

Features

- N-Channel
40V/6.6A,
 $R_{DS(ON)} = 21m\Omega (Typ.) @ V_{GS}=10V$
 $R_{DS(ON)} = 24m\Omega (Typ.) @ V_{GS}=4.5V$
- P-Channel
-40V/-4.6A,
 $R_{DS(ON)} = 46m\Omega (Typ.) @ V_{GS}=-10V$
 $R_{DS(ON)} = 57m\Omega (Typ.) @ V_{GS}=-4.5V$
- Very low on-resistance
- Fast Switching

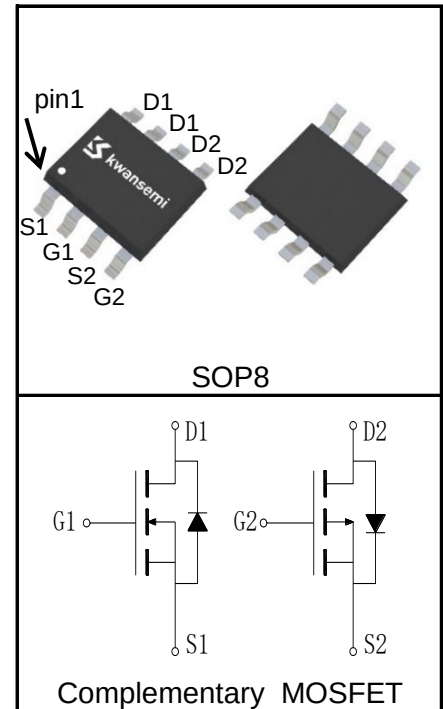
Applications

- Load Switch



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		40	-40	V
V _{GSS}	Gate-Source Voltage		±20	±20	
T _J	Maximum Junction Temperature		150	150	°C
T _J ,T _{STG}	Operating and Storage Temperature Range		-55 to 150	-55 to 150	°C
I _S	Diode Continuous Forward Current	T _C =25°C	1.6	-1.6	A
Mounted on Large Heat Sink					
I _{DP} ^①	Pulse Drain Current	T _A =25°C	26	-18	A
I _D ^②	Continuous Drain Current@T _C (V _{GS} =±10V)	T _A =25°C	6.6	-4.6	A
		T _A =70°C	5.2	-3.6	
P _D	Maximum Power Dissipation@T _C	T _A =25°C	2	2	
		T _A =70°C	1.3	1.3	
R _{θJL}	Thermal Resistance-Junction to Lead		40	40	°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		20	30	mJ

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

Symbol	Parameter	Test Condition	KS4640HB			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				30
		V _{DS} =-40V, V _{GS} =0V	P			-1		
				T _J =125°C				-30
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		21	26	mΩ	
		V _{GS} =-10V, I _{DS} =-4A	P		46	55		
		V _{GS} =4.5V, I _{DS} =3A	N		24	31		
		V _{GS} =-4.5V, I _{DS} =-3A	P		57	75		
Diode Characteristics								
V _{SD} ^⑤	Diode Forward Voltage	I _{SD} =4A, V _{GS} =0V	N		0.81	1.2	V	
		I _{SD} =-4A, V _{GS} =0V	P		-0.84	-1.2		
t _{rr}	Reverse Recovery Time	N-Channel I _{SD} =4A, dI _{SD} /dt=100A/μs	N		9		ns	
			P		10			
Q _{rr}	Reverse Recovery Charge	P-Channel I _{SD} =-4A, dI _{SD} /dt=100A/μs	N		11		nC	
			P		12			
Dynamic Characteristics ^⑥								
R _G	Gate Resistance	V _{GS} =0V,V _{DS} =0V,F=1MHz	N		4.3		Ω	
			P		13			
C _{iss}	Input Capacitance	N-Channel V _{GS} =0V,V _{DS} =20V, Frequency=1.0MHz	N		700		pF	
			P		740			
C _{oss}	Output Capacitance		N		50			
			P		55			
C _{rss}	Reverse Transfer Capacitance		N		40			
			P		45			

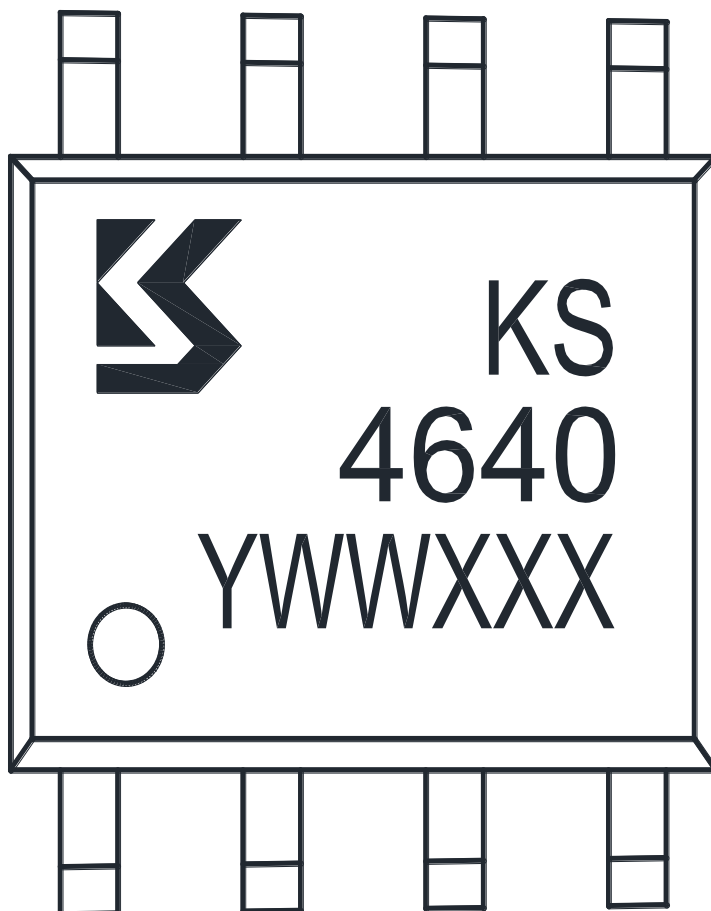
Electrical Characteristics ($T_C=25^{\circ}\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Test Condition	KS4640HB			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		9		ns
t _r	Turn-on Rise Time		P		11		
			N		15		
t _{d(OFF)}	Turn-off Delay Time		P		19		
		N		27			
t _f	Turn-off Fall Time	P		33			
		N		12			
		P		15			
Gate Charge Characteristics ^⑥							
Q _g	Total Gate Charge	N-Channel V _{DS} =20V, V _{GS} =10V, I _{DS} =4A	N		15		nC
Q _{gs}	Gate-Source Charge		P		17		
		N		1.6			
Q _{gd}	Gate-Drain Charge	P-Channel V _{DS} =-20V, V _{GS} = -10V, I _{DS} =-4A	P		1.9		
		N		2.6			
		P		2.8			

- 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: $I_{ASmax} = 9\text{A}$, $L=0.5\text{mH}$, $V_{DD} = 24\text{V}$, $R_G = 25\Omega$, $V_{GS}=10\text{V}$, Part not recommended for use above this value. P-Chanel: $I_{ASmax} = -11\text{A}$, $L=0.5\text{mH}$, $V_{DD} = -24\text{V}$, $R_G = 25\Omega$, $V_{GS}=-10\text{V}$, 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
KS4640HB	SOP8	Tape&Reel	3000	13"	12mm

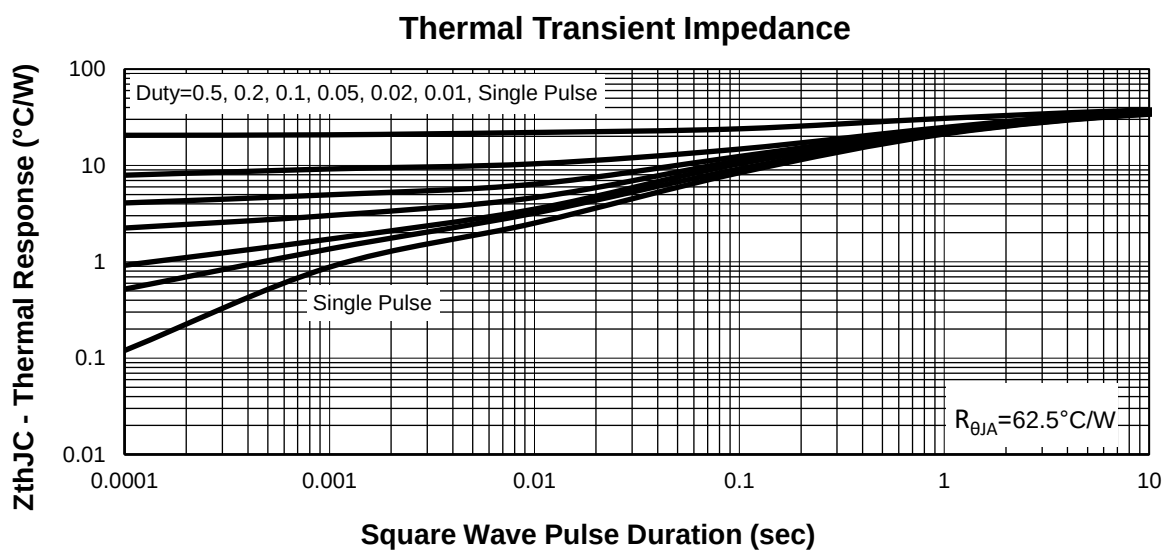
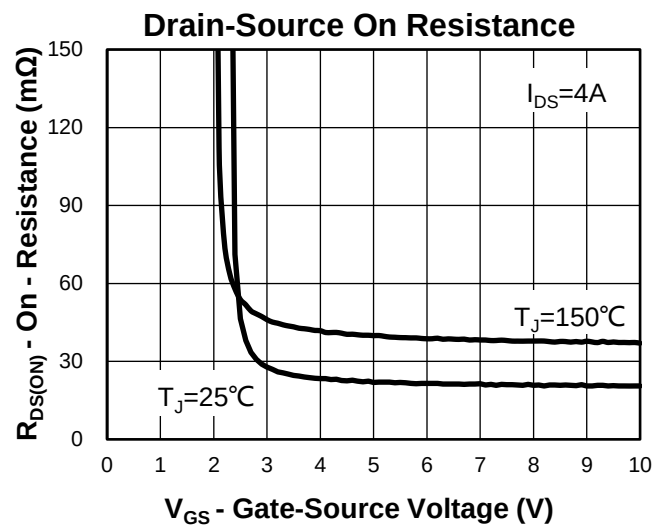
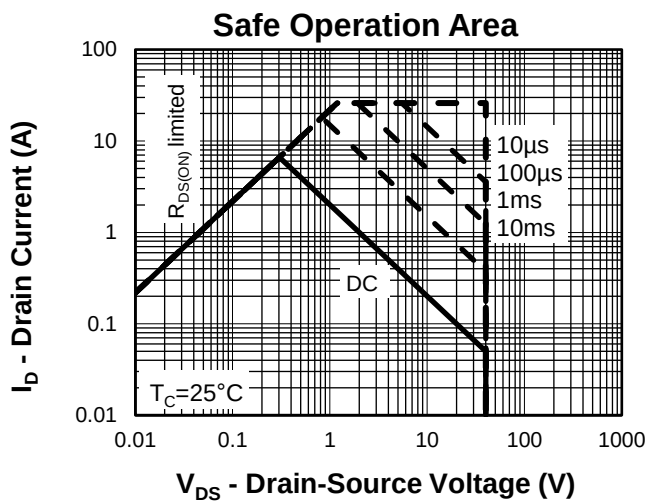
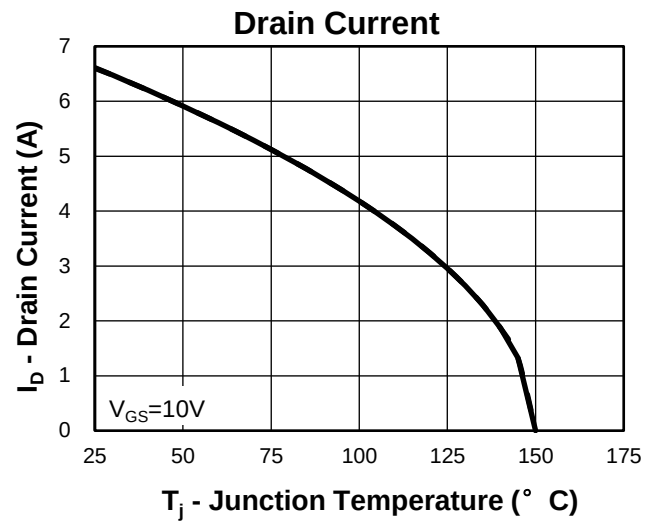
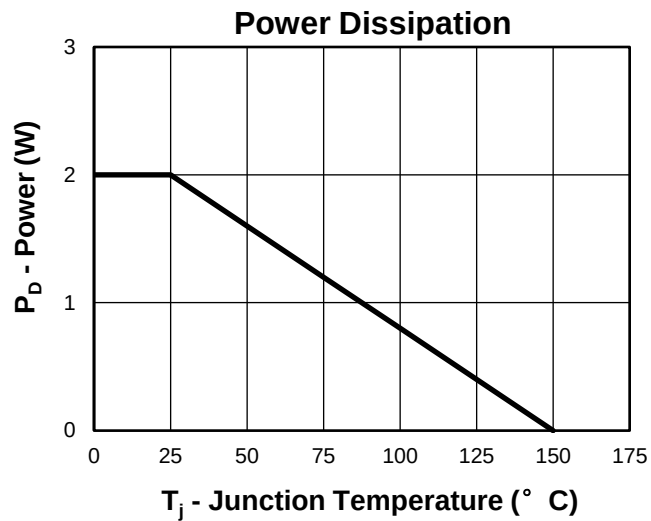


1st Line: Kwansemi LOGO, Kwansemi Code(KS)

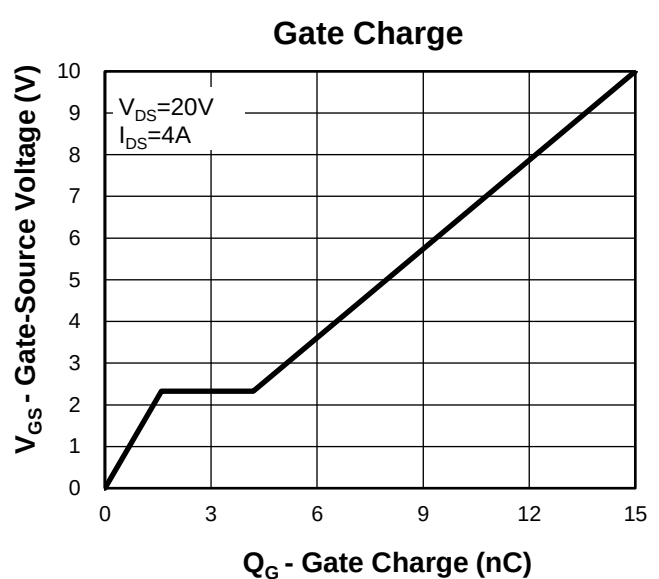
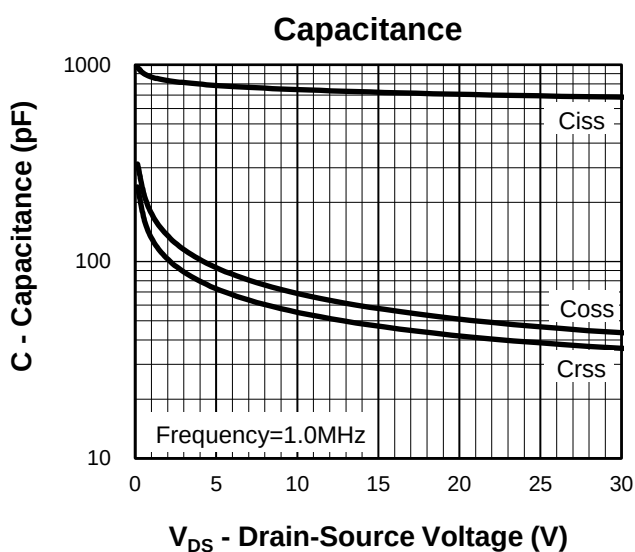
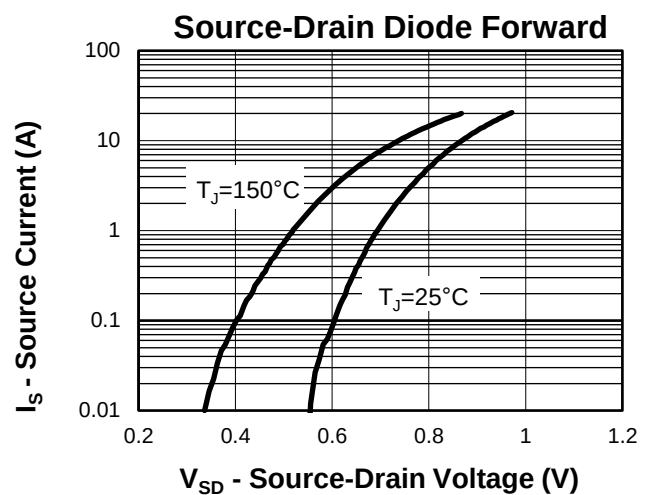
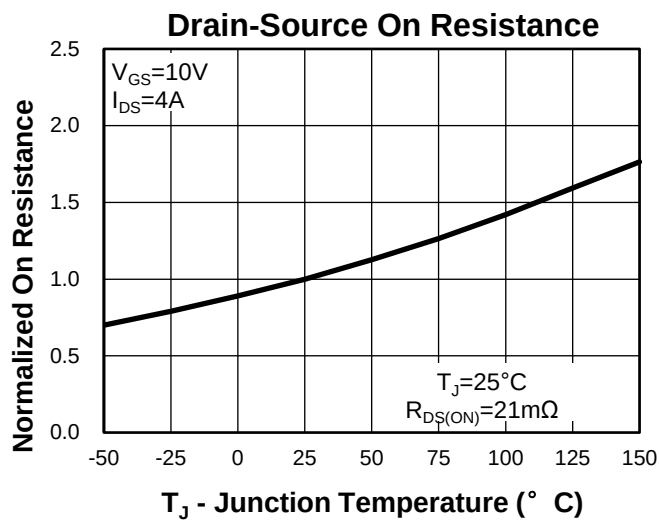
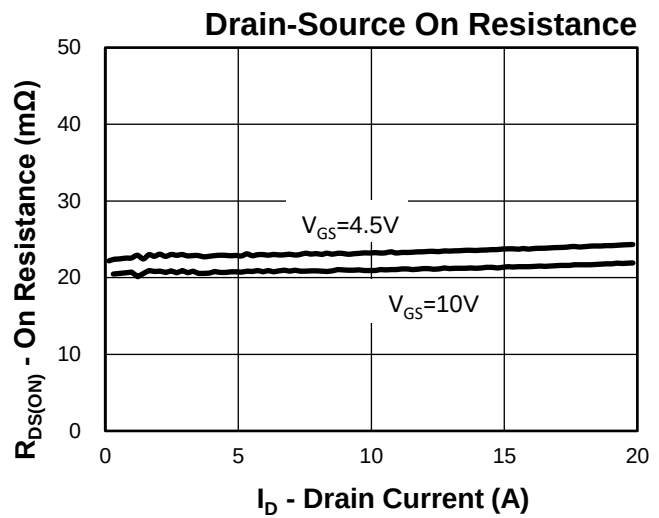
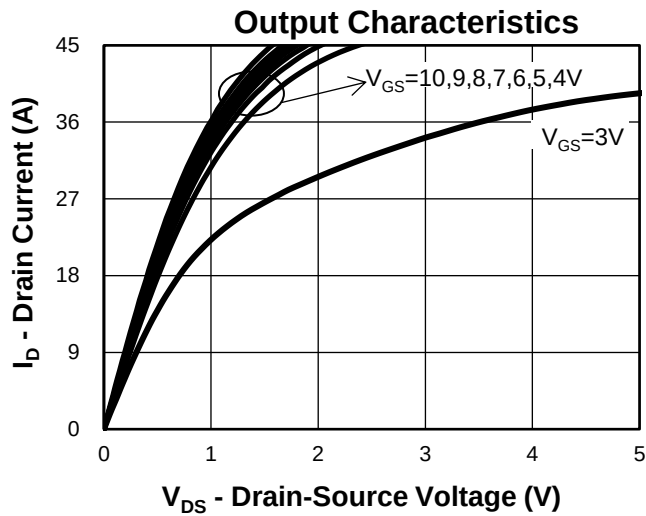
2nd Line: Part Number(4640)

3rd Line: Lot Number(YWWXXX)

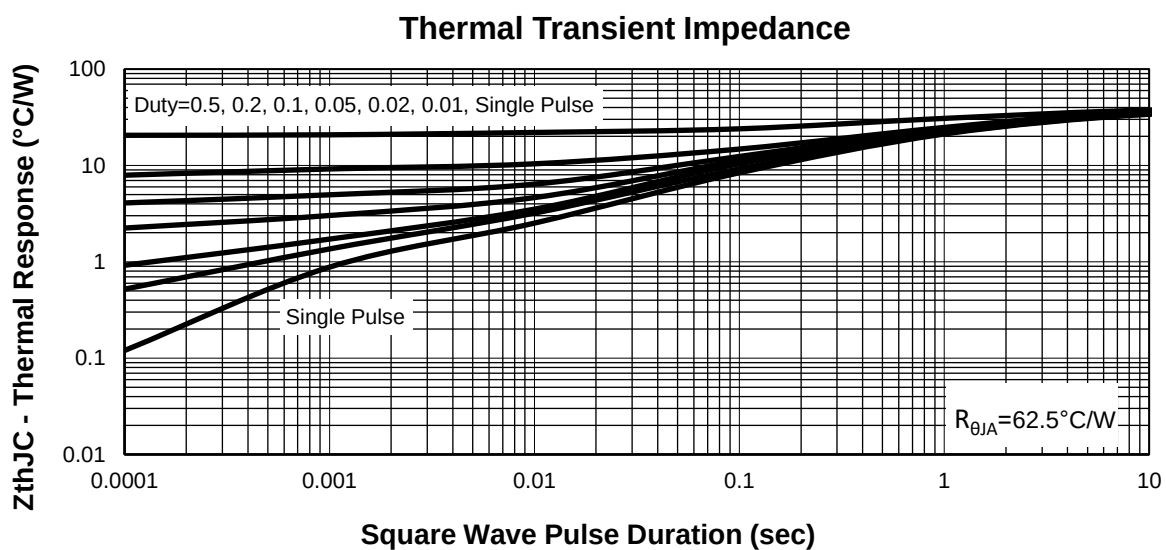
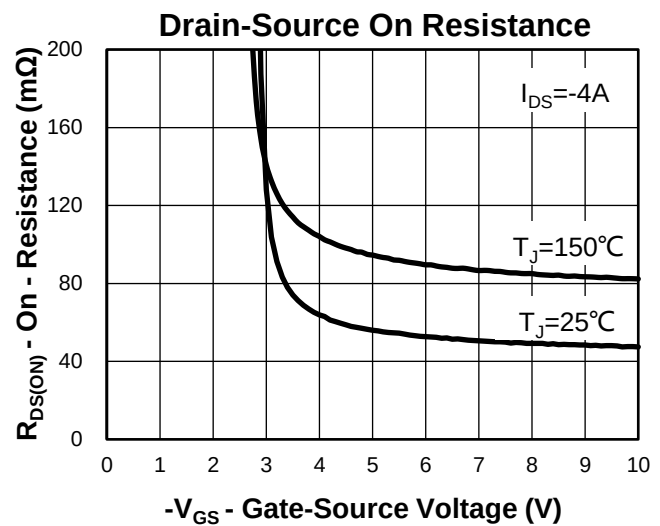
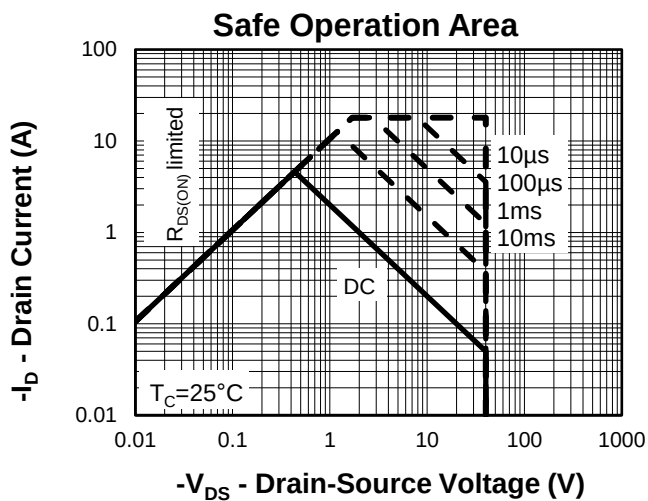
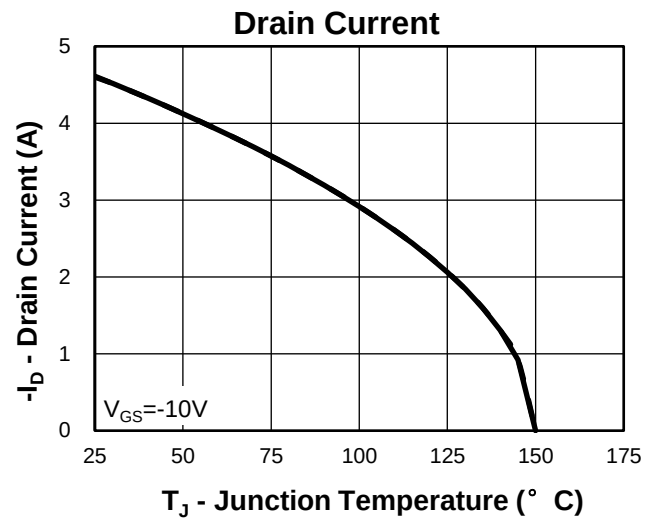
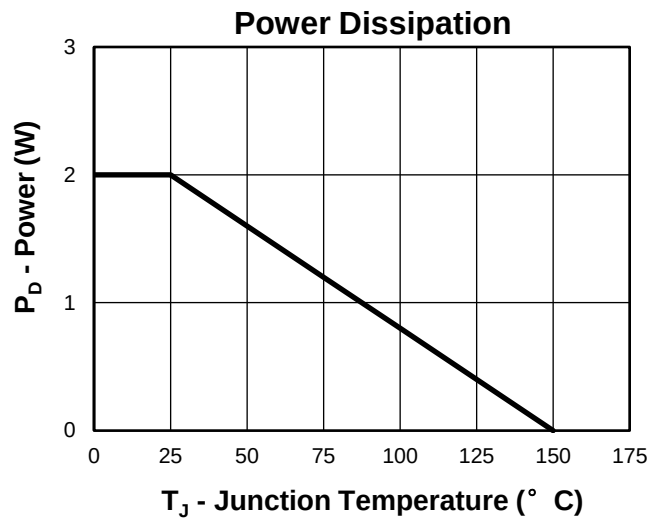
Typical Characteristics(N-Channel)



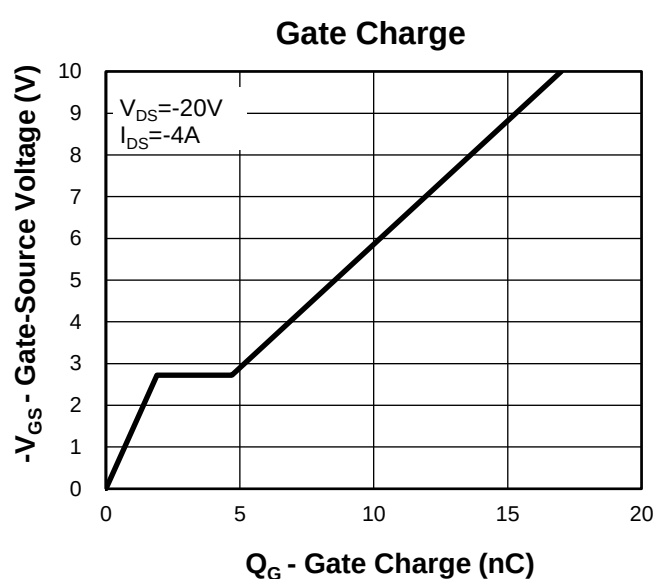
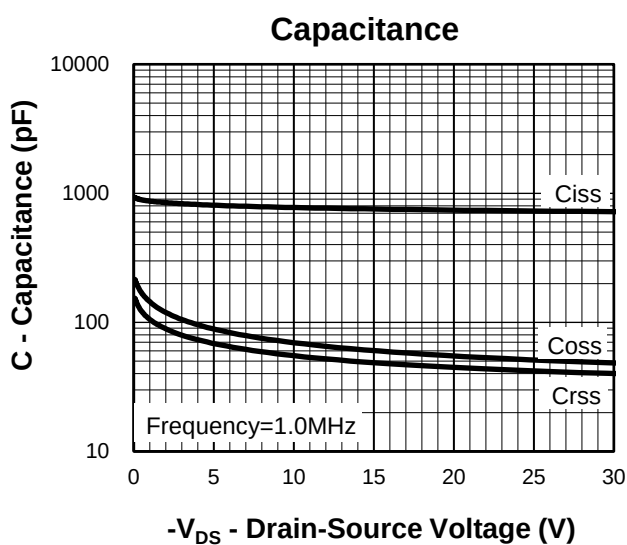
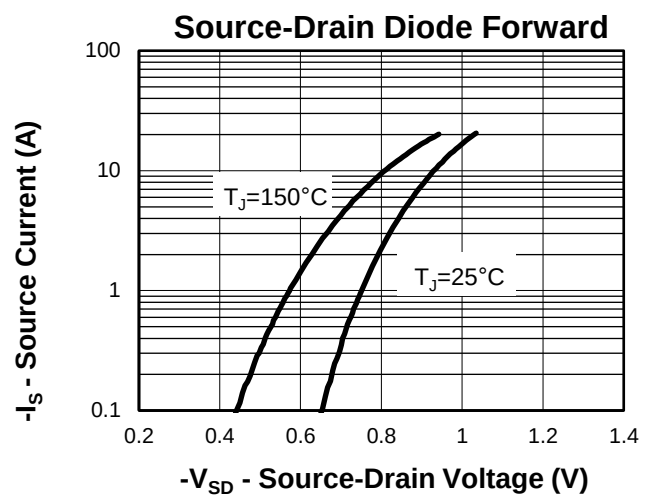
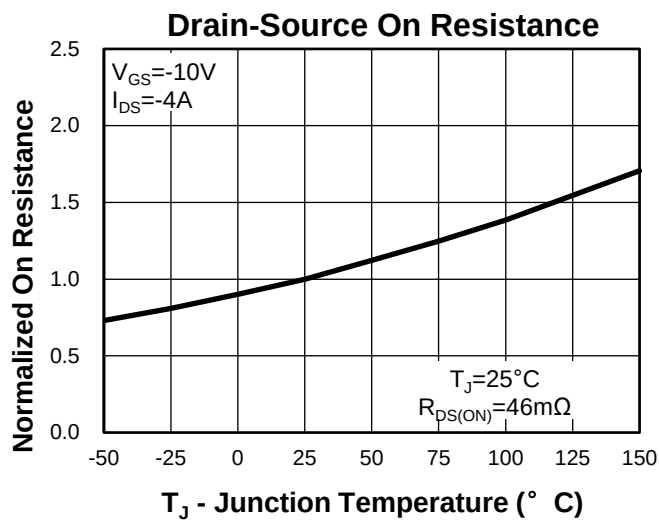
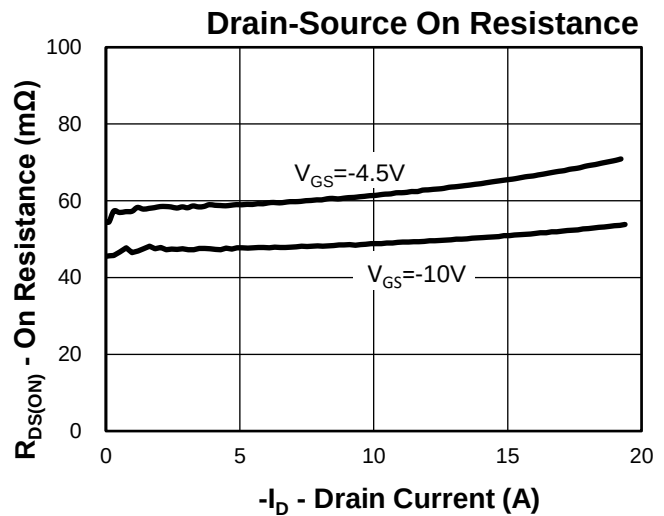
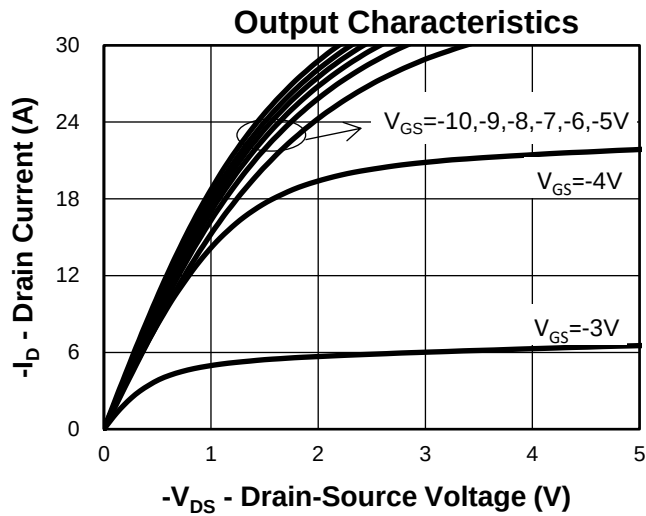
Typical Characteristics(N-Channel)

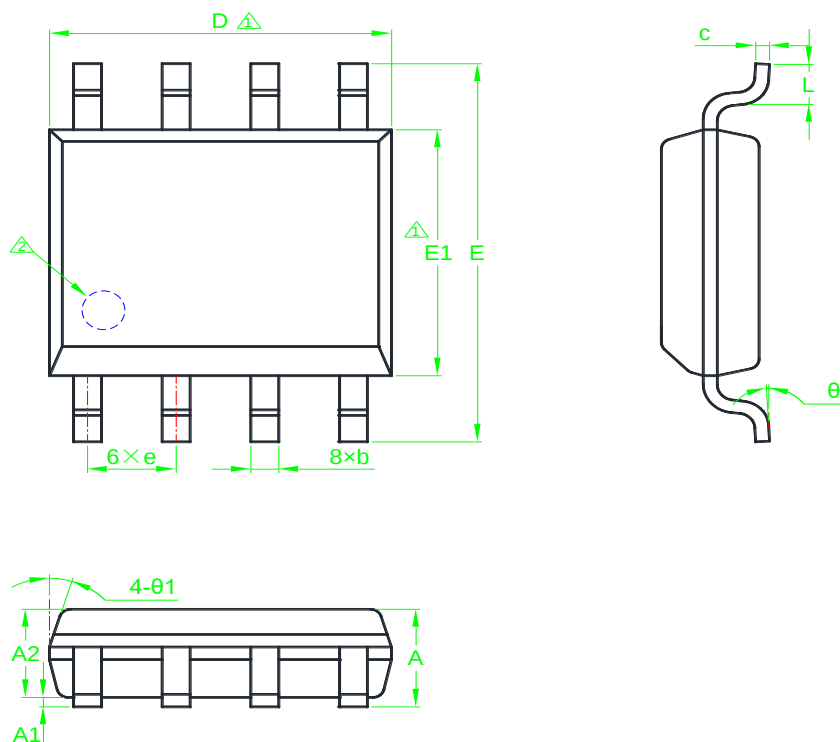


Typical Characteristics(P-Channel)



Typical Characteristics(P-Channel)



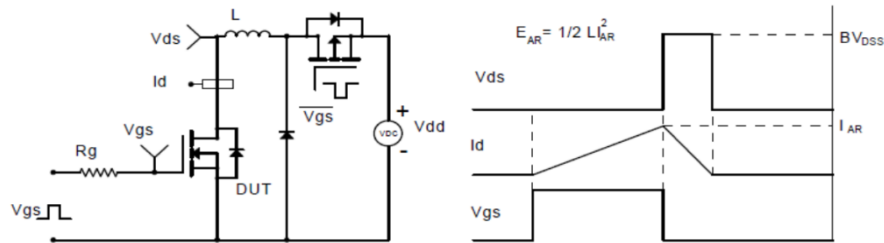
Package Information
SOP8


SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.35	*	1.75	0.053	*	0.069
A1	0.10	*	0.25	0.004	*	0.010
A2	1.25	1.45	1.65	0.049	0.057	0.065
b	0.33	*	0.51	0.013	*	0.020
c	0.15	*	0.25	0.006	*	0.010
D	4.70	4.90	5.10	0.185	0.193	0.201
E	5.80	6.00	6.30	0.228	0.236	0.248
E1	3.80	3.90	4.00	0.150	0.154	0.157
e	1.27BSC			0.050BSC		
L	0.40	*	1.27	0.016	*	0.050
θ	0°	*	8°	0°	*	8°
θ 1	5°	*	15°	5°	*	15°

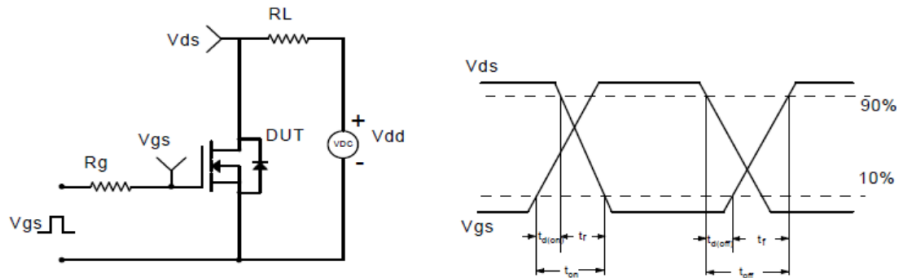
△1 Dimensions D and E1 do not include mold flash protrusions or gate burrs.

△2 The existence and size of demolding hole are variable depending on mold.

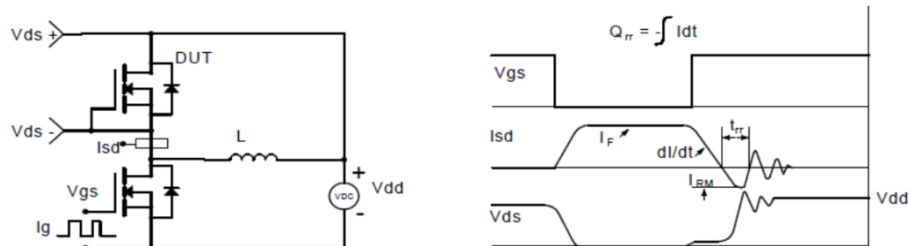
Avalanche Test Circuit and Waveforms(N-Channel)



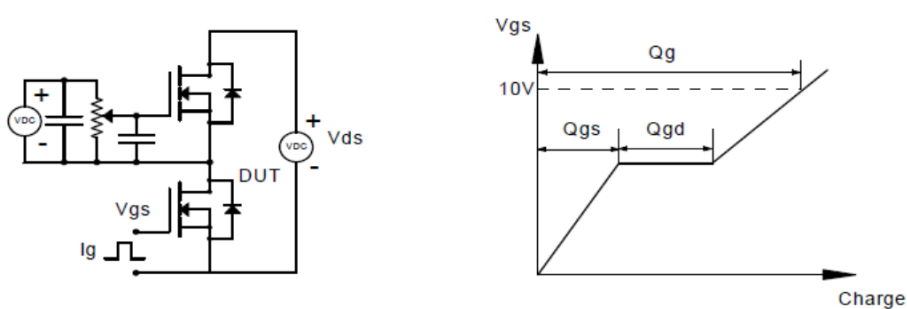
Switching Time Test Circuit and Waveforms(N-Channel)



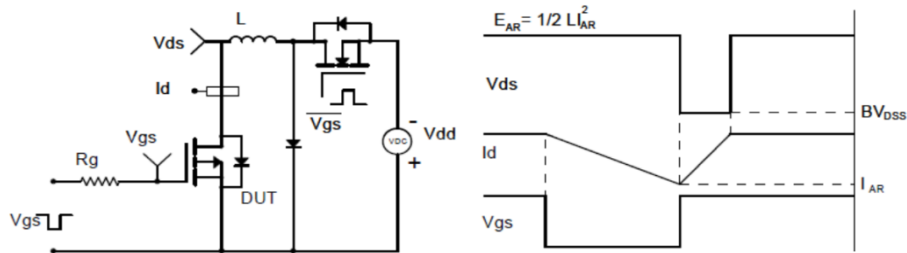
Diode Recovery Test Circuit and Waveforms(N-Channel)



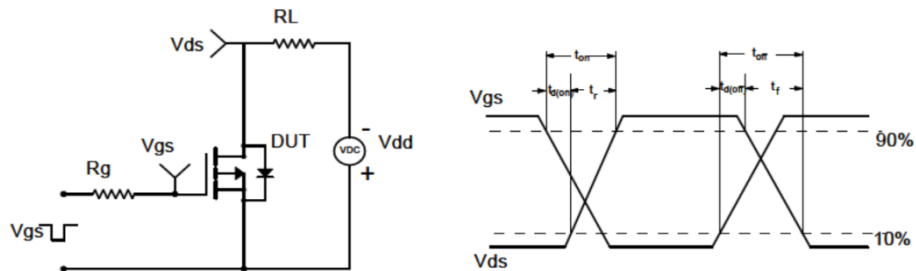
Gate Charge Test Circuit and Waveform(N-Channel)



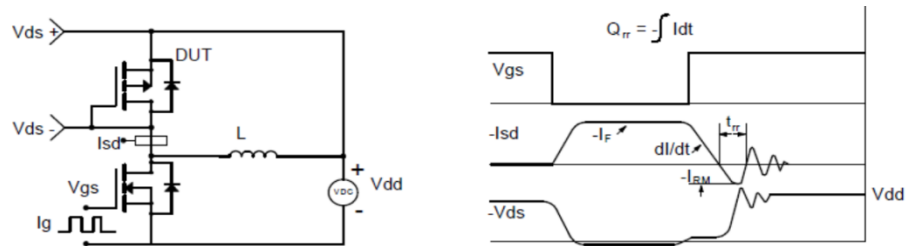
Avalanche Test Circuit and Waveforms(P-Channel)



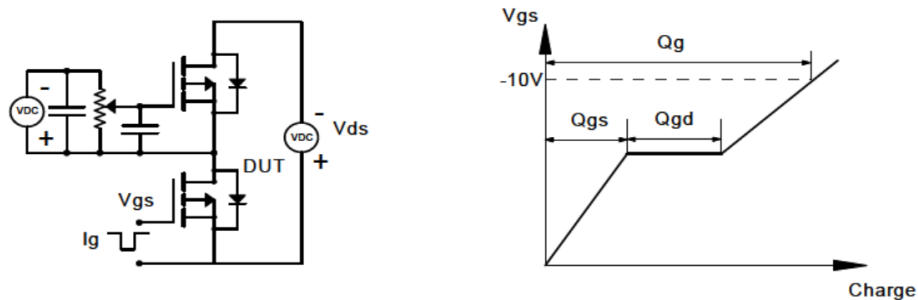
Switching Time Test Circuit and Waveforms(P-Channel)



Diode Recovery Test Circuit and Waveforms(P-Channel)



Gate Charge Test Circuit and Waveform(P-Channel)



Customer Service

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