

Features

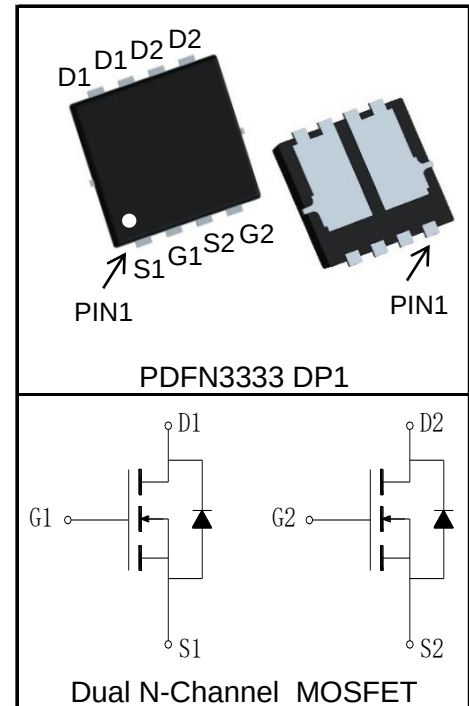
- 40V/18A,
 $R_{DS(ON)} = 25m\Omega(Typ.)@V_{GS}=10V$
 $R_{DS(ON)} = 32m\Omega(Typ.)@V_{GS}=4.5V$
- Low $R_{DS(ON)}$
- Super High Dense Cell Design
- Fast Switching Speed
- 100% avalanche tested

Applications

- Switching Application Systems



Pin Description



Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T _C =25°C Unless Otherwise Noted)				
V _{DSS}	Drain-Source Voltage		40	V
V _{GSS}	Gate-Source Voltage		±20	
T _J	Maximum Junction Temperature		150	°C
T _{STG}	Storage Temperature Range		-55 to 150	°C
I _S	Diode Continuous Forward Current	T _C =25°C	18	A
Mounted on Large Heat Sink				
I _{DP} ^①	300μs Pulse Drain Current Tested	T _C =25°C	72	A
I _D ^②	Continuous Drain Current@T _C (V _{GS} =10V)	T _C =25°C	18	A
		T _C =100°C	11	
	Continuous Drain Current@T _A (V _{GS} =10V) ^③	T _A =25°C	8	
		T _A =70°C	6	
P _D	Maximum Power Dissipation@T _C	T _C =25°C	14	W
		T _C =100°C	6	
	Maximum Power Dissipation@T _A ^③	T _A =25°C	2.8	
		T _A =70°C	1.8	

Symbol	Parameter	Rating	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	8.8	°C/W
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient	45	°C/W
Drain-Source Avalanche Ratings			
$E_{AS}^{④}$	Avalanche Energy, Single Pulsed	6	mJ

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

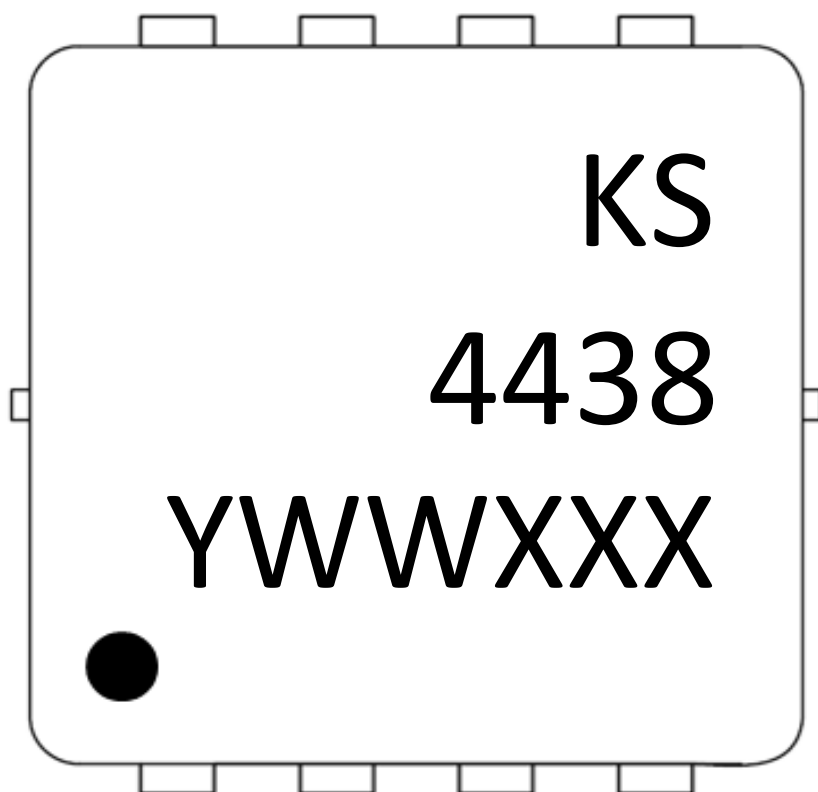
Symbol	Parameter	Test Condition	KS4438MA			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	40			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =40V, V _{GS} =0V			1	μA
		T _J =125°C			30	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	1.1	1.6	2.3	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V			±100	nA
R _{DS(ON)} ⑤	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =10A		25	32	mΩ
		V _{GS} =4.5V, I _{DS} =8A		32	42	mΩ
Diode Characteristics						
V _{SD} ⑤	Diode Forward Voltage	I _{SD} =10A, V _{GS} =0V		0.86	1.2	V
t _{rr}	Reverse Recovery Time	I _{SD} =10A, dI _{SD} /dt=100A/μs		21		ns
Q _{rr}	Reverse Recovery Charge			36		nC
Dynamic Characteristics ⑥						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz		2.6		Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =20V, Frequency=1.0MHz		590		pF
C _{oss}	Output Capacitance			75		
C _{rss}	Reverse Transfer Capacitance			55		
t _{d(ON)}	Turn-on Delay Time	V _{DD} =20V, I _{DS} =10A, V _{GS} =10V, R _G =6Ω		6		ns
t _r	Turn-on Rise Time			13		
t _{d(OFF)}	Turn-off Delay Time			19		
t _f	Turn-off Fall Time			8		
Gate Charge Characteristics ⑥						
Q _g	Total Gate Charge	V _{DS} =20V, V _{GS} =10V, I _{DS} =10A		5.5		nC
Q _{gs}	Gate-Source Charge			1.3		
Q _{gd}	Gate-Drain Charge			2.4		

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, $t \leq 10\text{sec}$.
- ④Limited by T_{Jmax} , $I_{AS} = 5A$, $L = 0.5mH$, $V_{DD} = 24V$, $R_G = 25\Omega$, Starting $T_J = 25^\circ C$.
- ⑤Pulse test;Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
- ⑥Guaranteed by design, not subject to production testing.

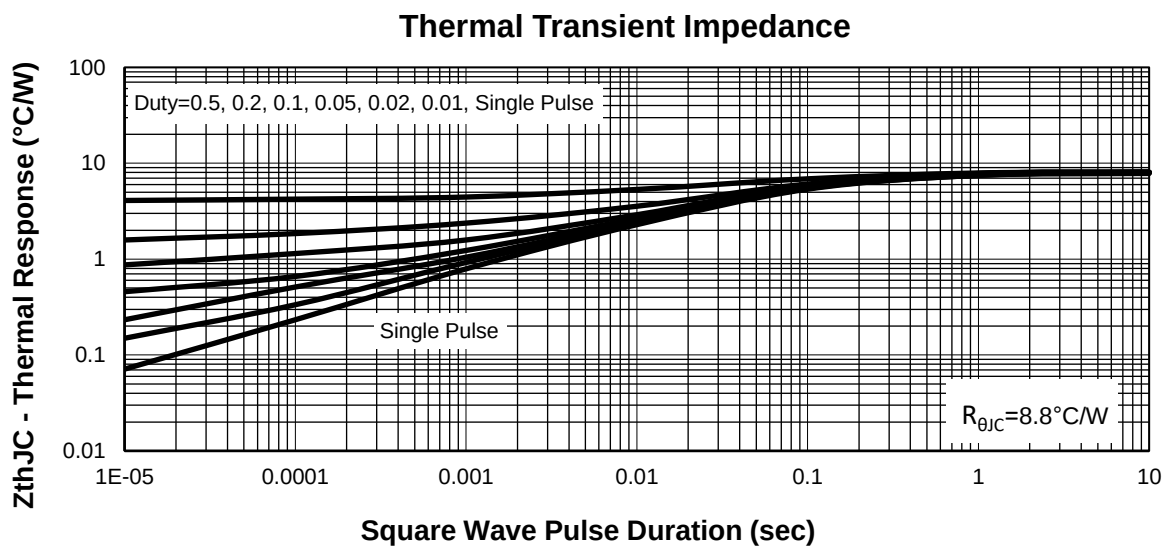
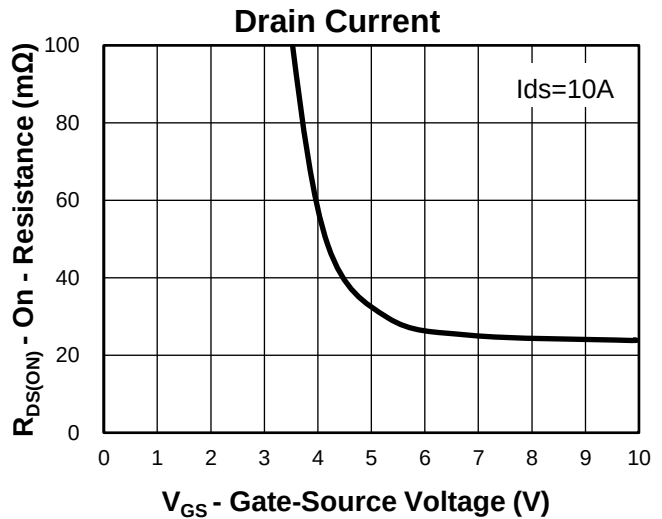
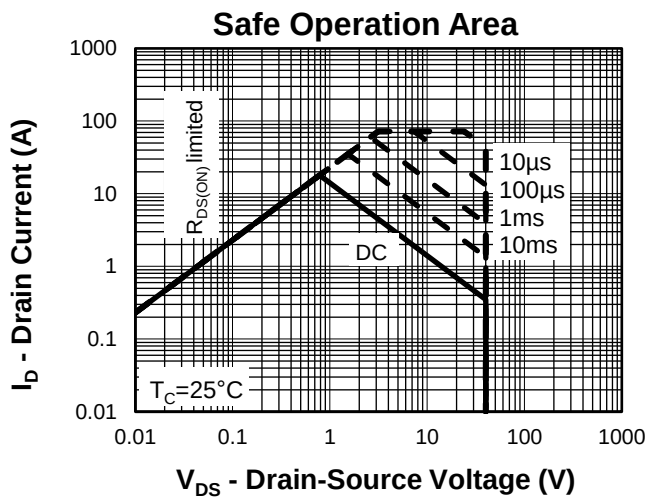
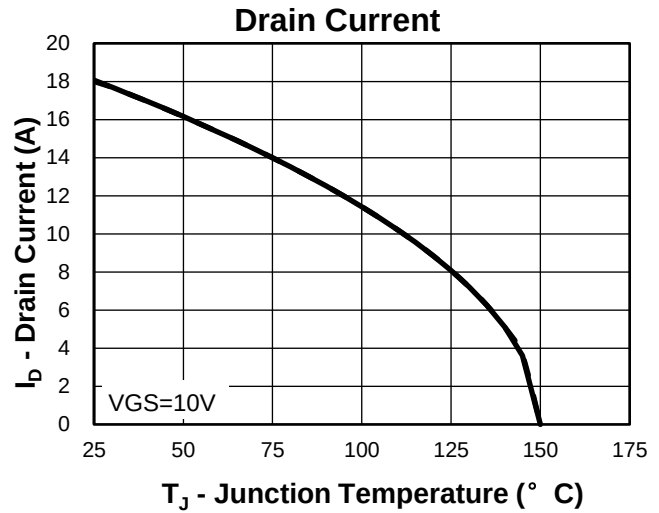
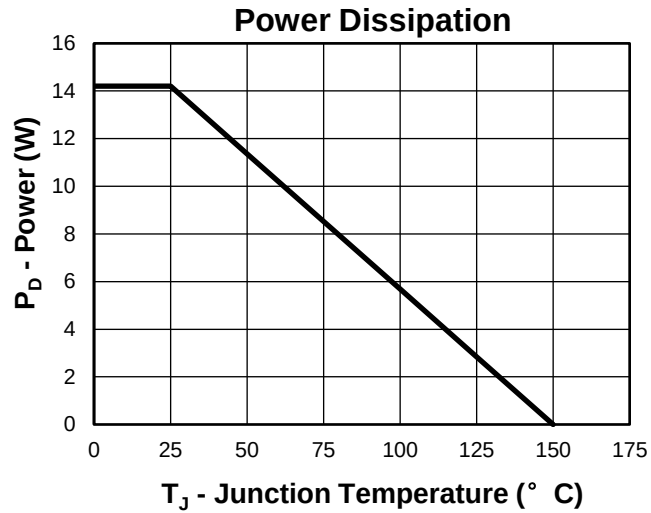
Ordering and Marking Information

Device	Package	Packaging	Quantity	Reel Size	Tape width
KS4438MA	PDFN3333 DP1	Tape&Reel	5000	13"	12mm

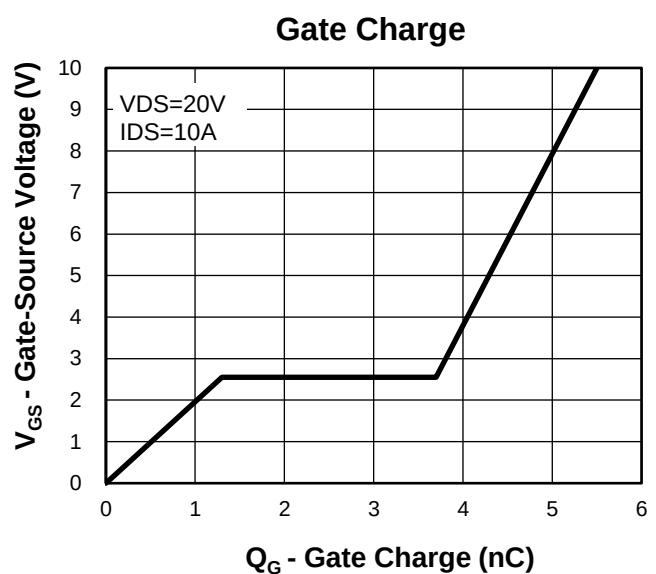
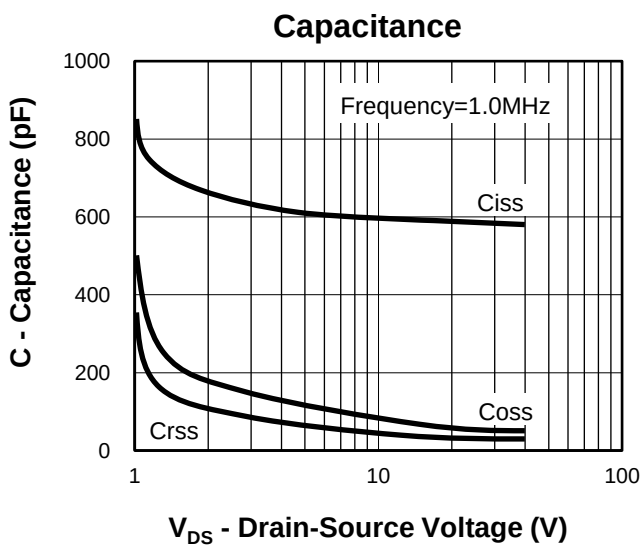
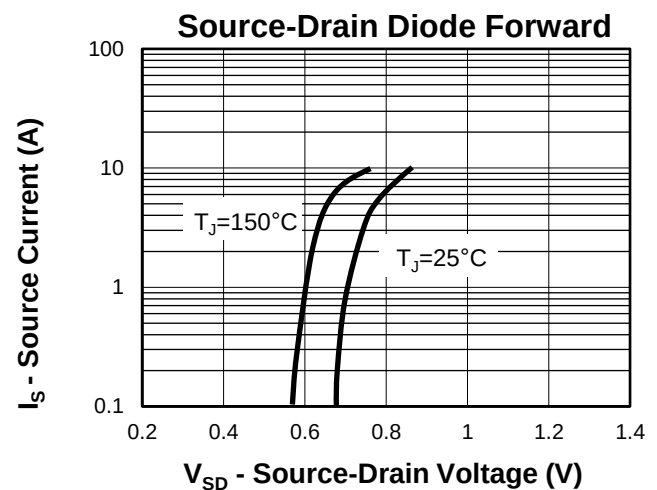
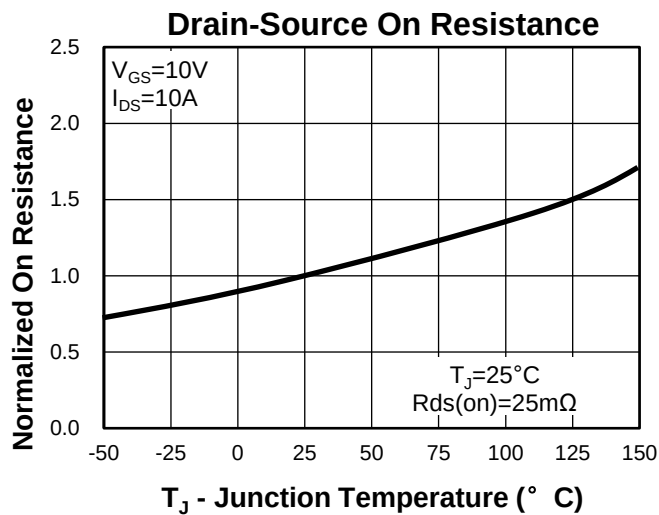
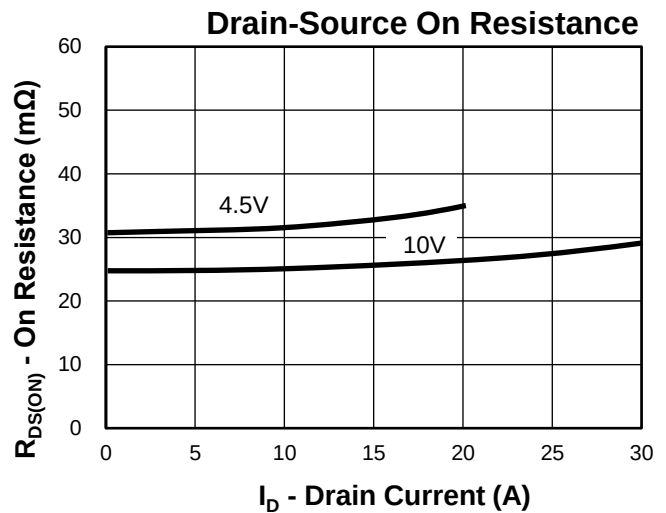
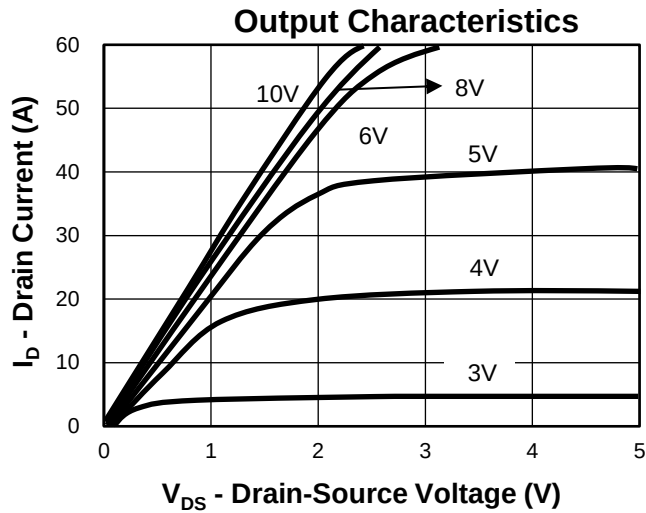


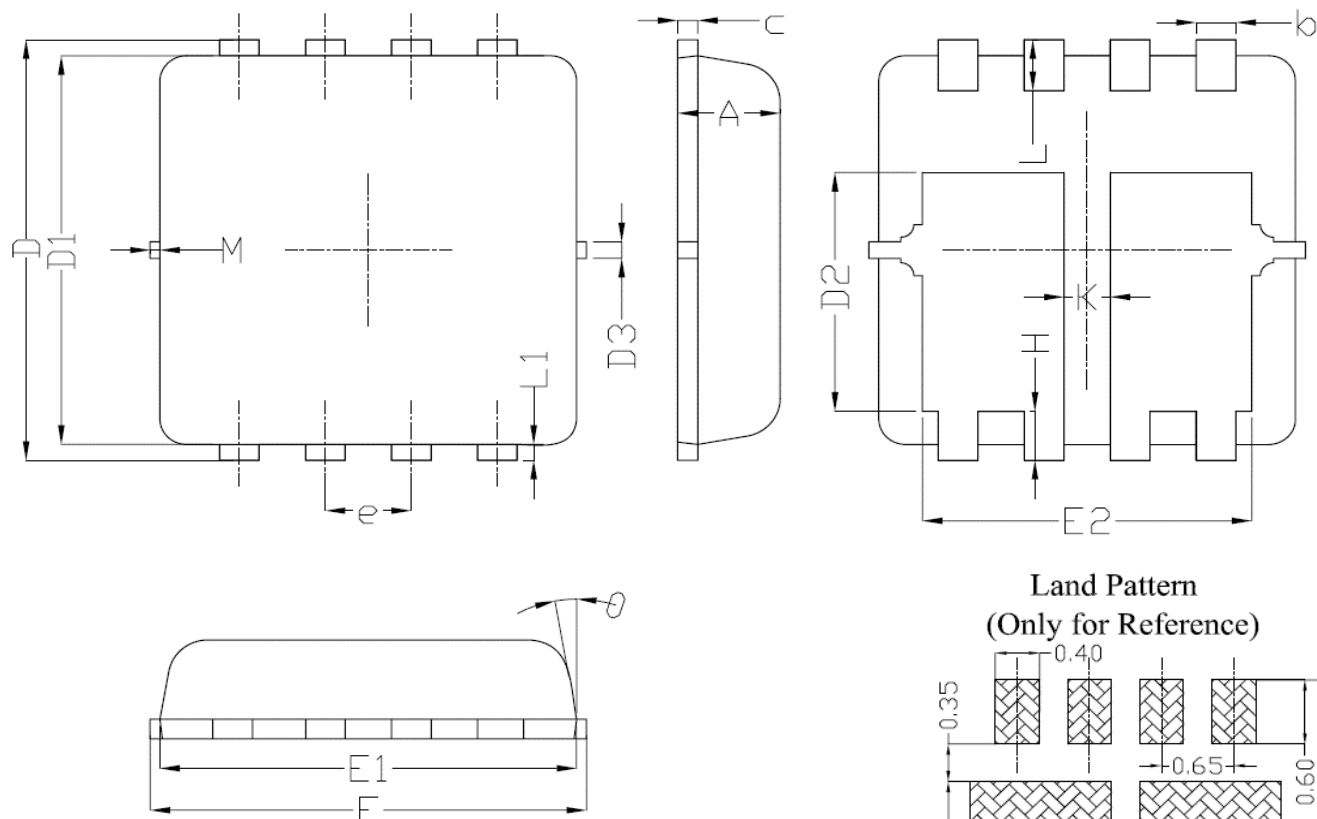
1st Line: Kwansemi Code(KS)
 2nd Line: Part Number(4438)
 3rd Line: Lot Number(YWWXXX)

Typical Characteristics



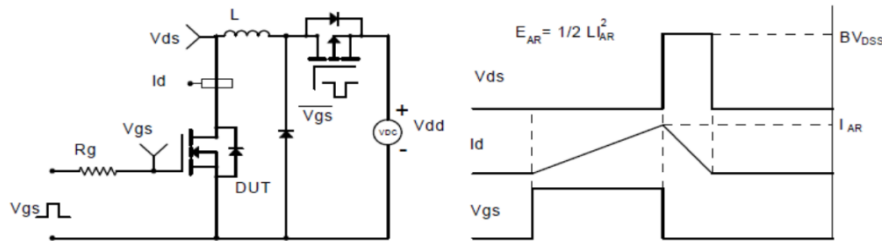
Typical Characteristics



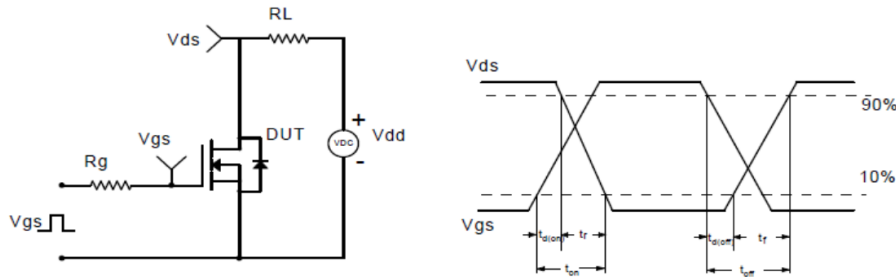
Package Information
PDFN3333 DP1


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

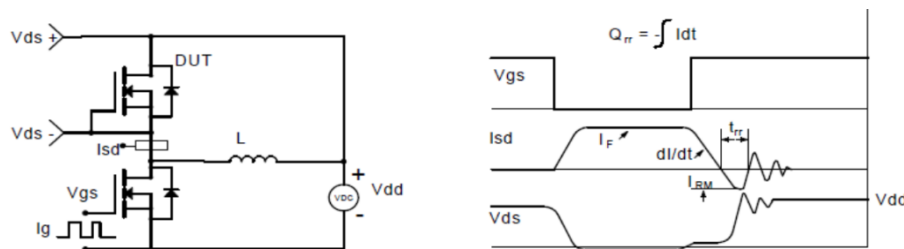
Avalanche Test Circuit and Waveforms



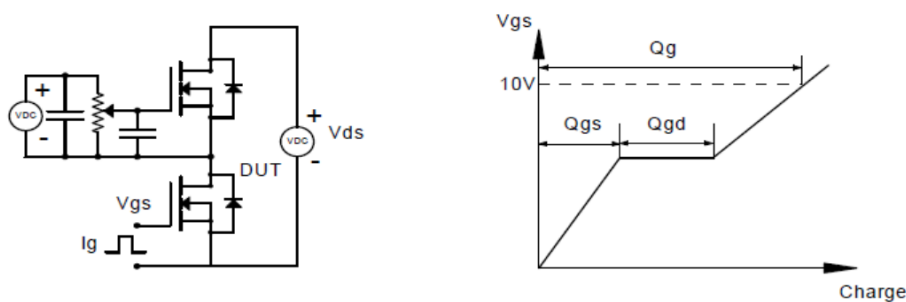
Switching Time Test Circuit and Waveforms



Diode Recovery Test Circuit and Waveforms



Gate Charge Test Circuit and Waveform



Customer Service

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