

Features

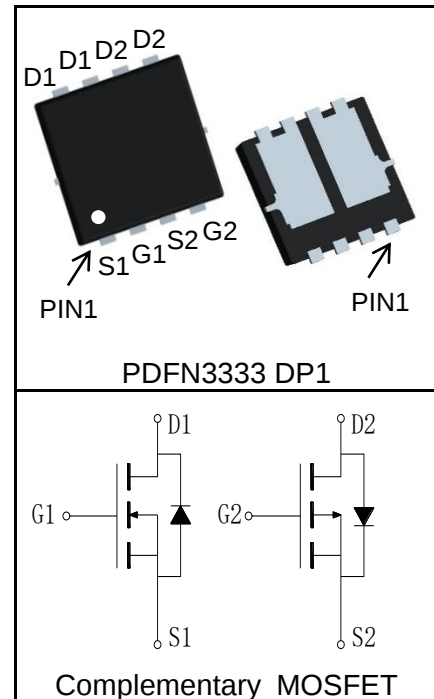
- N-Channel
40V/20A,
 $R_{DS(ON)} = 18m\Omega (Typ.) @ V_{GS} = 10V$
 $R_{DS(ON)} = 24m\Omega (Typ.) @ V_{GS} = 4.5V$
- P-Channel
-40V/-13A,
 $R_{DS(ON)} = 46m\Omega (Typ.) @ V_{GS} = -10V$
 $R_{DS(ON)} = 60m\Omega (Typ.) @ V_{GS} = -4.5V$
- Very low on-resistance
- Fast Switching

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		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 _C =25°C	20	-13	A
Mounted on Large Heat Sink					
I _{DP} ^①	300μs Pulse Drain Current Tested	T _C =25°C	80	-52	A
I _D ^②	Continuous Drain Current@T _C (V _{GS} =±10V)	T _C =25°C	20	-13	A
		T _C =100°C	13	-8	
	Continuous Drain Current@T _A (V _{GS} =±10V) ^③	T _A =25°C	8	-6	
		T _A =70°C	7	-4	
P _D	Maximum Power Dissipation@T _C	T _C =25°C	16	16	W
		T _C =100°C	6	6	
	Maximum Power Dissipation@T _A ^③	T _A =25°C	2.8	2.8	
		T _A =70°C	1.8	1.8	
R _{θJC}	Thermal Resistance-Junction to Case		7.8	7.8	°C/W
R _{θJA} ^③	Thermal Resistance-Junction to Ambient		45	45	°C/W
Drain-Source Avalanche Ratings					
E _{AS} ^④	Avalanche Energy, Single Pulsed		12	16	mJ

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

Symbol	Parameter	Test Condition	KS4630MA			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	2.1	V
		V _{DS} =V _{GS} , I _{DS} =-250μA	P	-1.1	-1.5	-2.1	
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		18	25	mΩ
		V _{GS} =-10V, I _{DS} =-8A	P		46	60	
		V _{GS} =4.5V, I _{DS} =6A	N		24	34	
		V _{GS} =-4.5V, I _{DS} =-6A	P		60	78	
Diode Characteristics							
V _{SD} ^⑤	Diode Forward Voltage	I _{SD} =8A, V _{GS} =0V	N		0.85	1.2	V
		I _{SD} =-8A, V _{GS} =0V	P		-0.91	-1.2	
t _{rr}	Reverse Recovery Time	N-Channel I _{SD} =8A, dl _{SD} /dt=100A/μs	N		16		ns
			P		21		
Q _{rr}	Reverse Recovery Charge	P-Channel I _{SD} =-8A, dl _{SD} /dt=100A/μs	N		29		nC
			P		33		
Dynamic Characteristics ^⑥							
R _G	Gate Resistance	V _{GS} =0V,V _{DS} =0V,F=1MHz	N		1.2		Ω
			P		4.5		
C _{iss}	Input Capacitance	N-Channel V _{GS} =0V,V _{DS} =20V, Frequency=1.0MHz	N		355		pF
			P		765		
C _{oss}	Output Capacitance		N		60		
			P		85		
C _{rss}	Reverse Transfer Capacitance	P-Channel V _{GS} =0V,V _{DS} =-20V, Frequency=1.0MHz	N		30		
			P		55		

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

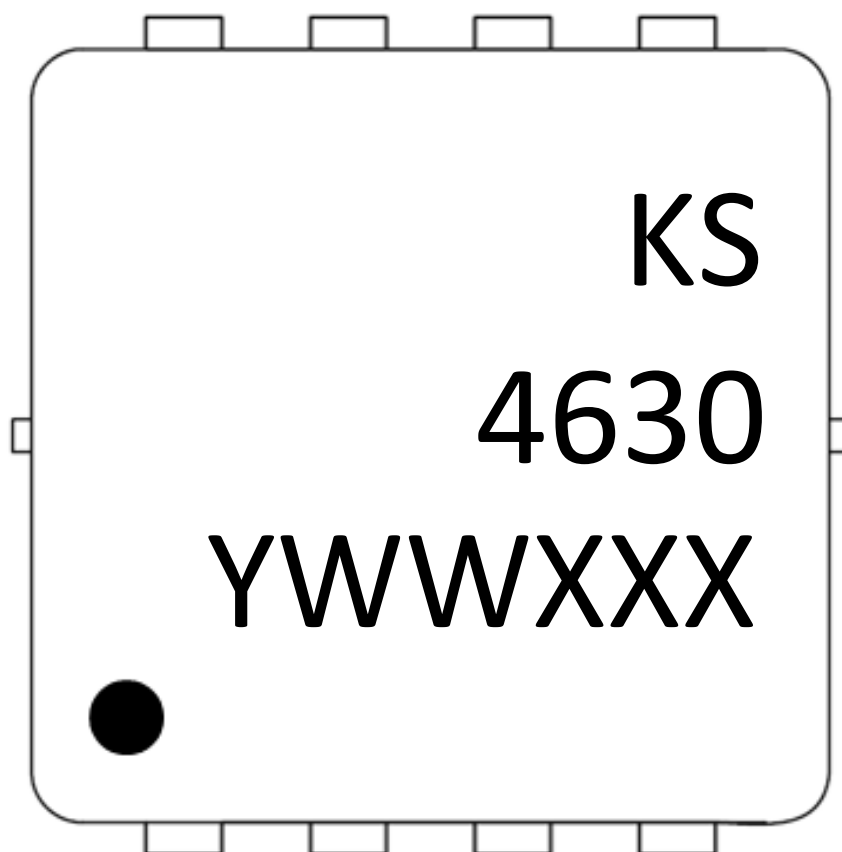
Symbol	Parameter	Test Condition	KS4630MA			Unit	
			Min.	Typ.	Max.		
Dynamic Characteristics ^⑥							
t _{d(ON)}	Turn-on Delay Time	N-Channel V _{DD} =20V, I _{DS} =8A, V _{GEN} =10V, R _G =3Ω	N		6		ns
t _r	Turn-on Rise Time		P		7		
			N		8		
t _{d(OFF)}	Turn-off Delay Time		P		11		
		N		15			
t _f	Turn-off Fall Time	P		29			
		N		5			
		P		17			
Gate Charge Characteristics ^⑥							
Q _g	Total Gate Charge	N-Channel V _{DS} =20V, V _{GS} =10V, I _{DS} =8A	N		8		nC
Q _{gs}	Gate-Source Charge		P		16		
		N		2.5			
Q _{gd}	Gate-Drain Charge	P		3.9			
		N		3.1			
		P		4.3			

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: $L = 0.5\text{mH}$, $R_G = 25\Omega$, $I_{AS} = 7\text{A}$, $V_{GS} = 10\text{V}$, P-Channel: $L = 0.5\text{mH}$, $R_G = 25\Omega$, $I_{AS} = -8\text{A}$, $V_{GS} = -10\text{V}$, 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
KS4630MA	PDFN3333 DP1	Tape&Reel	5000	13"	12mm

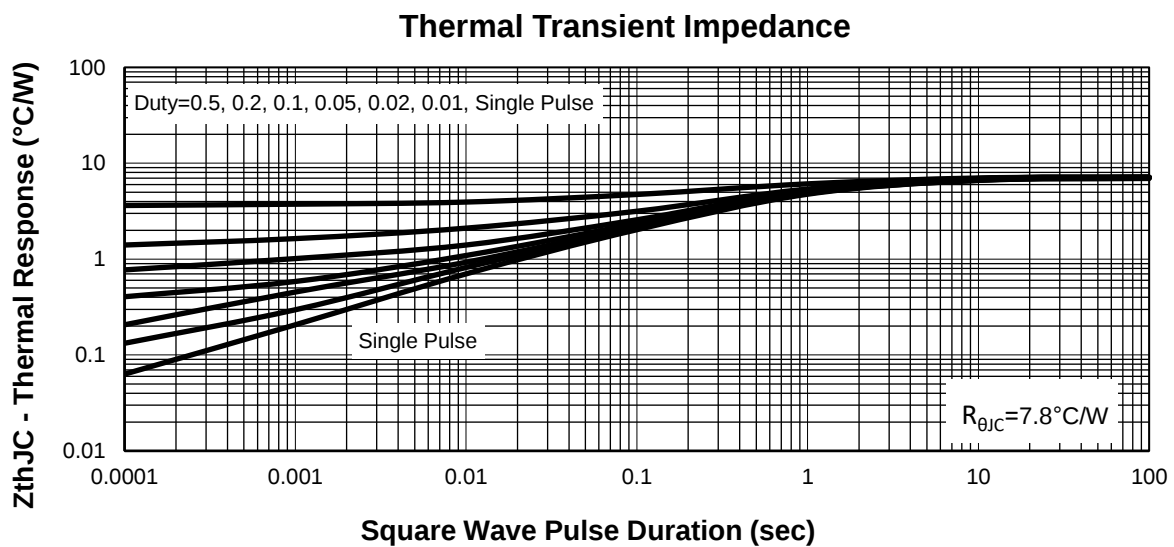
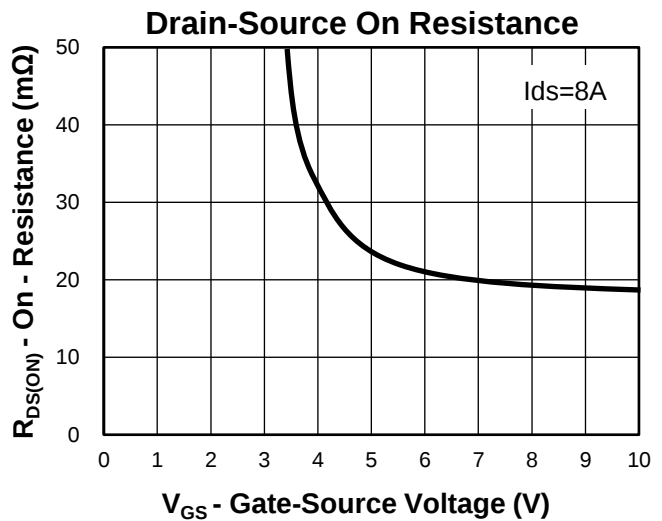
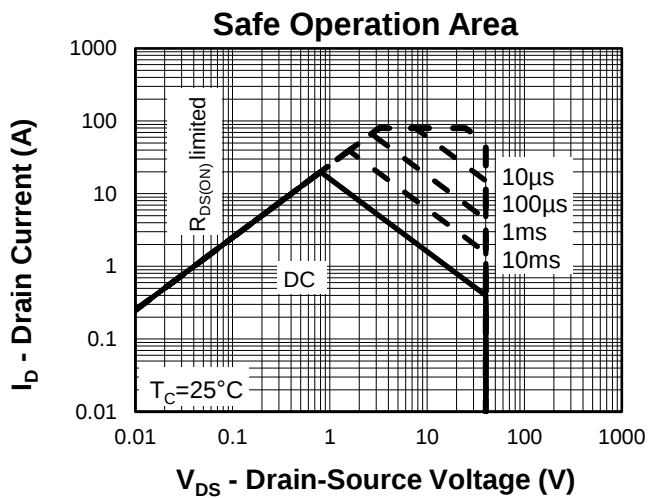
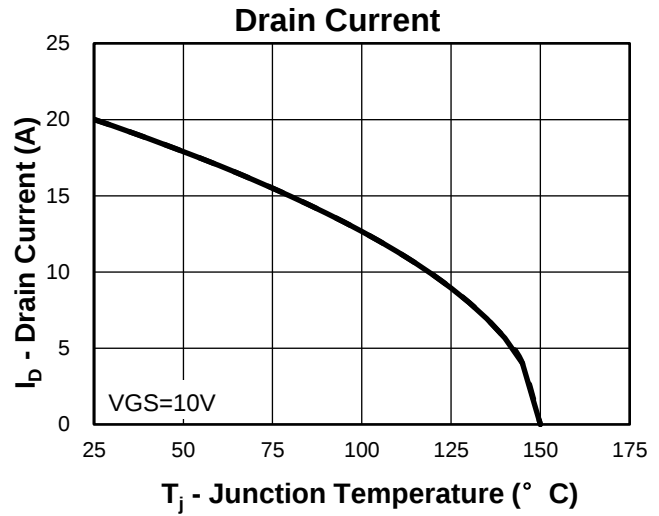
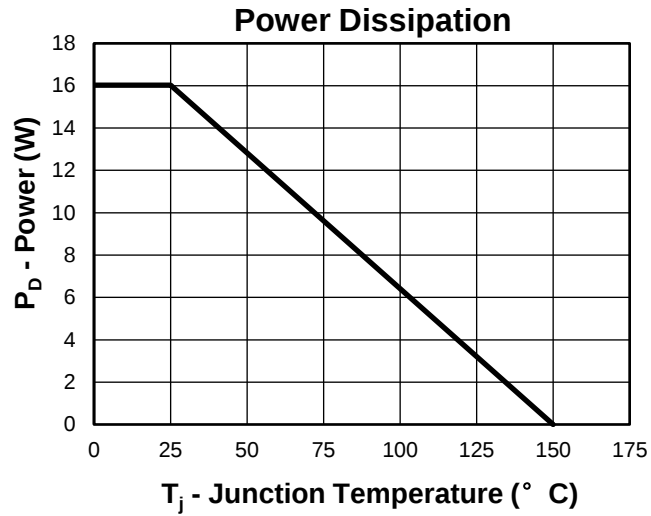


1st Line: Kwansemi Code(KS)

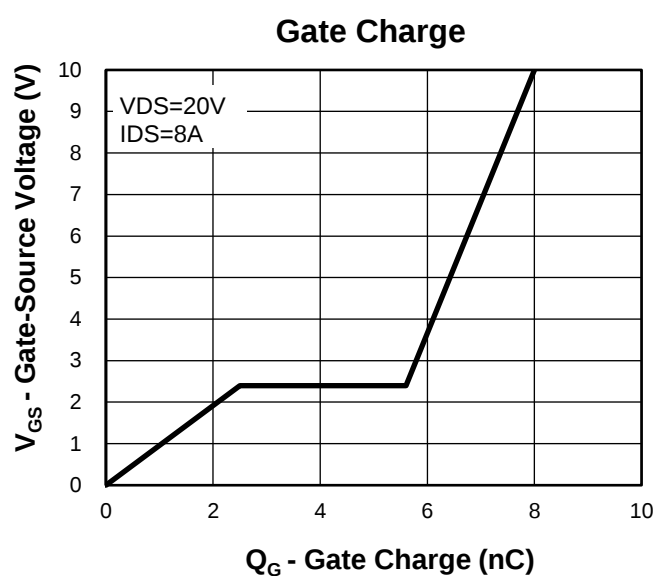
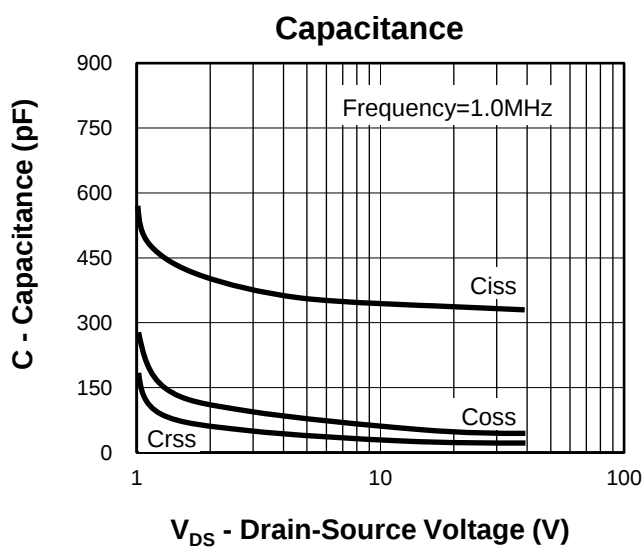
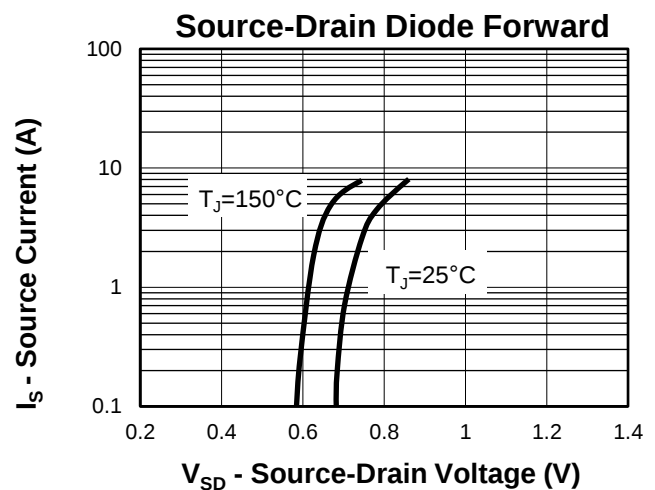
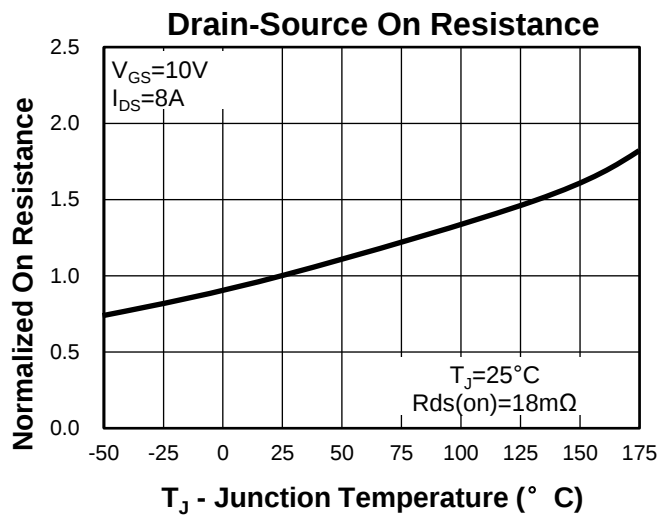
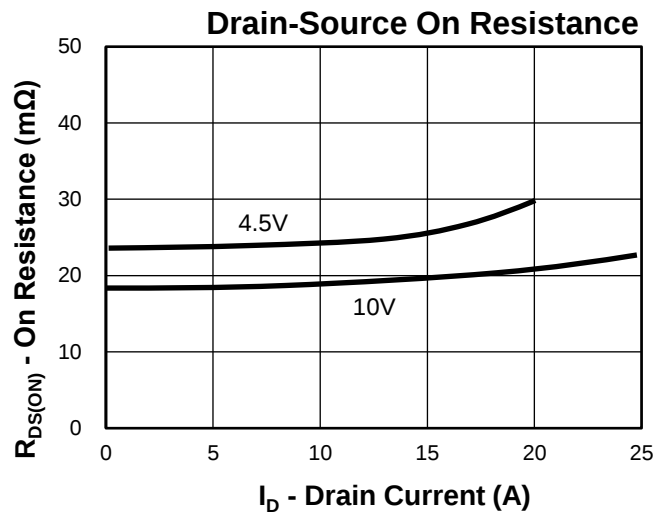
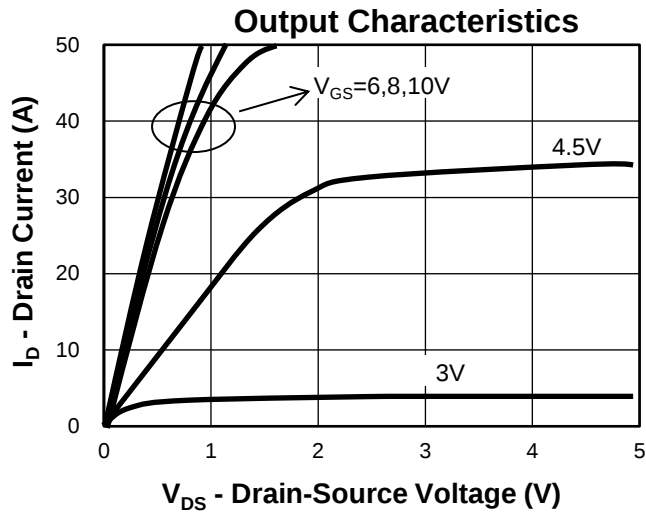
2nd Line: Part Number(4630)

3rd Line: Lot Number(YWWXXX)

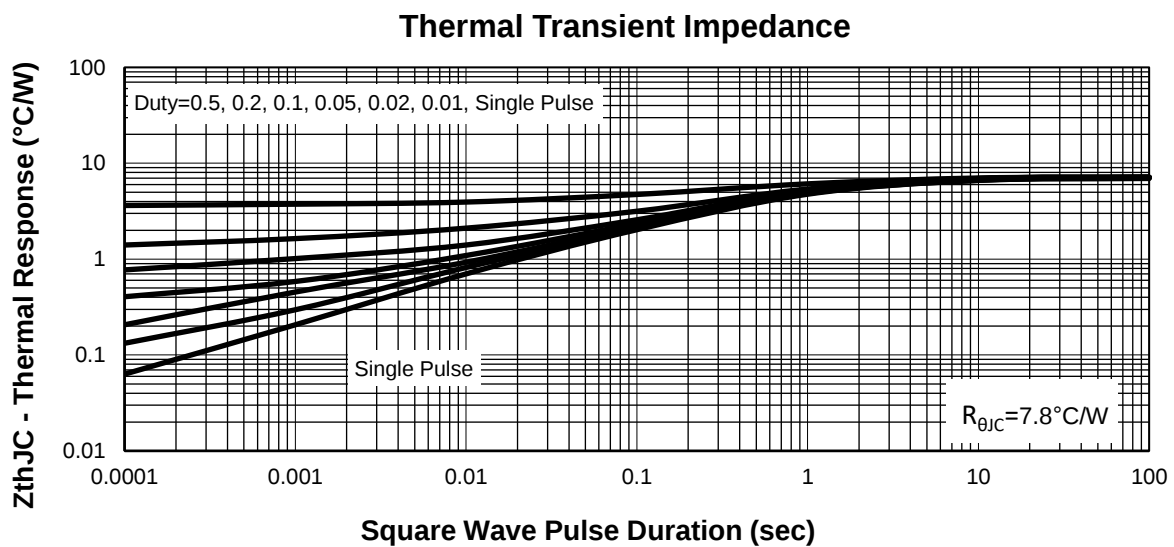
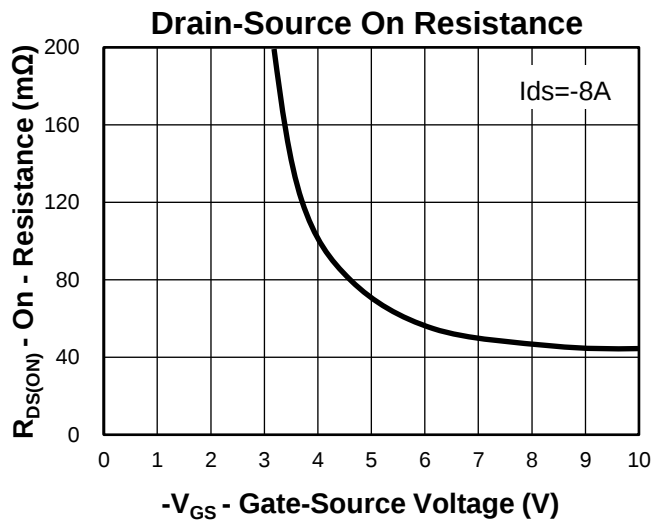
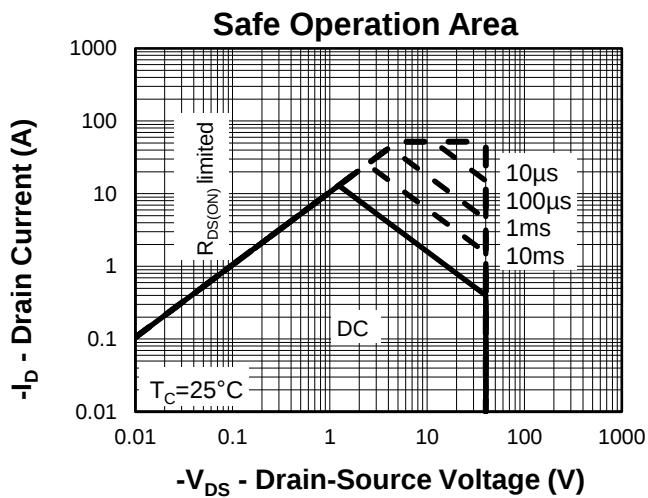
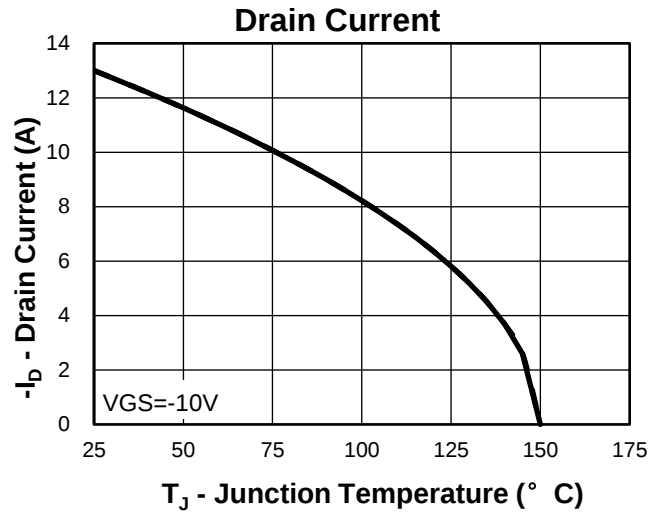
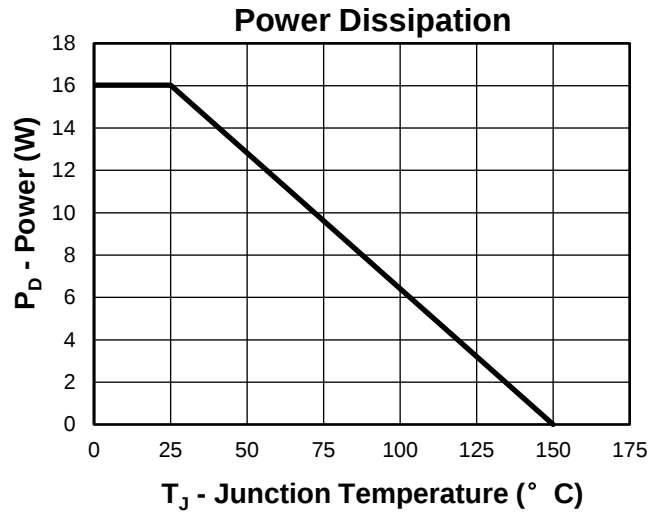
Typical Characteristics(N-Channel)



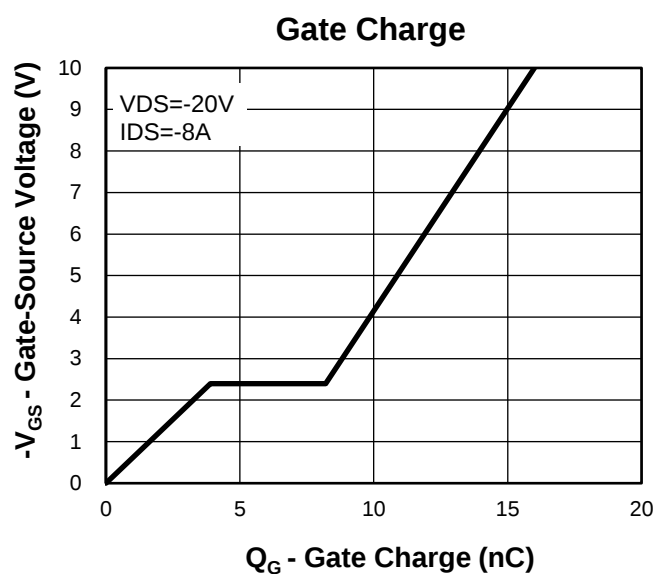
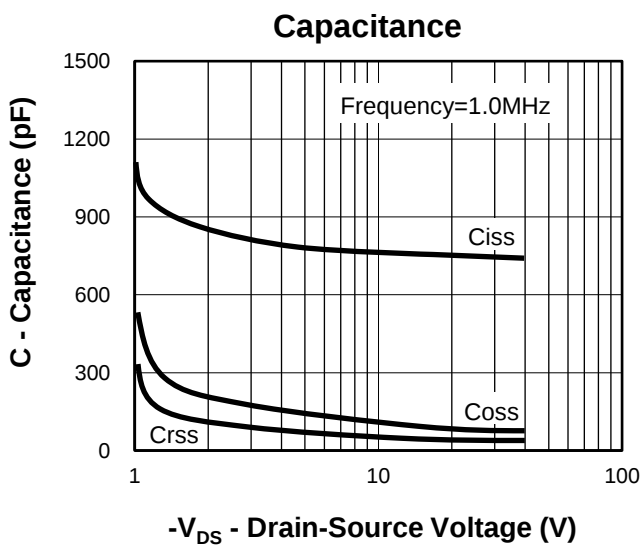
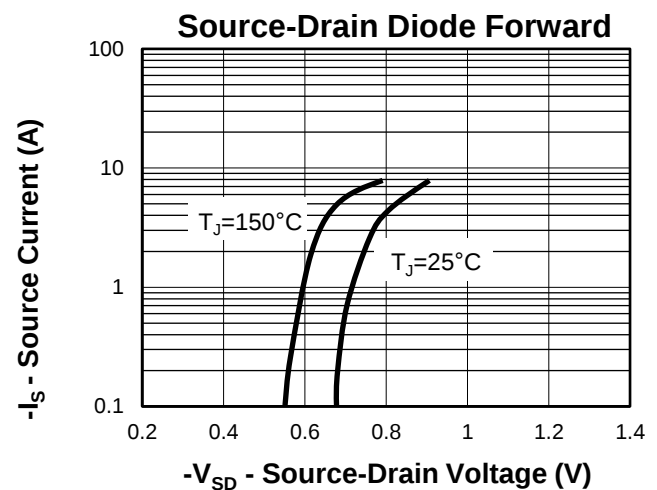
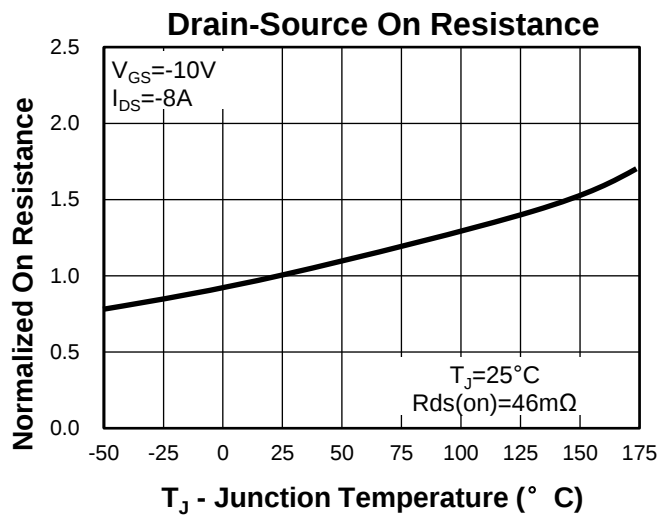
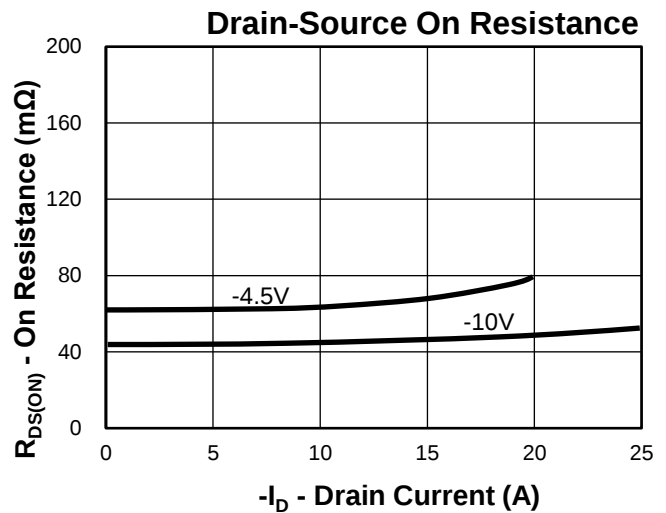
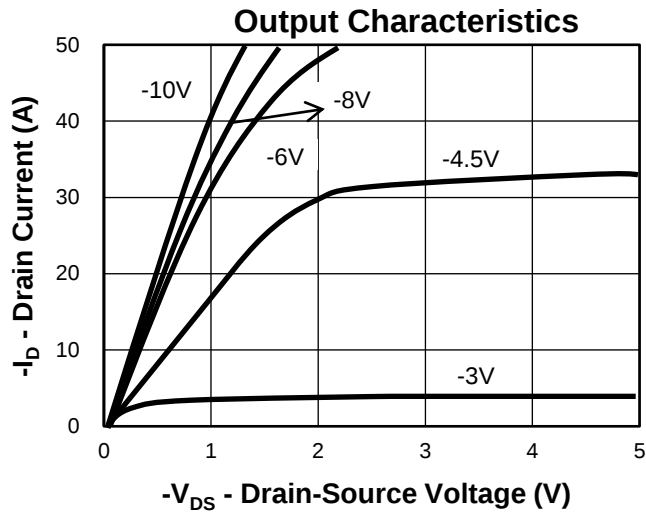
Typical Characteristics(N-Channel)

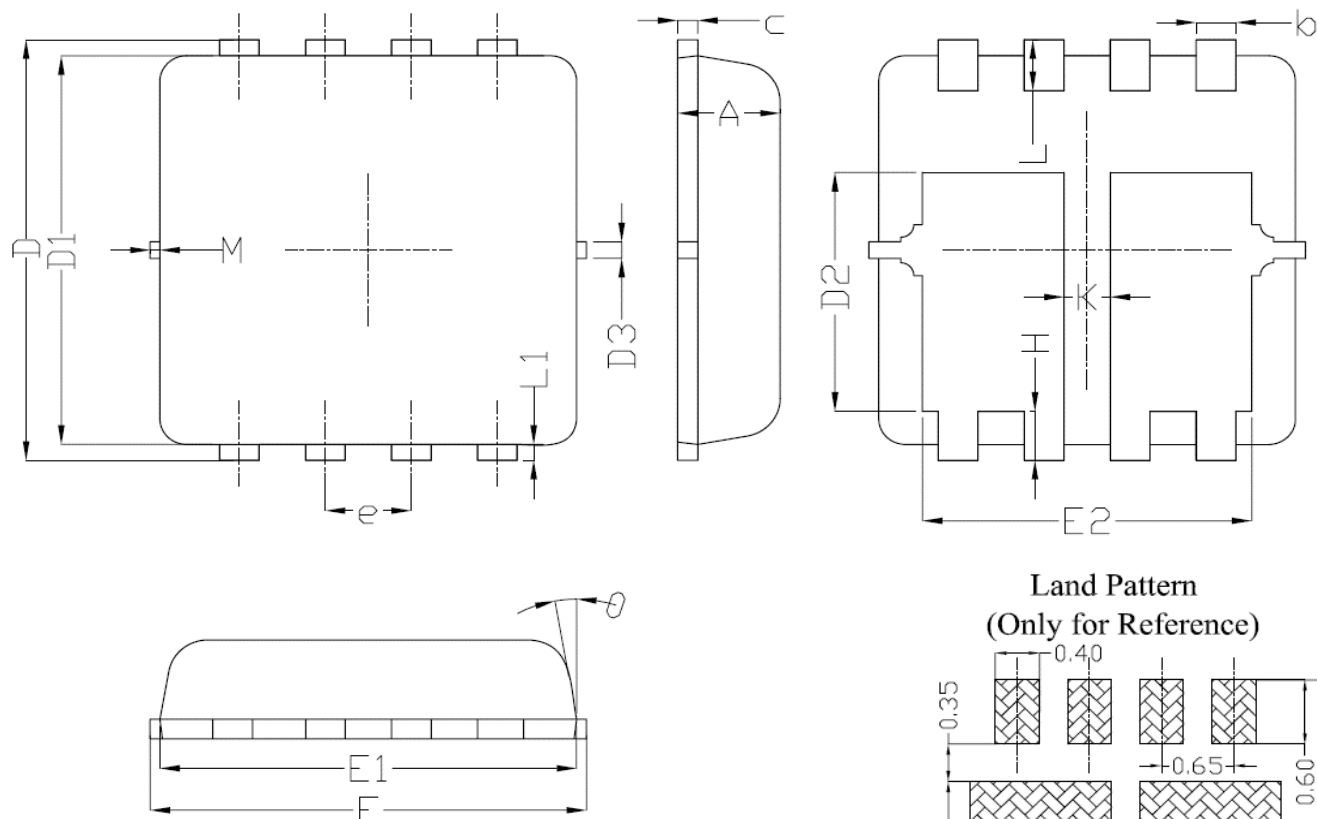


Typical Characteristics(P-Channel)



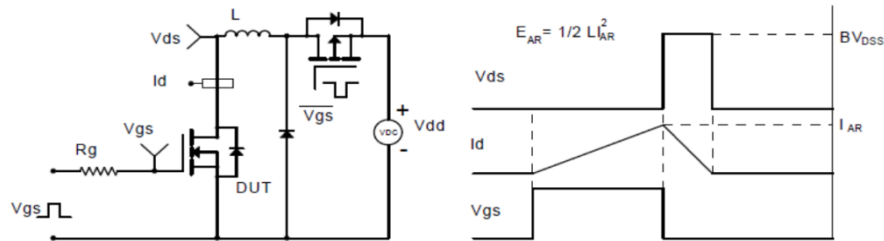
Typical Characteristics(P-Channel)



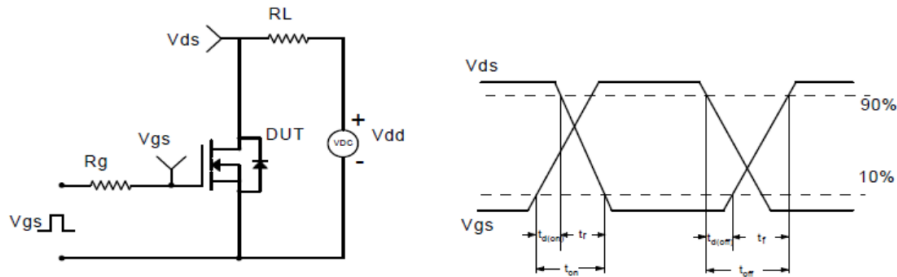
Package Information
PDFN3333 DP1


SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	0.75	0.80	0.028	0.030	0.031
b	0.25	0.30	0.35	0.010	0.012	0.014
c	0.10	0.15	0.25	0.004	0.006	0.010
D	3.25	3.35	3.45	0.128	0.132	0.136
D1	3.00	3.10	3.20	0.118	0.122	0.126
D2	1.78	1.88	1.98	0.070	0.074	0.078
D3		0.13			0.005	
E	3.20	3.30	3.40	0.126	0.130	0.134
E1	3.00	3.15	3.20	0.118	0.124	0.126
E2	2.39	2.49	2.59	0.094	0.098	0.102
e	0.65 BSC			0.026 BSC		
H	0.30	0.39	0.50	0.012	0.015	0.020
L	0.30	0.40	0.50	0.012	0.016	0.020
L1		0.13			0.005	
K	0.30			0.012		
θ	0°		12°	0°		12°
M			0.15			0.006

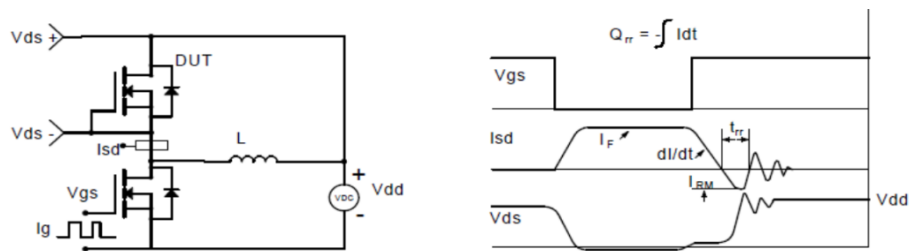
Avalanche Test Circuit and Waveforms(N-Channel)



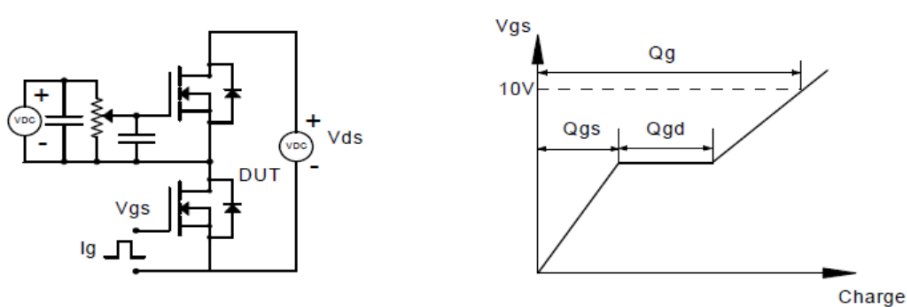
Switching Time Test Circuit and Waveforms(N-Channel)



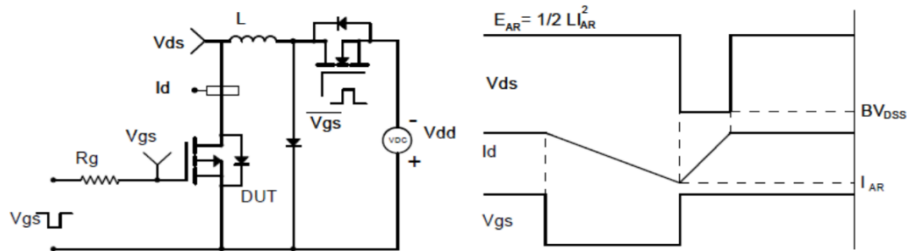
Diode Recovery Test Circuit and Waveforms(N-Channel)



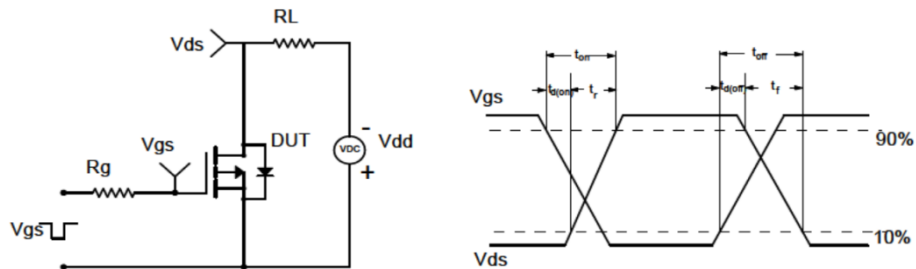
Gate Charge Test Circuit and Waveform(N-Channel)



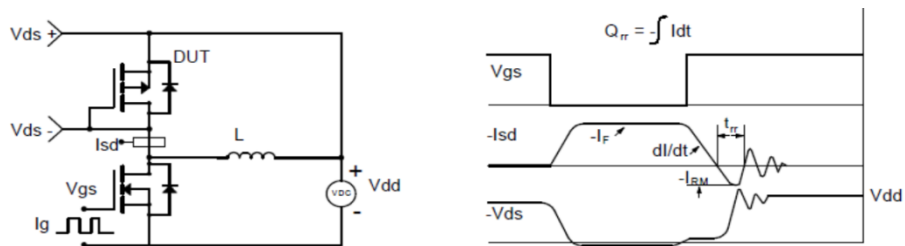
Avalanche Test Circuit and Waveforms(P-Channel)



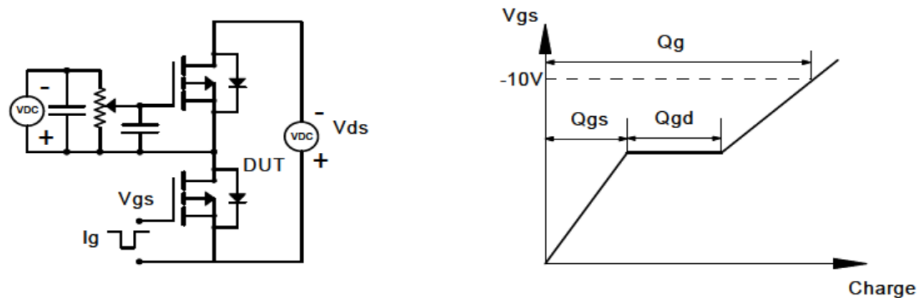
Switching Time Test Circuit and Waveforms(P-Channel)



Diode Recovery Test Circuit and Waveforms(P-Channel)



Gate Charge Test Circuit and Waveform(P-Channel)



Customer Service

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