KS2644MA

Complementary Advanced Power MOSFET

Features

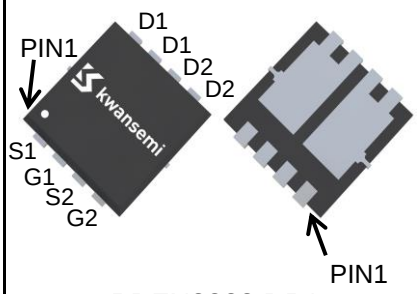
• N-Channel
20V/27A,
$R_{DS\ (ON)}$ =10mΩ(Typ.) @ V_{GS}=4.5V
$R_{DS\ (ON)}$ =13mΩ(Typ.) @ V_{GS}=2.5V
• P-Channel
-20V/-26A,
$R_{DS\ (ON)}$ =16mΩ (Typ.) @ V_{GS}=-4.5V
$R_{DS\ (ON)}$ =19mΩ (Typ.) @ V_{GS}=-2.5V
• Very low on-resistance
• Fast Switching

Applications

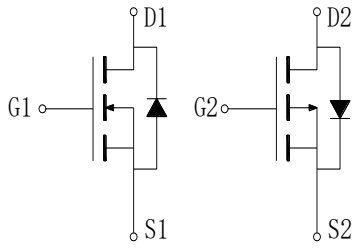
• Motor Drive Applications

RoHS Pb HF Halogen-Free

Pin Description



PDFN3333 DP1



Complementary MOSFET

Absolute Maximum Ratings

Symbol	Parameter		N-Channel	P-Channel	Unit
Common Ratings (T_A=25°C Unless Otherwise Noted)					
V_{DSS}	Drain-Source Voltage		20	-20	V
V_{GSS}	Gate-Source Voltage		±12	±12	
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	27	-26	A
Mounted on Large Heat Sink					
I_{DP} ①	Pulse Drain Current	T_C=25°C	108	-104	A
I_D ②	Continuous Drain Current@T_C(V_{GS}=±4.5V)	T_C=25°C	27	-26	A
		T_C=100°C	17	-16	
	Continuous Drain Current@T_A(V_{GS}=±4.5V) ③	T_A=25°C	12	-10	
		T_A=70°C	9	-8	
P_D	Maximum Power Dissipation@T_C	T_C=25°C	13	20	W
		T_C=100°C	5	8	
	Maximum Power Dissipation@T_A ③	T_A=25°C	2.8	2.8	
		T_A=70°C	1.8	1.8	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		9	6.2	°C/W
$R_{\theta JA}$ ③	Thermal Resistance-Junction to Ambient		45	45	°C/W
Drain-Source Avalanche Ratings					
E_{AS} ④	Avalanche Energy, Single Pulsed		25	72	mJ

Electrical Characteristics (T_A=25°C Unless Otherwise Noted)

Symbol	Parameter	Test Condition		Rating			Unit
				Min.	Typ.	Max.	
Static Characteristics							
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250μA	N	20			V
		V_{GS}=0V, I_{DS}=-250μA	P	-20			
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=20V, V_{GS}=0V	N			1	μA
		T_J=125°C				30	
		V_{DS}=-0V, V_{GS}=0V	P			-1	
		T_J=125°C				-30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	N	0.4	0.7	1	V
		V_{DS}=V_{GS}, I_{DS}=-250μA	P	-0.4	-0.7	-1	
I_{GSS}	Gate Leakage Current	V_{GS}=±12V, V_{DS}=0V	N			±100	nA
		V_{GS}=±12V, V_{DS}=0V	P			±100	
$R_{DS(ON)}$ ⑤	Drain-Source On-state Resistance	V_{GS}=4.5V, I_{DS}=5A	N		10	13	mΩ
		V_{GS}=-4.5V, I_{DS}=-5A	P		16	20	
		V_{GS}=2.5V, I_{DS}=-3A	N		13	17	
		V_{GS}=-2.5V, I_{DS}=-3A	P		19	25	
Diode Characteristics							
V_{SD} ⑤	Diode Forward Voltage	I_{SD}=5A, V_{GS}=0V	N		0.82	1.2	V
		I_{SD}=-5A, V_{GS}=0V	P		-0.84	-1.2	
t_{rr}	Reverse Recovery Time	N-Channel I_{SD}=5A, dI_{SD}/dt=100A/μs	N		6		ns
			P		17		
Q_{rr}	Reverse Recovery Charge	P-Channel I_{SD}=-5A, dI_{SD}/dt=-100A/μs	N		5		nC
			P		14		
Dynamic Characteristics ⑥							
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz	N		3.1		Ω
			P		7.7		
C_{iss}	Input Capacitance	N-Channel V_{GS}=0V,V_{DS}=10V, Frequency=200KHz	N		700		pF
			P		1850		
C_{oss}	Output Capacitance	P-Channel V_{GS}=0V,V_{DS}=-10V, Frequency=200KHz	N		115		
			P		205		
C_{rss}	Reverse Transfer Capacitance		N		105		
			P		195		

Electrical Characteristics (T_A=25°C Unless Otherwise Noted)

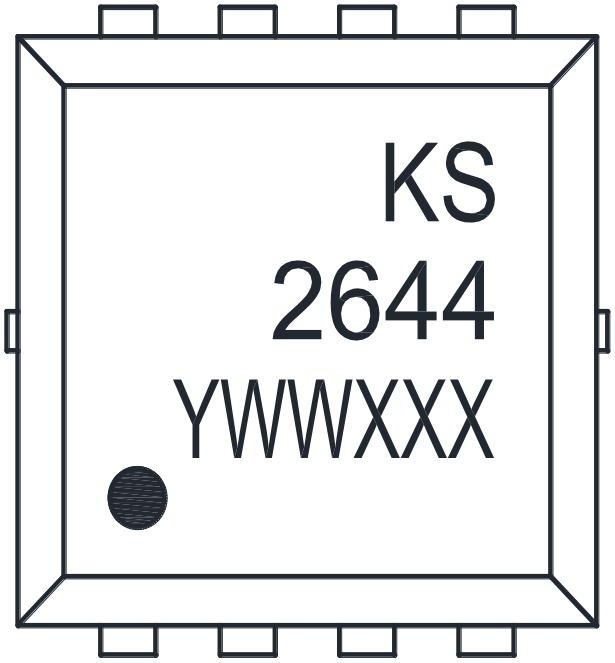
Symbol	Parameter	Test Condition		Rating			Unit
				Min.	Typ.	Max.	
Dynamic Characteristics⑥							
$t_{d(ON)}$	Turn-on Delay Time	N-Channel V_{DD}=10V, I_{DS}=5A, V_{GEN}=4.5V, R_G=3Ω P-Channel V_{DD}=-10V, I_{DS}=-5A, V_{GEN}= -4.5V, R_G=3Ω	N		8		ns
			P		15		
t_r	Turn-on Rise Time		N		7		
			P		21		
$t_{d(OFF)}$	Turn-off Delay Time		N		32		
			P		37		
t_f	Turn-off Fall Time		N		8		
			P		15		
Gate Charge Characteristics⑥							
Q_g	Total Gate Charge	N-Channel V_{DS}=10V, V_{GS}=4.5V, I_{DS}=5A P-Channel V_{DS}=-10V, V_{GS}= -4.5V, I_{DS}=-5A	N		9.5		nC
			P		11		
Q_{gs}	Gate-Source Charge		N		1		
			P		1.3		
Q_{gd}	Gate-Drain Charge		N		2.9		
			P		3.2		

Notes:

①Pulse width limited by safe operating area.
②Calculated continuous current based on maximum allowable junction temperature.
③When mounted on 1 inch square copper board, t≤10sec. The value in any given application depends on the user's specific board design.
④Limited by $T_{Jmax.}$ Starting T_J = 25°C, N Chanel: I_{ASmax} =10A, L=0.5mH, V_{DD} =10V, R_G = 25Ω, V_{GS}=4.5V, Part not recommended for use above this value.100% Final Test at I_{AS}=6A, L=0.5mH. P-Chanel: I_{ASmax} =-17A, L=0.5mH, V_{DD} = -10V, R_G = 25Ω, V_{GS}=-4.5V, Part not recommended for use above this value.100% Final Test at I_{AS}=-9A, L=0.5mH.
⑤Pulse test;Pulse width≤300μs, duty cycle≤2%.
⑥Guaranteed by design, not subject to production testing.

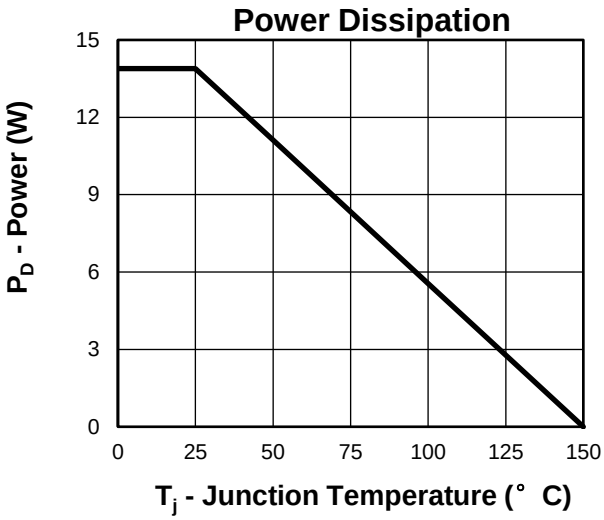
Ordering and Marking Information

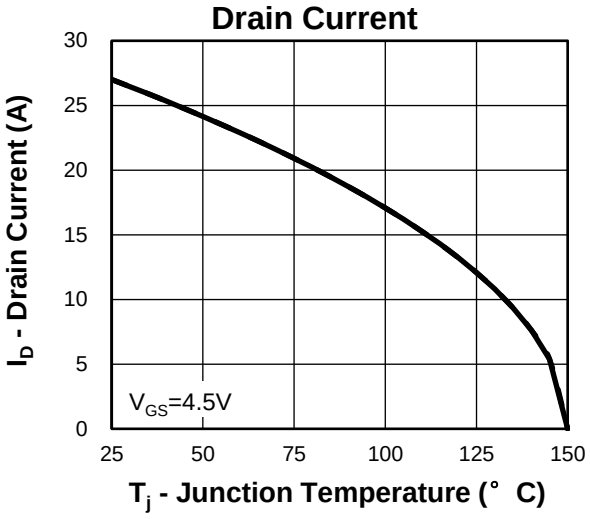
Device	Package	Packaging	Quantity	Reel Size	Tape width
KS2644MA	PDFN3333 DP1	Tape&Reel	5000	13"	12mm

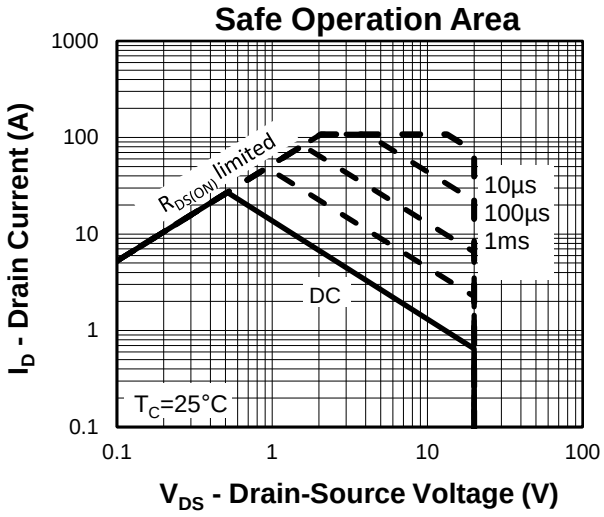


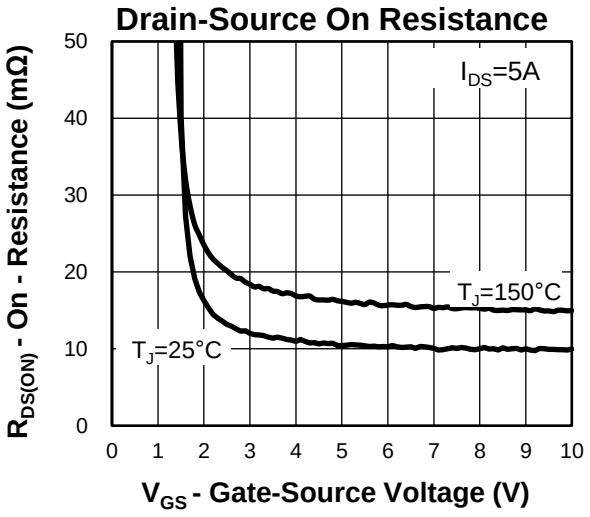
1st Line: Kwansemi Code(KS)
2nd Line: Part Number(2644)
3rd Line: Lot Number(YWWXXX)

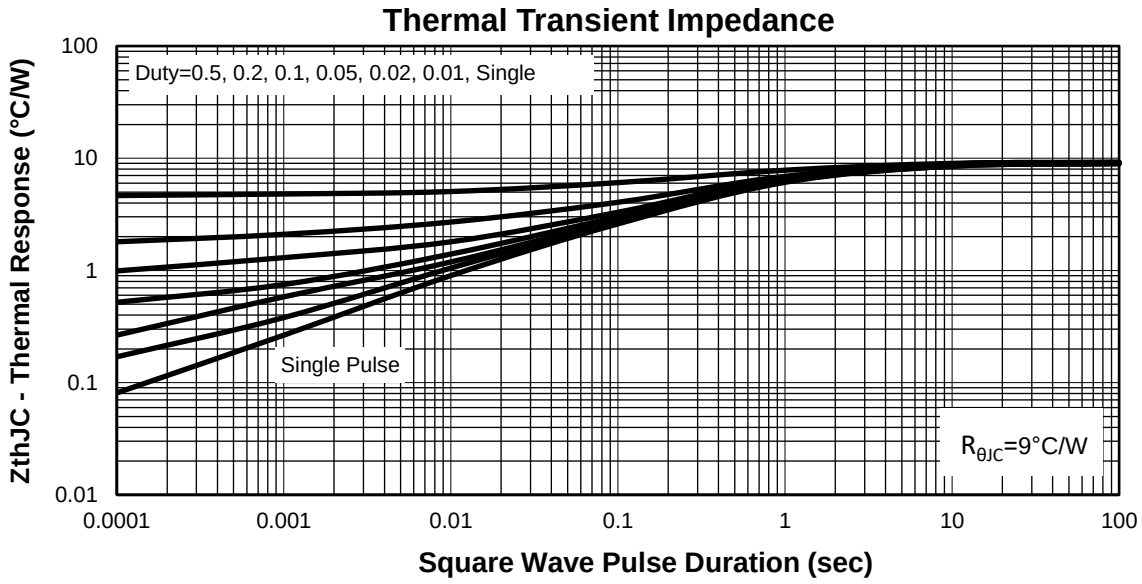
Typical Characteristics(N-Channel)





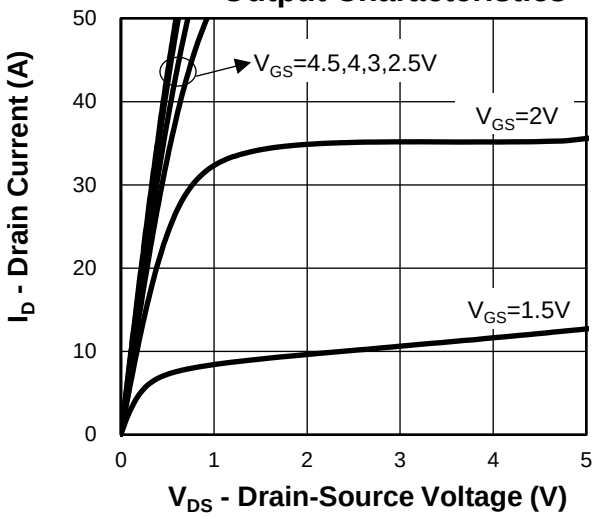




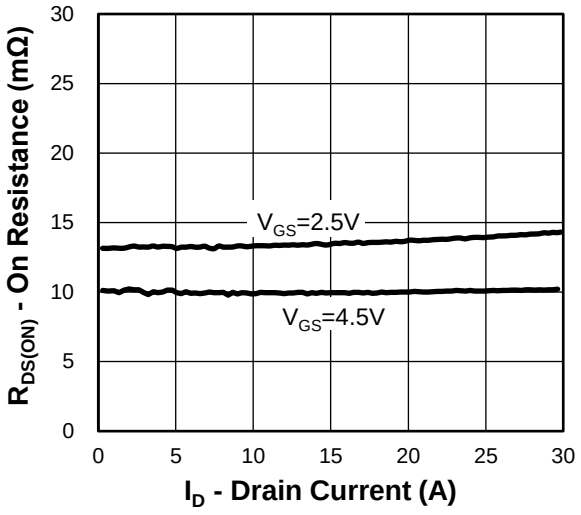


Typical Characteristics(N-Channel)

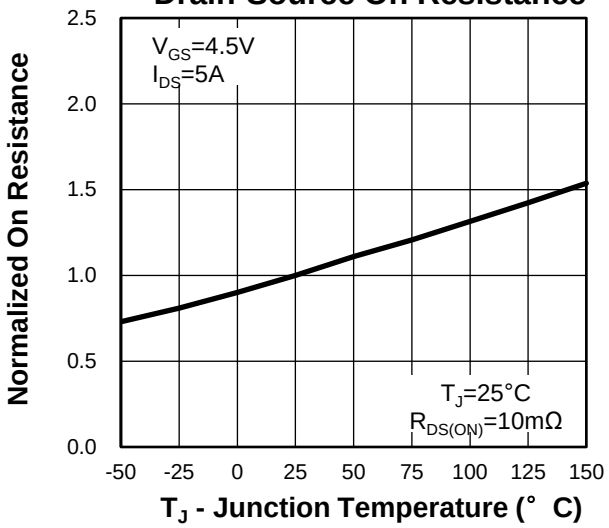
Output Characteristics



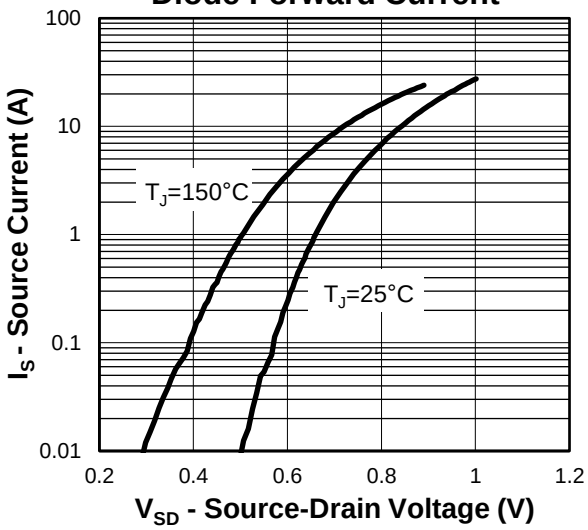
Drain-Source On Resistance



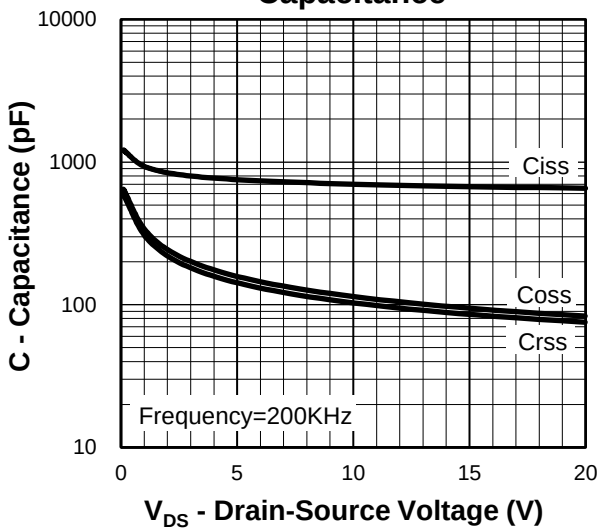
Drain-Source On Resistance



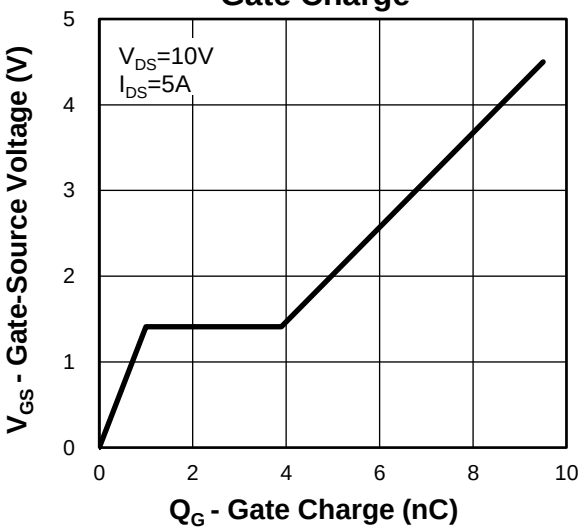
Diode Forward Current



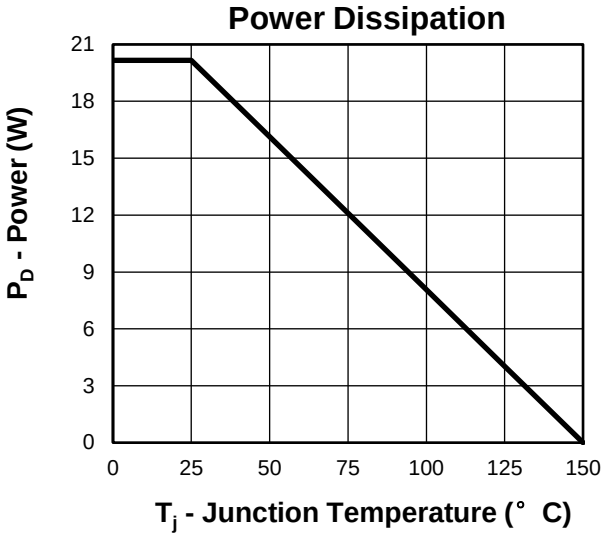
Capacitance

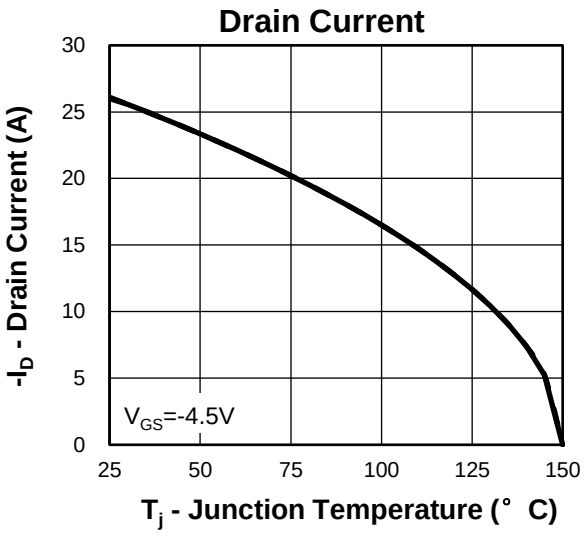


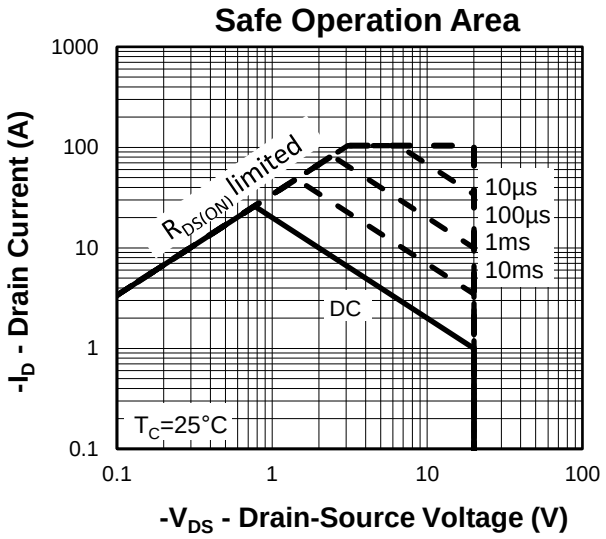
Gate Charge

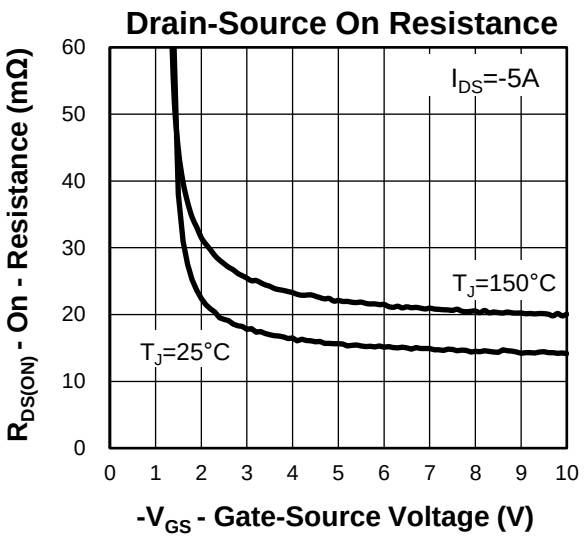


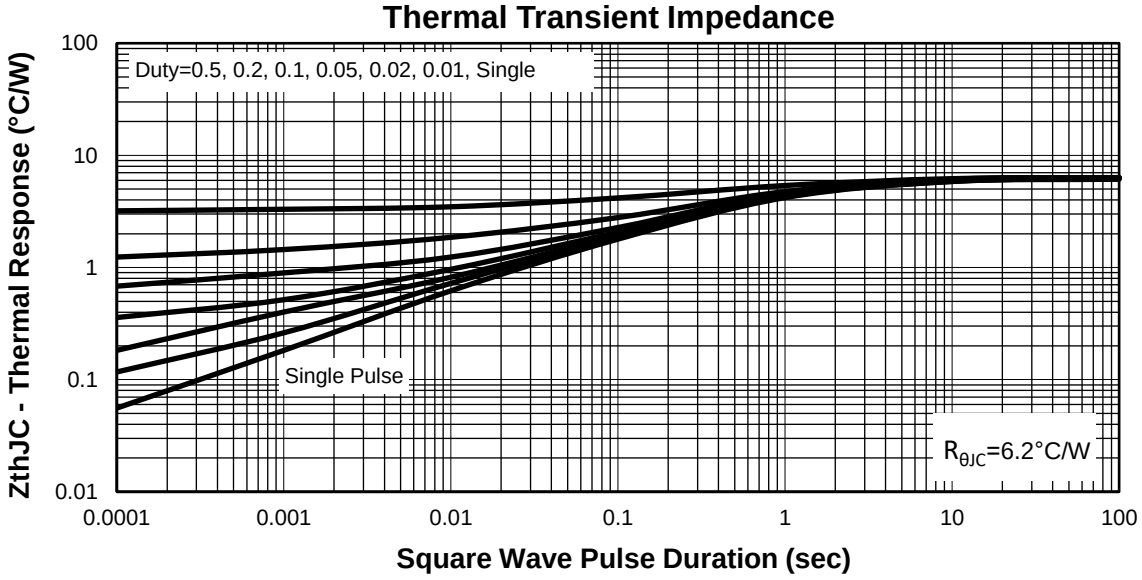
Typical Characteristics(P-Channel)



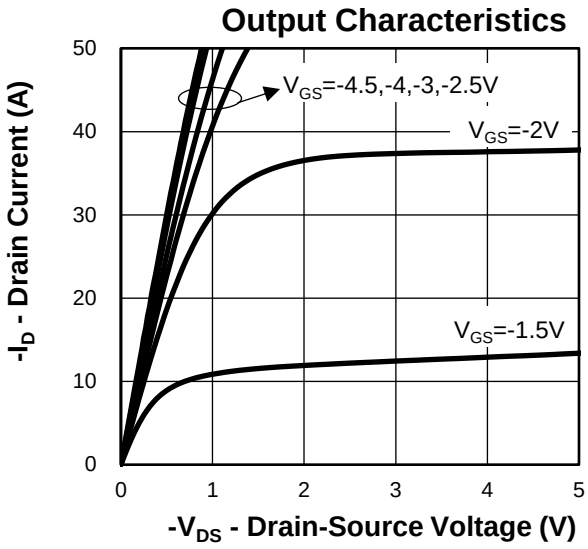


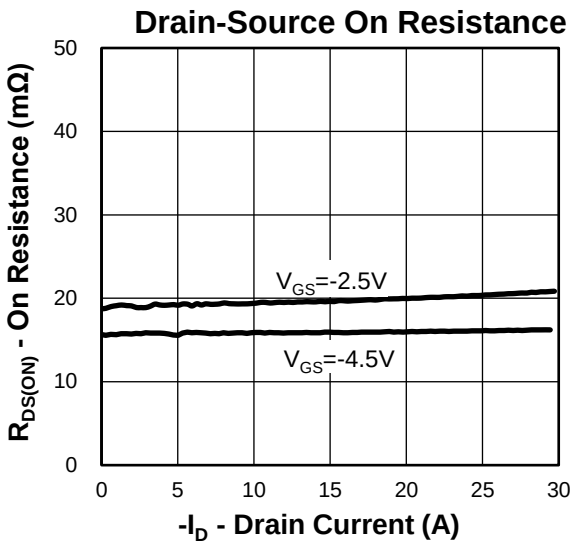


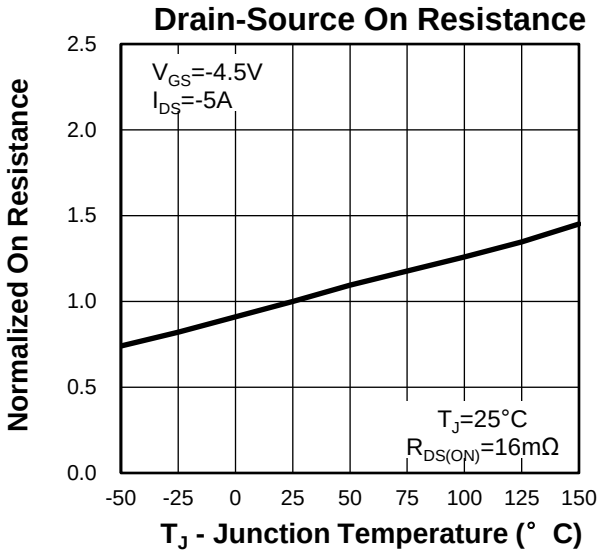


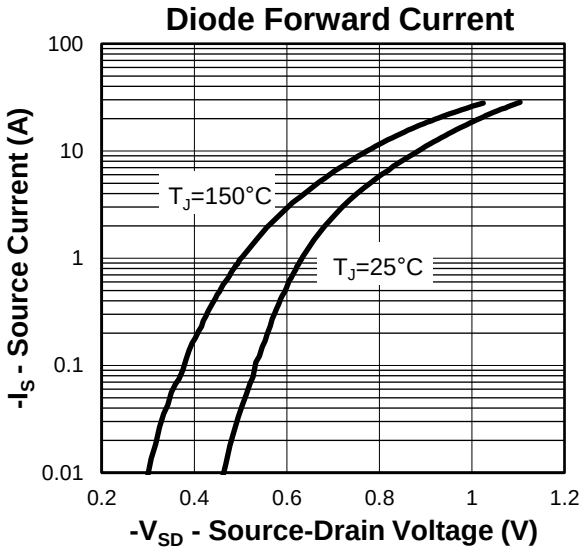


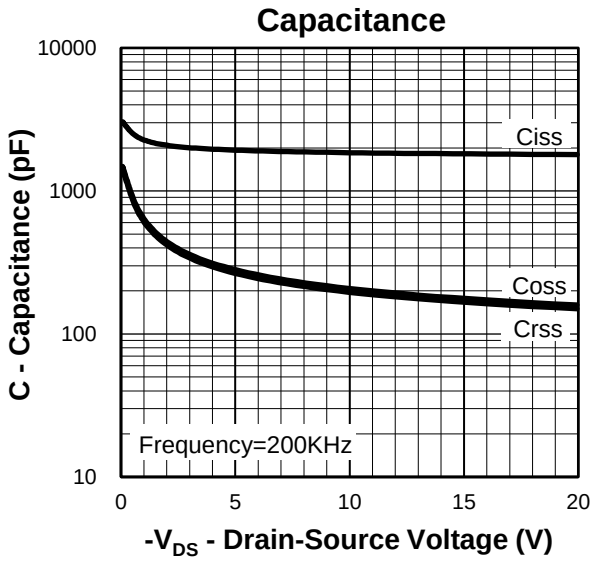
Typical Characteristics(P-Channel)

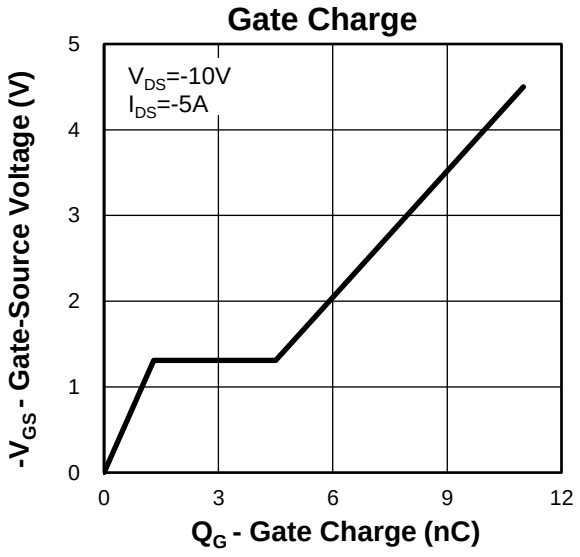






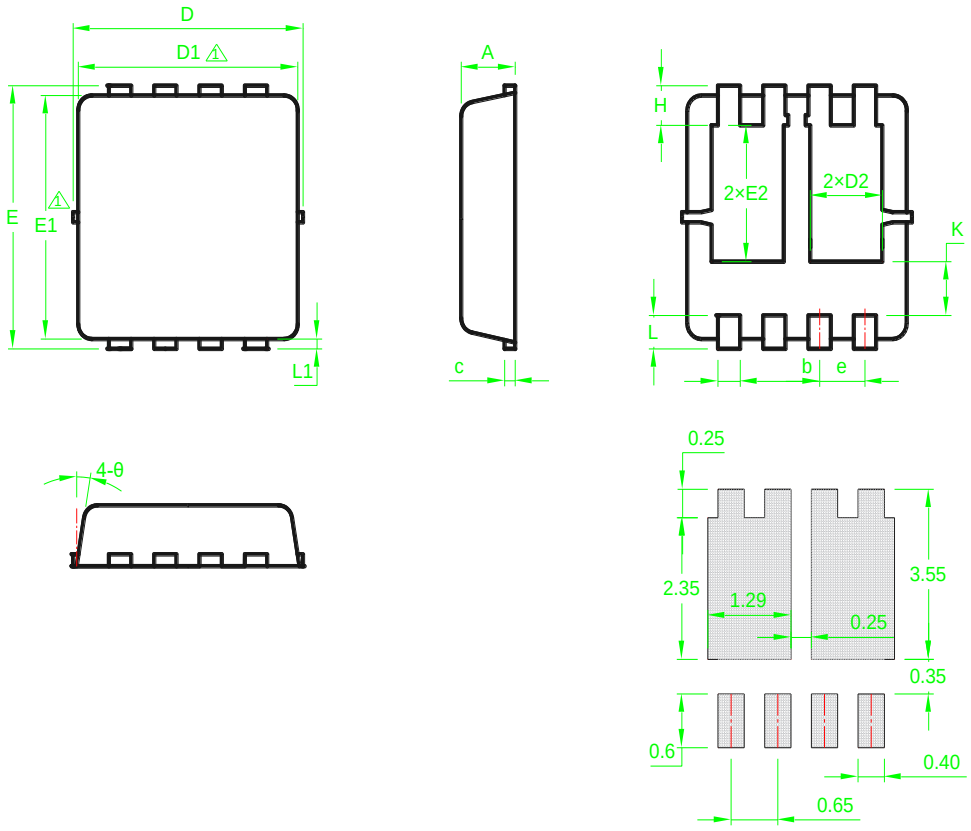






Package Information

PDFN3333 DP1

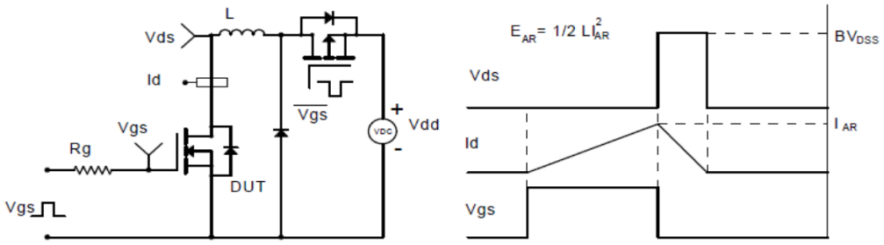


Land pattern
(Only for Reference)

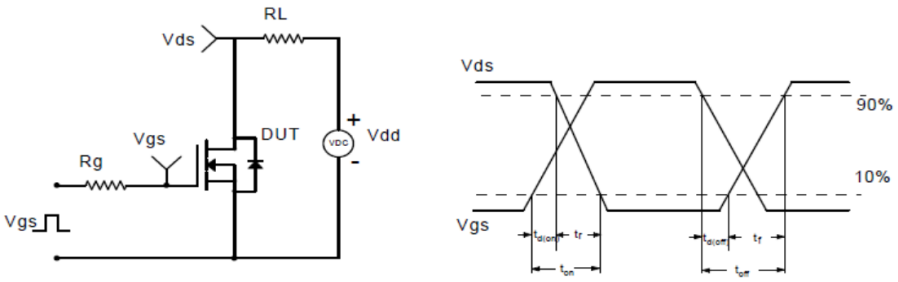
SYMBOL	MM			INCH			SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX		MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	0.80	0.90	0.028	0.031	0.035	E2	1.65	*	1.95	0.065	*	0.077
b	0.25	0.30	0.35	0.010	0.012	0.014	e	0.65BSC			0.026BSC		
c	0.10	0.15	0.25	0.004	0.006	0.010	H	0.30	0.40	0.50	0.012	0.016	0.020
D	3.30BSC			0.130BSC			K	0.50	*	0.80	0.020	*	0.031
D1	3.00	3.15	3.25	0.118	0.124	0.128	L	0.30	0.40	0.50	0.012	0.016	0.020
D2	0.80	1.00	1.20	0.031	0.039	0.047	L1	0.10	0.15	0.20	0.004	0.006	0.008
E	3.30BSC			0.130BSC			θ	8°	*	12°	8°	*	12°
E1	2.90	3.05	3.20	0.114	0.120	0.126							

⚠1 Dimensions D1 and E1 do not include mold flash protrusions or gate burrs.

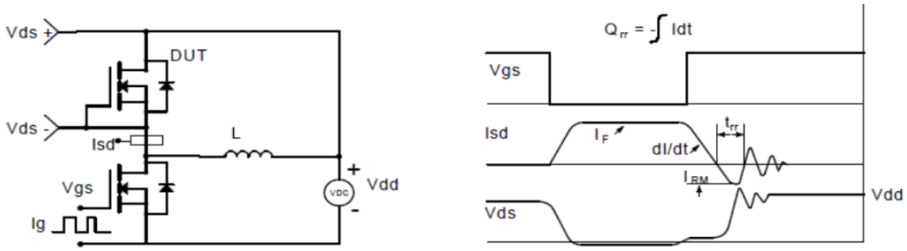
Avalanche Test Circuit and Waveforms(N-Channel)



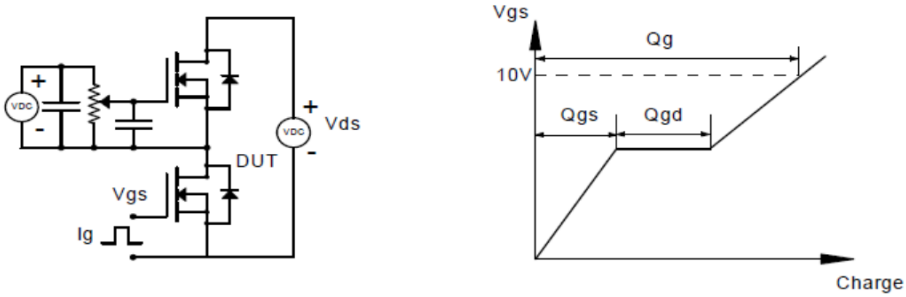
Switching Time Test Circuit and Waveforms(N-Channel)



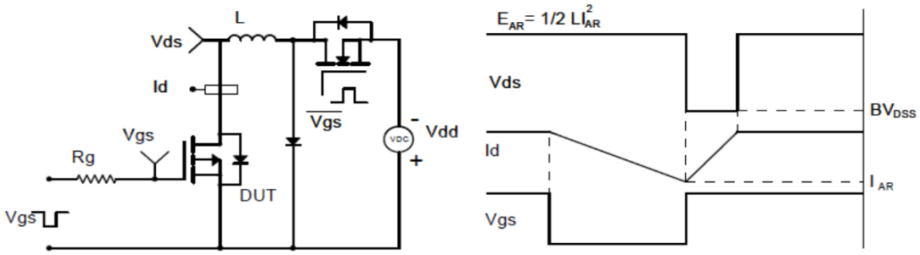
Diode Recovery Test Circuit and Waveforms(N-Channel)



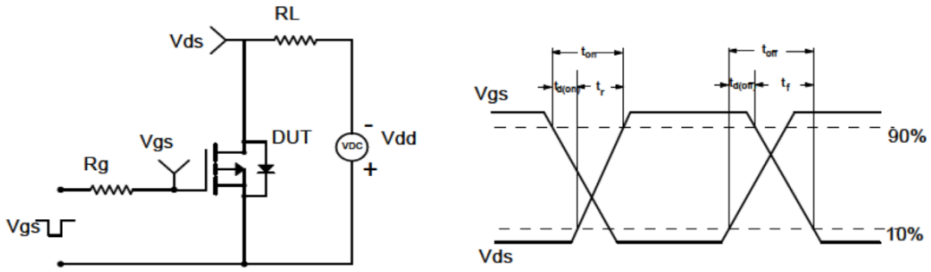
Gate Charge Test Circuit and Waveform(N-Channel)



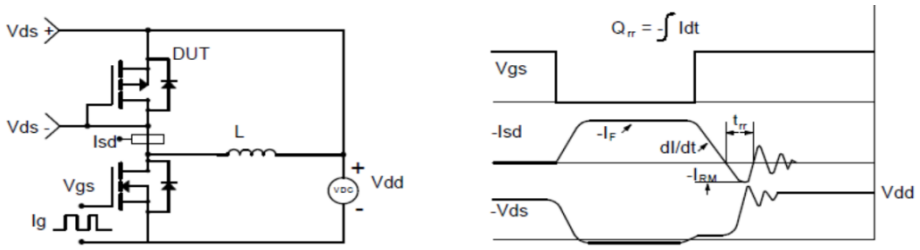
Avalanche Test Circuit and Waveforms(P-Channel)



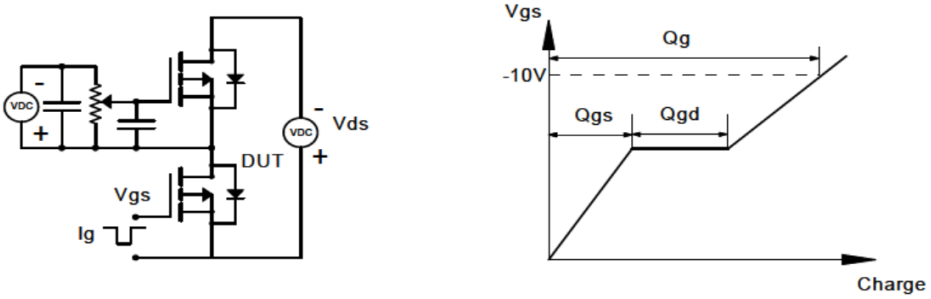
Switching Time Test Circuit and Waveforms(P-Channel)



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

DISCLAIMER: