KS3640MB

Complementary Advanced Power MOSFET

Features

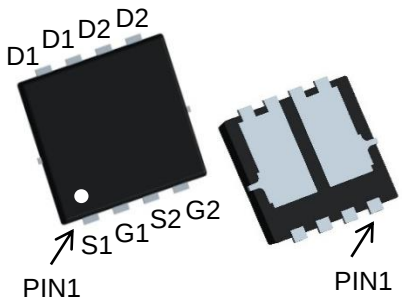
• N-Channel
30V/20A,
$R_{DS\ (ON)}$ =15mΩ(Typ.) @ V_{GS}=10V
$R_{DS\ (ON)}$ =20mΩ(Typ.) @ V_{GS}=4.5V
• P-Channel
-30V/-22A,
$R_{DS\ (ON)}$ =18mΩ (Typ.) @ V_{GS}=-10V
$R_{DS\ (ON)}$ =28mΩ (Typ.) @ V_{GS}=-4.5V
• Very low on-resistance
• Fast Switching

Applications

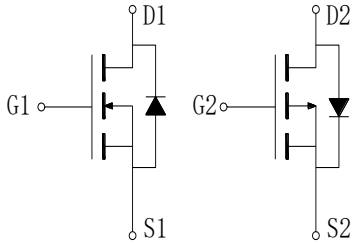
• Motor Drive Applications

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		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	20	-22	A
Mounted on Large Heat Sink					
I_{DP} ①	300μs Pulse Drain Current Tested	T_C=25°C	80	-88	A
I_D ②	Continuous Drain Current@T_C(V_{GS}=±10V)	T_C=25°C	20	-22	A
		T_C=100°C	13	-14	
	Continuous Drain Current@T_A(V_{GS}=±10V) ③	T_A=25°C	9	-8	
		T_A=70°C	7	-6	
P_D	Maximum Power Dissipation@T_C	T_C=25°C	14	22	W
		T_C=100°C	6	9	
	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	5.8	°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		9	20	mJ

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

Symbol	Parameter	Test Condition		KS3640MB Min.	KS3640MB Typ.	KS3640MB Max.	Unit
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	N			30	
		V_{DS}=-30V, V_{GS}=0V	P			-1	
		T_J=125°C	P			-30	
$V_{GS(th)}$	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	P-Channel V_{GS}=0V,V_{DS}=-15V, Frequency=1.0MHz	N		70		
			P		175		
C_{rss}	Reverse Transfer Capacitance		N		45		
			P		120		

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

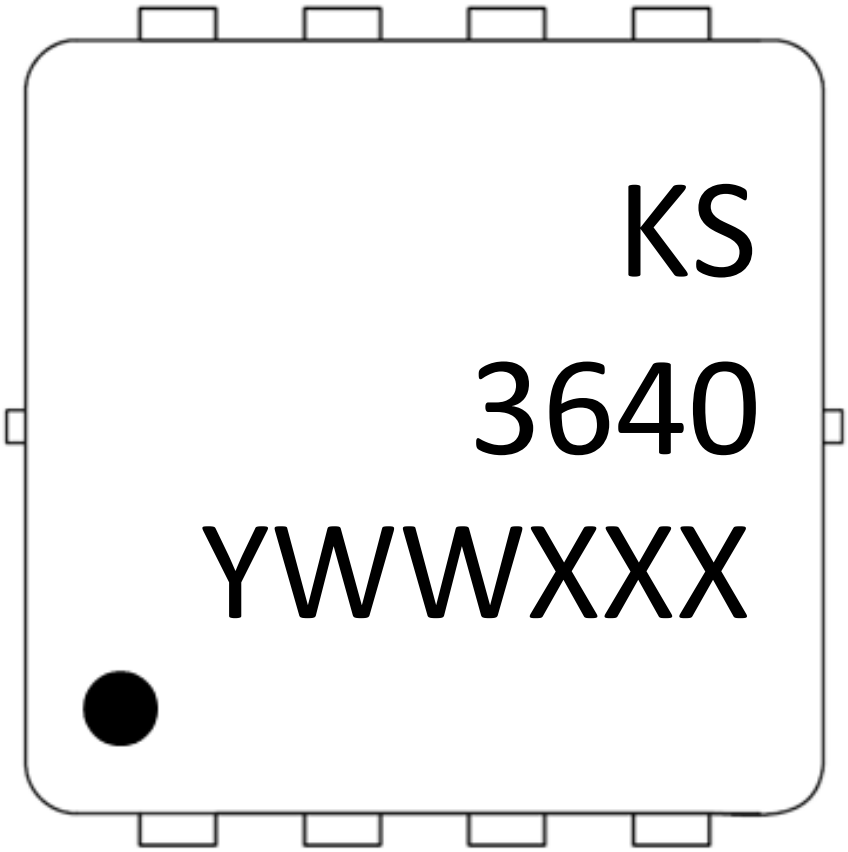
Symbol	Parameter	Test Condition		KS3640MB			Unit
				Min.	Typ.	Max.	
Dynamic Characteristics⑥							
$t_{d(ON)}$	Turn-on Delay Time	N-Channel V_{DD}=15V, I_{DS}=7A, V_{GEN}=10V, R_G=3Ω P-Channel V_{DD}=-15V, I_{DS}=-7A, V_{GEN}= -10V, R_G=3Ω	N		8		ns
			P		13		
t_r	Turn-on Rise Time		N		11		
			P		25		
$t_{d(OFF)}$	Turn-off Delay Time		N		19		
			P		32		
t_f	Turn-off Fall Time		N		9		
			P		14		
Gate Charge Characteristics⑥							
Q_g	Total Gate Charge	N-Channel V_{DS}=15V, V_{GS}=10V, I_{DS}=7A P-Channel V_{DS}=-15V, V_{GS}= -10V, I_{DS}=-7A	N		10		nC
			P		23		
Q_{gs}	Gate-Source Charge		N		3		
			P		5		
Q_{gd}	Gate-Drain Charge		N		4		
			P		7		

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: L = 0.5mH,R_G = 25Ω, I_{AS} = 6A, V_{GS} =10V, P-Chanel: L = 0.5mH, R_G = 25Ω, I_{AS} = -9A, V_{GS} =-10V, Part not recommended for use above this value.
⑤Pulse test;Pulse width≤300μs, duty cycle≤2%.
⑥Guaranteed by design, not subject to production testing.

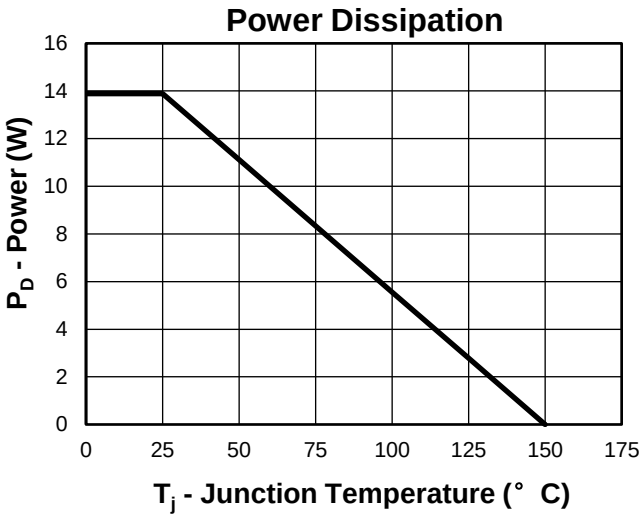
Ordering and Marking Information

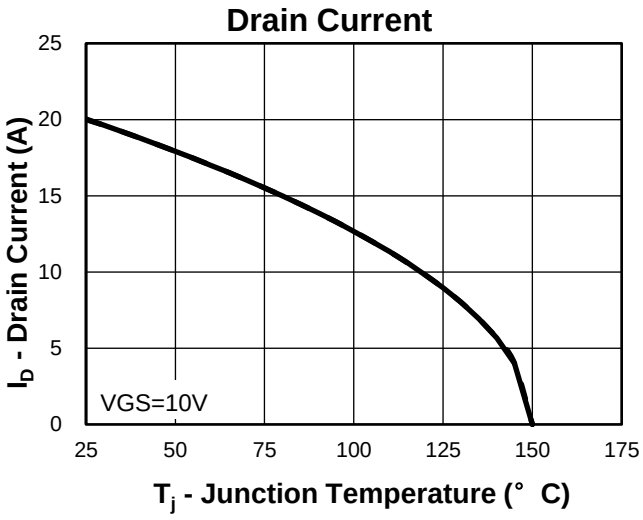
Device	Package	Packaging	Quantity	Reel Size	Tape width
KS3640MB	PDFN3333 DP1	Tape&Reel	5000	13"	12mm

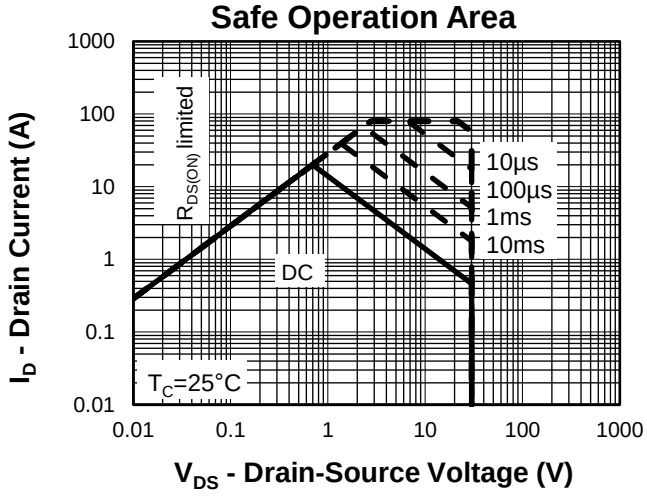


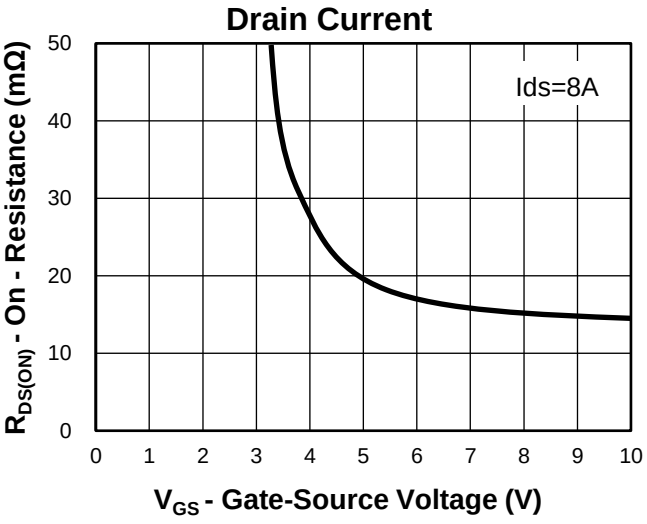
Y =Year,2017-A,2018-B,etc.
WW =Week.
XXX =Lot number.

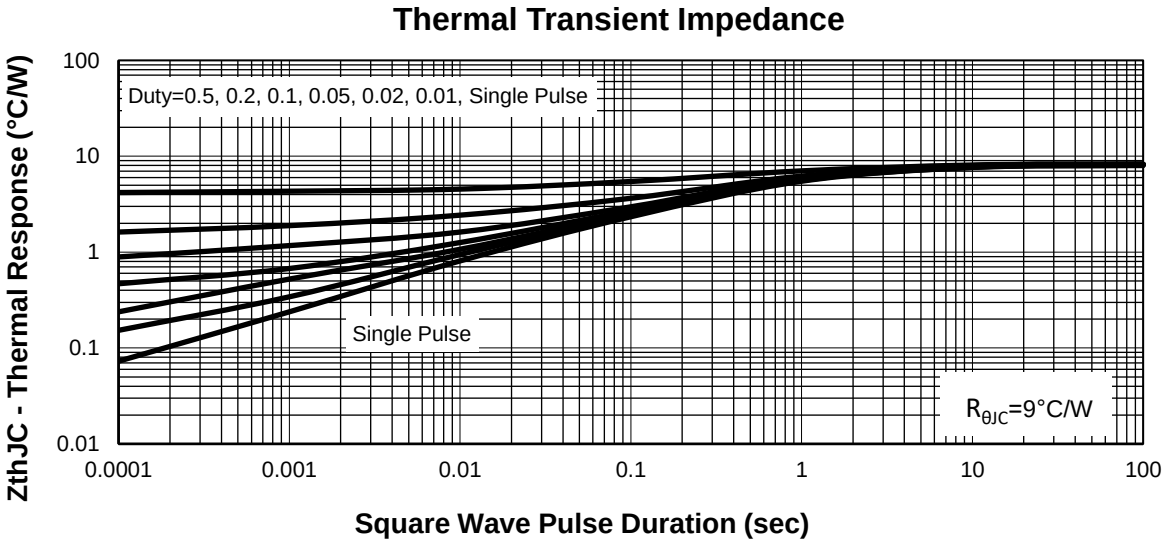
Typical Characteristics(N-Channel)



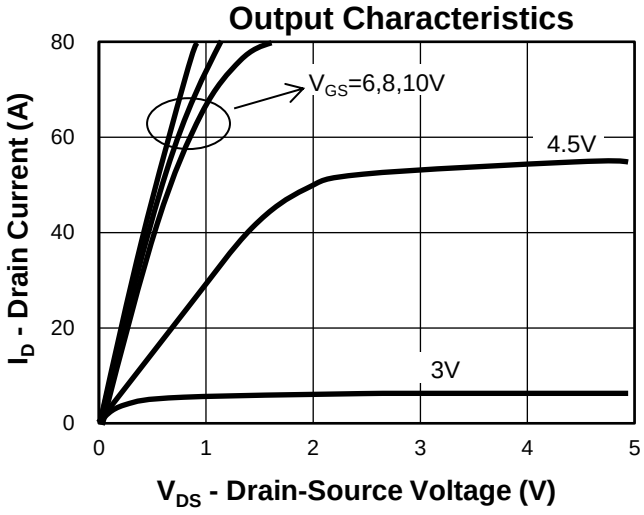


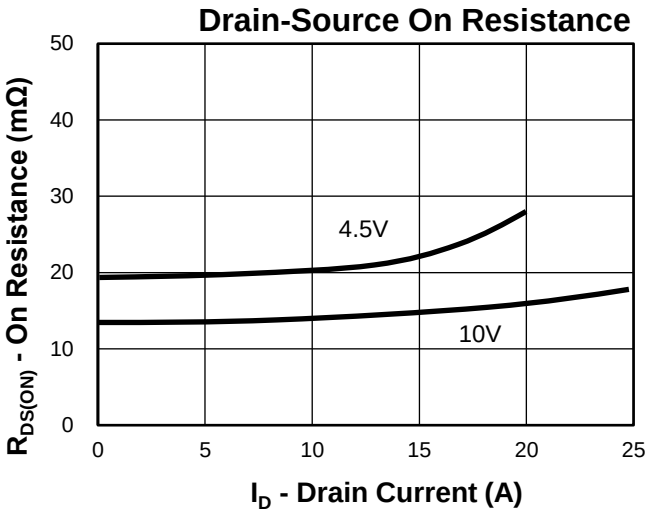


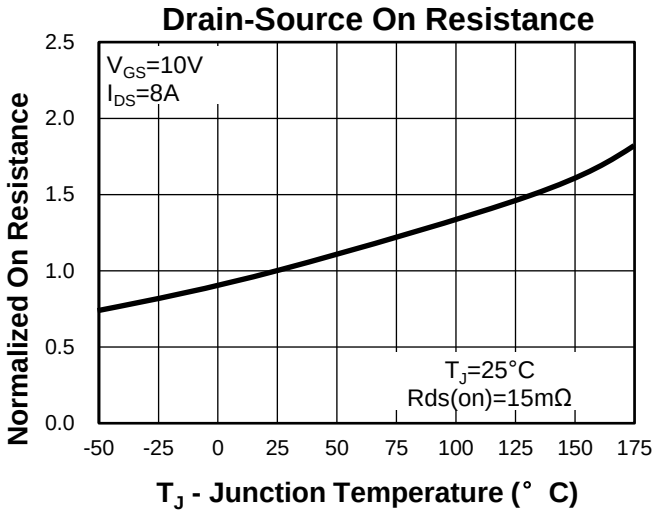


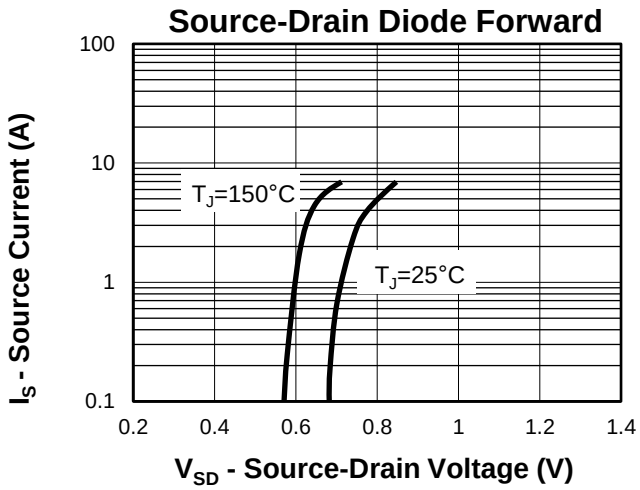


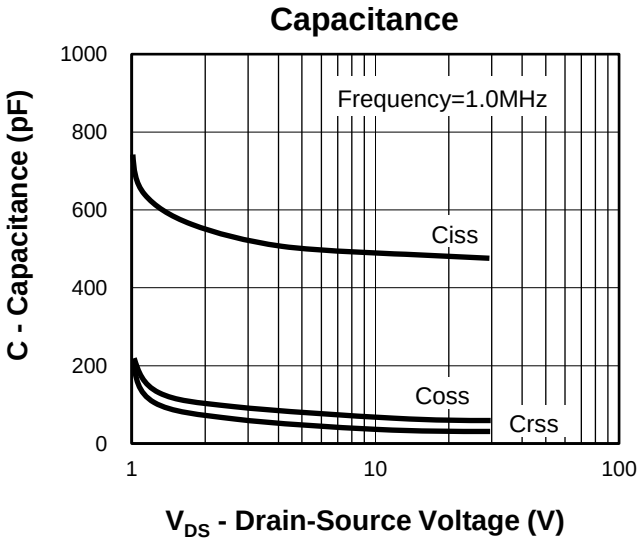
Typical Characteristics(N-Channel)

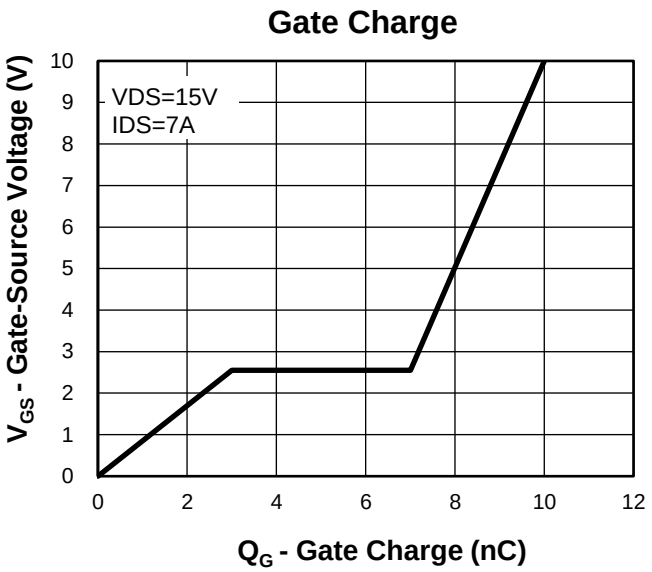




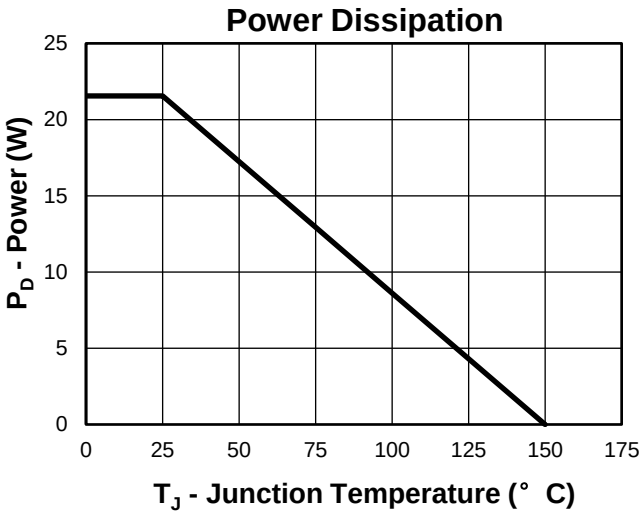


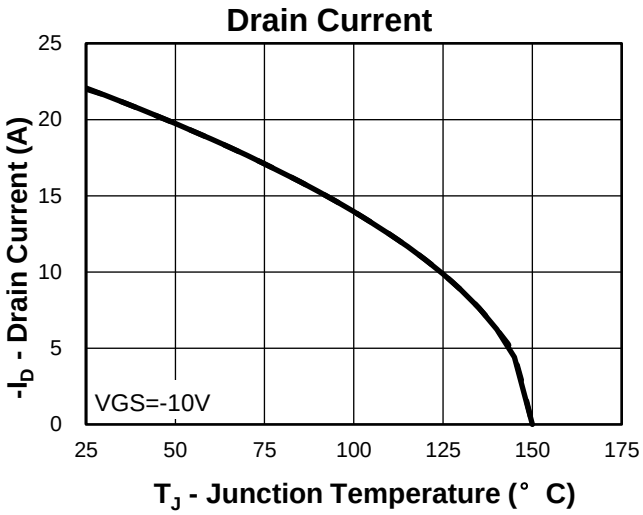


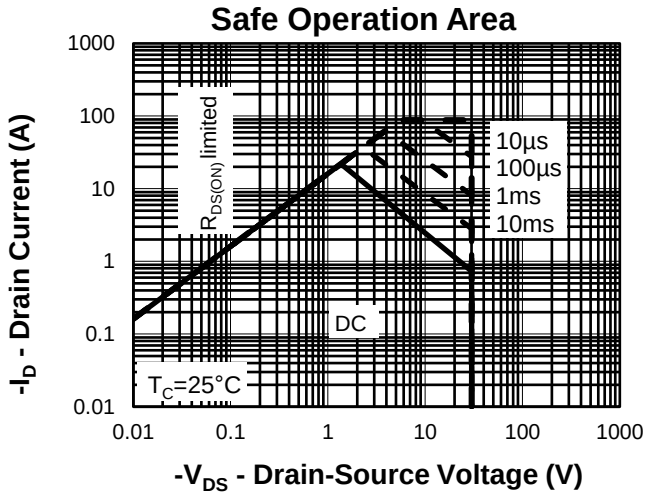


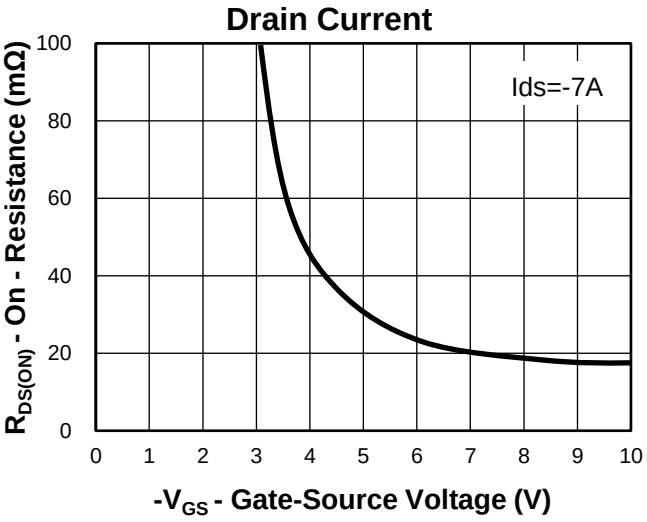


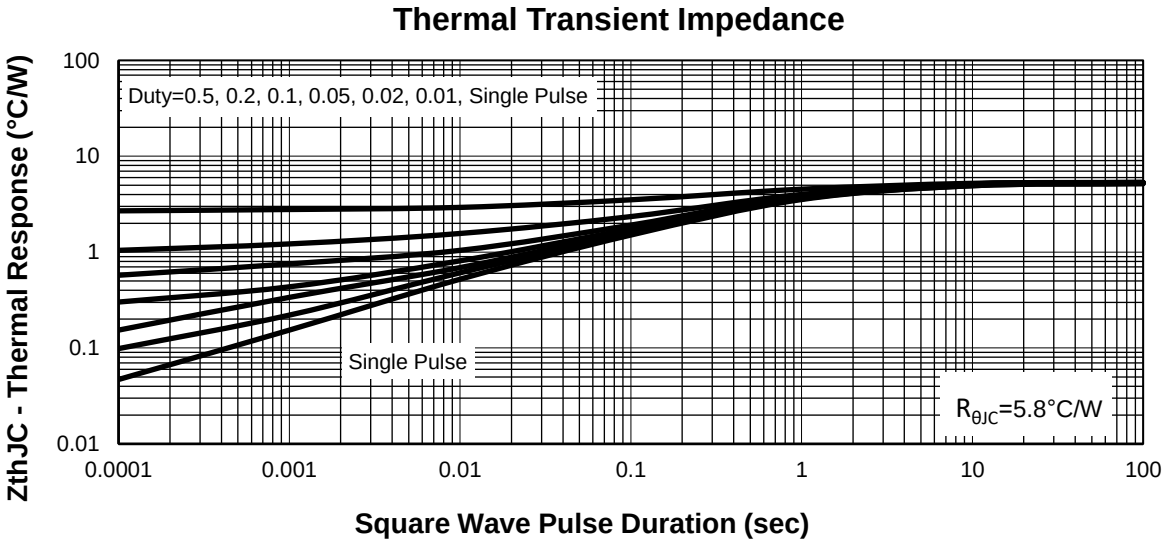
Typical Characteristics(P-Channel)





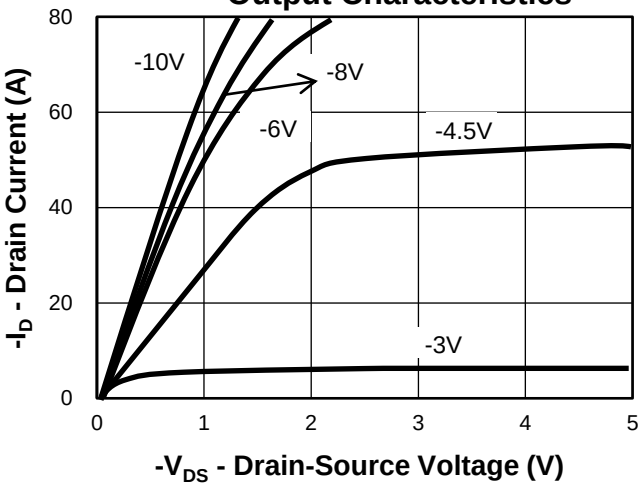




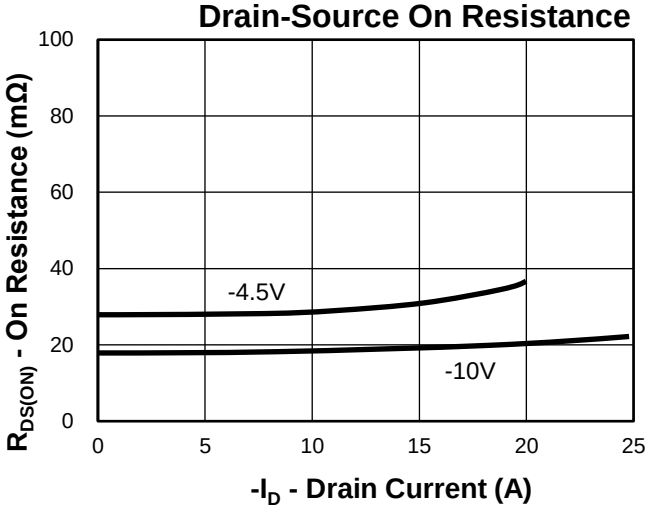


Typical Characteristics(P-Channel)

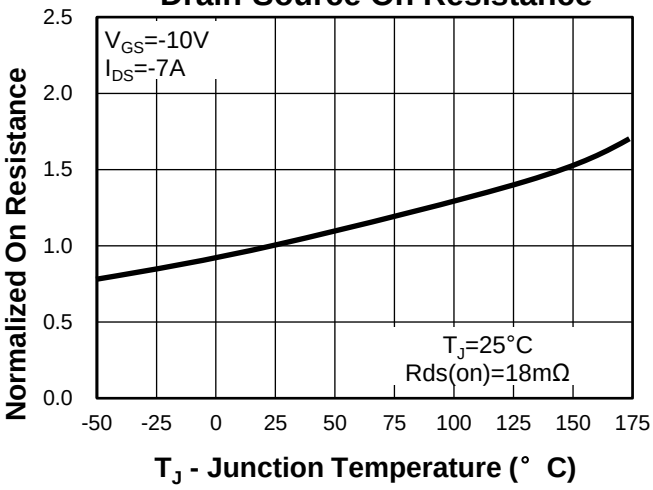
Output Characteristics



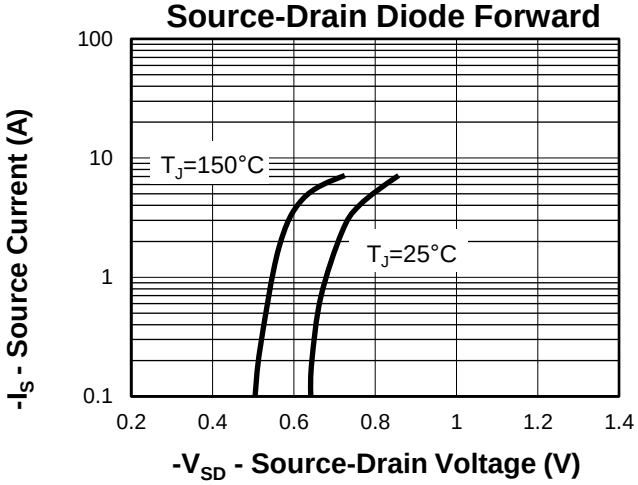
Drain-Source On Resistance



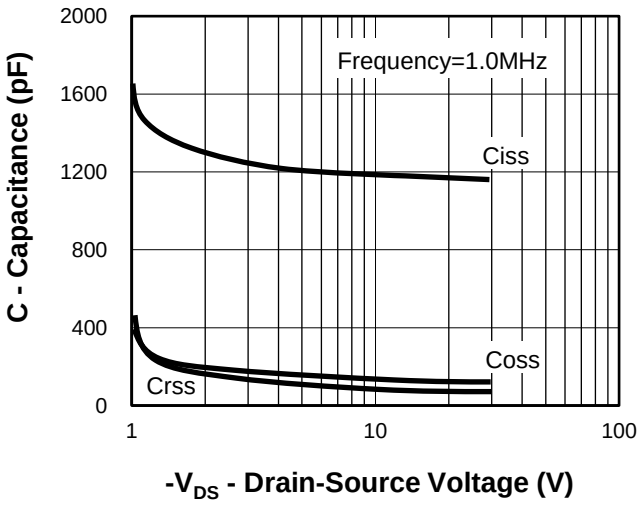
Drain-Source On Resistance



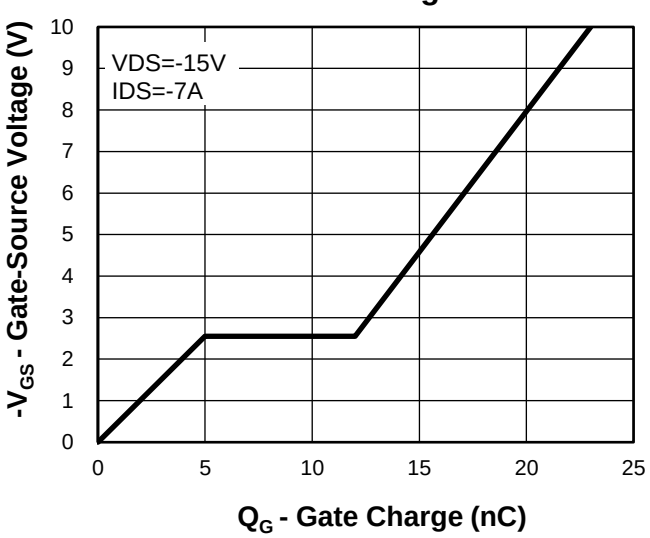
Source-Drain Diode Forward



Capacitance

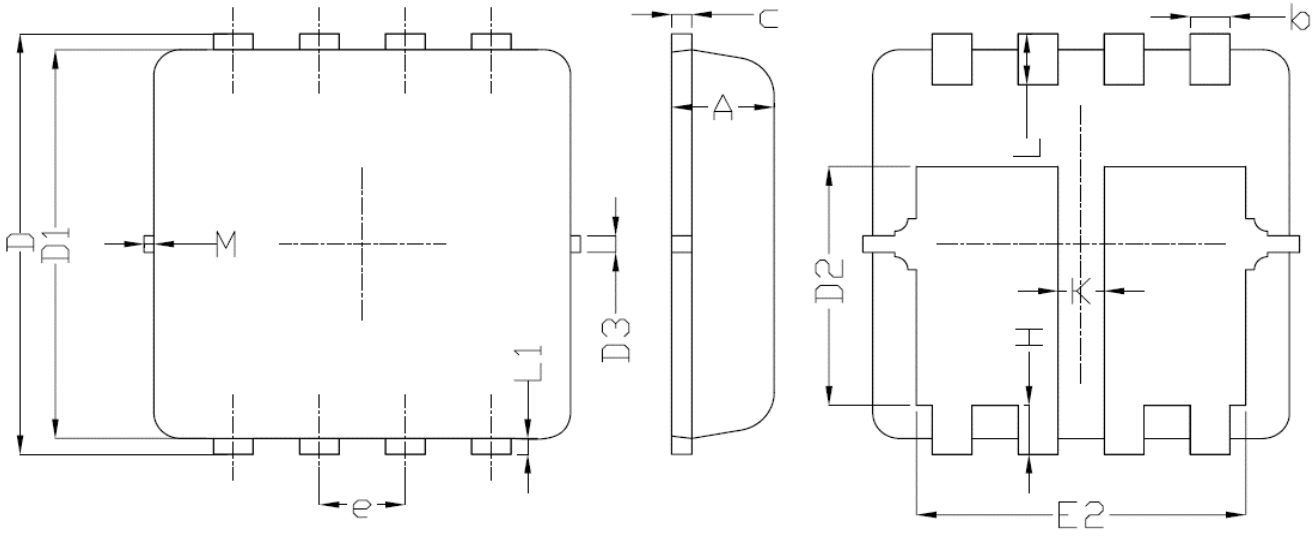


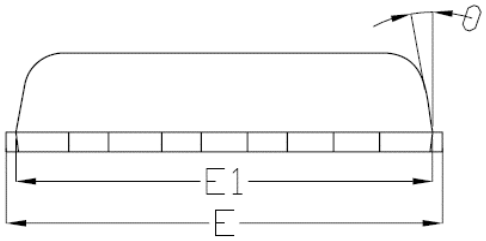
Gate Charge



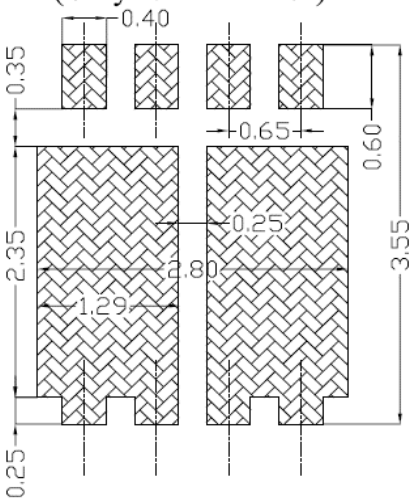
Package Information

PDFN3333 DP1



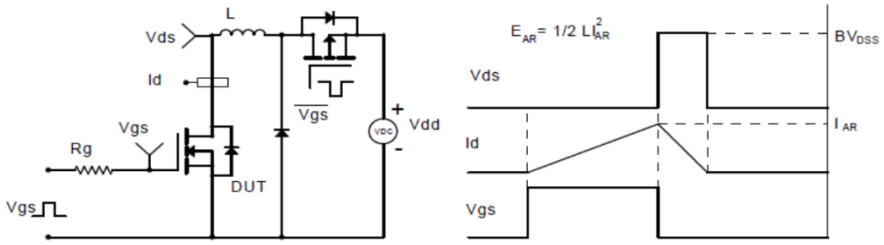


Land Pattern
(Only for Reference)

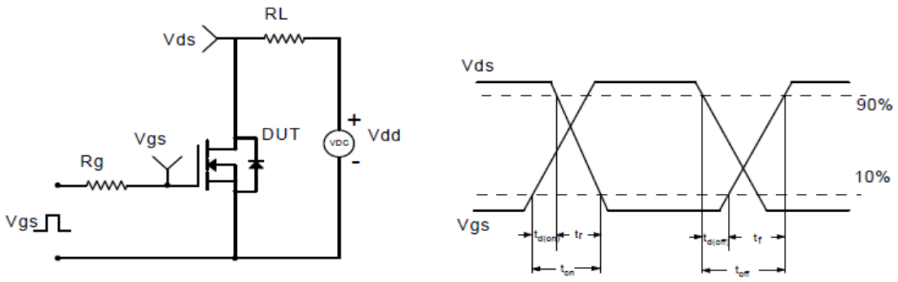


SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	0.75	0.80	0.028	0.030	0.031
b	0.25	0.30	0.35	0.010	0.012	0.014
c	0.10	0.15	0.25	0.004	0.006	0.010
D	3.25	3.35	3.45	0.128	0.132	0.136
D1	3.00	3.10	3.20	0.118	0.122	0.126
D2	1.78	1.88	1.98	0.070	0.074	0.078
D3		0.13			0.005	
E	3.20	3.30	3.40	0.126	0.130	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

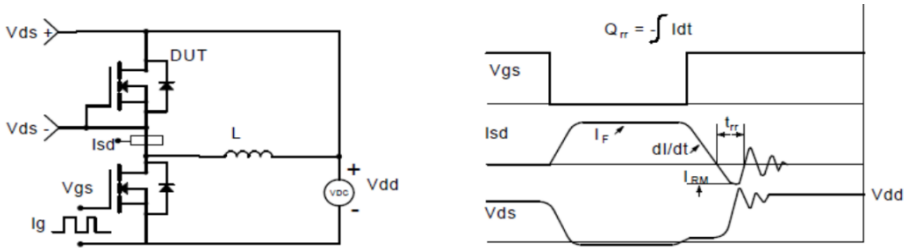
Avalanche Test Circuit and Waveforms(N-Channel)



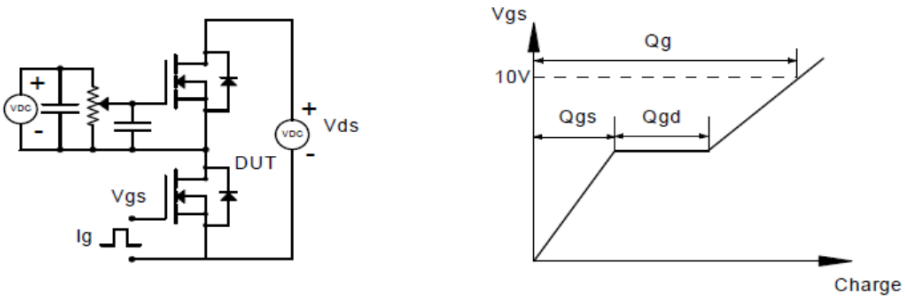
Switching Time Test Circuit and Waveforms(N-Channel)



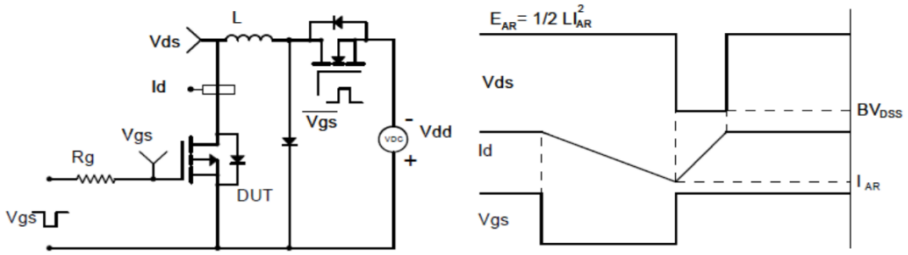
Diode Recovery Test Circuit and Waveforms(N-Channel)



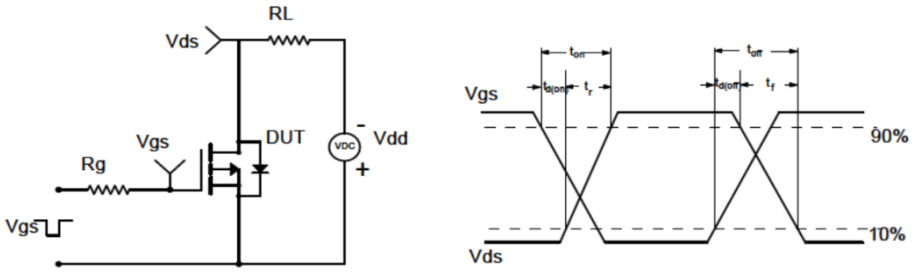
Gate Charge Test Circuit and Waveform(N-Channel)



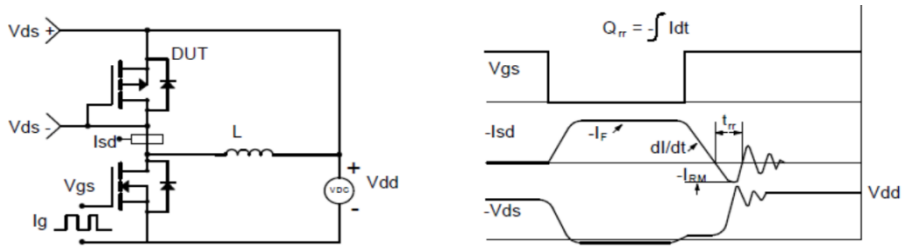
Avalanche Test Circuit and Waveforms(P-Channel)



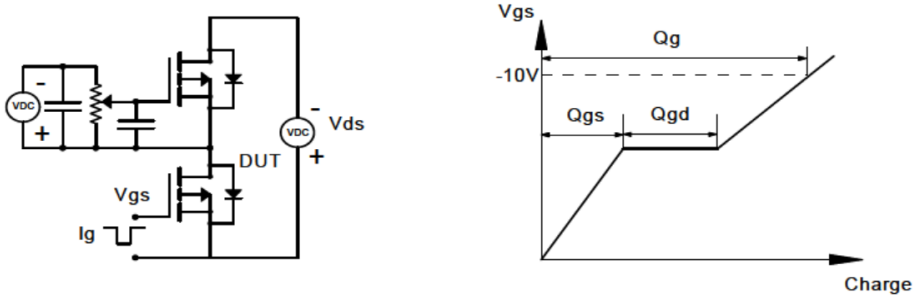
Switching Time Test Circuit and Waveforms(P-Channel)



Diode Recovery Test Circuit and Waveforms(P-Channel)



Gate Charge Test Circuit and Waveform(P-Channel)



Customer Service

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DISCLAIMER: