =-7A	N		3		
			P		5		
			Q _{gd}	Gate-Drain Charge	N		
P					7		

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: $L = 0.5\text{mH}$, $R_G = 25\Omega$, $I_{AS} = 6\text{A}$, $V_{GS} = 10\text{V}$, P-Channel: $L = 0.5\text{mH}$, $R_G = 25\Omega$, $I_{AS} = -9\text{A}$, $V_{GS} = -10\text{V}$, 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
KS3640NB	PDFN5060 DP1	Tape&Reel	5000	13"	12mm

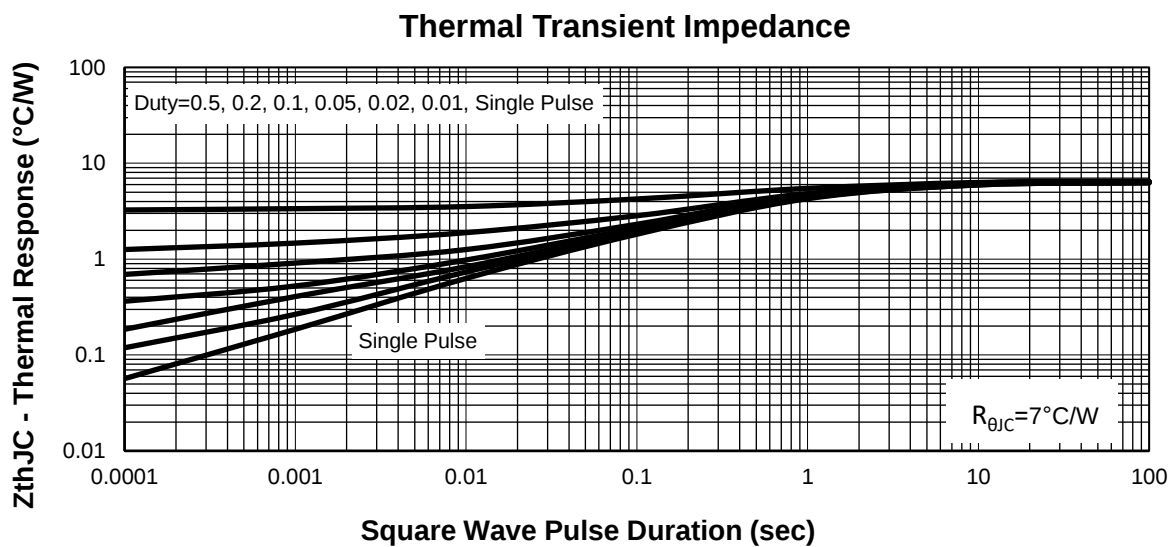
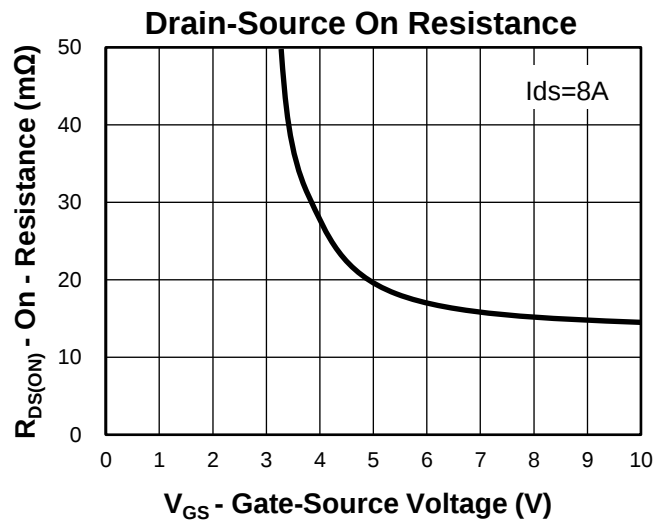
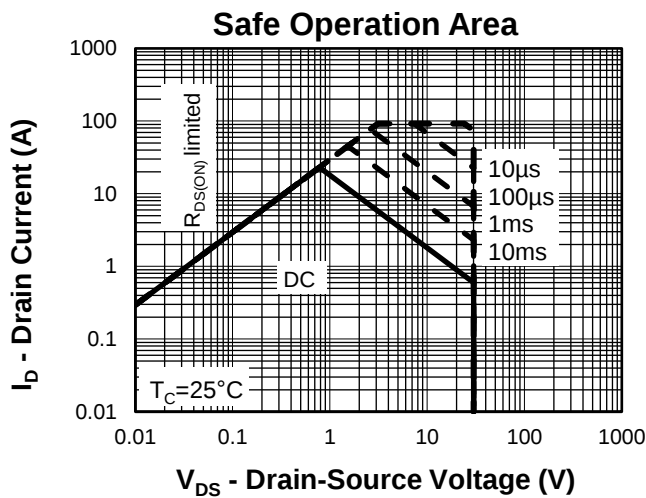
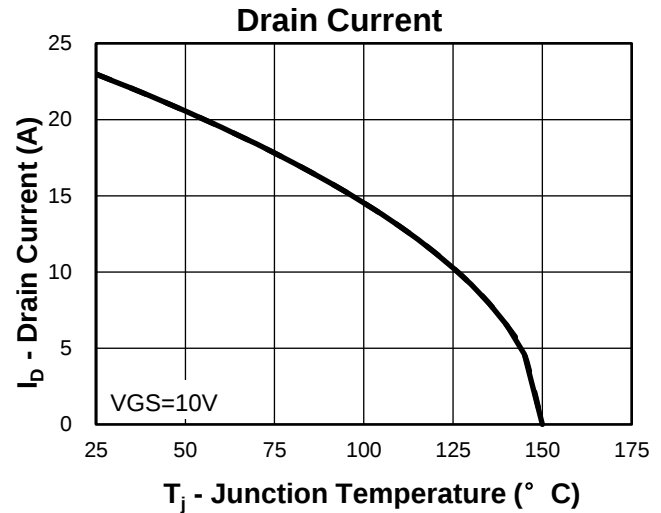
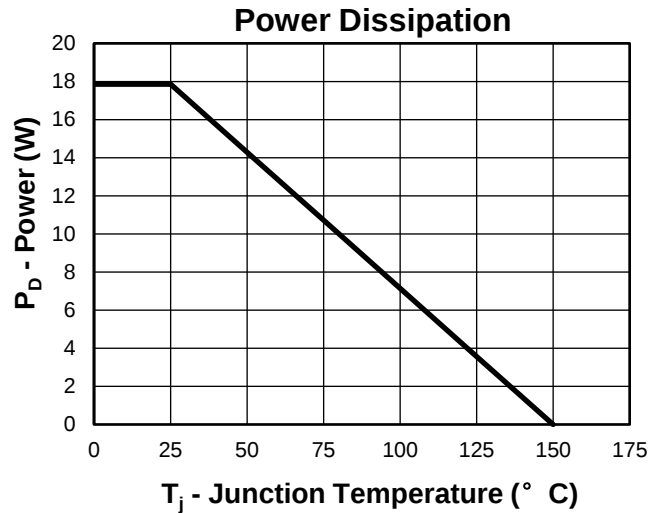


1st Line: Kwansemi LOGO, Kwansemi Code(KS)

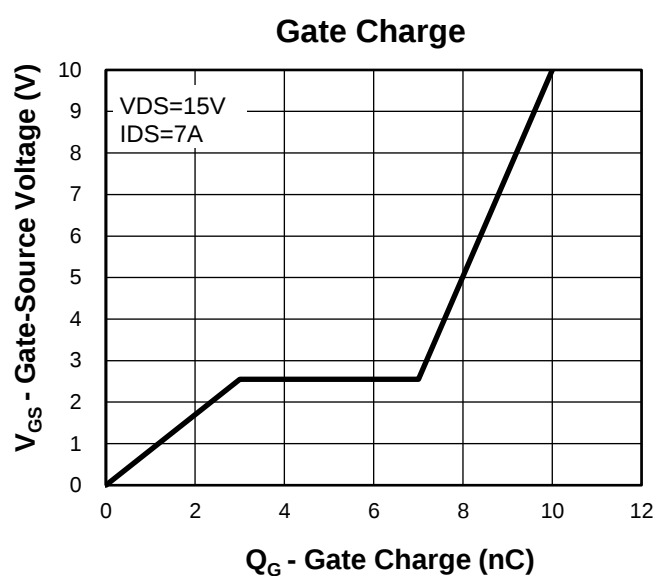
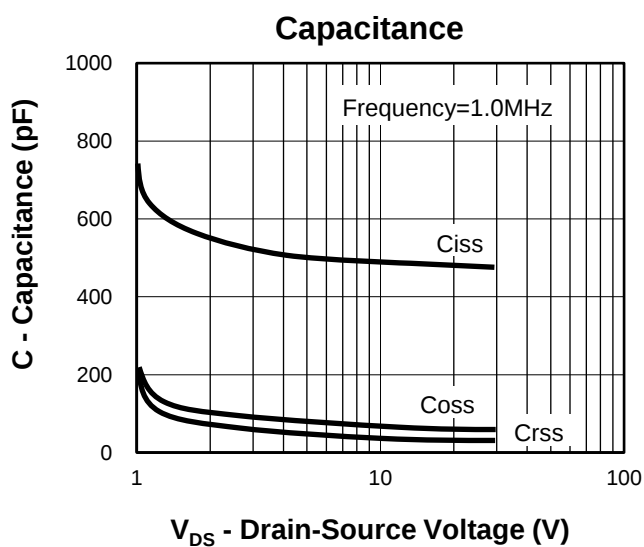
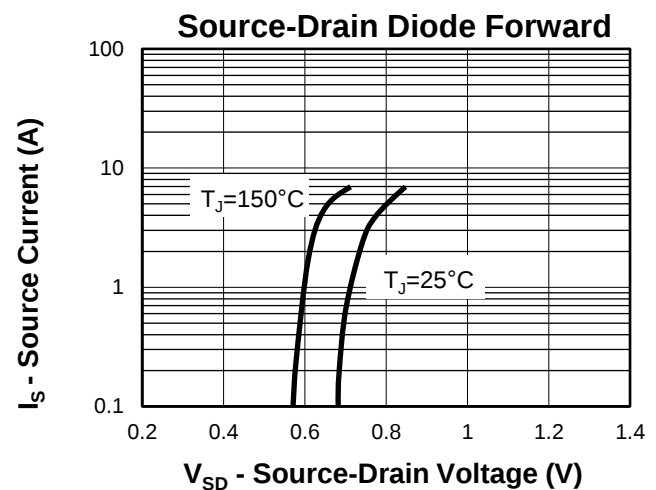
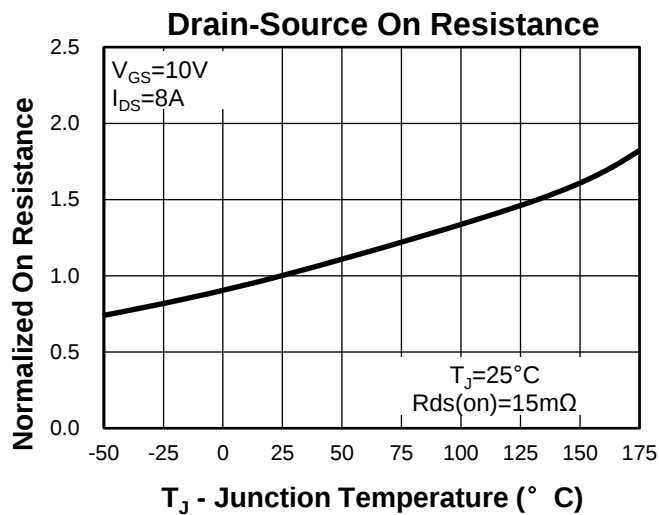
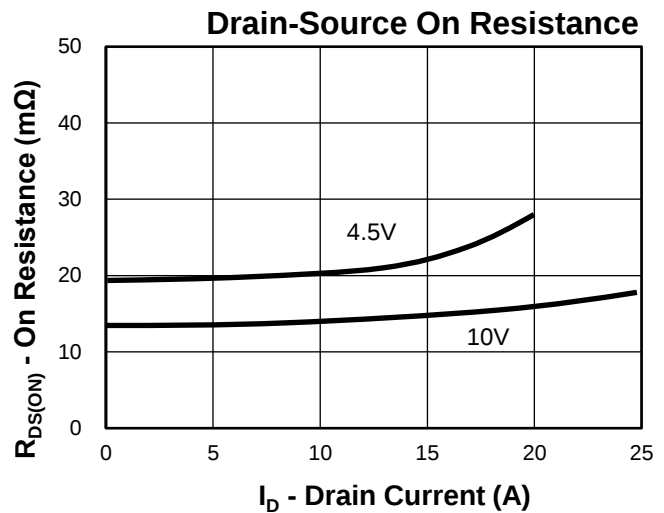
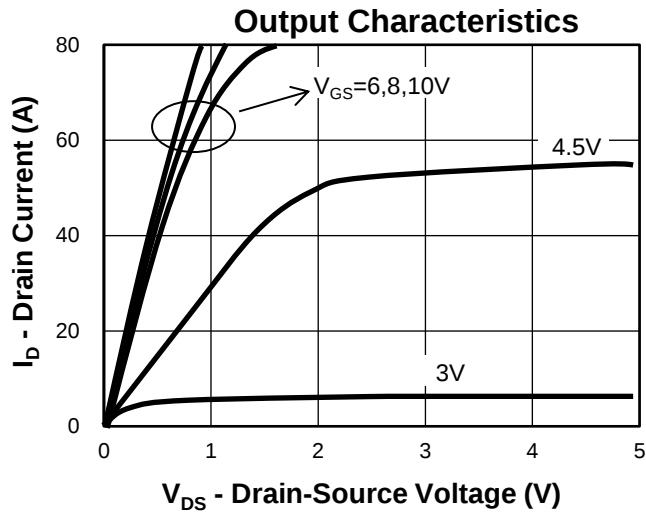
2nd Line: Part Number(3640)

3rd Line: Lot Number(YWWXXX)

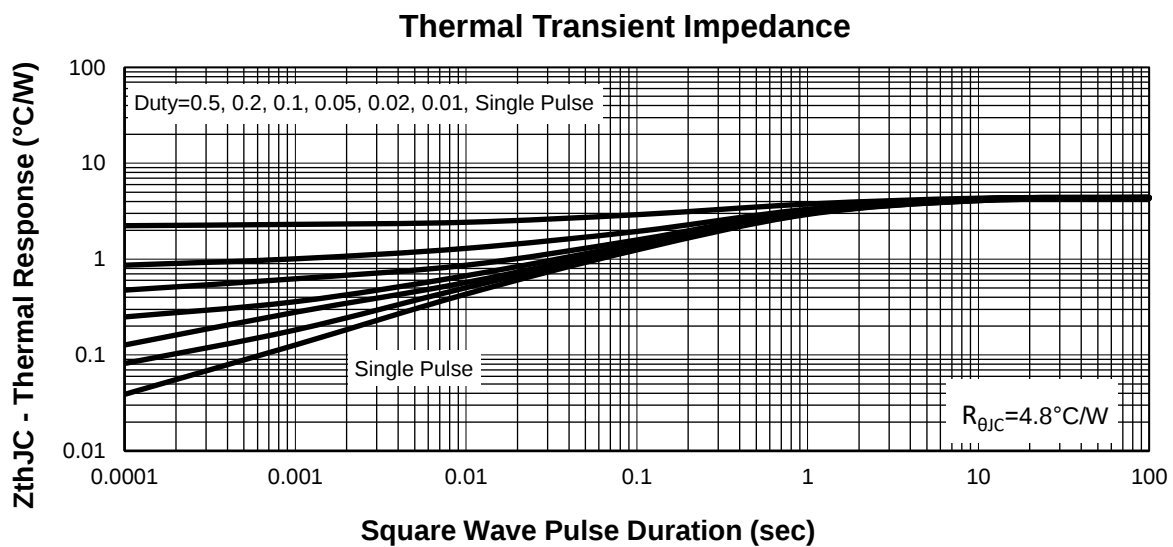
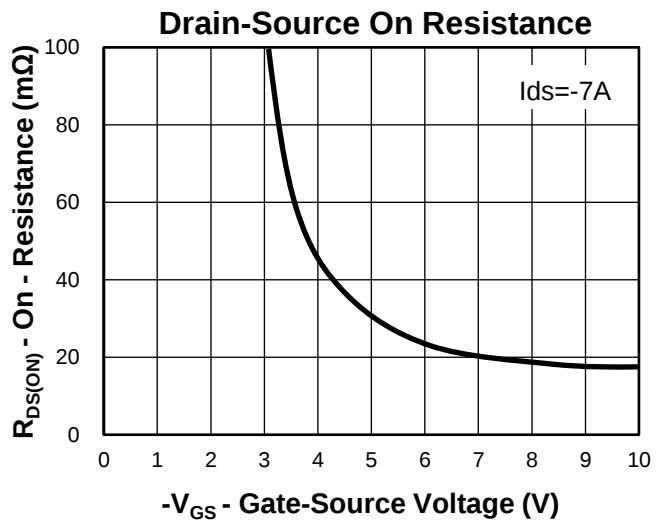
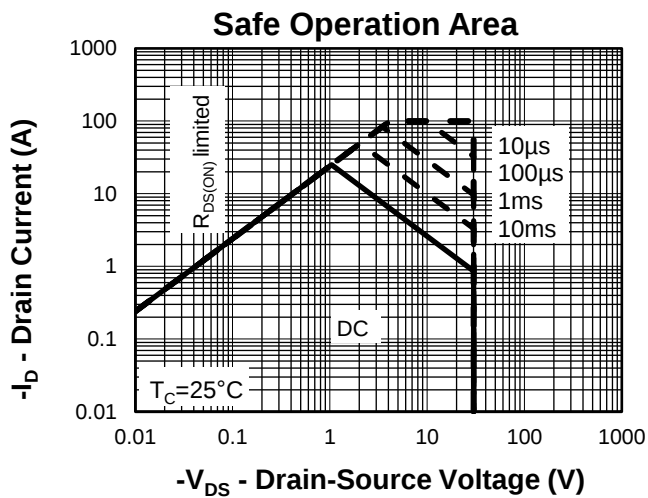
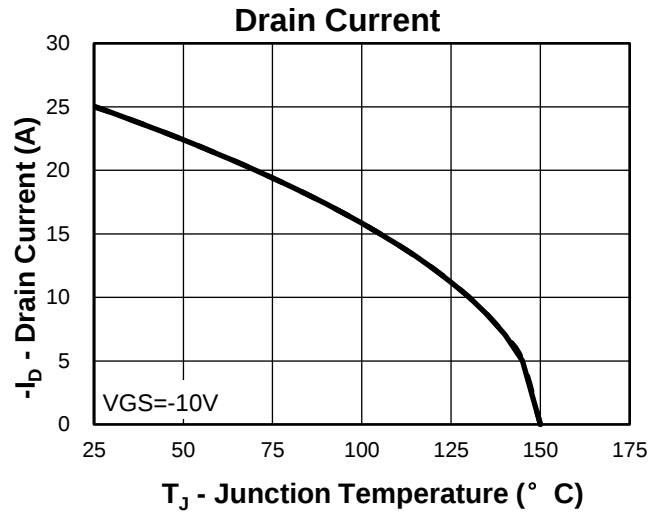
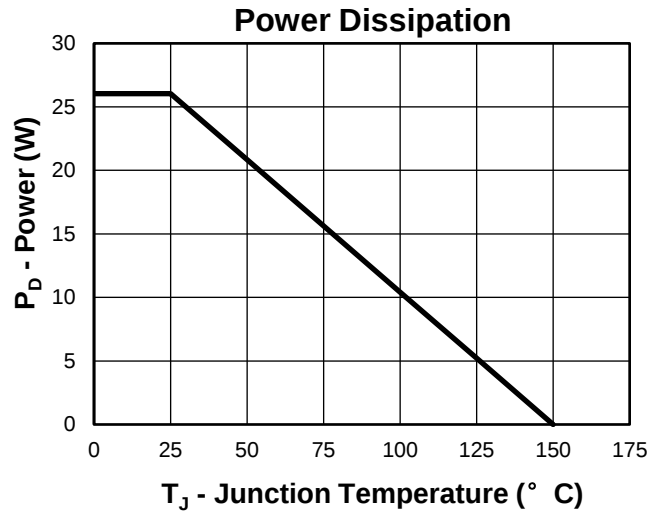
Typical Characteristics(N-Channel)



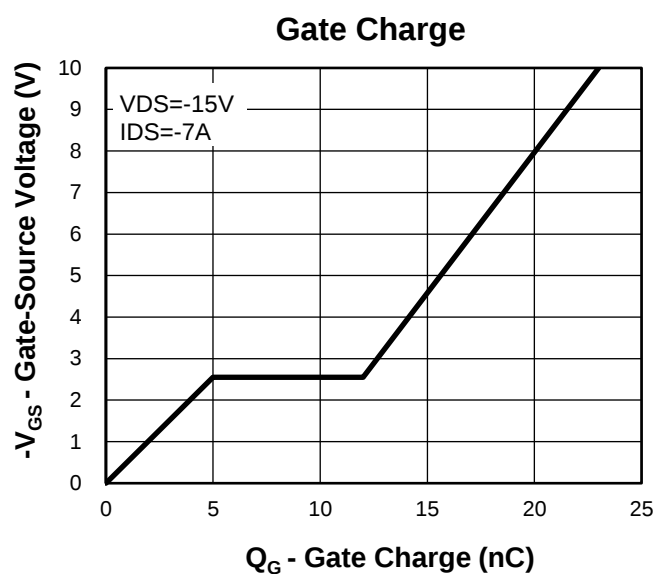
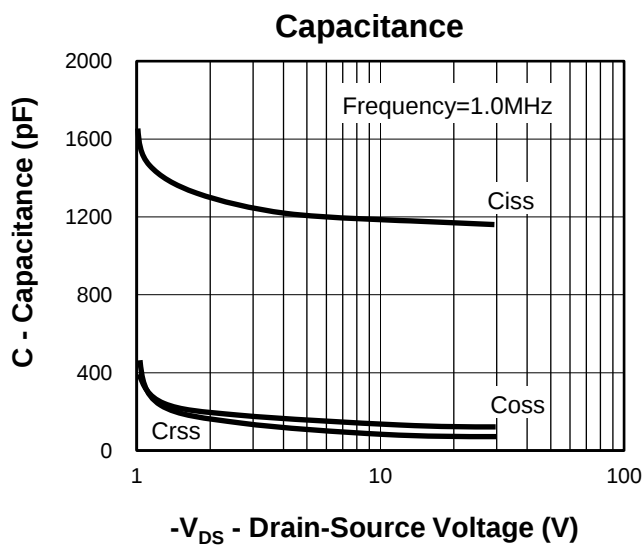
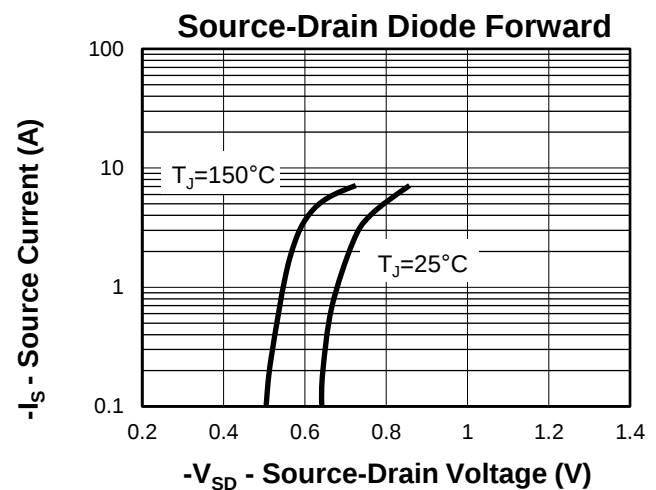
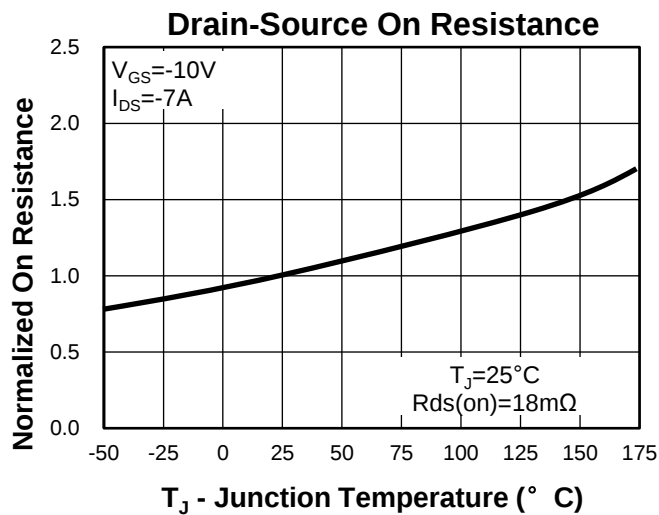
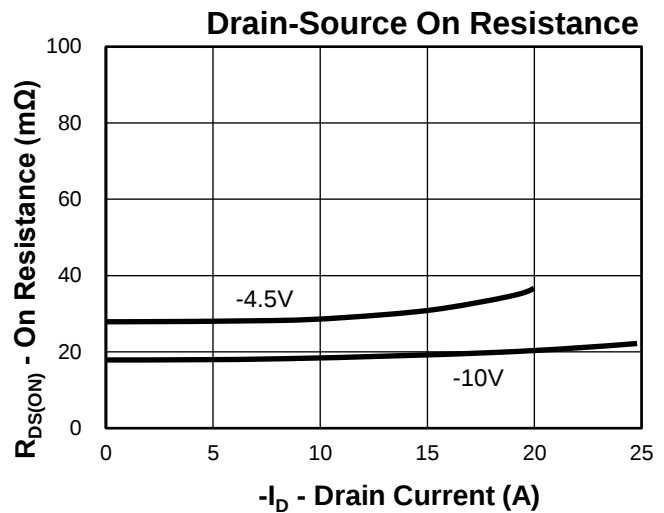
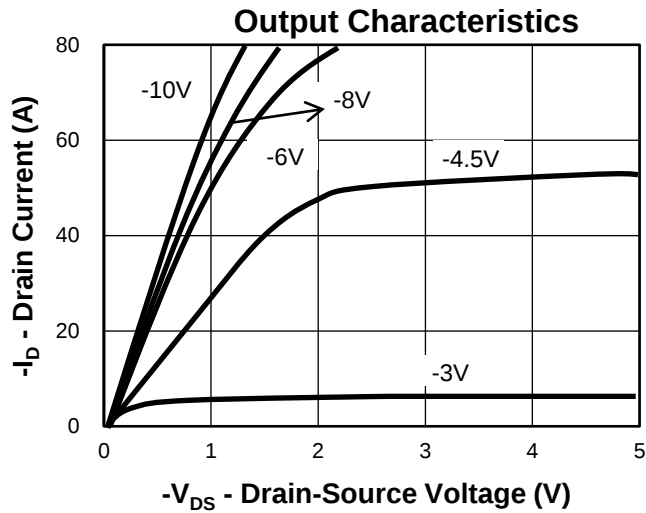
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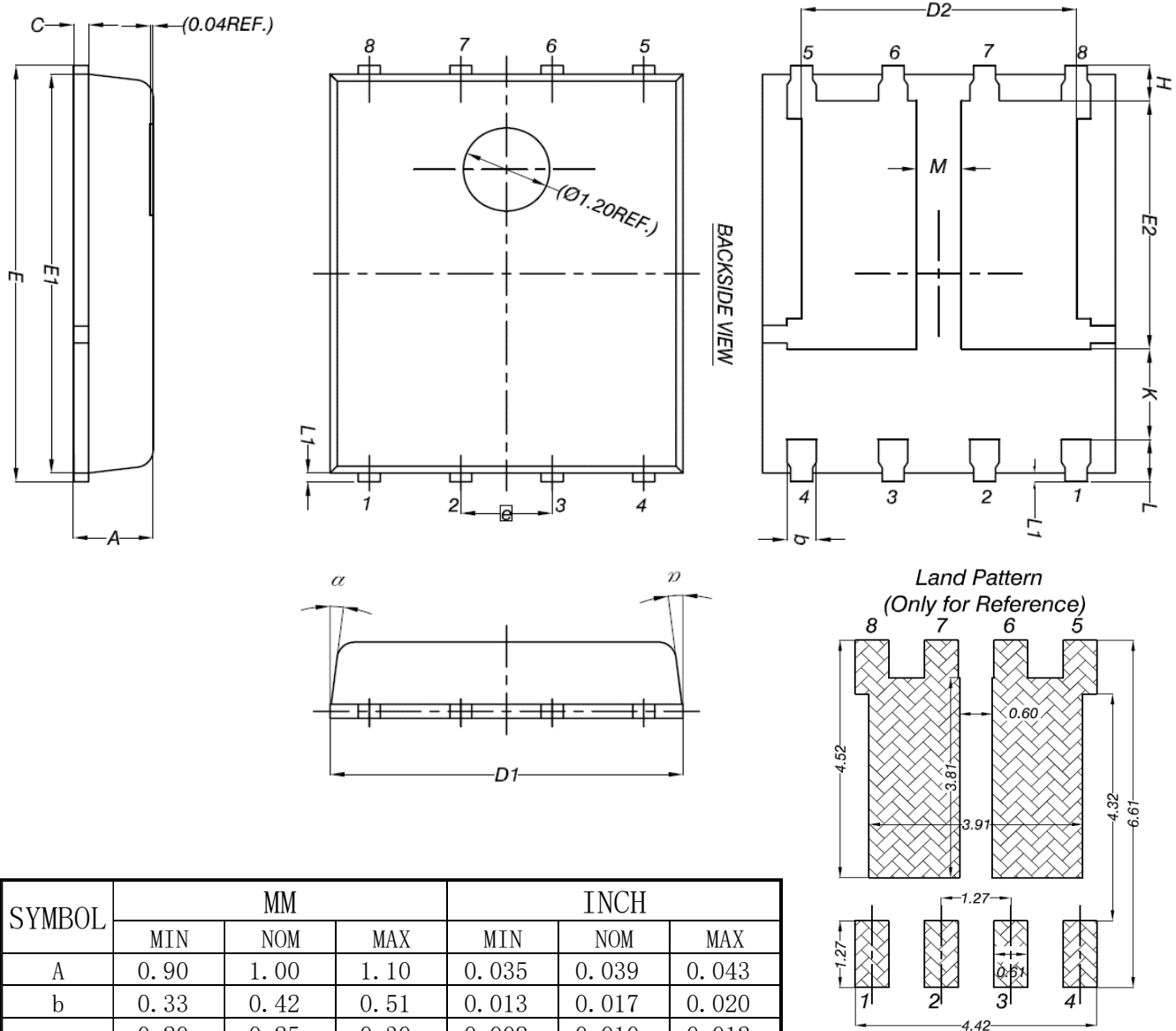


Typical Characteristics(P-Channel)

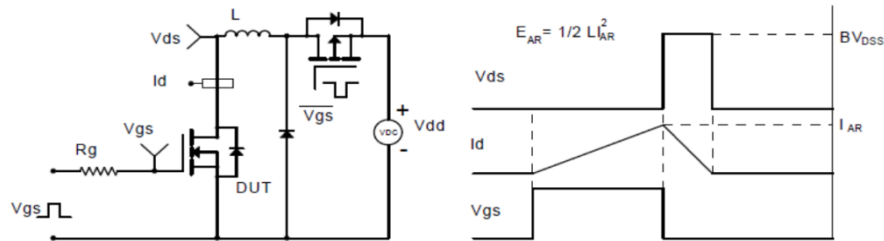


Typical Characteristics(P-Channel)

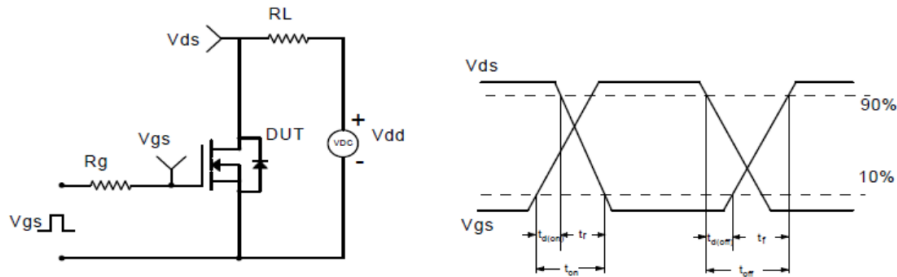


Package Information
PDFN5060 DP1


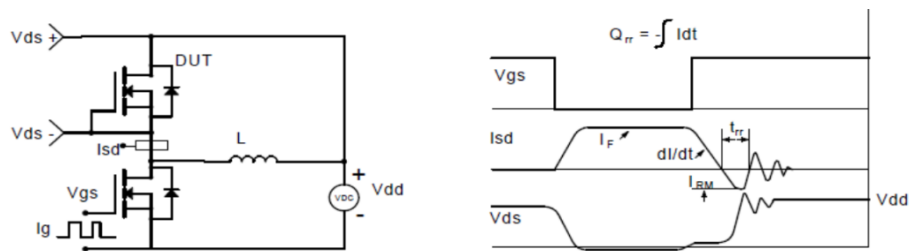
Avalanche Test Circuit and Waveforms(N-Channel)



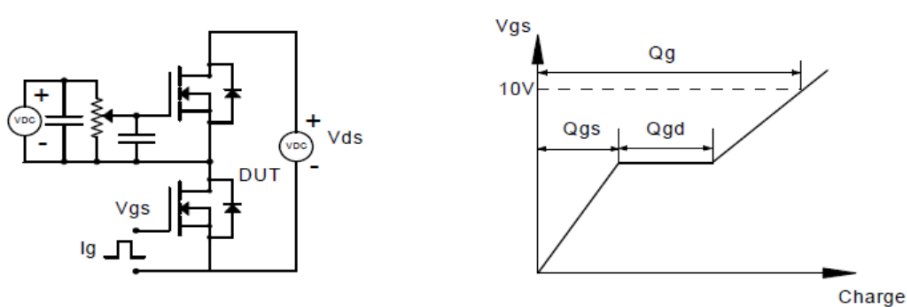
Switching Time Test Circuit and Waveforms(N-Channel)



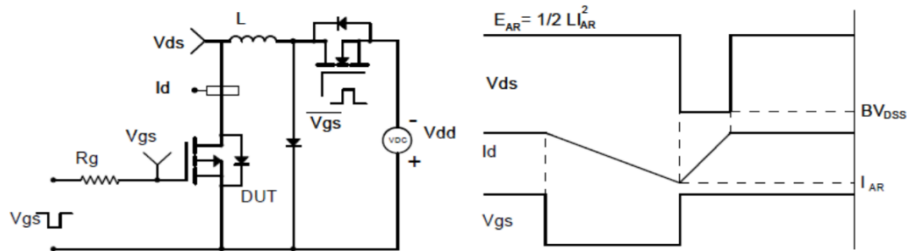
Diode Recovery Test Circuit and Waveforms(N-Channel)



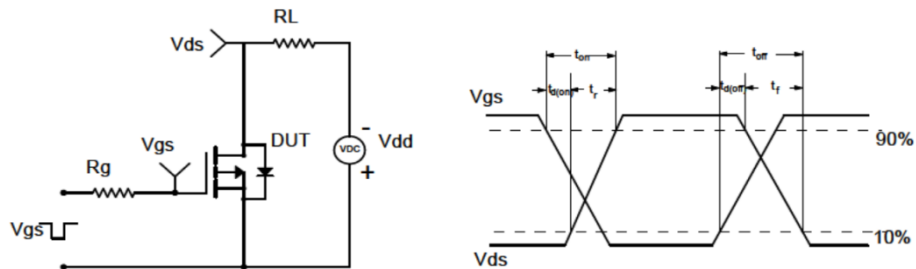
Gate Charge Test Circuit and Waveform(N-Channel)



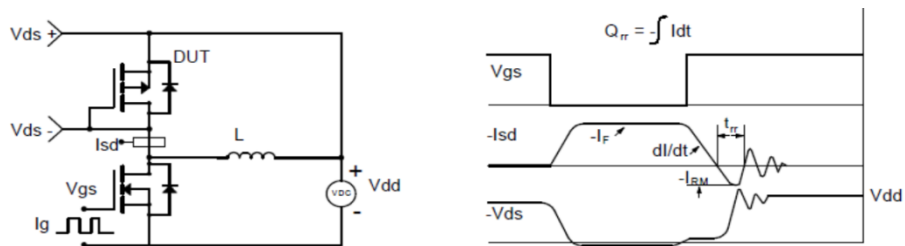
Avalanche Test Circuit and Waveforms(P-Channel)



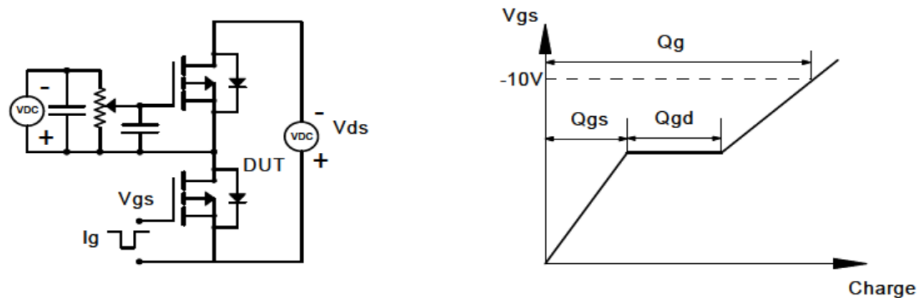
Switching Time Test Circuit and Waveforms(P-Channel)



Diode Recovery Test Circuit and Waveforms(P-Channel)



Gate Charge Test Circuit and Waveform(P-Channel)



Customer Service

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