

**20V N-Channel MOSFETs**

**SDM380N02AK**

**Description**

**Features**

- $V_{DS}=20V, I_D=0.75A$
- $R_{DS(ON)} < 0.38\Omega @ V_{GS} = 4.5V$   
 $R_{DS(ON)} < 0.45\Omega @ V_{GS} = 2.5V$
- N-Channel Switch with Low  $R_{DS(on)}$
- Operated at Low Logic Level Gate Drive
- Surface Mount Package
- ESD Protected

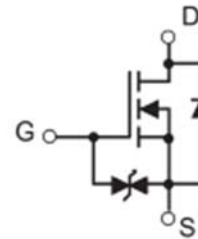
**Application**

- Battery Protection
- Load Switch
- Power Management

**Package**



DFN1006-3L



**Absolute Maximum Ratings** ( $T_C=25^\circ C$  unless otherwise specified)

Symbol	Parameter		Max.	Units
$V_{DSS}$	Drain-Source Voltage		20	V
$V_{GSS}$	Gate-Source Voltage		$\pm 10$	V
$I_D$	Continuous Drain Current	$T_C = 25^\circ C$	0.75	A
		$T_C = 100^\circ C$	0.5	
$I_{DM}$	Pulsed Drain Current <sup>note1</sup>		3	A
$P_D$	Power Dissipation	$T_A = 25^\circ C$	0.15	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient		833	$^\circ C/W$
$T_J, T_{STG}$	Operating and Storage Temperature Range		-55 to +150	$^\circ C$

**Electrical Characteristics** ( $T_C=25^\circ\text{C}$  unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristic</b>						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	20	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=16V, V_{GS}=0V,$	-	-	1	$\mu A$
$I_{GSS}$	Gate to Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 8V$	-	-	$\pm 10$	$\mu A$
<b>On Characteristics</b>						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	0.3	0.65	1	V
$R_{DS(on)}$	Static Drain-Source on-Resistance <small>note2</small>	$V_{GS}=4.5V, I_D=0.5A$	-	0.25	0.38	$\Omega$
		$V_{GS}=2.5V, I_D=0.5A$	-	0.35	0.45	
$g_{FS}$	Forward Transconductance	$V_{DS}=10V, I_D=0.4A$	0.8	-	-	S
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=16V, V_{GS}=0V,$ $f=1.0MHz$	-	79	120	pF
$C_{oss}$	Output Capacitance		-	13	20	pF
$C_{rss}$	Reverse Transfer Capacitance		-	9	15	pF
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-on Delay Time	$V_{DS}=10V, I_D=0.5A,$ $R_{GEN}=10\Omega, V_{GS}=4.5V,$	-	6.7	-	ns
$t_r$	Turn-on Rise Time		-	4.8	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	17.3	-	ns
$t_f$	Turn-off Fall Time		-	7.4	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
$I_S$	Maximum Continuous Drain to Source Diode Forward Current		-	-	0.75	A
$I_{SM}$	Maximum Pulsed Drain to Source Diode Forward Current		-	-	3	A
$V_{SD}$	Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S=0.5A$	-	0.7	1.3	V

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

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

### Typical Performance Characteristics

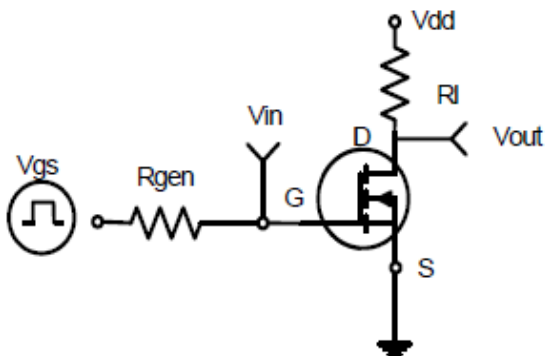


Figure1:Switching Test Circuit

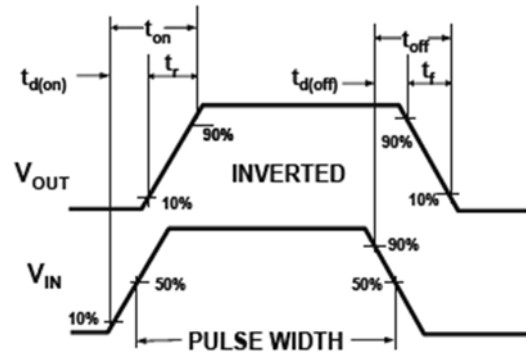
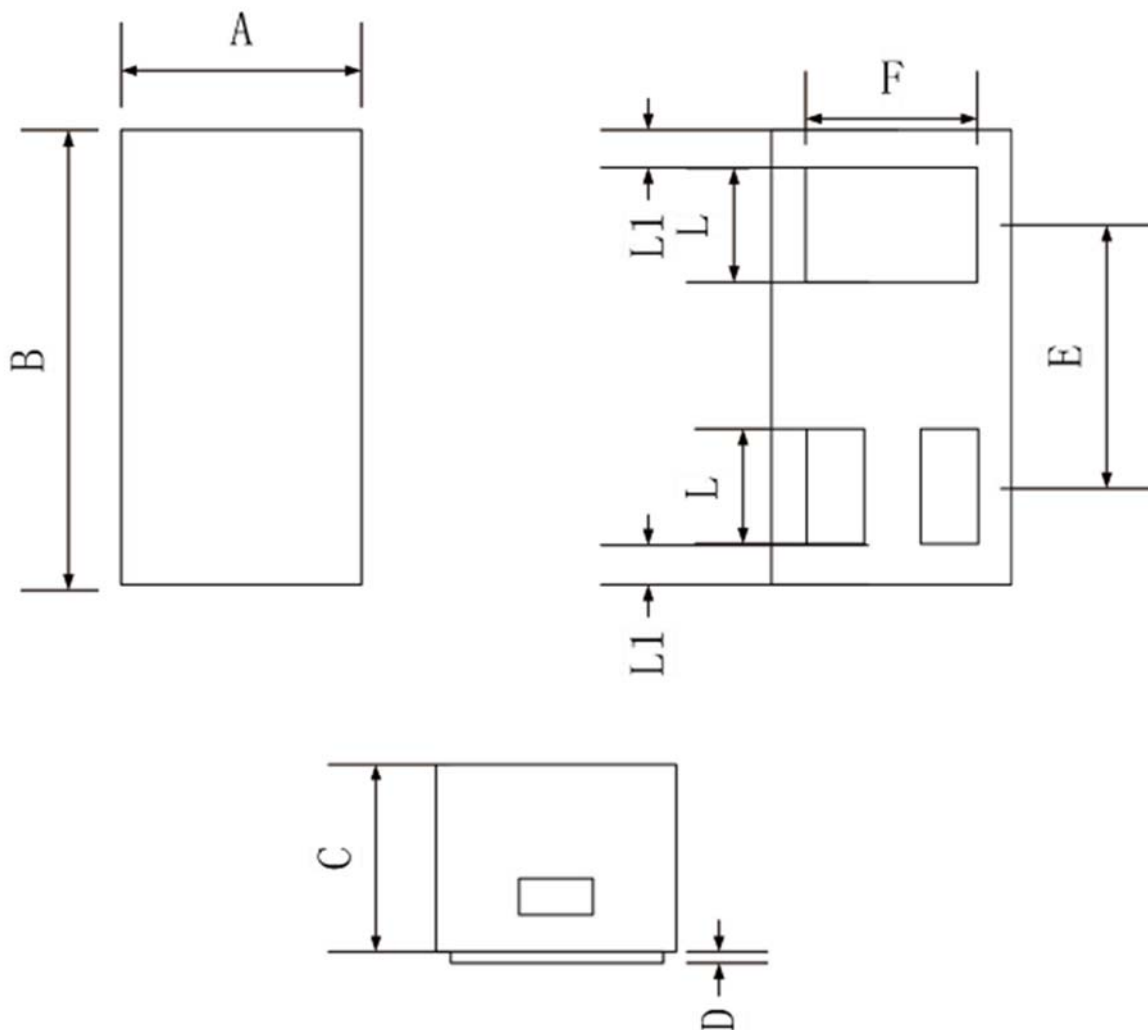


Figure2:Switching Waveforms

**Package Mechanical Data**



	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	0.55	0.60	0.65
B	0.95	1.00	1.05
C	0.44	0.47	0.50
D	0.00	0.03	0.05
E	-	0.65	-
F	0.40	0.50	0.60
L	0.20	0.25	0.30
L1	0.05REF		

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