

Features

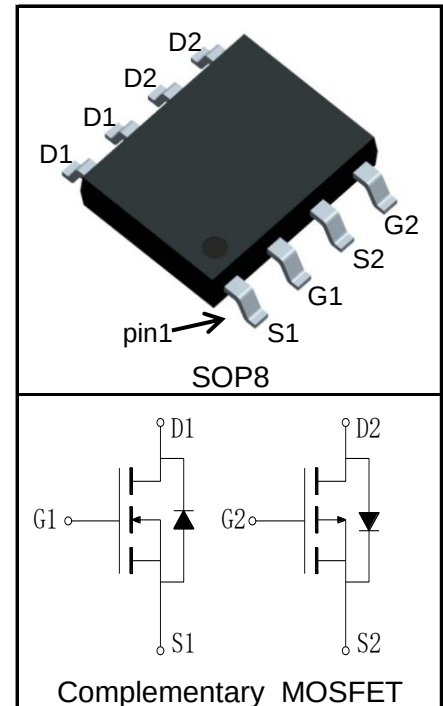
- N-Channel
40V/6A,
 $R_{DS(ON)} = 25m\Omega (Typ.) @ V_{GS}=10V$
 $R_{DS(ON)} = 32m\Omega (Typ.) @ V_{GS}=4.5V$
- P-Channel
-40V/-4.6A,
 $R_{DS(ON)} = 60m\Omega (Typ.) @ V_{GS}=-10V$
 $R_{DS(ON)} = 85m\Omega (Typ.) @ V_{GS}=-4.5V$
- Very low on-resistance
- Fast Switching

Applications

- Load Switch



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		40	-40	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 _A =25°C	1.6	-1.6	A
Mounted on Large Heat Sink					
I _{DP} ^①	300μs Pulse Drain Current Tested	T _A =25°C	24	-18	A
I _D ^②	Continuous Drain Current(V _{GS} =±10V)	T _A =25°C	6	-4.6	A
		T _A =70°C	4.8	-3.7	
P _D	Maximum Power Dissipation	T _A =25°C	2	2	W
		T _A =70°C	1.3	1.3	
R _{θJL}	Thermal Resistance-Junction to Lead		24	24	°C/W
R _{θJA} ^③	Thermal Resistance-Junction to Ambient		62.5	62.5	°C/W
Drain-Source Avalanche Ratings					
E _{AS} ^④	Avalanche Energy, Single Pulsed		9	9	mJ

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

Symbol	Parameter	Test Condition	KS4640HA			Unit	
			Min.	Typ.	Max.		
Static Characteristics							
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	N	40			V
		V _{GS} =0V, I _{DS} =-250μA	P	-40			
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =40V, V _{GS} =0V	N			1	μA
				T _J =125°C			
		V _{DS} =-40V, 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} =4A	N		25	30	mΩ
		V _{GS} =-10V, I _{DS} =-3A	P		60	70	
		V _{GS} =4.5V, I _{DS} =3A	N		32	40	
		V _{GS} =-4.5V, I _{DS} =-2A	P		85	100	
Diode Characteristics							
V _{SD} ^⑤	Diode Forward Voltage	I _{SD} =4A, V _{GS} =0V	N		0.81	1.2	V
		I _{SD} =-3A, V _{GS} =0V	P		-0.86	-1.2	
t _{rr}	Reverse Recovery Time	N-Channel I _{SD} =4A, dI _{SD} /dt=100A/μs	N		12		ns
			P		13		
Q _{rr}	Reverse Recovery Charge	P-Channel I _{SD} =-3A, dI _{SD} /dt=100A/μs	N		8		nC
			P		9		
Dynamic Characteristics ^⑥							
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	N		1.6		Ω
			P		5.3		
C _{iss}	Input Capacitance	N-Channel V _{GS} =0V, V _{DS} =20V, Frequency=1.0MHz	N		850		pF
			P		1050		
C _{oss}	Output Capacitance		N		125		
			P		140		
C _{rss}	Reverse Transfer Capacitance	P-Channel V _{GS} =0V, V _{DS} =-20V, Frequency=1.0MHz	N		60		
			P		75		

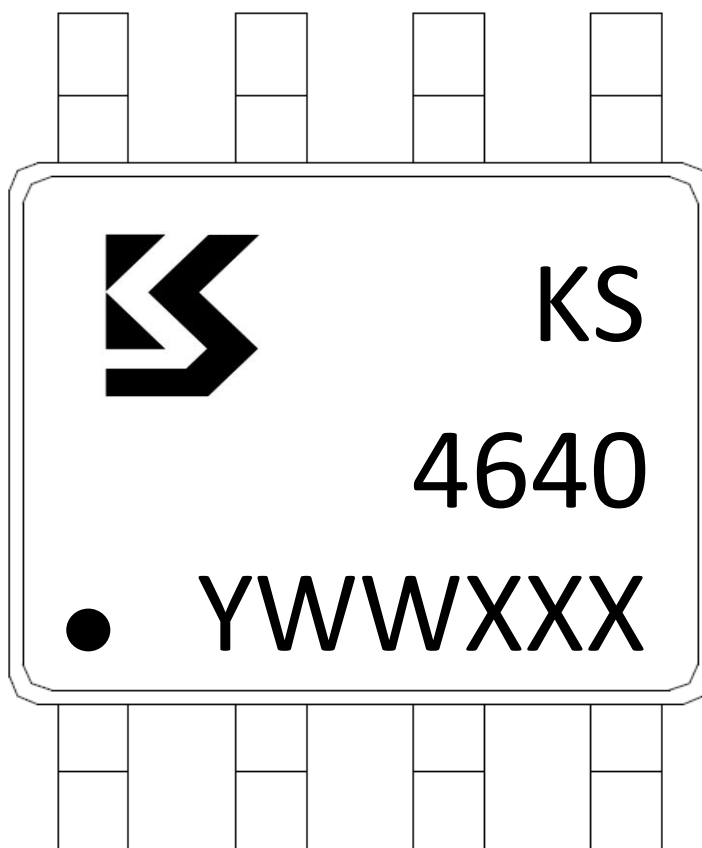
Electrical Characteristics ($T_A=25^{\circ}\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Test Condition	KS4640HA			Unit
			Min.	Typ.	Max.	
Dynamic Characteristics ^⑥						
t _{d(ON)}	Turn-on Delay Time	N-Channel V _{DD} =20V, I _{DS} =4A, V _{GEN} =10V, R _G =3Ω	N		8	ns
t _r	Turn-on Rise Time		P		15	
			N		12	
t _{d(OFF)}	Turn-off Delay Time		P		21	
		N		29		
t _f	Turn-off Fall Time	P		33		
		N		10		
		P		18		
Gate Charge Characteristics ^⑥						
Q _g	Total Gate Charge	N-Channel V _{DS} =20V, V _{GS} =10V, I _{DS} =4A	N		13	nC
Q _{gs}	Gate-Source Charge		P		18	
		N		2.8		
Q _{gd}	Gate-Drain Charge	P-Channel V _{DS} =-20V, V _{GS} = -10V, I _{DS} =-3A	P		3.2	
		N		3.7		
		P		4.8		

- 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: $L = 0.5\text{mH}$, $R_G = 25\Omega$, $I_{AS} = -6\text{A}$, $V_{GS} = -10\text{V}$, 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
KS4640HA	SOP8	Tape&Reel	3000	13"	12mm

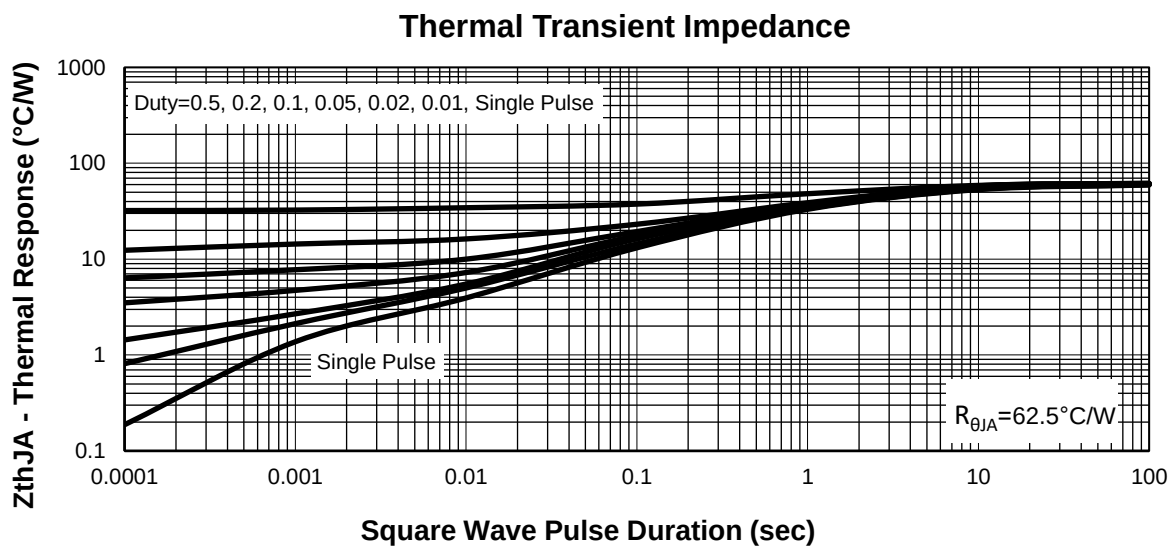
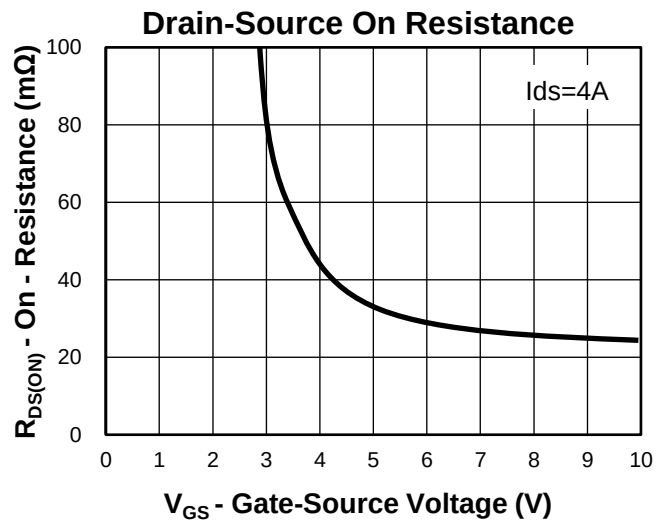
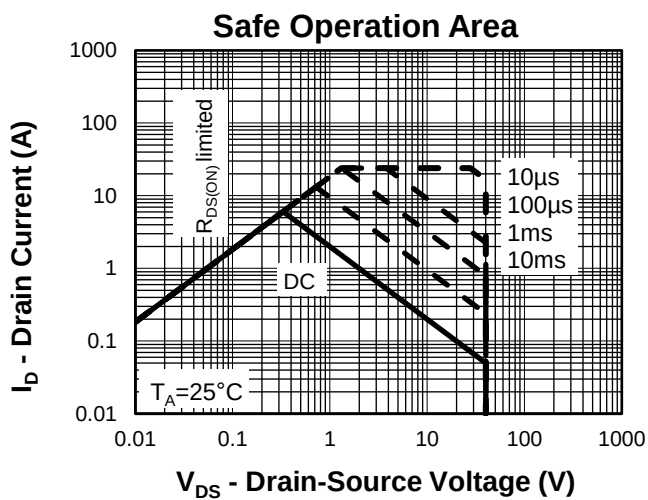
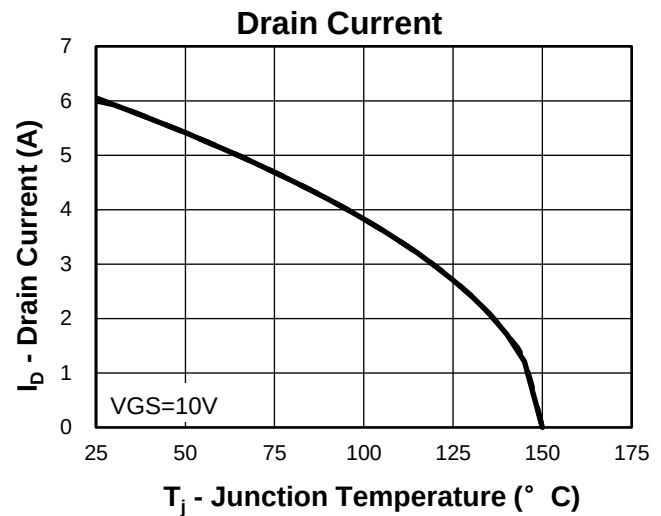
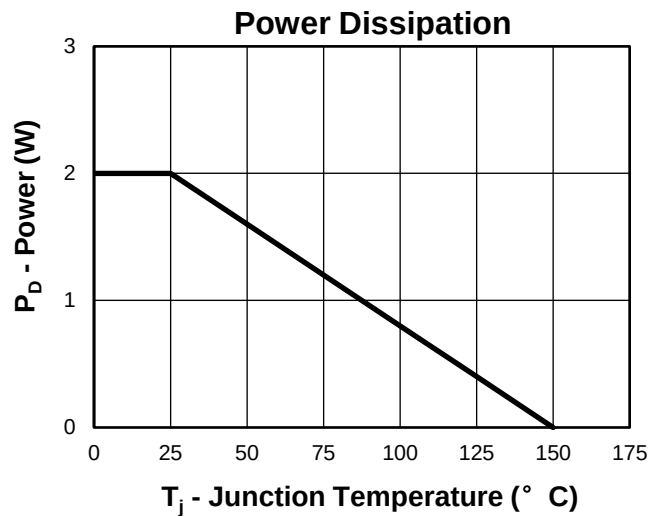


1st Line: Kwansemi LOGO, Kwansemi Code(KS)

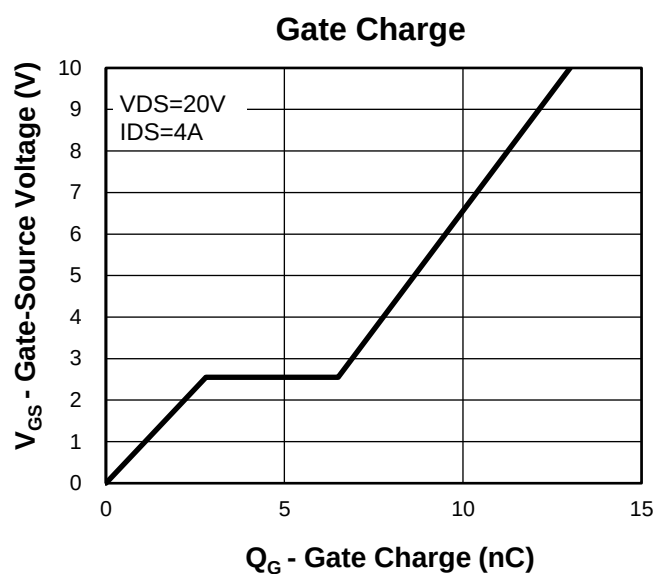
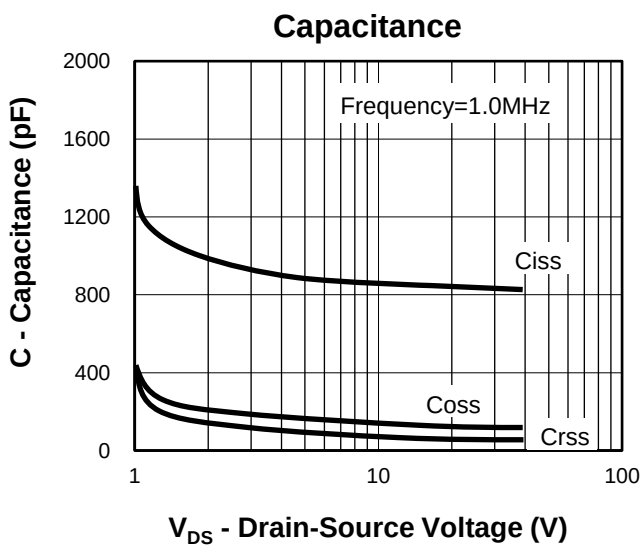
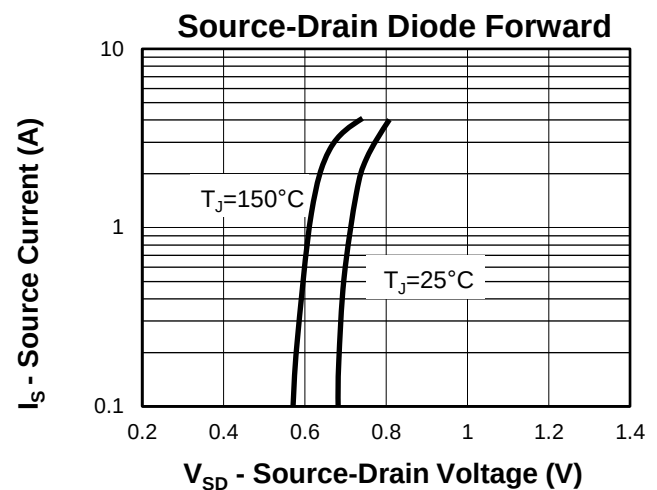
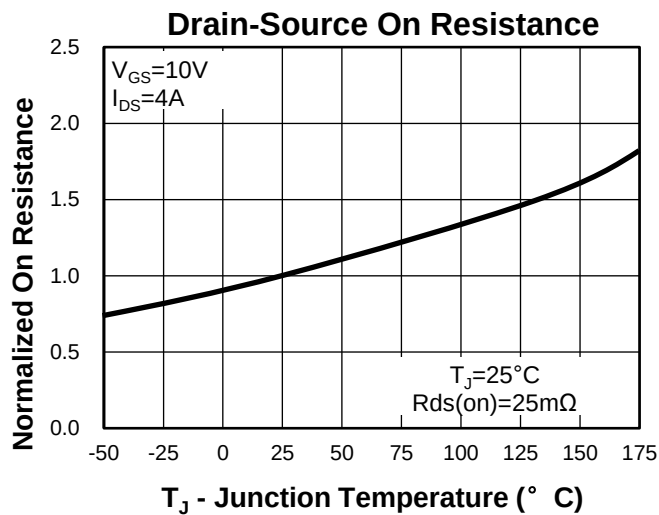
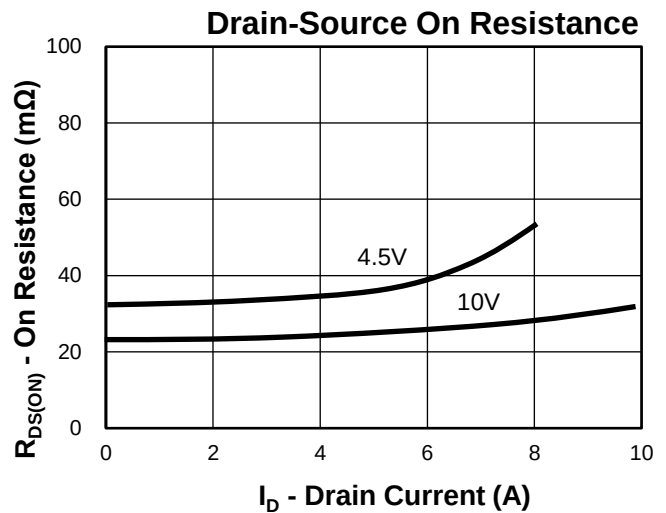
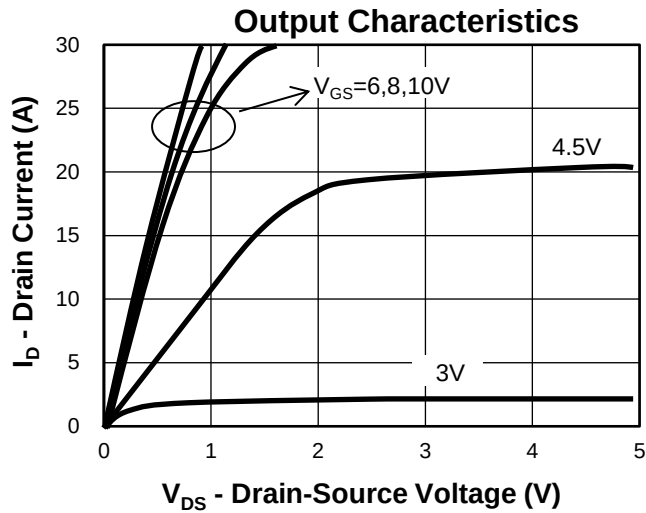
2nd Line: Part Number(4640)

3rd Line: Lot Number(YWWXXX)

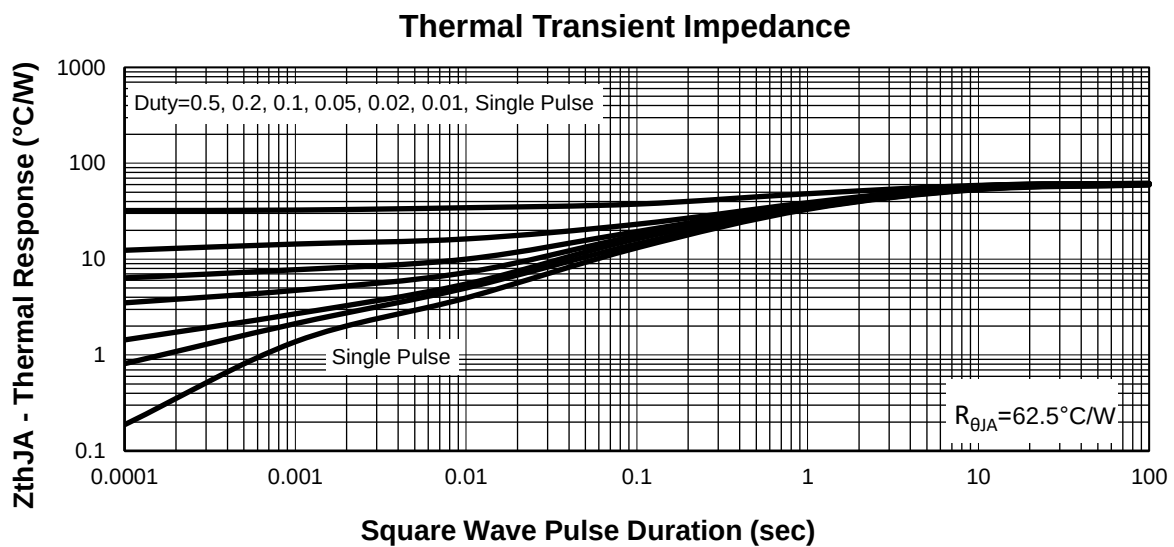
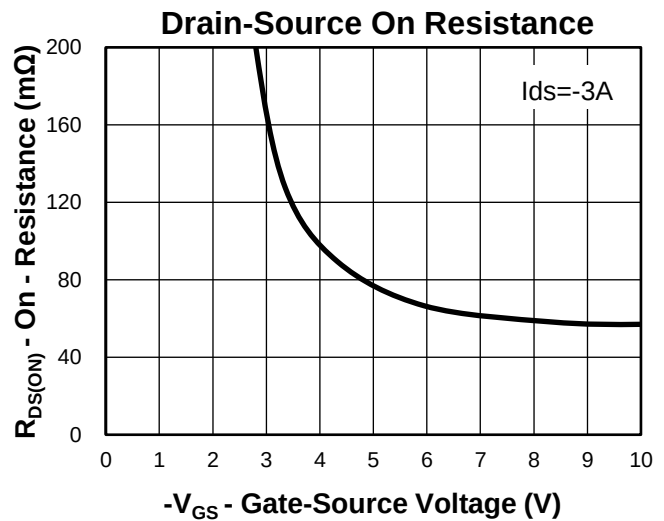
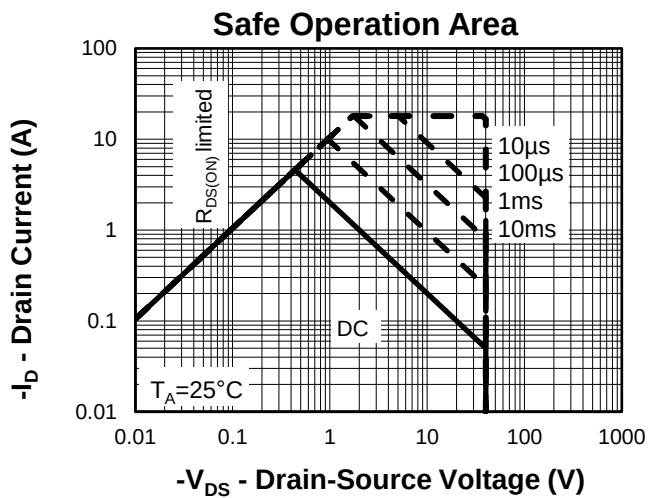
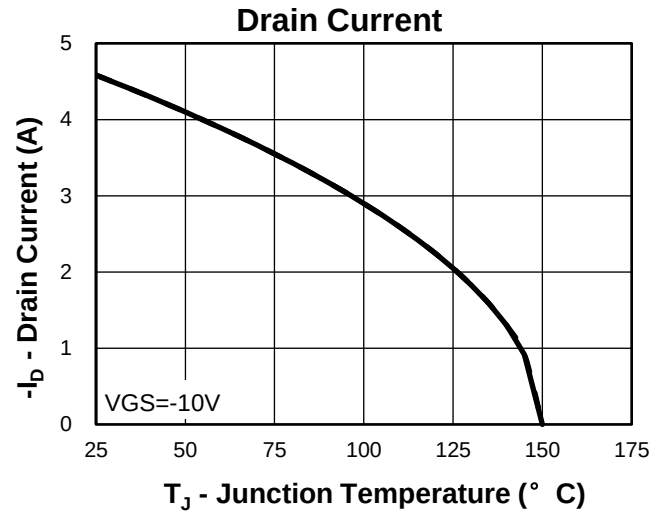
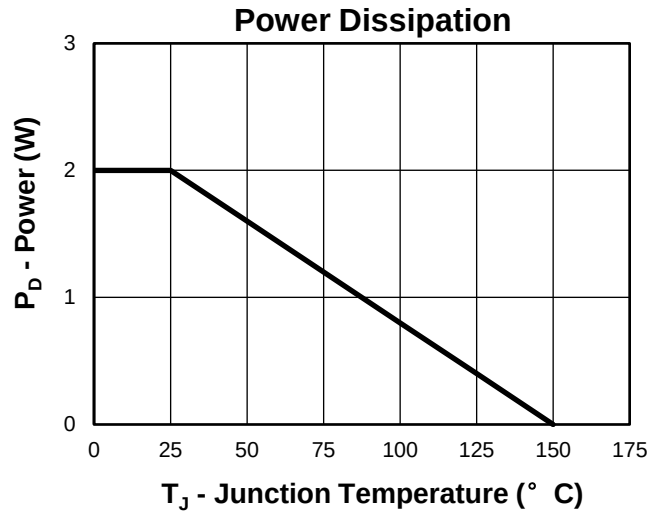
Typical Characteristics(N-Channel)



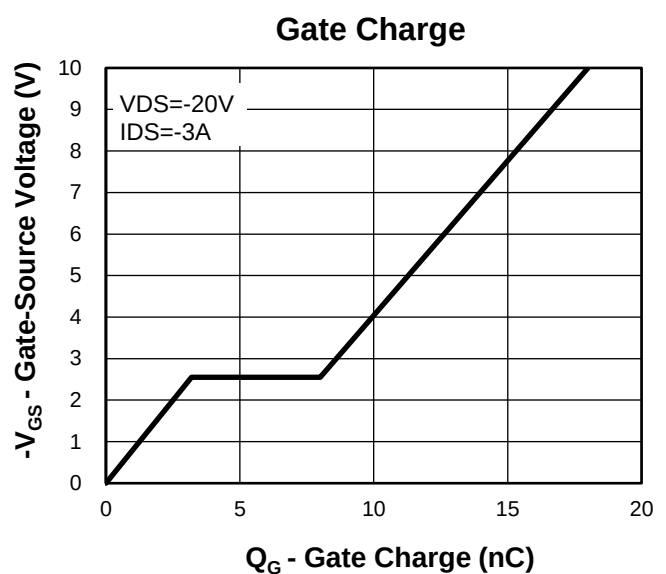
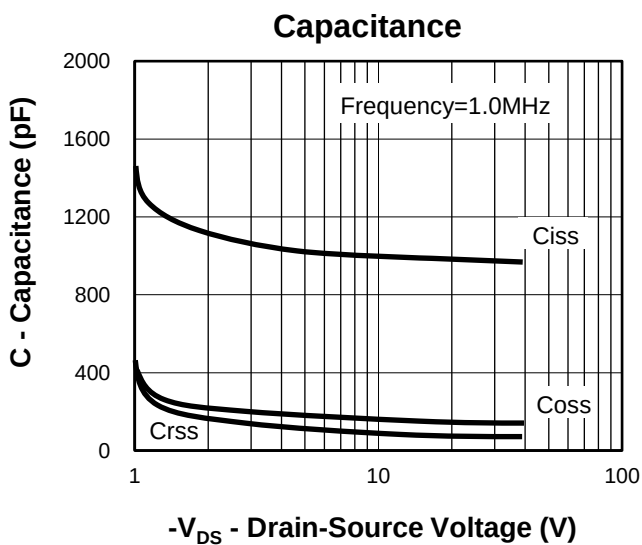
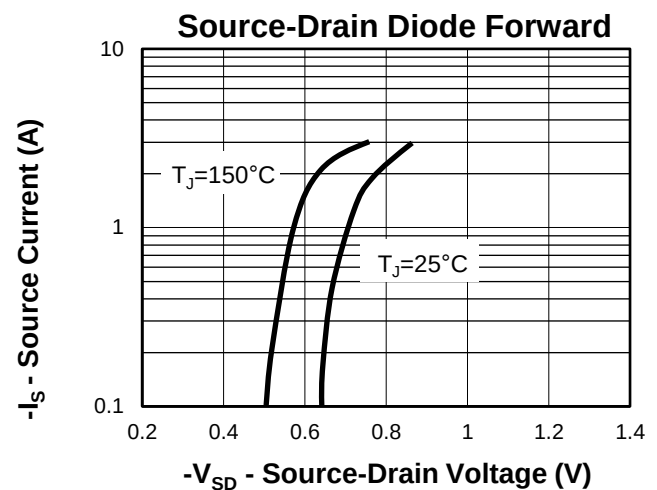
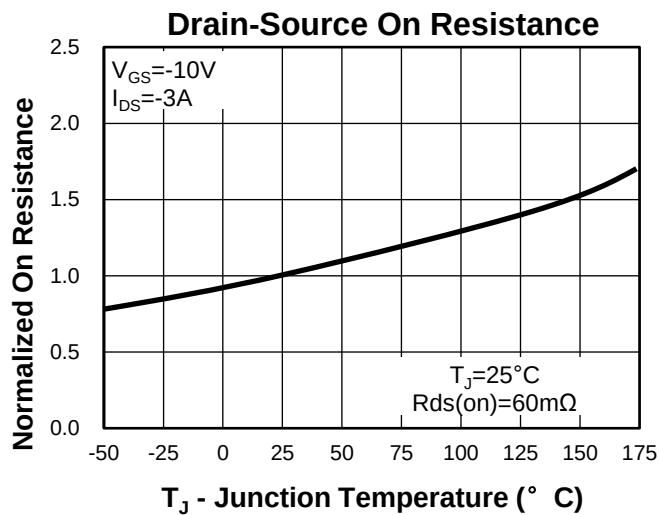
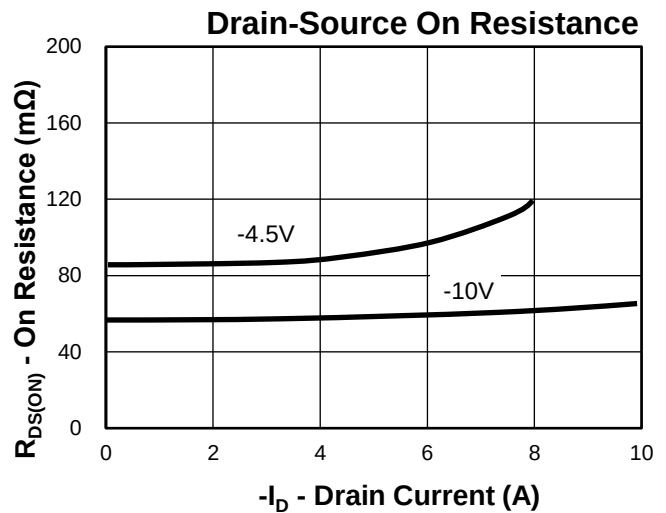
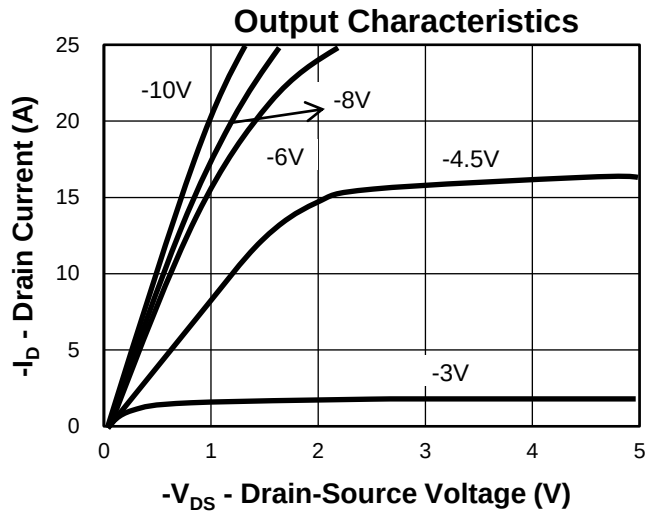
Typical Characteristics(N-Channel)

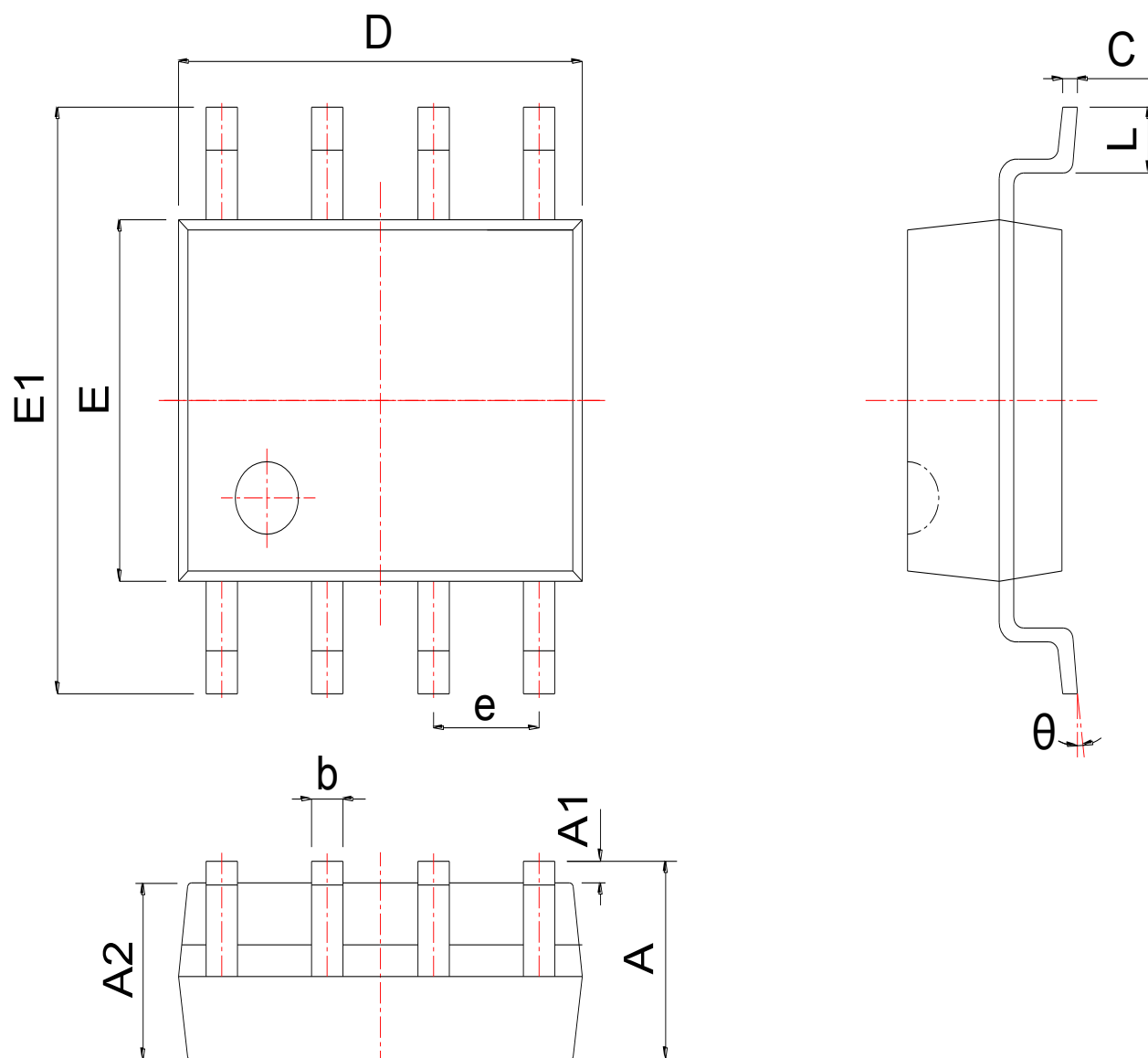


Typical Characteristics(P-Channel)



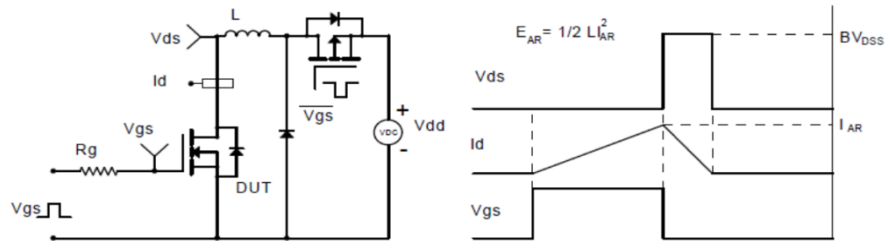
Typical Characteristics(P-Channel)



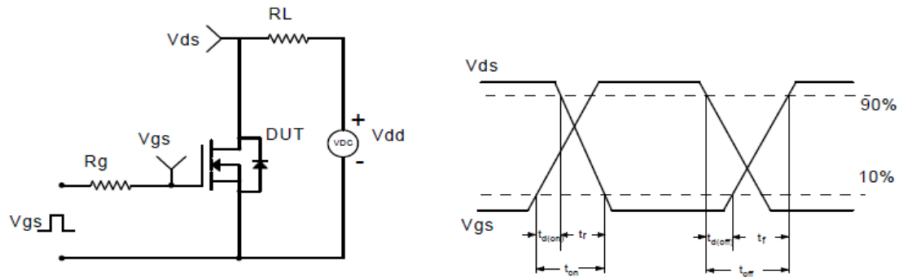
Package Information
SOP8


SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.300	1.525	1.750	0.051	0.060	0.069
A1	0.050	0.150	0.250	0.002	0.006	0.010
A2	1.350	1.450	1.550	0.053	0.057	0.061
b	0.330	0.420	0.510	0.013	0.017	0.020
c	0.170	0.210	0.250	0.007	0.008	0.010
D	4.700	4.900	5.100	0.185	0.193	0.201
E	3.800	3.900	4.000	0.150	0.154	0.157
E1	5.800	6.000	6.200	0.228	0.236	0.244
e	1.270 BSC			0.050 BSC		
L	0.400	0.835	1.270	0.016	0.033	0.050
θ	0°		8°	0°		8°

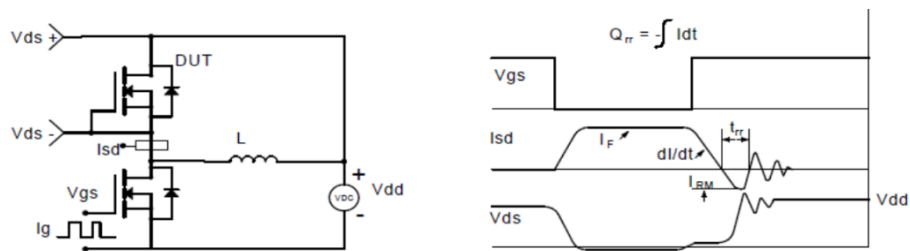
Avalanche Test Circuit and Waveforms(N-Channel)



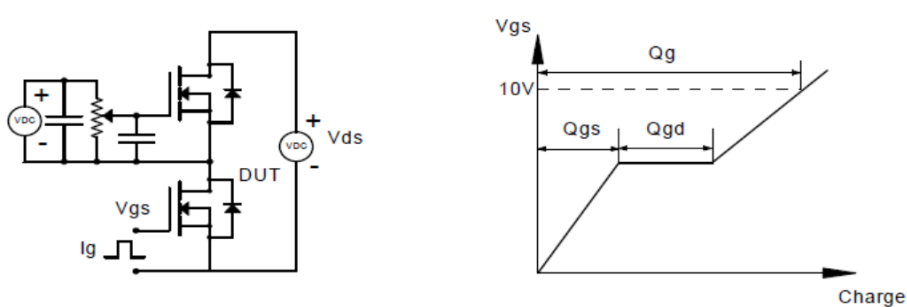
Switching Time Test Circuit and Waveforms(N-Channel)



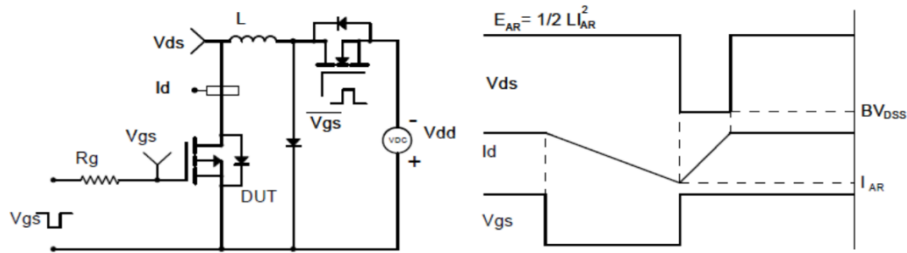
Diode Recovery Test Circuit and Waveforms(N-Channel)



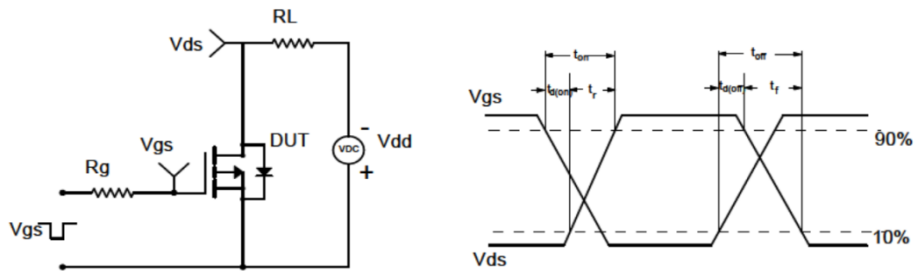
Gate Charge Test Circuit and Waveform(N-Channel)



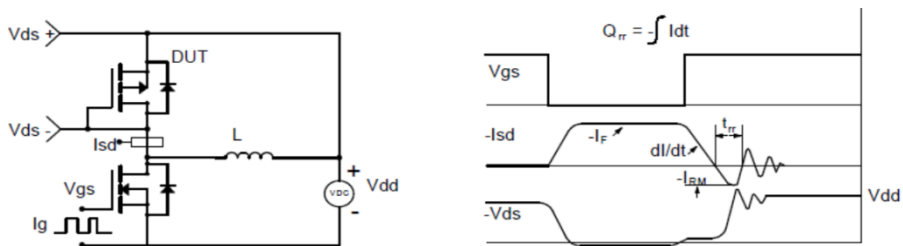
Avalanche Test Circuit and Waveforms(P-Channel)



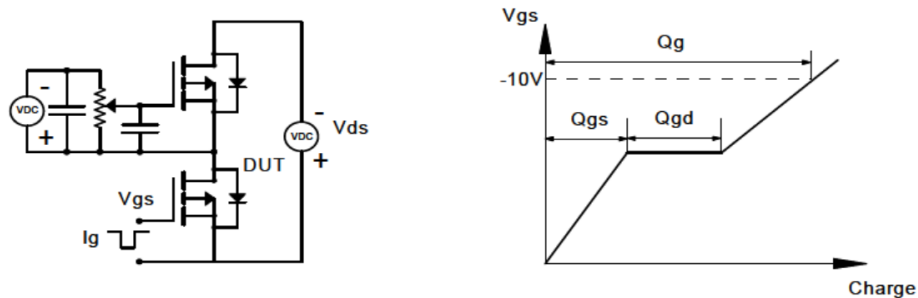
Switching Time Test Circuit and Waveforms(P-Channel)



Diode Recovery Test Circuit and Waveforms(P-Channel)



Gate Charge Test Circuit and Waveform(P-Channel)



Customer Service

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