

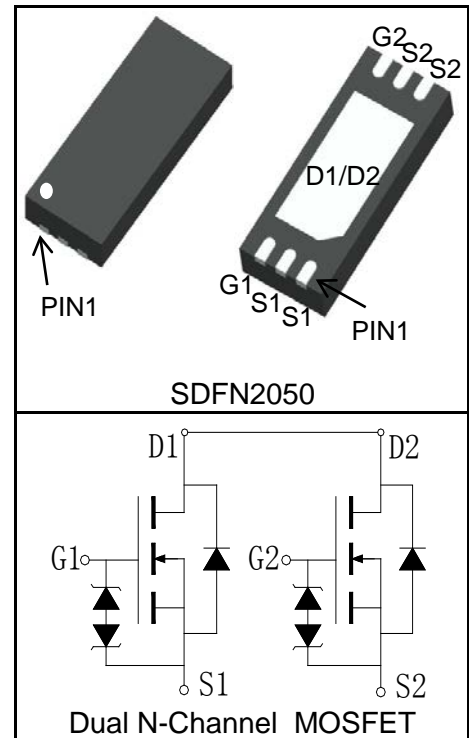
### Features

- 20V/8A,  
 $R_{DS(ON)} = 13m\Omega(Typ.)@V_{GS}=4.5V$   
 $R_{DS(ON)} = 14m\Omega(Typ.)@V_{GS}=4V$   
 $R_{DS(ON)} = 16m\Omega(Typ.)@V_{GS}=3.1V$   
 $R_{DS(ON)} = 18m\Omega(Typ.)@V_{GS}=2.5V$
- Super High Dense Cell Design
- Fast Switching Speed
- ESD Protected
- 100% avalanche tested
- Lead Free and Green Devices Available (RoHS Compliant)

### Applications

- DC-DC Converters
- Power Management

### Pin Description



### Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit	
<b>Common Ratings</b> ( $T_C=25^\circ C$ Unless Otherwise Noted)				
$V_{DSS}$	Drain-Source Voltage	20	V	
$V_{GSS}$	Gate-Source Voltage	$\pm 10$		
$T_J$	Maximum Junction Temperature	150	$^\circ C$	
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$	
$I_S$	Diode Continuous Forward Current	$T_C=25^\circ C$	28	A
<b>Mounted on Large Heat Sink</b>				
$I_{DP}^{①}$	300 $\mu s$ Pulse Drain Current Tested	$T_C=25^\circ C$	60	A
$I_D^{②}$	Continuous Drain Current@ $T_C(V_{GS}=4.5V)$	$T_C=25^\circ C$	28	A
		$T_C=100^\circ C$	18	
	Continuous Drain Current@ $T_A(V_{GS}=4.5V)^{③}$	$T_A=25^\circ C$	8	
		$T_A=70^\circ C$	6.4	
$P_D$	Maximum Power Dissipation@ $T_C$	$T_C=25^\circ C$	25	W
		$T_C=100^\circ C$	10	
	Maximum Power Dissipation@ $T_A^{③}$	$T_A=25^\circ C$	1.7	
		$T_A=70^\circ C$	1.1	

Symbol	Parameter	Rating	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	5	°C/W
$R_{\theta JA}$ <sup>③</sup>	Thermal Resistance-Junction to Ambient	75	°C/W
<b>Drain-Source Avalanche Ratings</b>			
$E_{AS}$ <sup>④</sup>	Avalanche Energy, Single Pulsed	TBD	mJ

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

Symbol	Parameter	Test Condition	RU20T8M7			Unit
			Min.	Typ.	Max.	
<b>Static Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\mu A$	20	24		V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=20V, V_{GS}=0V$			1	$\mu A$
		$T_J=125^\circ C$			30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	0.5		1.5	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 10V, V_{DS}=0V$			$\pm 10$	$\mu A$
$R_{DS(ON)}$ <sup>⑤</sup>	Drain-Source On-state Resistance	$V_{GS}=4.5V, I_{DS}=8A$		13	15	$m\Omega$
		$V_{GS}=4V, I_{DS}=7A$		14	16	$m\Omega$
		$V_{GS}=3.1V, I_{DS}=6A$		16	18	$m\Omega$
		$V_{GS}=2.5V, I_{DS}=5A$		18	20	$m\Omega$
<b>Diode Characteristics</b>						
$V_{SD}$ <sup>⑤</sup>	Diode Forward Voltage	$I_{SD}=8A, V_{GS}=0V$			1.2	V
$t_{rr}$	Reverse Recovery Time	$I_{SD}=8A, di_{SD}/dt=100A/\mu s$		25		ns
$Q_{rr}$	Reverse Recovery Charge			13		nC
<b>Dynamic Characteristics</b> <sup>⑥</sup>						
$R_G$	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1MHz$		1.5		$\Omega$
$C_{iss}$	Input Capacitance	$V_{GS}=0V, V_{DS}=10V, \text{Frequency}=1.0MHz$		1150		pF
$C_{oss}$	Output Capacitance			180		
$C_{riss}$	Reverse Transfer Capacitance			140		
$t_{d(ON)}$	Turn-on Delay Time			5		
$t_r$	Turn-on Rise Time	$V_{DD}=10V, I_{DS}=8A, V_{GEN}=4.5V, R_G=2.5\Omega$		13		
$t_{d(OFF)}$	Turn-off Delay Time			34		
$t_f$	Turn-off Fall Time			17		
<b>Gate Charge Characteristics</b> <sup>⑥</sup>						
$Q_g$	Total Gate Charge	$V_{DS}=16V, V_{GS}=4.5V, I_{DS}=8A$		13		nC
$Q_{gs}$	Gate-Source Charge			1.2		
$Q_{gd}$	Gate-Drain Charge			3.9		

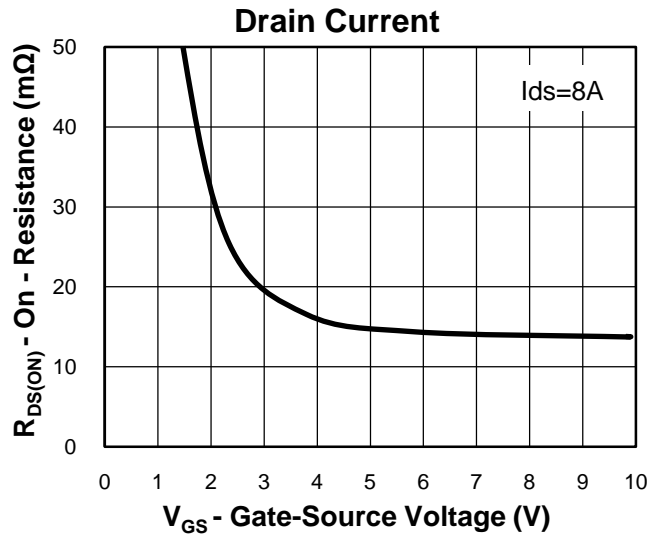
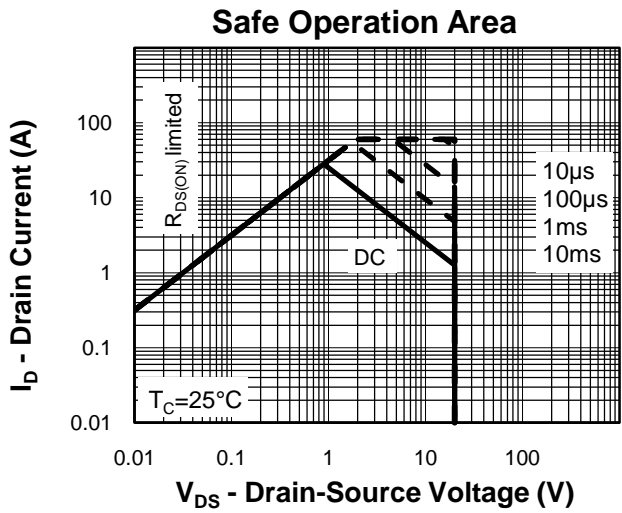
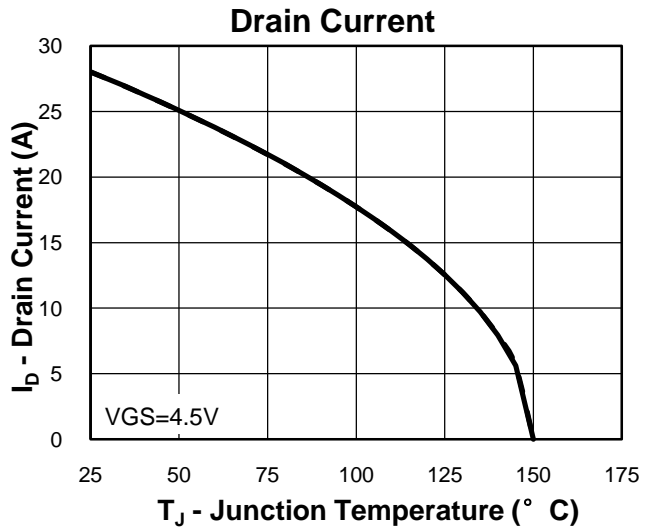
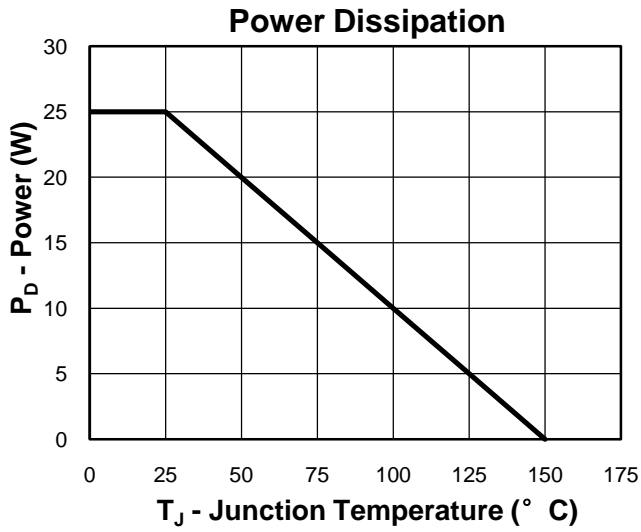
**Notes:**

- ① Pulse width limited by safe operating area.
- ② Calculated continuous current based on maximum allowable junction temperature.
- ③ When mounted on 1 inch square copper board,  $t \leq 10\text{sec}$ .
- ④ Limited by  $T_{J\text{max}}$ ,  $V_{DD} = 16\text{V}$ ,  $R_G = 50\Omega$ , Starting  $T_J = 25^\circ\text{C}$ .
- ⑤ Pulse test; Pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .
- ⑥ Guaranteed by design, not subject to production testing.

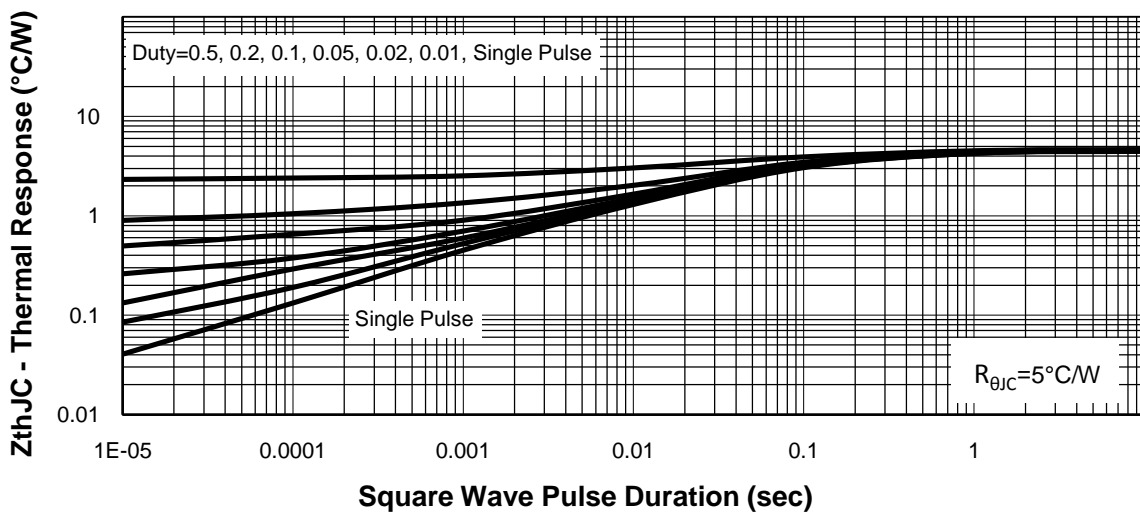
**Ordering and Marking Information**

<b>Device</b>	<b>Marking</b>	<b>Package</b>	<b>Packaging</b>	<b>Quantity</b>	<b>Reel Size</b>	<b>Tape width</b>
RU20T8M7	RU20T8M7	SDFN2050	Tape&Reel	2500	7"	12mm

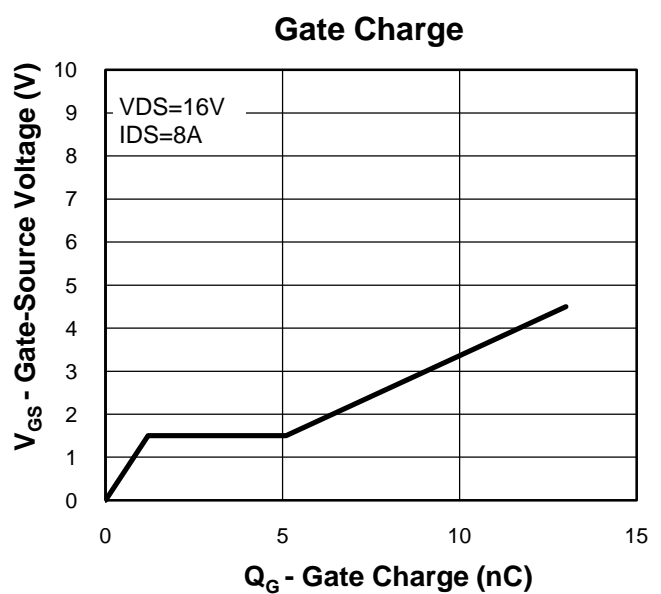
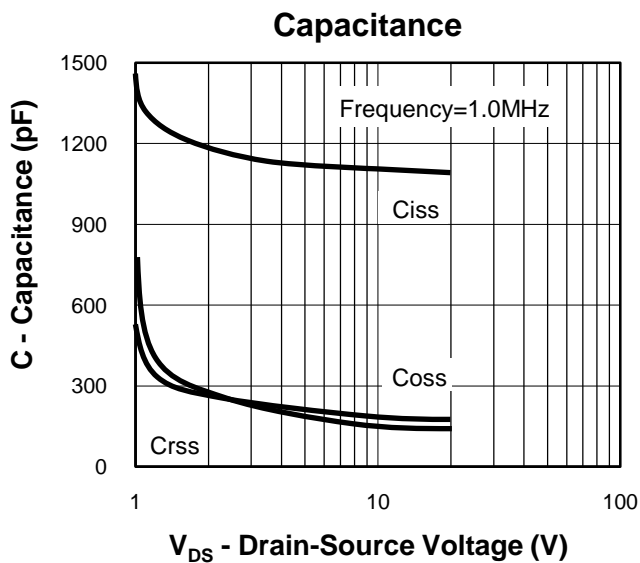
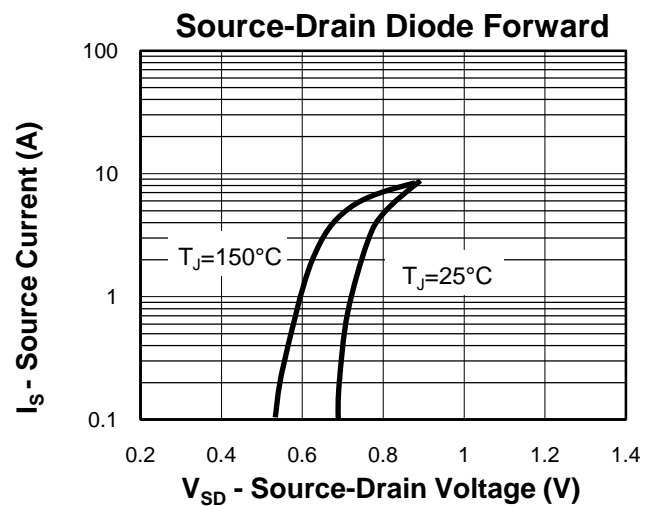
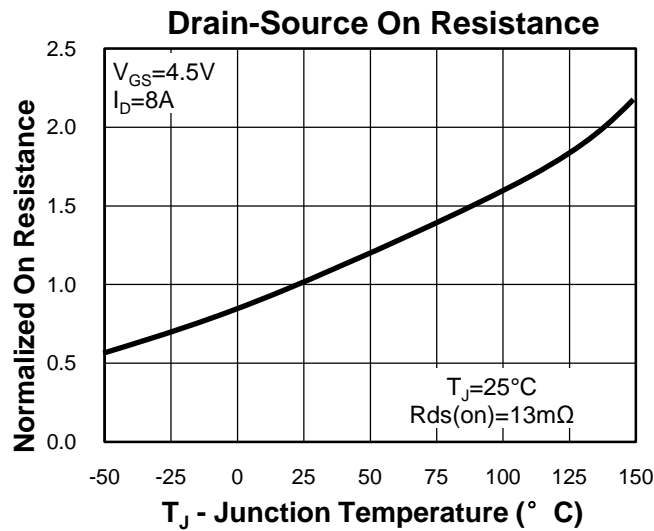
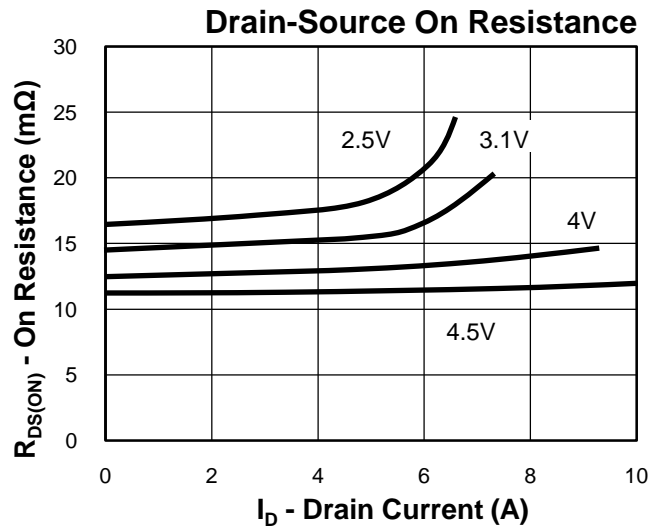
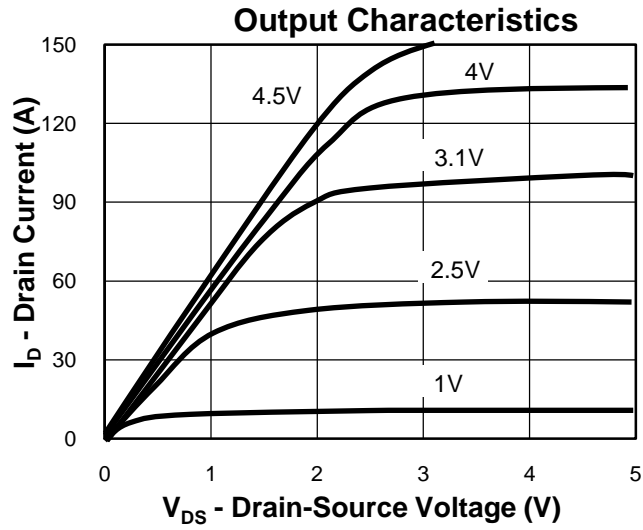
**Typical Characteristics**



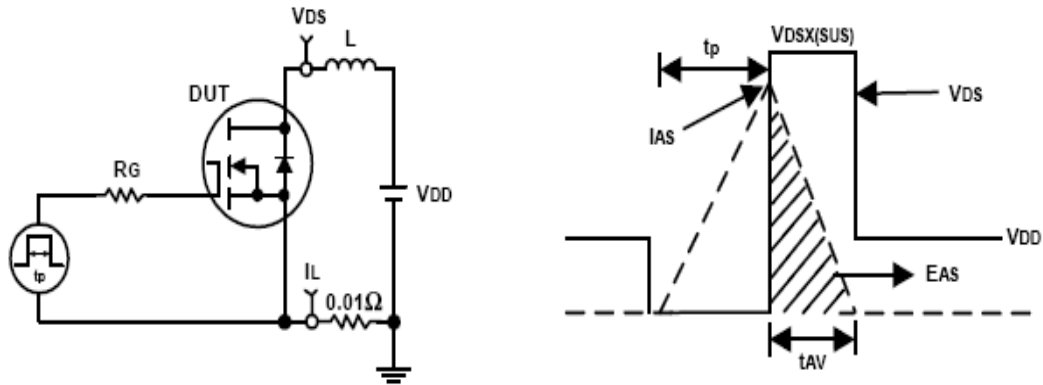
**Thermal Transient Impedance**



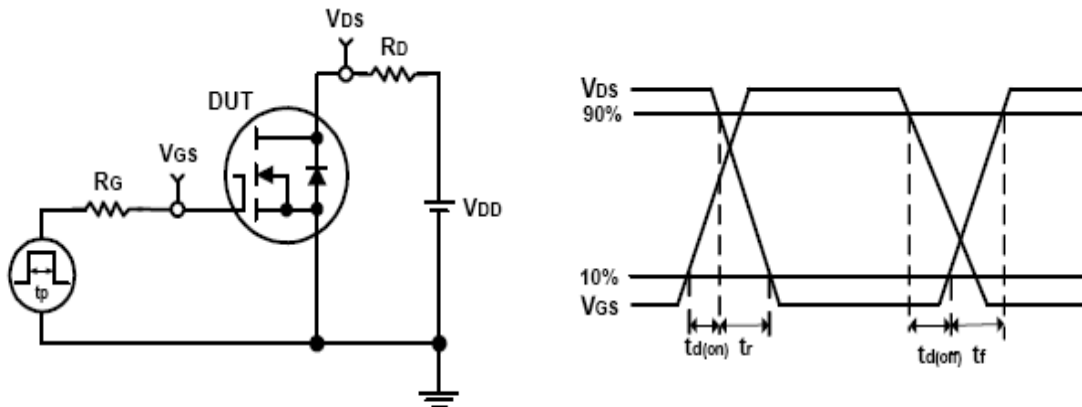
**Typical Characteristics**



**Avalanche Test Circuit and Waveforms**

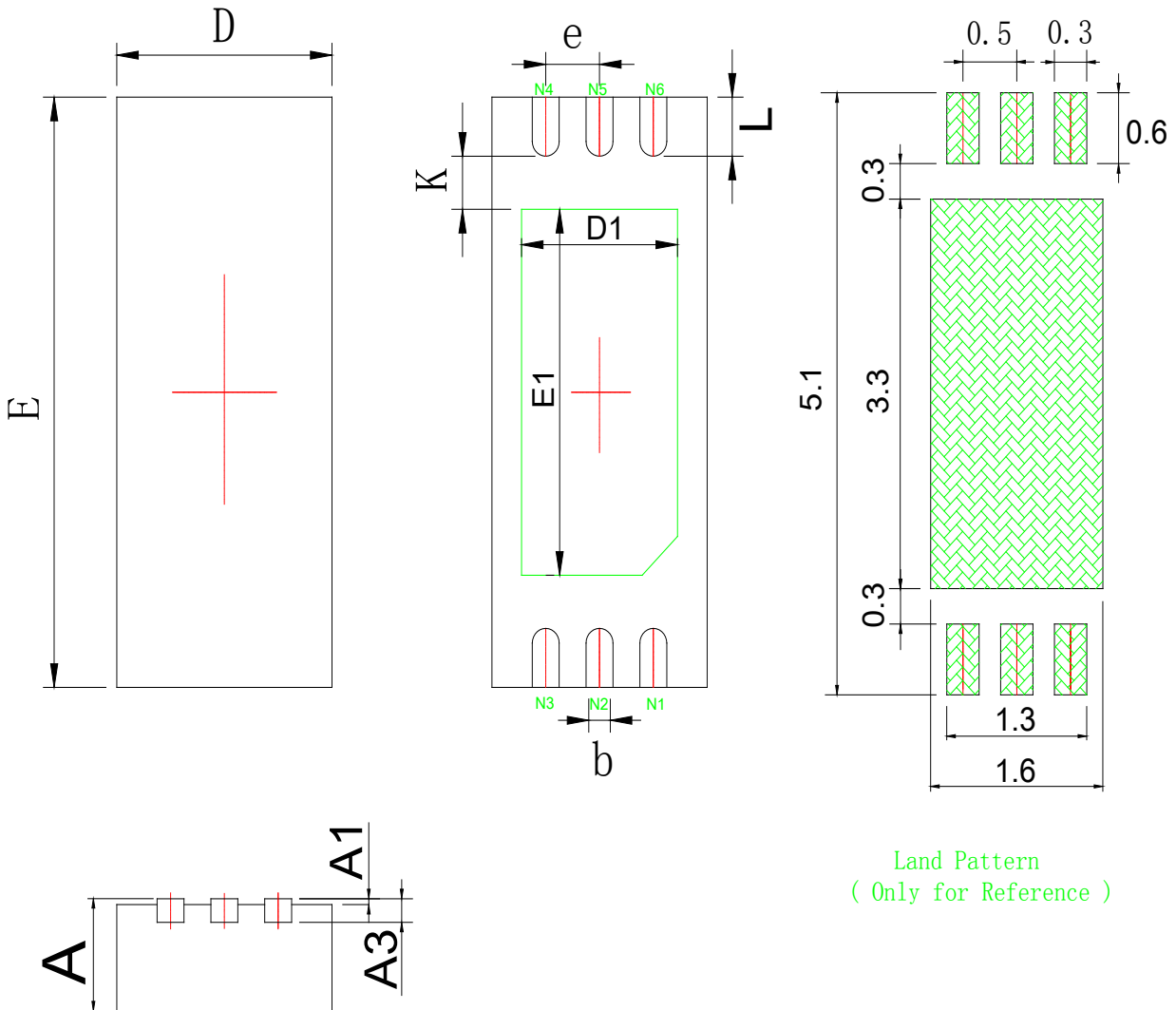


**Switching Time Test Circuit and Waveforms**



**Package Information**

**SDFN2050**



SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.700	0.800	0.900	0.028	0.031	0.035
A1	0.000	0.025	0.050	0.000	0.001	0.002
A3	0.203 REF.			0.008 REF.		
D	1.924	2.000	2.076	0.076	0.079	0.082
E	4.924	5.000	5.076	0.194	0.197	0.200
D1	1.350	1.450	1.550	0.053	0.057	0.061
E1	2.950	3.050	3.150	0.116	0.120	0.124
K	0.200 MIN.			0.008 MIN.		
b	0.200	0.250	0.300	0.008	0.010	0.012
e	0.500 TYP			0.020 TYP		
L	0.424	0.500	0.576	0.017	0.020	0.023

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