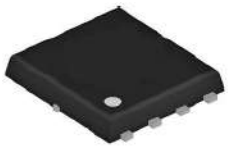
200V N-Ch Power MOSFET

Feature

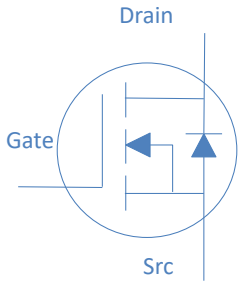
◇ High Speed Power Smooth Switching, Logic Level
◇ Enhanced Body diode dv/dt capability
◇ Enhanced Avalanche Ruggedness
◇ 100% UIS Tested, 100% Rg Tested
◇ Lead Free

DFN3.3*3.3

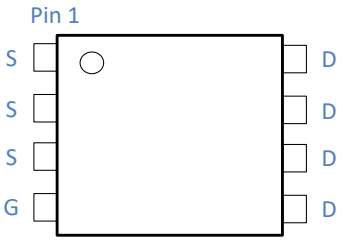


Application

◇ Synchronous Rectification in SMPS
◇ Hard Switching and High Speed Circuit
◇ Power Tools
◇ UPS
◇ Motor Control



Part Number	Package	Marking
KSPRGM1K2N20ML	DFN 3.3*3.3	M1K2N20L



V_{DS}		200	V
$R_{DS(on),typ}$	V_{GS}=10V	104	mΩ
$R_{DS(on),typ}$	V_{GS}=4.5V	114	mΩ
$I_{D\ (Sillicon\ Limited)}$		13	A
$I_{D\ (Package\ Limited)}$		10	A

Absolute Maximum Ratings at T_j=25℃ (unless otherwise specified)

Parameter	Symbol	Conditions	Value	Unit
Continuous Drain Current (Silicon Limited)	I_D	T_C=25℃	13	A
		T_C=100℃	9.2	
Continuous Drain Current (Package Limited)		T_C=25℃	10	
Drain to Source Voltage	V_{DS}	-	200	V
Gate to Source Voltage	V_{GS}	-	±20	V
Pulsed Drain Current	I_{DM}	-	25	A
Avalanche Energy, Single Pulse	E_{AS}	L=0.4mH, T_C=25℃	5	mJ
Power Dissipation	P_D	T_C=25℃	40	W
Operating and Storage Temperature	T_J, T_{stg}	-	-55 to150	℃

Absolute Maximum Ratings

Parameter	Symbol	Max	Unit
Thermal Resistance Junction-Case	$R_{\Theta JC}$	3.1	℃/W
Thermal Resistance Junction-Ambient	$R_{\Theta JA}$	65	℃/W

Electrical Characteristics at T_j=25℃ (unless otherwise specified)

Static Characteristics

Parameter	Symbol	Conditions	Value			Unit
			min	typ	max	
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250μA	200	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=250μA	1	2	3	
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS}=0V, V_{DS}=200V, T_j=25℃	-		1	μA
		V_{GS}=0V, V_{DS}=200V, T_j=100℃	-	-	100	
Gate to Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Drain to Source on Resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=5A	-	104	120	mΩ
	$R_{DS(on)}$	V_{GS}=4.5V, I_D=3A	-	114	140	mΩ
Transconductance	g_{fs}	V_{DS}=5V, I_D=20A	-	15	-	S
Gate Resistance	R_G	V_{GS}=0V, V_{DS} Open, f=1MHz	-	5.5	-	Ω

Dynamic Characteristics

Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=100V, f=1MHz	-	491	-	pF
Output Capacitance	C_{oss}		-	22	-	
Reverse Transfer Capacitance	C_{rss}		-	5.5	-	
Total Gate Charge	Q_g (10V)	V_{DD}=100V, I_D=5A, V_{GS}=10V	-	9.8	-	nC
Total Gate Charge	Q_g (4.5V)		-	5.8	-	
Gate to Source Charge	Q_{gs}		-	1.6	-	
Gate to Drain (Miller) Charge	Q_{gd}		-	3.2	-	
Turn on Delay Time	$t_{d(on)}$	V_{DD}=100V, I_D=5A, V_{GS}=10V, R_G=10Ω,	-	9	-	ns
Rise time	t_r		-	5	-	
Turn off Delay Time	$t_{d(off)}$		-	13	-	
Fall Time	t_f		-	4	-	

Reverse Diode Characteristics

Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_F=20A	-	0.9	1.2	V
Reverse Recovery Time	t_{rr}	V_R=100V, I_F=5A, dI_F/dt=100A/μs	-	60	-	ns
Reverse Recovery Charge	Q_{rr}		-	126	-	nC

Fig 1. Typical Output Characteristics

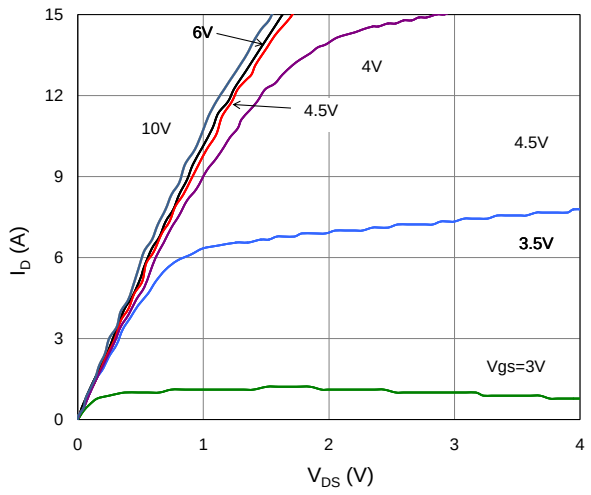


Figure 2. On-Resistance vs. Gate-Source Voltage

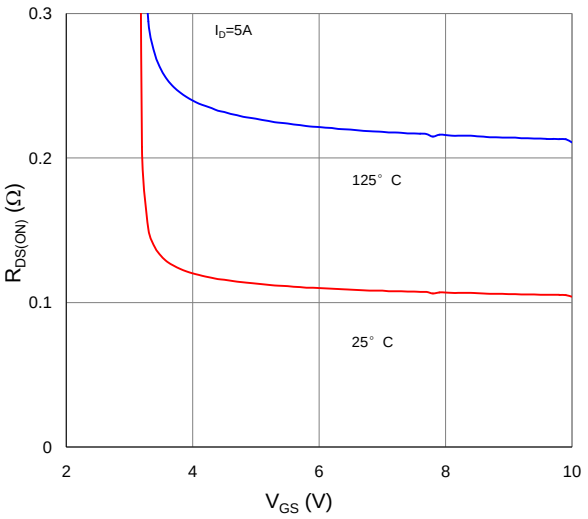


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

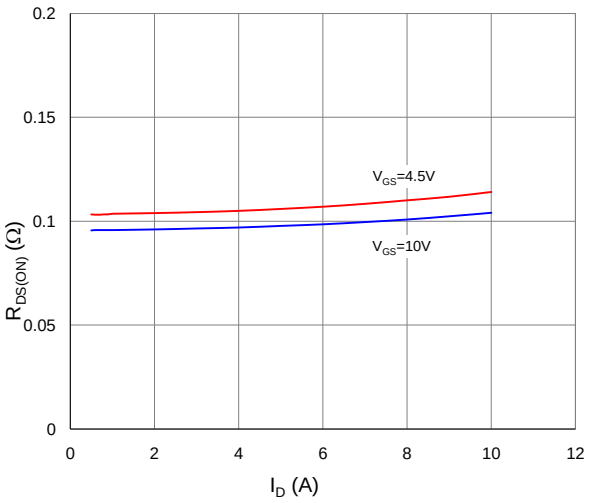


Figure 4. Normalized On-Resistance vs. Junction Temperature

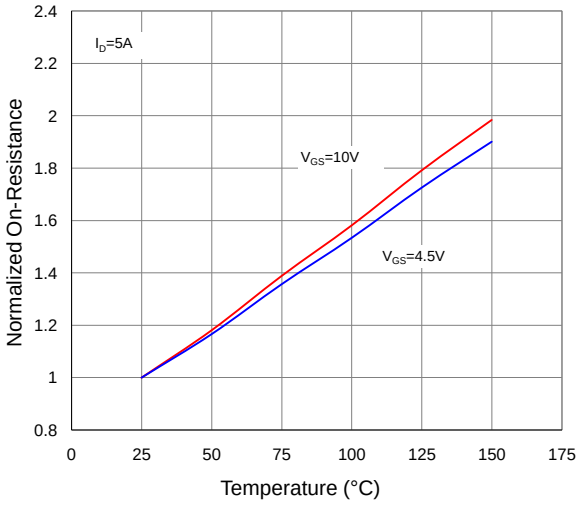


Figure 5. Typical Transfer Characteristics

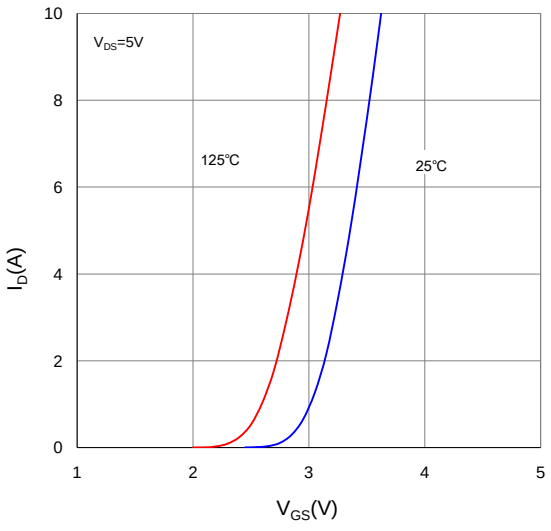


Figure 6. Typical Source-Drain Diode Forward Voltage

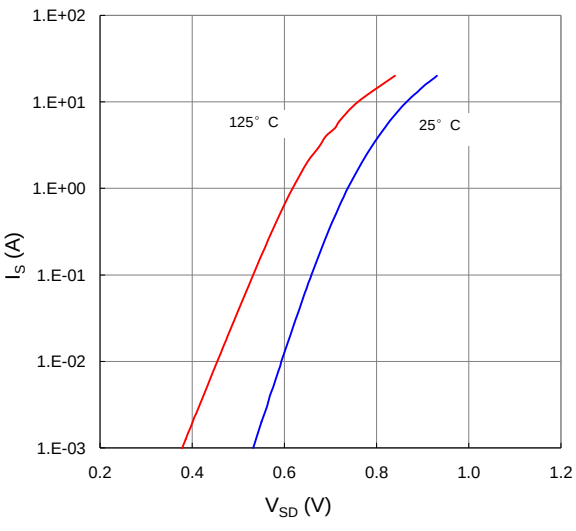


Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

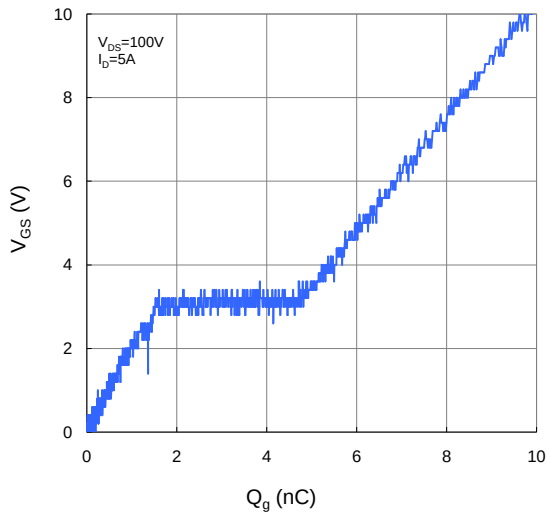


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

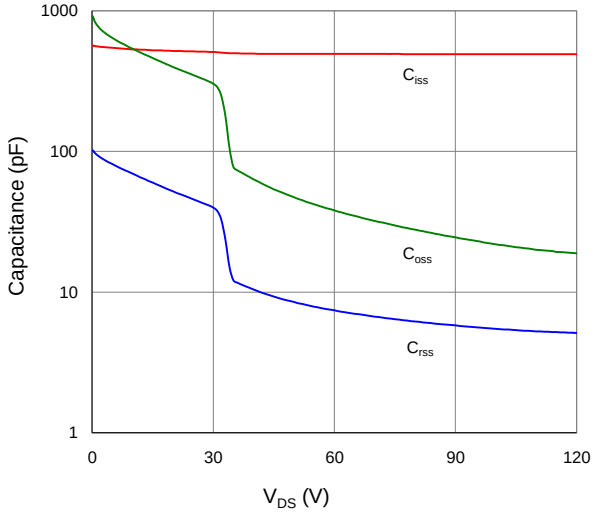


Figure 9. Maximum Safe Operating Area

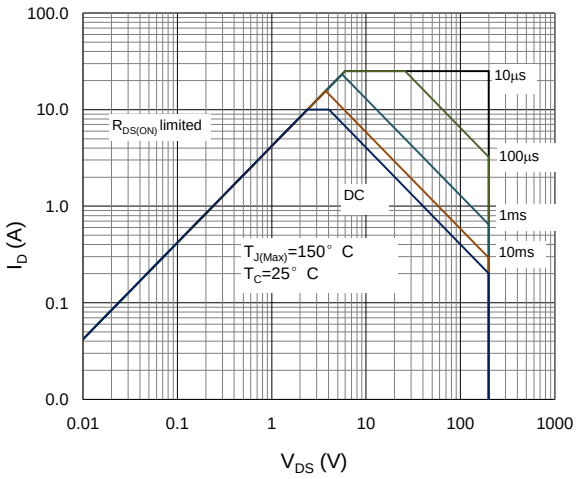


Figure 10. Maximun Drain Current vs. Case Temperature

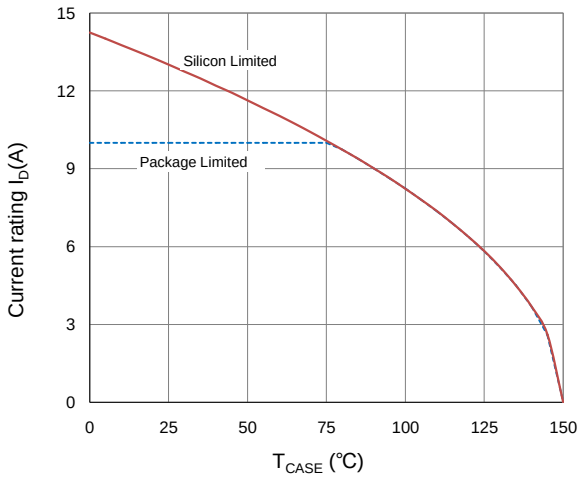
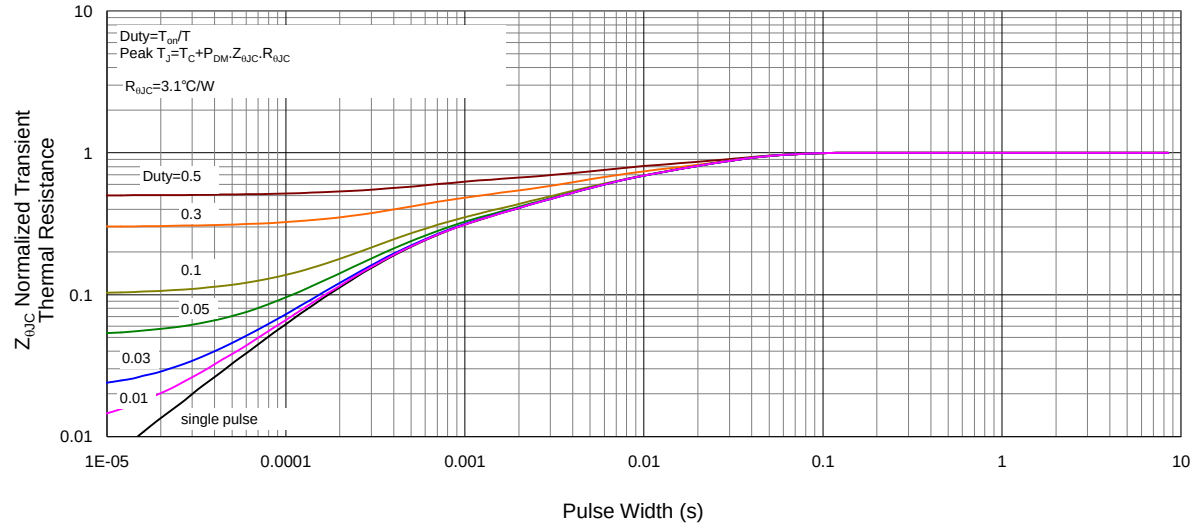
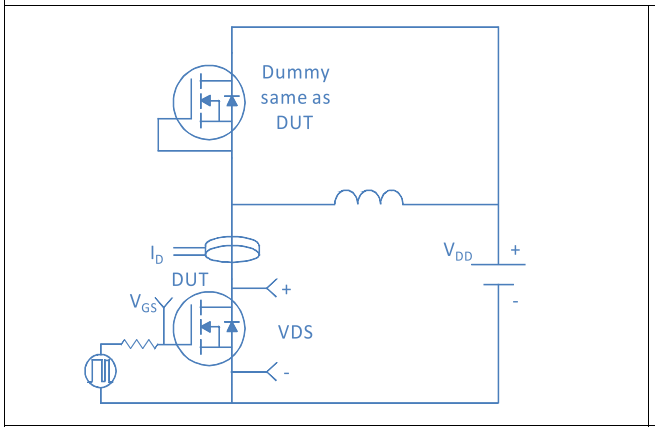
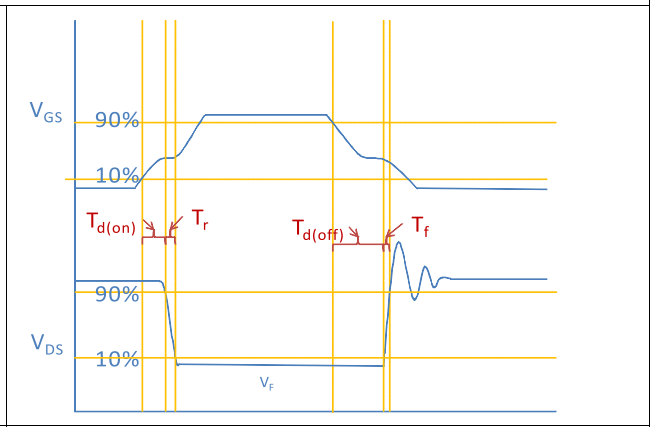


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Case

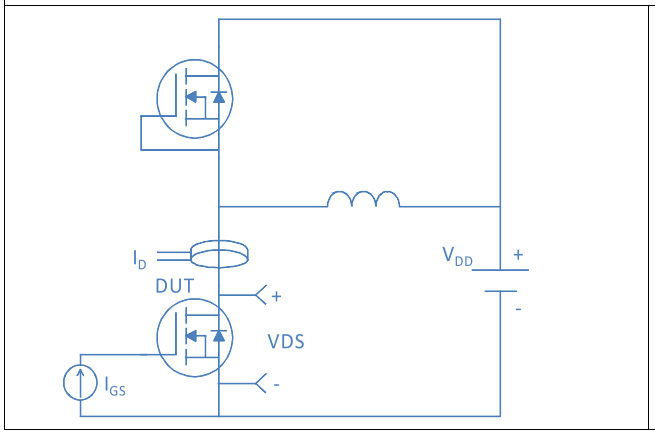


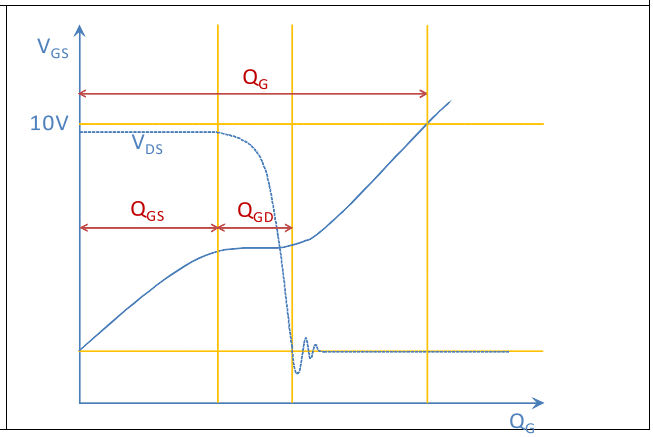
Inductive switching Test



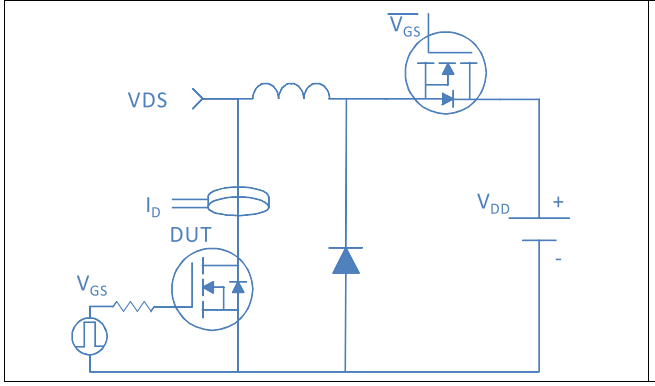


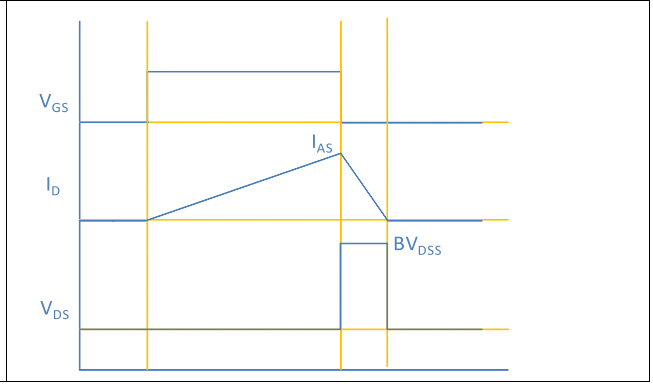
Gate Charge Test



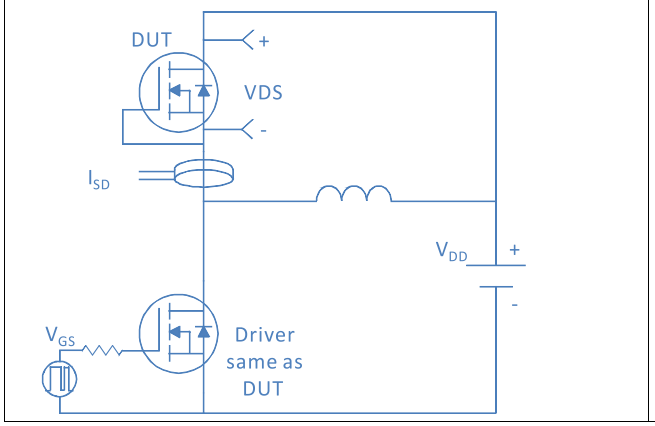


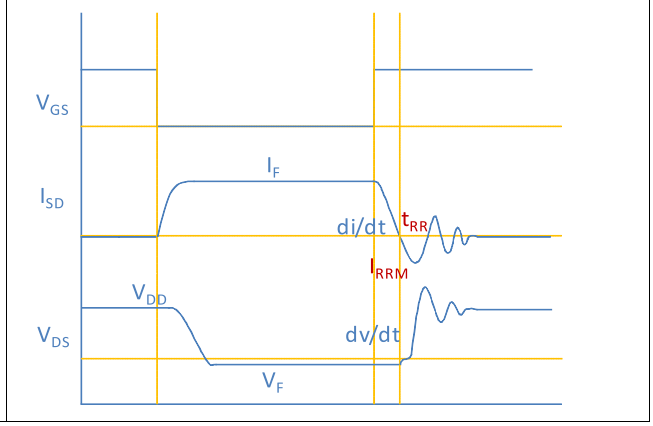
Uclamped Inductive Switching (UIS) Test



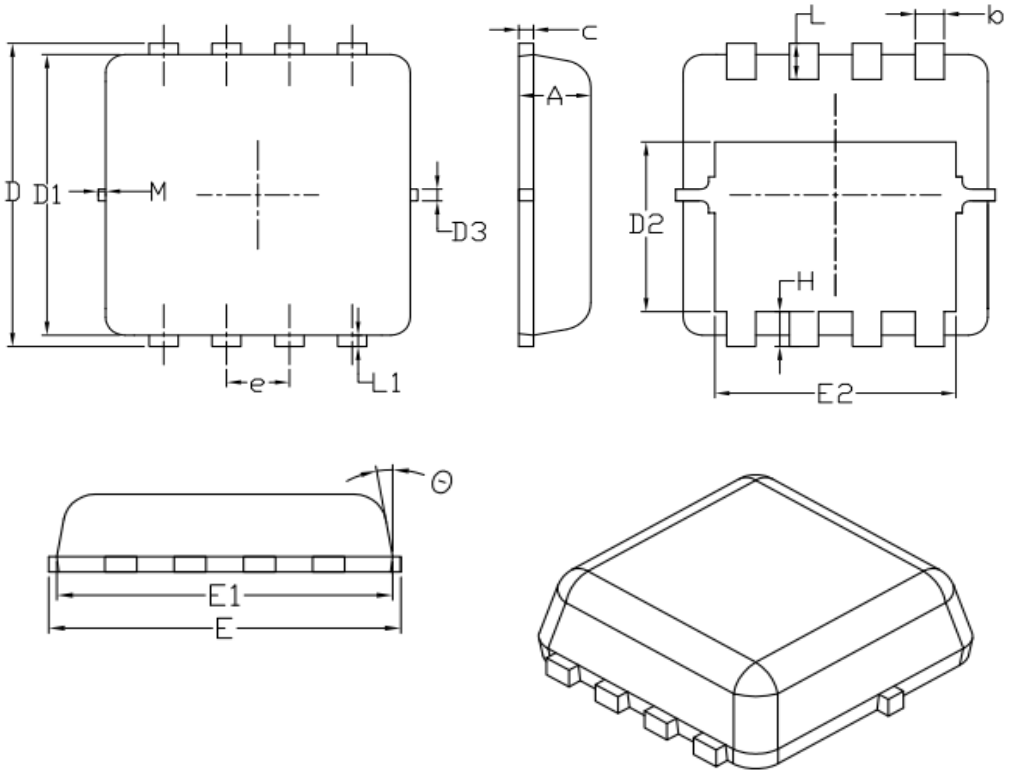


Diode Recovery Test





DFN3.3*3.3_P, 8 leads



SYMBOL	DIMENSIONAL REQMTS		
	MIN	NOM	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	3.00	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	---	0.13	---
θ	---	10°	12°
M	*	*	0.15
* Not specified			