ASDM40DN20E

40V Dual N-Channel Power MOSFET

General Description

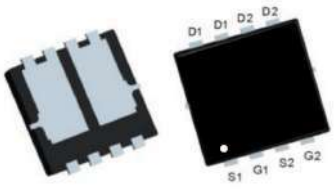
- Trench Power LV MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$

Applications

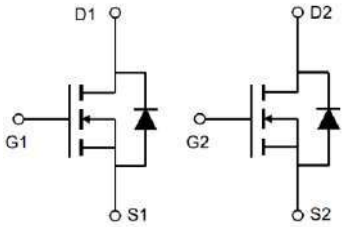
- High current load applications
- Load switching
- Hard switched and high frequency circuits
- Uninterruptible power supply

Product Summary

V_{DS}	40	V
$R_{DS(on),Typ}$@ V_{GS}=10 V	15	mΩ
I_D	20	A



PDFN 3.3x3.3-8



NMOS

Absolute Maximum Ratings (T_A=25℃unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-source Voltage		V_{DS}	40	V
Gate-source Voltage		V_{GS}	±20	V
Drain Current	T_C=25℃	I_D	20	A
	T_C=100℃		16	
Pulsed Drain Current [A]		I_{DM}	80	A
Single Pulse Avalanche Energy [B]		E_{AS}	70	mJ
Total Power Dissipation	T_C=25℃	P_D	21	W
Thermal Resistance Junction-to-Ambient		$R_{\theta JA}$	35	℃/ W
Thermal Resistance Junction-to-Case		$R_{\theta JC}$	3.0	℃/ W
Junction and Storage Temperature Range		T_J ,T_{STG}	-55～+150	℃

Electrical Characteristics (T_J=25℃ unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}= 0V, I_D=250μA	40			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=40V,V_{GS}=0V			1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}= ±20V, V_{DS}=0V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}= V_{GS}, I_D=250μA	1.0	1.5	2.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}= 10V, I_D=20A		15	19	mΩ
		V_{GS}= 4.5V, I_D=10A		18	25	
Diode Forward Voltage	V_{SD}	I_S=20A,V_{GS}=0V		0.7	1.2	V
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{DS}=20V,V_{GS}=0V,f=1MHZ		800		pF
Output Capacitance	C_{oss}			112		
Reverse Transfer Capacitance	C_{rss}			94		
Switching Parameters						
Total Gate Charge	Q_g	V_{GS}=10V,V_{DS}=20V,I_D=20A		23.6		nC
Gate-Source Charge	Q_{gs}			4.4		
Gate-Drain Charge	Q_{gd}			6.3		
Reverse Recovery Charge	Q_{rr}	I_F=20A, di/dt=100A/us		0.4		
Reverse Recovery Time	t_{rr}			7		ns
Turn-on Delay Time	$t_{D(on)}$	V_{GS}=10V,V_{DD}=20V, I_D=2A,R_{GEN}=3Ω		10		
Turn-on Rise Time	t_r			56		
Turn-off Delay Time	$t_{D(off)}$			27		
Turn-off fall Time	t_f			72		

A. Pulse Test: Pulse Width≤300us,Duty cycle ≤2%.

B. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance, where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design, while $R_{\theta JA}$ is determined by the board design. The maximum rating presented here is based on mounting on a 1 in 2 pad of 2oz copper.

Typical Performance Characteristics

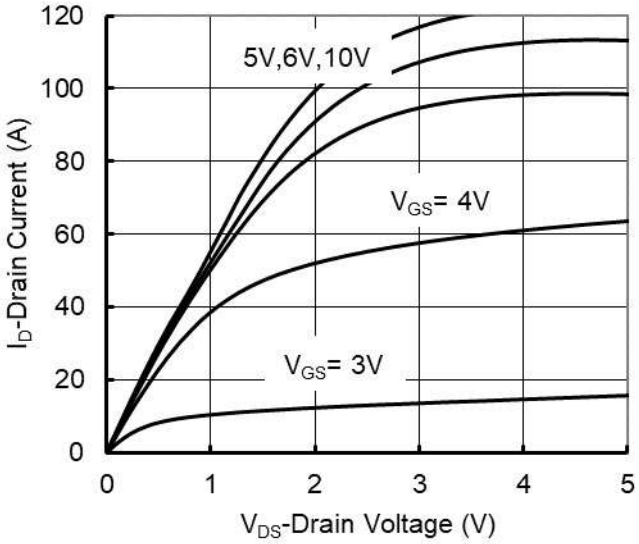


Figure 1. Output Characteristics

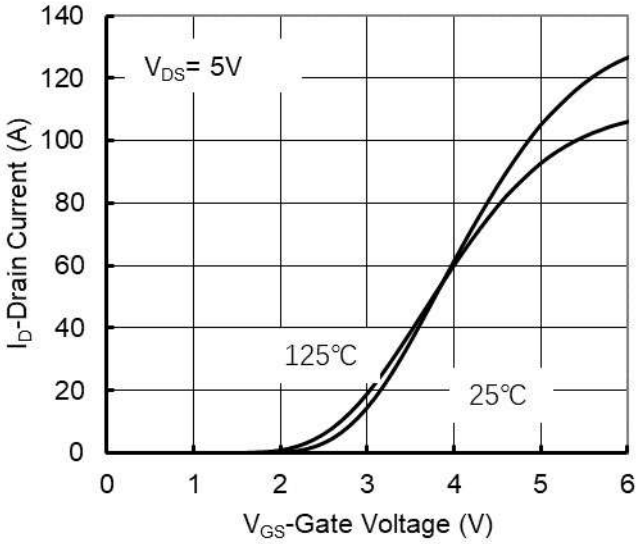


Figure 2. Transfer Characteristics

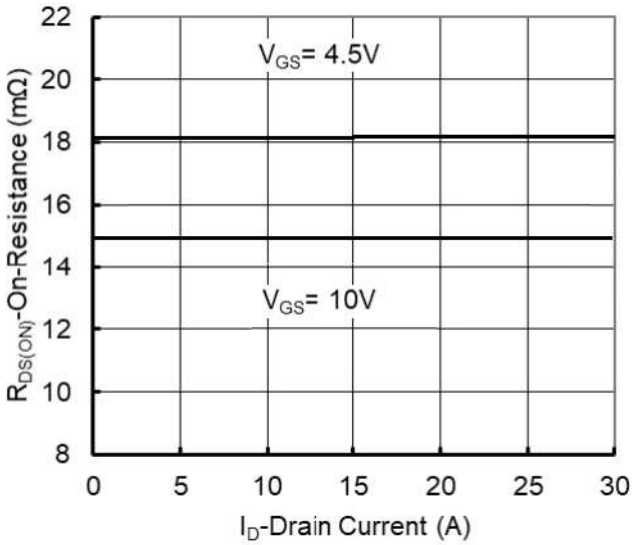


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

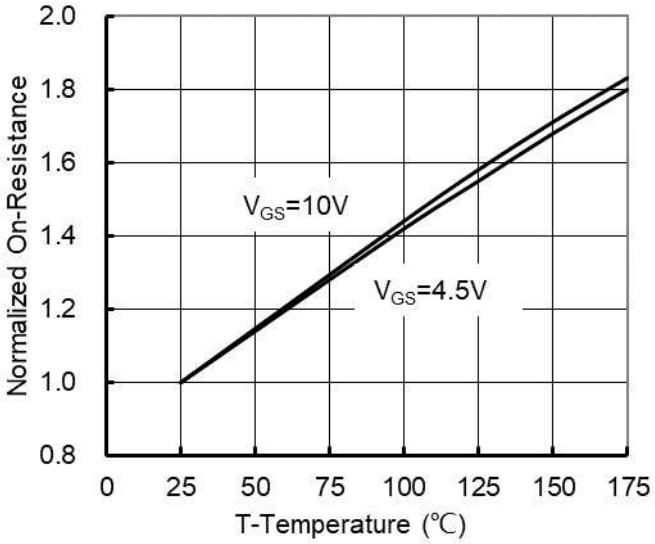


Figure 4. On-Resistance vs. Junction Temperature

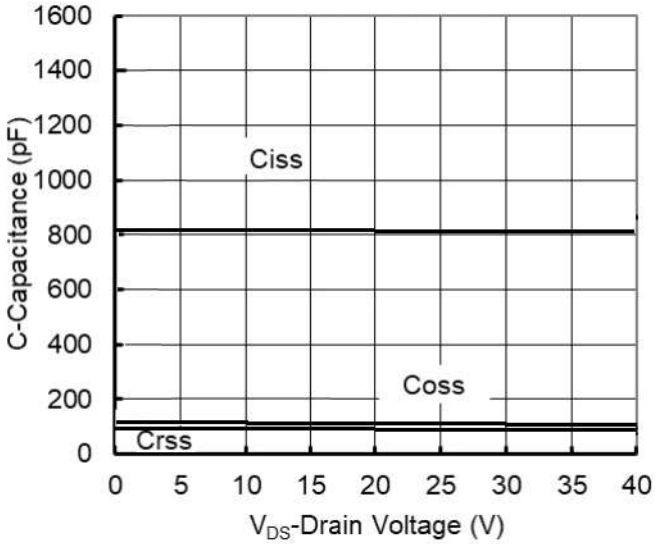


Figure 5. Capacitance Characteristics

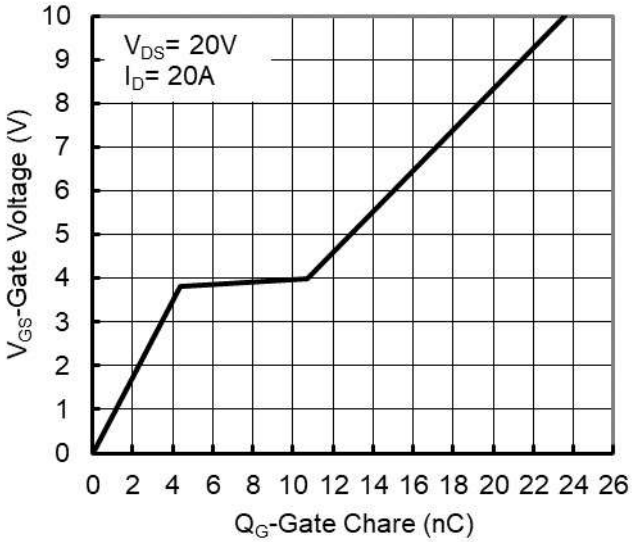


Figure 6. Gate Charge

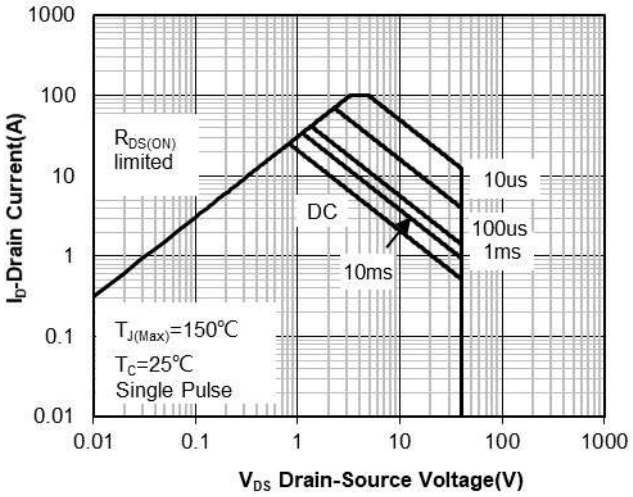


Figure 7. Safe Operation Area

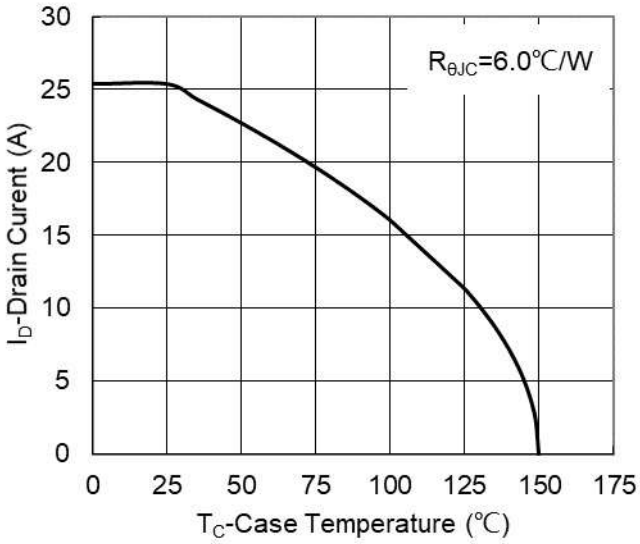


Figure 8. Maximum Continuous Drain Current vs Case Temperature

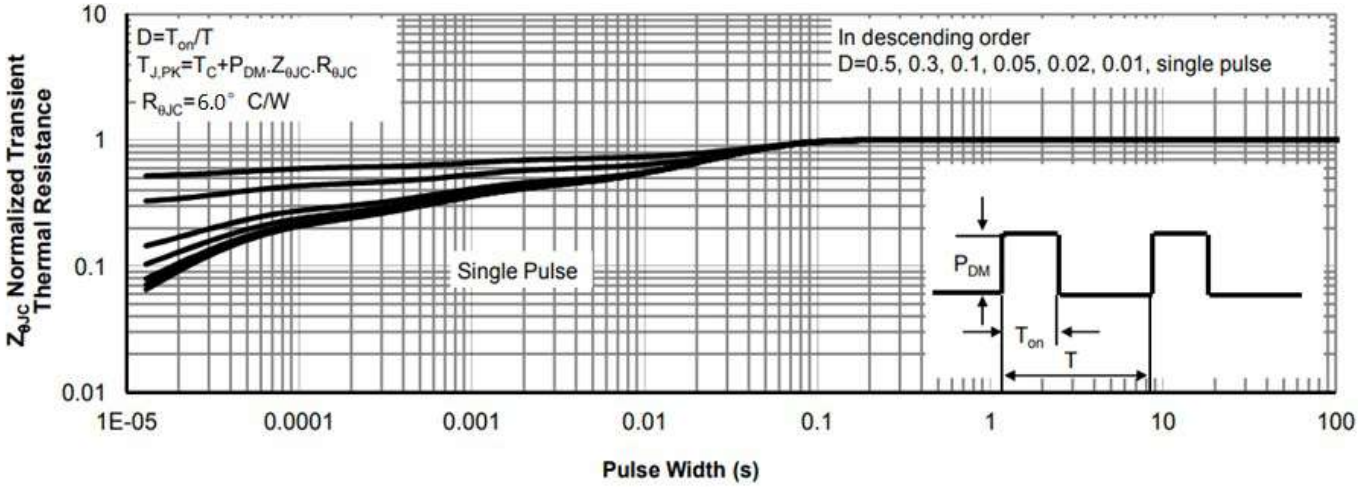
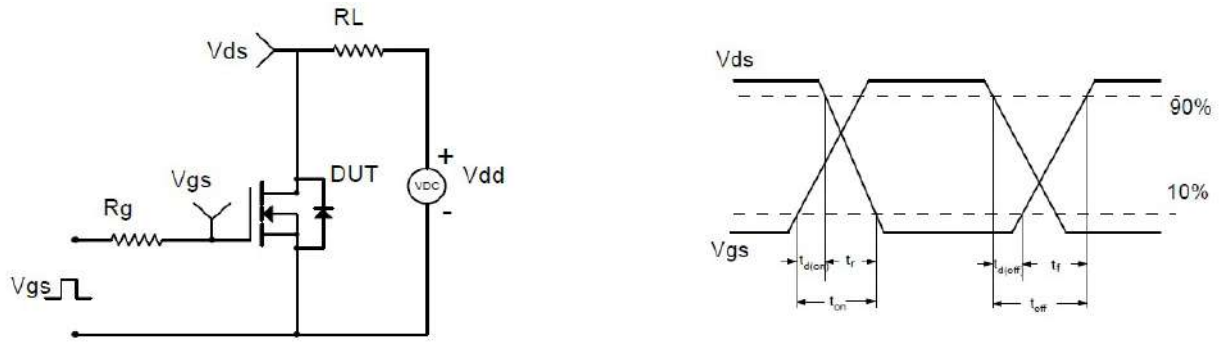
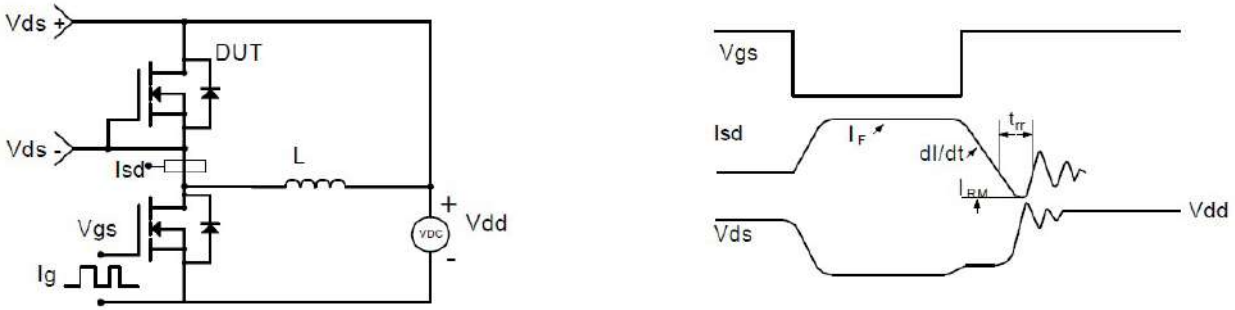


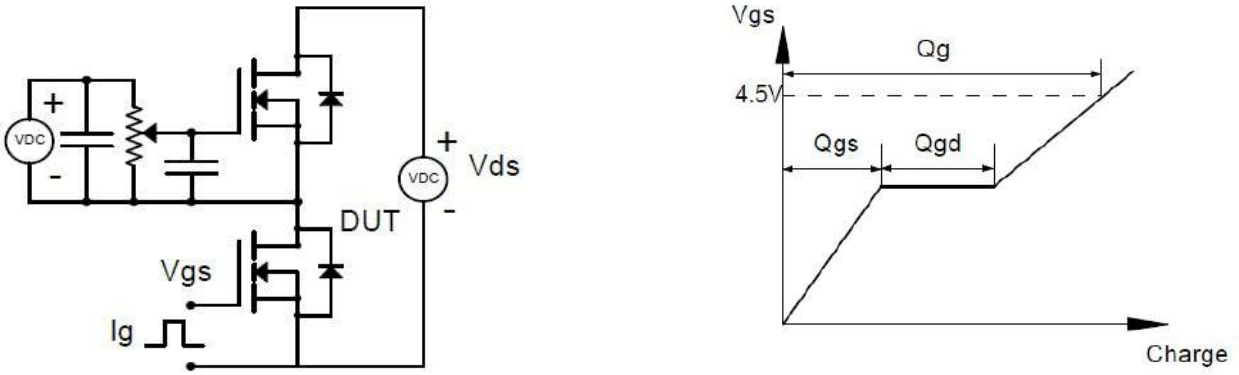
Figure 9. Normalized Maximum Transient Thermal Impedance



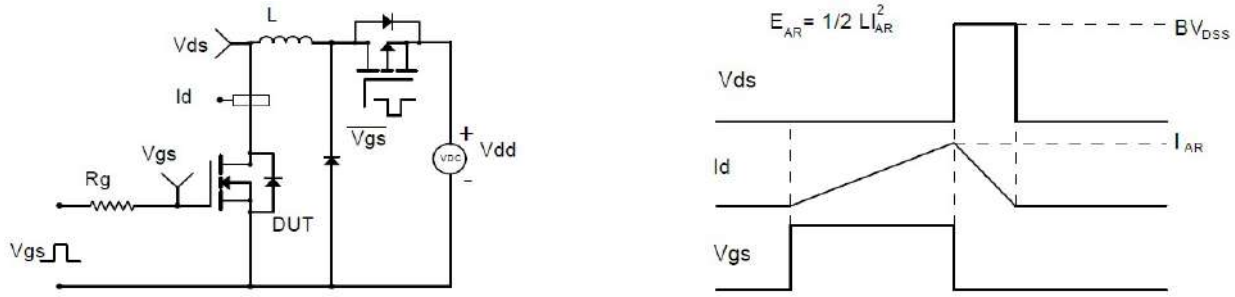
Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



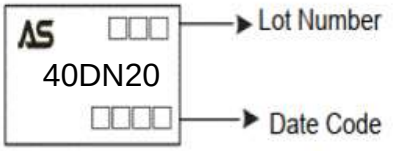
Gate Charge Test Circuit & Waveform



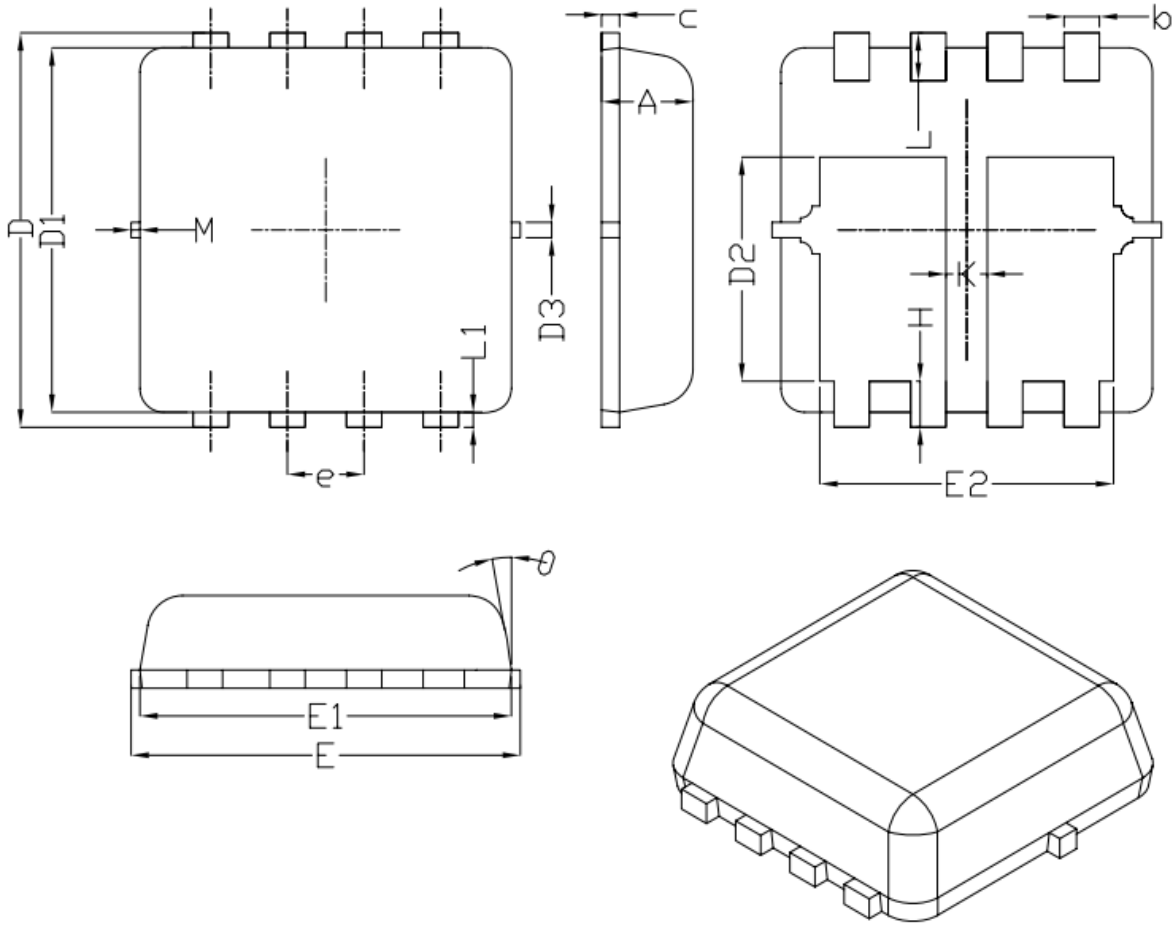
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

Ordering and Marking Information

Ordering Device No.	Marking	Package	Packing	Quantity
ASDM40DN20E-R	40DN20	PDFN3.3*3.3-8	Tape&Reel	5000/Reel

PACKAGE	MARKING
PDFN3.3*3.3-8	

Dual PDFN3.3*3.3-8 Package Outline Data



Symbol	Dimensions (unit: mm)		
	Min	Typ	Max
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.78	1.88	1.98
D3	--	0.13	--
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65 BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	--	0.13	--
K	0.30	--	--
θ	--	10°	12°
M	*	*	0.15
* Not Specified			

Notes:

1. Refer to JEDEC MO-240 variation CA.
2. Dimensions "D1" and "E1" do NOT include mold flash protrusions or gate burrs.
3. Dimensions "D1" and "E1" include interterminal flash or protrusion. Interterminal flash or protrusion shall not exceed 0.25mm per side.

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