

N-Channel 60V(D-S) MOSFET

Product summary		
V_{DS}	60	V
$R_{DS(ON)}$ (at $V_{GS}=4.5V$) Typ.	1.9	Ω
$R_{DS(ON)}$ (at $V_{GS}=2.5V$) Typ.	2.3	Ω
I_D ($T_A=25^\circ C$)	0.2	A

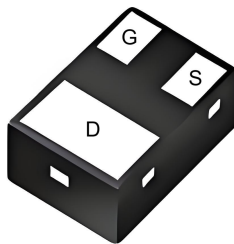
Features

- Advanced Trench Technology
- ESD protection :1.5 kV
- Small package DFN1006-3L

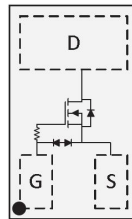
Applications

- Battery Operated System
- Solid-State Relays

Pin Configuration



DFN1006-3L



Packing Information

Device	Package	Reel Size	Quantity(Min. Package)
ECAD138K	DFN1006-3L	7"	10000pcs

Absolute Maximum Ratings (at $T_A=25^\circ C$ Unless Otherwise Noted)

Symbol	Parameter	Rating	Units	
V_{DS}	Drain-Source Voltage	60	V	
V_{GS}	Gate-Source Voltage	± 20	V	
I_D	Continuous Drain Current ^A C	$T_A=25^\circ C$	0.20	A
		$T_A=70^\circ C$	0.16	A
I_{DM}	Pulse Drain Current Tested ^B	0.8	A	
P_D	Power Dissipation ^A C	$T_A=25^\circ C$	0.3	W
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to +150	$^\circ C$	

Thermal Characteristics

Symbol	Parameter	Typical	Units
$R_{\theta JA}$	Thermal Resistance-Junction to ambient ^A	416	$^\circ C/W$

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

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
Static Parameters						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	60	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=60V, V_{GS}=0V$	--	--	1	μA
I_{GSS}	Gate-Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$	--	--	± 10	μA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	0.5	0.9	1.3	V
$R_{DS(on)}$	Drain-Source On-State Resistance ^D	$V_{GS}=4.5V, I_D=0.3A$	--	1.9	2.5	Ω
		$V_{GS}=2.5V, I_D=0.2A$	--	2.3	4.5	Ω
V_{SD}	Forward Voltage	$I_{SD}=0.3A, V_{GS}=0V$	--	--	1.2	V
Dynamic Parameters ^E						
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=25V$ $f=1\text{MHz}$	--	22	--	pF
C_{oss}	Output Capacitance		--	3	--	pF
C_{riss}	Reverse Transfer Capacitance		--	2	--	pF
Q_g	Total Gate Charge	$V_{DS}=10V, I_D=0.3A$ $V_{GS}=4.5V$	--	1.8	--	nC
Q_{gs}	Gate-Source Charge		--	0.4	--	nC
Q_{gd}	Gate-Drain Charge		--	0.7	--	nC
$t_{D(on)}$	Turn-on Delay Time	$V_{DD}=10V$ $I_D=0.2A,$ $V_{GS}=10V, R_{GEN}=10$ Ω	--	2	--	ns
t_r	Turn-on Rise Time		--	16	--	ns
$t_{D(off)}$	Turn-off Delay Time		--	7	--	ns
t_f	Turn-off Fall Time		--	19	--	ns

A. The data tested by surface mounted on a 1 inch x 1 inch FR-4 board with 20Z copper.

B. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.

C. Maximum junction temperature $T_J=150^\circ\text{C}$.

D. Pulse Test: Pulse Width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

E. Guaranteed by design, not subject to production testing.

Test Circuit

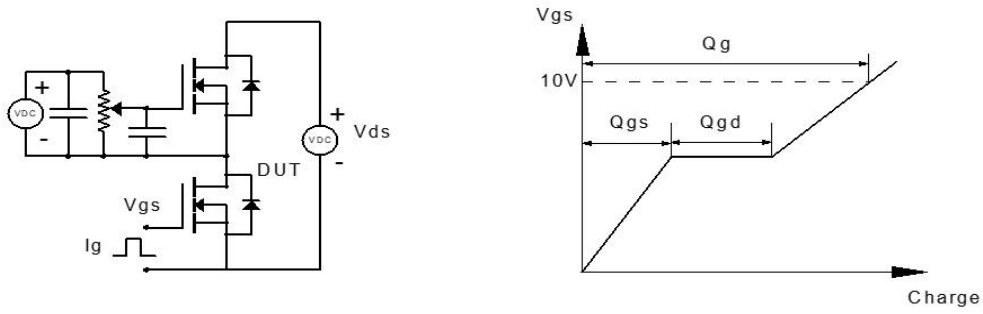


Figure 1: Gate Charge Test Circuit & Waveform

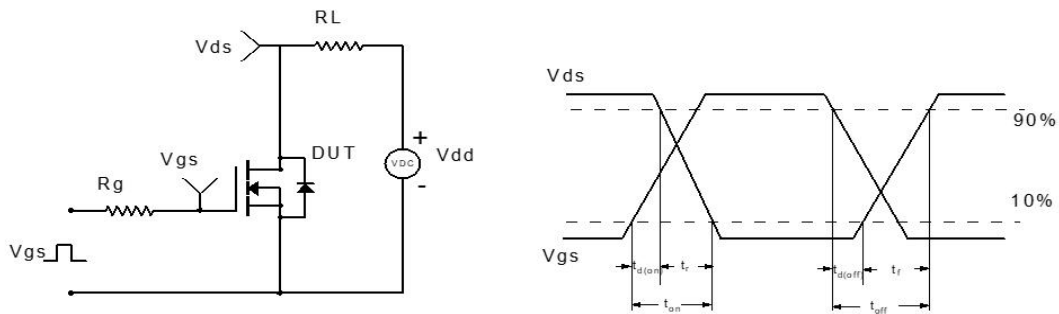


Figure 2: Resistive Switching Test Circuit & Waveform

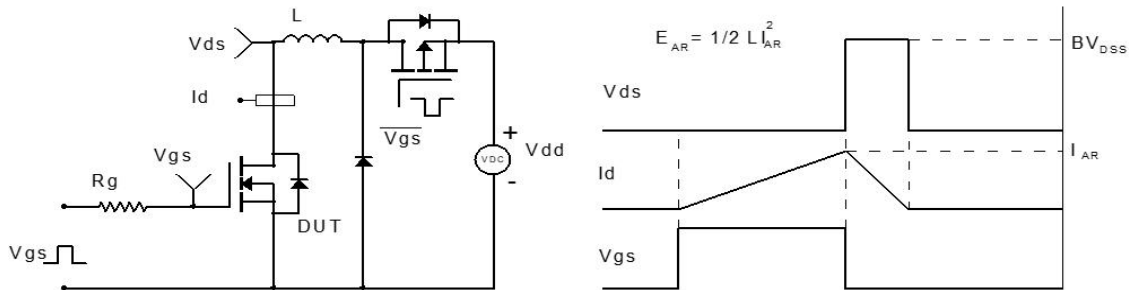


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

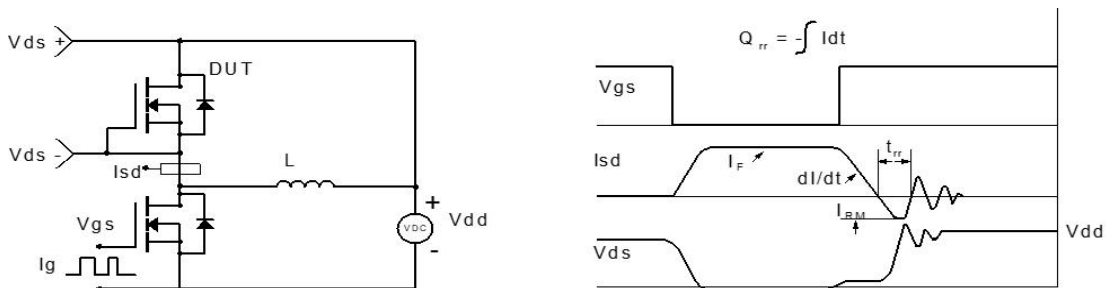
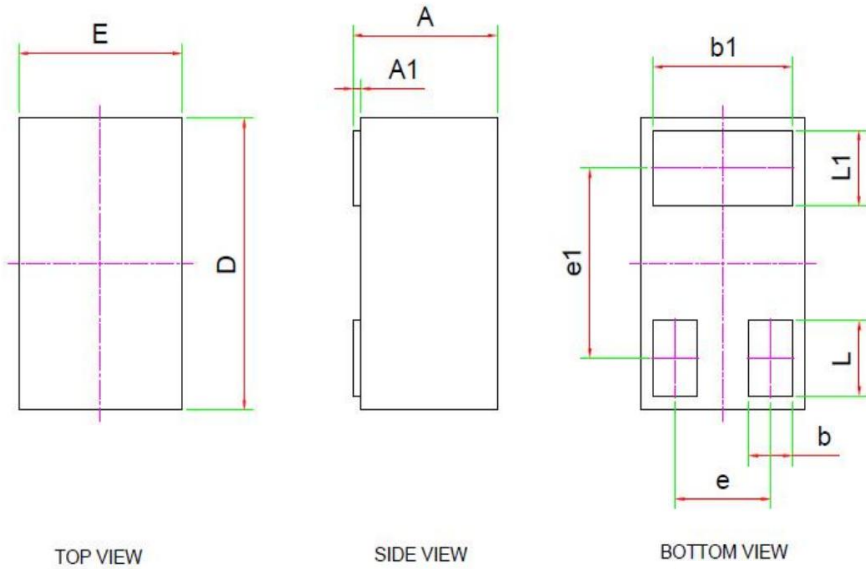


Figure 4: Diode Recovery Test Circuit & Waveform

DFN1006-3L Package Information



SYMBOL	MIN	NOM	MAX
A	0.45	0.50	0.55
A1	0.00	NA	0.03
L	0.22	0.26	0.30
b	0.12	0.16	0.20
D	0.95	1.00	1.05
E	0.55	0.60	0.65
L1	0.22	0.26	0.30
b1	0.47	0.51	0.55
e	0.35 BSC		
e1	0.65 BSC		