

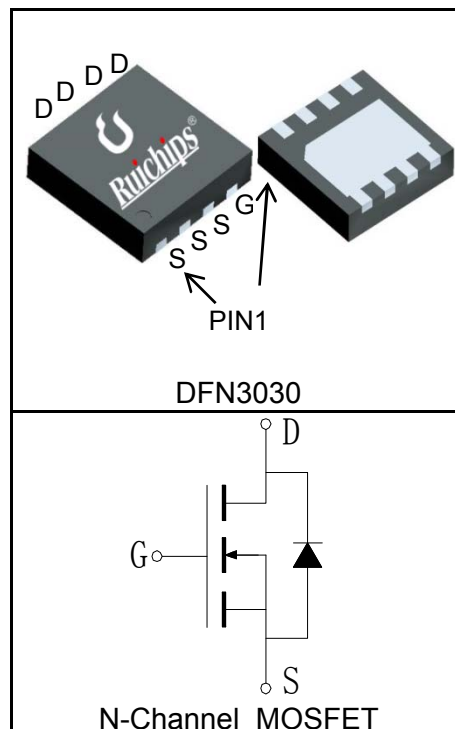
Features

- 40V/40A,
- $R_{DS(ON)} = 7m\Omega(Typ.)@V_{GS}=10V$
- $R_{DS(ON)} = 12m\Omega(Typ.)@V_{GS}=4.5V$
- Ultra Low On-Resistance
- Excellent $Q_g \times R_{DS(on)}$ product(FOM)
- 100% avalanche tested
- Lead Free and Green Devices Available (RoHS Compliant)

Applications

- DC/DC Converters
- On board power for server
- Synchronous rectification

Pin Description



Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T _C =25°C Unless Otherwise Noted)				
V _{DSS}	Drain-Source Voltage		40	V
V _{GSS}	Gate-Source Voltage		±20	
T _J	Maximum Junction Temperature		150	°C
T _{STG}	Storage Temperature Range		-55 to 150	°C
I _S	Diode Continuous Forward Current	T _C =25°C	40	A
Mounted on Large Heat Sink				
I _{DP} ^①	300μs Pulse Drain Current Tested	T _C =25°C	160	A
I _D ^②	Continuous Drain Current@T _C (V _{GS} =10V)	T _C =25°C	40	A
		T _C =100°C	25	
	Continuous Drain Current@T _A (V _{GS} =10V) ^③	T _A =25°C	18	
		T _A =70°C	14	
P _D	Maximum Power Dissipation@T _C	T _C =25°C	34	W
		T _C =100°C	13	
	Maximum Power Dissipation@T _A ^③	T _A =25°C	4.2	
		T _A =70°C	2.7	

Symbol	Parameter	Rating	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	3.72	°C/W
$R_{\theta JA}^{(3)}$	Thermal Resistance-Junction to Ambient	35	°C/W
Drain-Source Avalanche Ratings			
$E_{AS}^{(4)}$	Avalanche Energy, Single Pulsed	20	mJ

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

Symbol	Parameter	Test Condition	RUH4040M3			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	40			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =40V, V _{GS} =0V			1	μA
		T _J =125°C			30	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	1		2.5	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V			±100	nA
R _{DS(ON)} ⑤	Drain-Source On-state Resistance	V _{GS} =4.5V, I _{DS} =20A		12	14	mΩ
		V _{GS} =10V, I _{DS} =20A		7	9	mΩ
		T _J =150°C		11	14.2	mΩ
Diode Characteristics						
V _{SD} ⑤	Diode Forward Voltage	I _{SD} =40A, V _{GS} =0V		0.9	1.2	V
g _{fs}	Transconductance	V _{DS} =5V, I _{DS} =40A		38	50	S
t _{rr}	Reverse Recovery Time	I _{SD} =40A, dI _{SD} /dt=100A/μs		6.5	9	ns
Q _{rr}	Reverse Recovery Charge			2.8	6	nC
Dynamic Characteristics⑥						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz		1	1.5	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =20V, Frequency=1.0MHz		650	750	pF
C _{oss}	Output Capacitance			118	150	
C _{rss}	Reverse Transfer Capacitance			110	150	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =20V, I _{DS} =40A, V _{GEN} =10V, R _G =4.7Ω		4	8	ns
t _r	Turn-on Rise Time			34	50	
t _{d(OFF)}	Turn-off Delay Time			9	15	
t _f	Turn-off Fall Time			2	5	
Gate Charge Characteristics⑧						
Q _g	Total Gate Charge	V _{DS} =32V, V _{GS} =10V, I _{DS} =40A		17	25	nC
Q _{gs}	Gate-Source Charge			2.7	6	
Q _{gd}	Gate-Drain Charge			4	10	

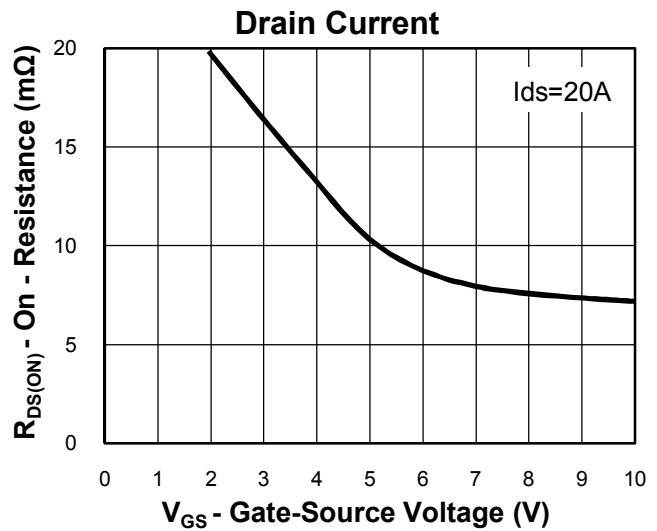
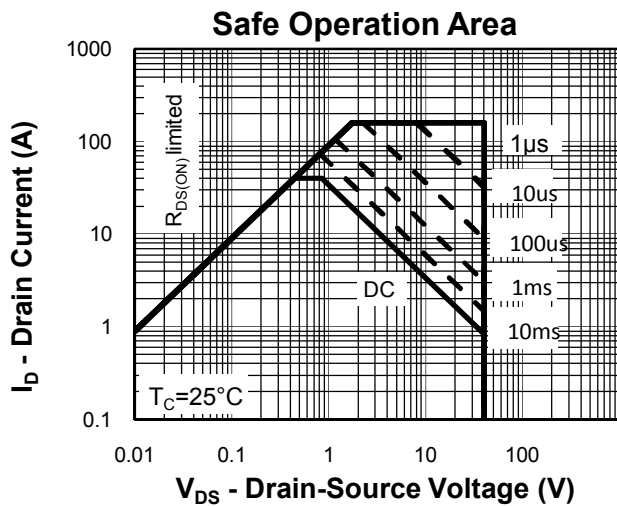
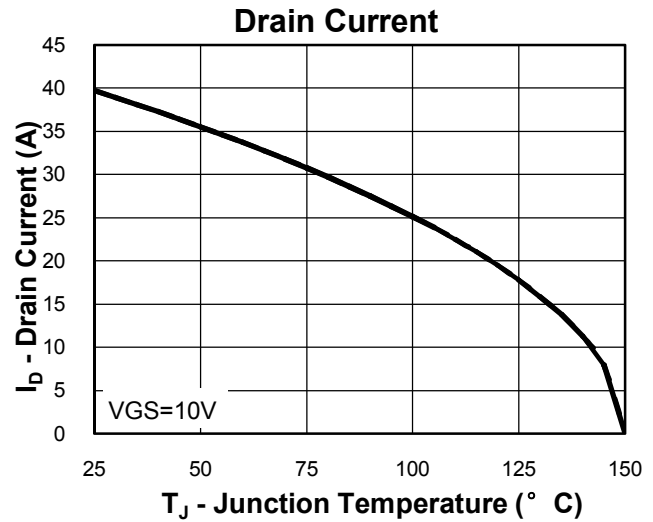
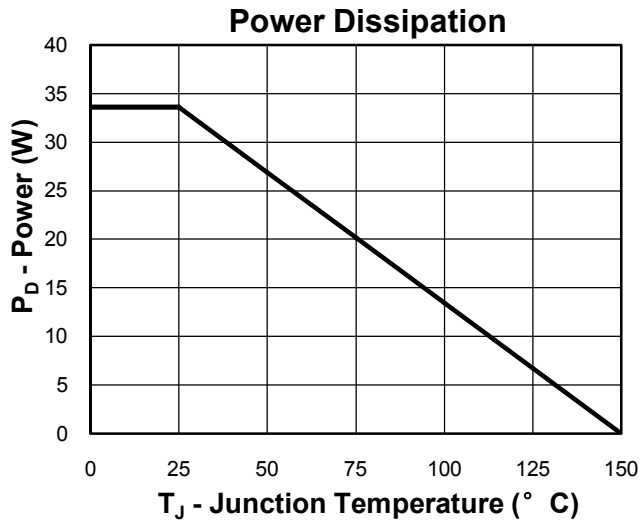
Notes:

- ① Max current is limited by the source bonding.
- ② Pulse width limited by safe operating area.
- ③ When mounted on 1 inch square copper board, t 10sec.
- ④ Limited by TJmax, IAS =9A, VDD =32V, RG = 50Ω , Starting TJ = 25° C.
- ⑤ Pulse test ; Pulse width300s, duty cycle2%.
- ⑥ Guaranteed by design, not subject to production testing.

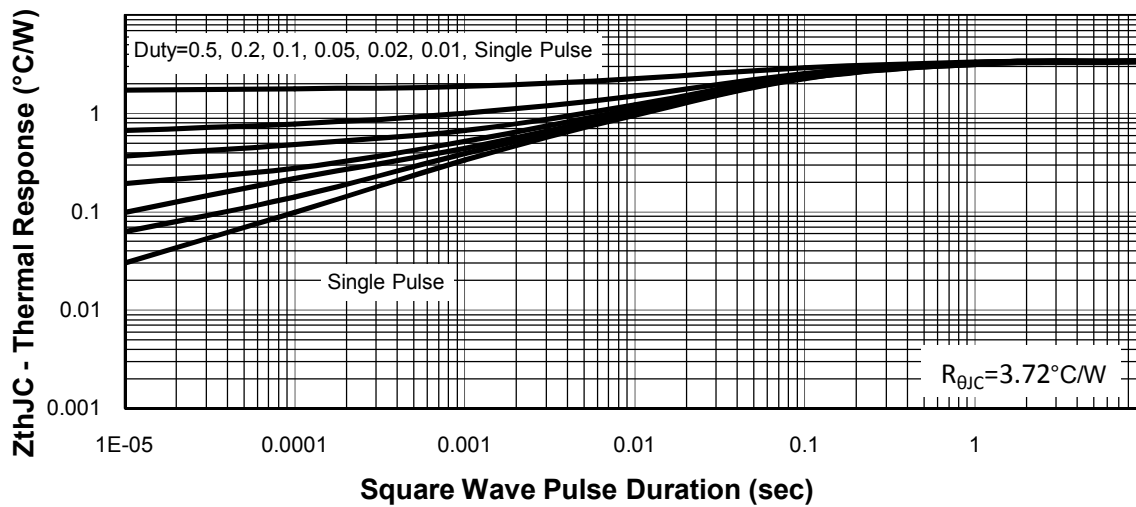
Ordering and Marking Information

Device	Marking	Package	Packaging	Quantity	Reel Size	Tape width
RUH4040M3	RUH4040	DFN3030	Tape&Reel	5000	13"	12mm

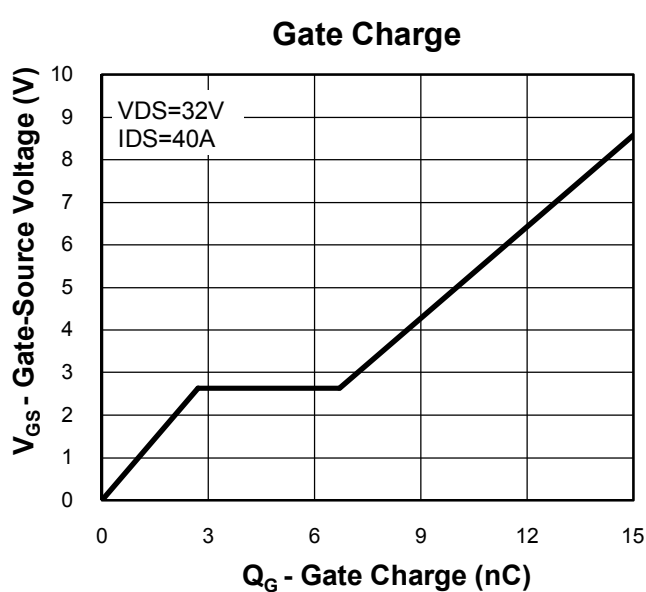
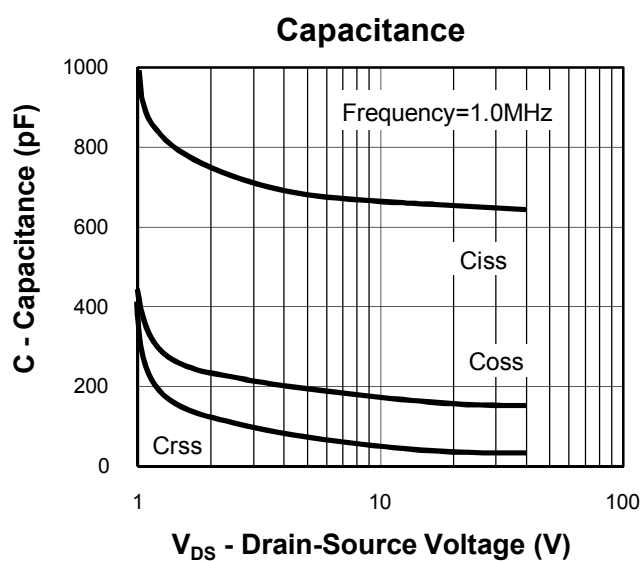
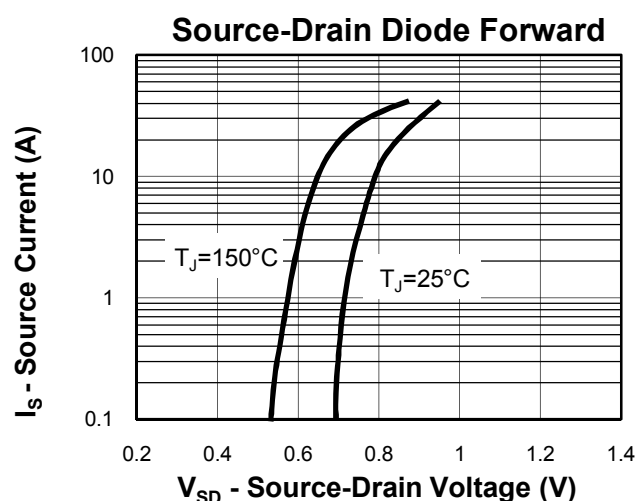
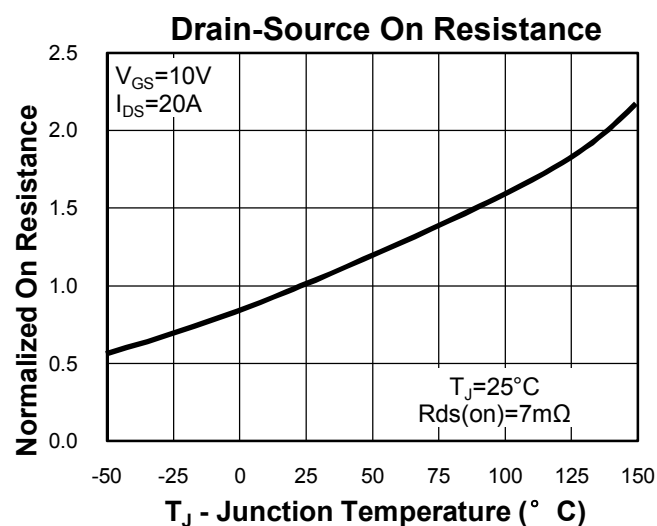
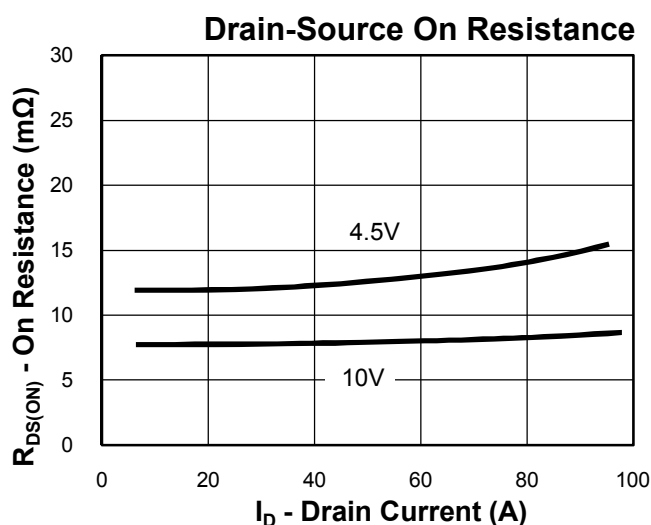
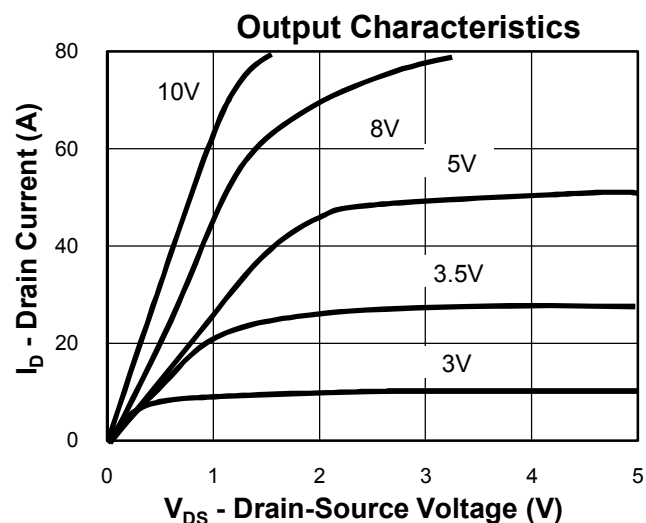
Typical Characteristics



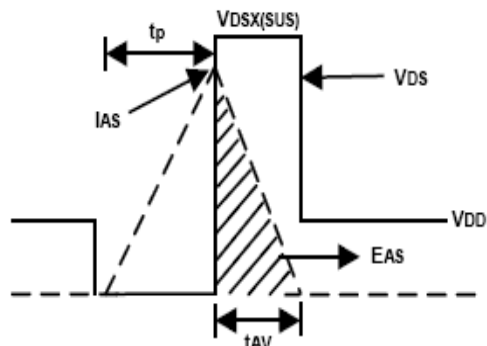
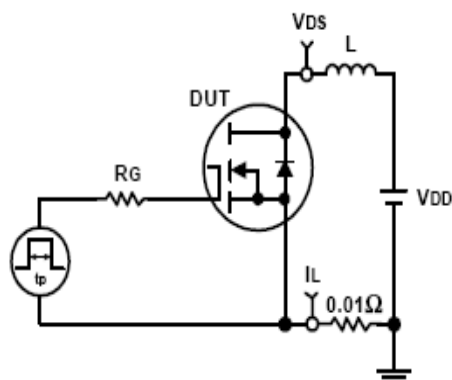
Thermal Transient Impedance



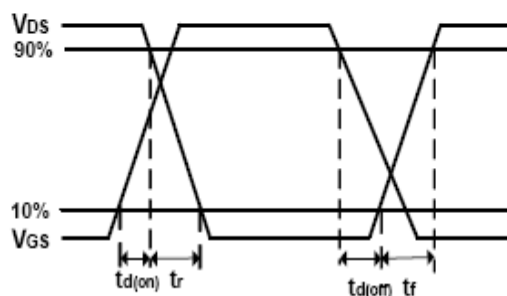
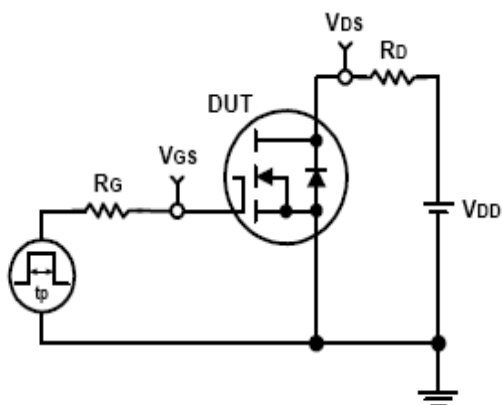
Typical Characteristics



Avalanche Test Circuit and Waveforms

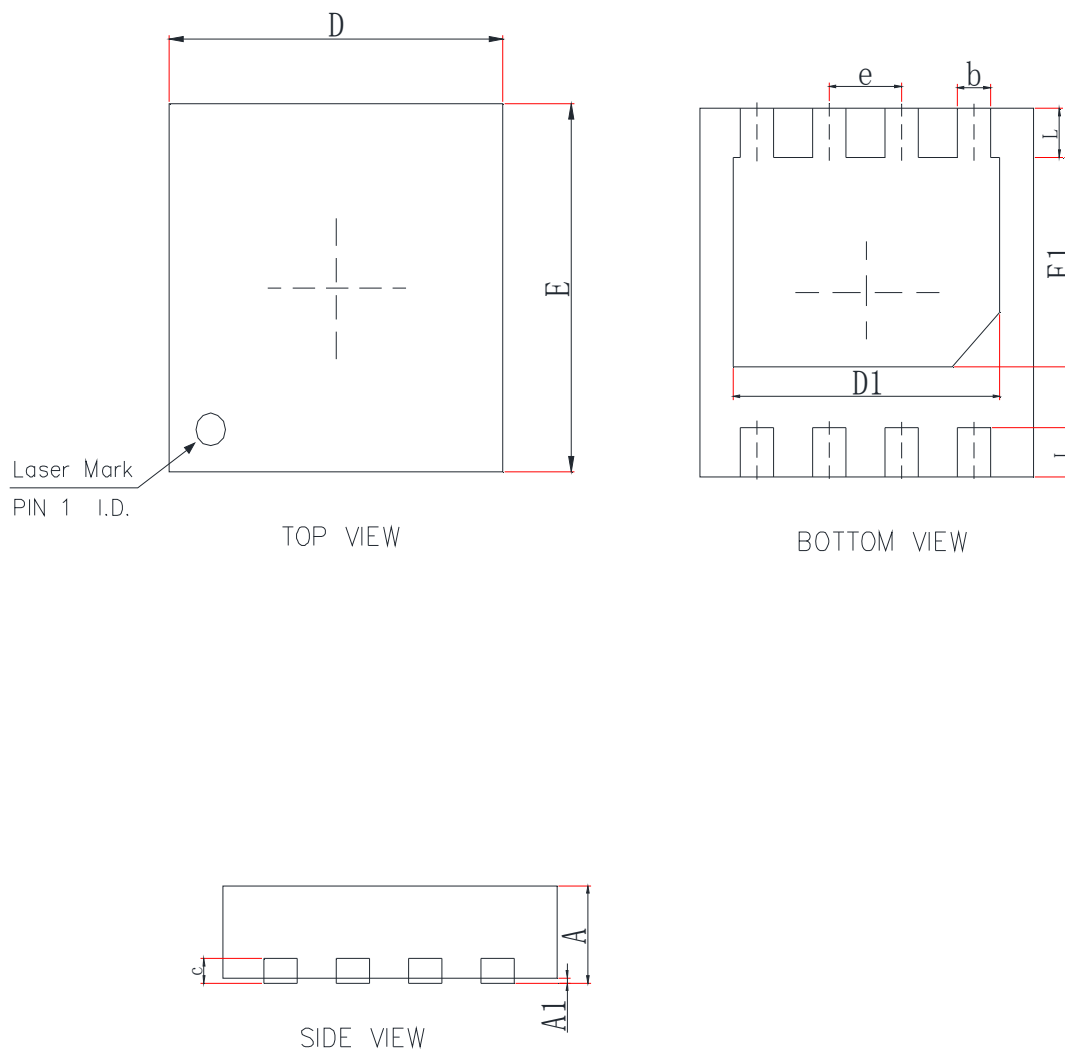


Switching Time Test Circuit and Waveforms



Package Information

DFN3030



SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	0.75	0.80	0.028	0.030	0.031
A1			0.05			0.002
b	0.25	0.30	0.35	0.010	0.012	0.014
c	0.18	0.20	0.30	0.007	0.008	0.012
D	2.95	3.00	3.15	0.116	0.118	0.124
E	2.95	3.00	3.15	0.116	0.118	0.124
D1	2.30	2.40	2.50	0.091	0.094	0.098
E1	1.70	1.80	1.90	0.067	0.071	0.075
L	0.30	0.40	0.50	0.012	0.016	0.020
e	0.65 BSC			0.026 BSC		