

Features

- 60V/120A,
 $R_{DS(ON)} = 4m\Omega(Typ.)@V_{GS}=10V$
 $R_{DS(ON)} = 4.5m\Omega(Typ.)@V_{GS}=4.5V$
- Uses Ruichips Advanced RUISGT™ Technology
- Low Gate Charge Minimizing Switching Loss
- Ultra Low On-Resistance
- Excellent $Q_g \times R_{DS(on)}$ product(FOM)
- 100% Avalanche Tested
- Lead Free and Green Devices (RoHS Compliant)

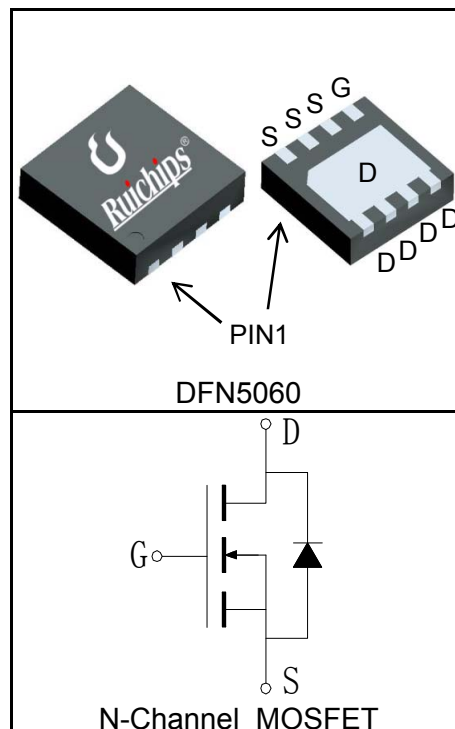
Applications

- UPS (Uninterruptible Power Supplies)
- Battery Management
- Switch Systems
- Motor Control and Drive



Halogen-Free

Pin Description



Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T _C =25°C Unless Otherwise Noted)				
V _{DSS}	Drain-Source Voltage		60	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	120	A
Mounted on Large Heat Sink				
I _{DP} ^①	300μs Pulse Drain Current Tested	T _C =25°C	480	A
I _D ^②	Continuous Drain Current@T _C (V _{GS} =10V)	T _C =25°C	120	A
		T _C =100°C	76	
	Continuous Drain Current@T _A (V _{GS} =10V) ^③	T _A =25°C	15	
		T _A =70°C	11	
P _D	Maximum Power Dissipation@T _C	T _C =25°C	165	W
		T _C =100°C	66	
	Maximum Power Dissipation@T _A ^③	T _A =25°C	2.35	
		T _A =70°C	1.5	

Symbol	Parameter	Rating	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	0.76	°C/W
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient	53	°C/W
Drain-Source Avalanche Ratings			
$E_{AS}^{④}$	Avalanche Energy, Single Pulsed	361	mJ

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

Symbol	Parameter	Test Condition	RUH60120M			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	60			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =60V, V _{GS} =0V			1	μA
			T _J =125°C		30	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	1		3	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} =10V, I _{DS} =50A		4	5.5	mΩ
		V _{GS} =4.5V, I _{DS} =40A		4.5	6.5	
Diode Characteristics						
V _{SD} ^⑤	Diode Forward Voltage	I _{SD} =50A, V _{GS} =0V		0.85	1.2	V
t _{rr}	Reverse Recovery Time	I _{SD} =50A, dI _{SD} /dt=100A/μs		61	80	ns
Q _{rr}	Reverse Recovery Charge			39	50	nC
Dynamic Characteristics ^⑥						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz		2.7	4	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =30V, Frequency=1.0MHz		3050	3600	pF
C _{oss}	Output Capacitance			745	1000	
C _{rss}	Reverse Transfer Capacitance			14	20	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =30V, I _{DS} =50A, V _{GEN} =10V, R _G =4.7Ω		9	15	ns
t _r	Turn-on Rise Time			48	70	
t _{d(OFF)}	Turn-off Delay Time			19	30	
t _f	Turn-off Fall Time			17	30	
Gate Charge Characteristics ^⑥						
Q _g	Total Gate Charge	V _{DS} =48V, V _{GS} =10V, I _{DS} =50A		51	70	nC
Q _{gs}	Gate-Source Charge			9	20	
Q _{gd}	Gate-Drain Charge			11	20	

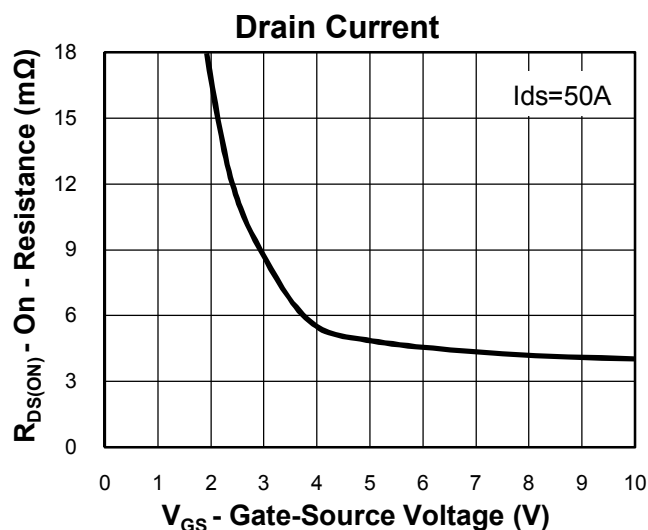
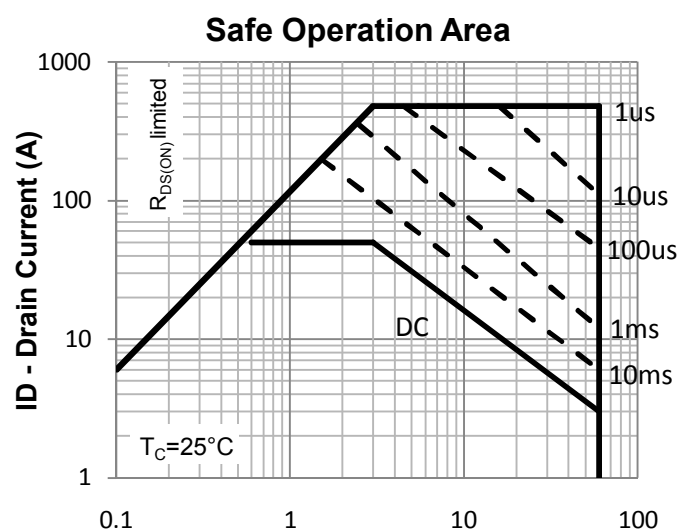
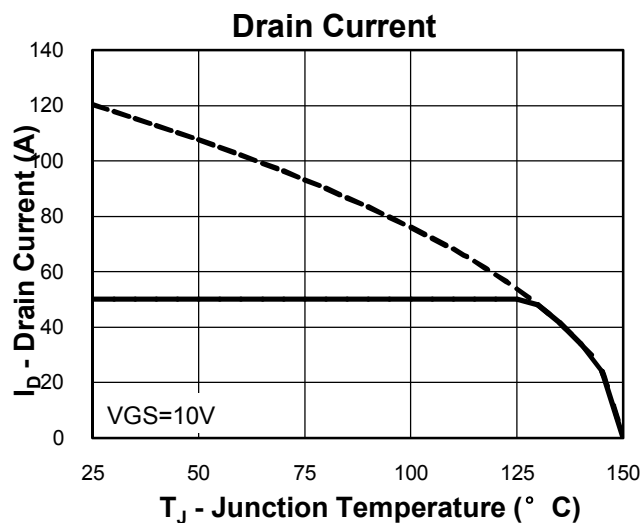
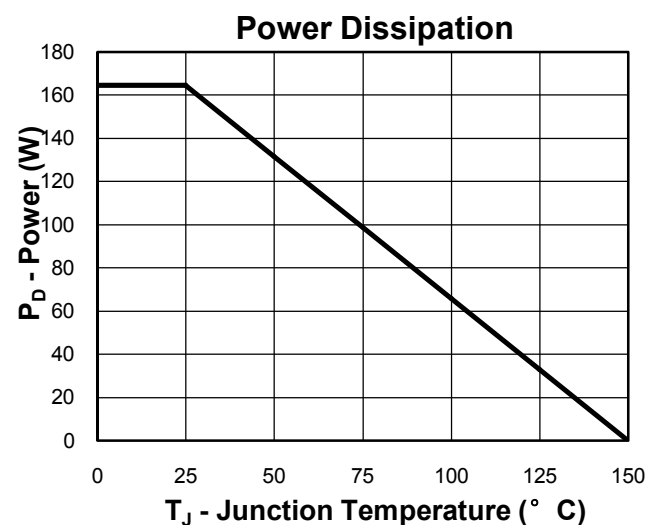
Notes:

- ① Max current is limited by the source bonding.
- ② Calculated continuous current based on maximum allowable junction temperature. The package limitation current is 50A.
- ③ When mounted on 1 inch square copper board, t 10sec.
- ④ This value is based on starting $T_J=25^{\circ}\text{C}$, $L=0.5\text{mH}$, $R_G=50\Omega$, $I_{AS}=38\text{A}$, $V_{DD}=48\text{V}$; 100% FT tested at $L=0.5\text{mH}$, $I_{AS}=19\text{A}$.
- ⑤ Pulse test ; Pulse width 300s, duty cycle 2%.
- ⑥ Guaranteed by design, not subject to production testing.

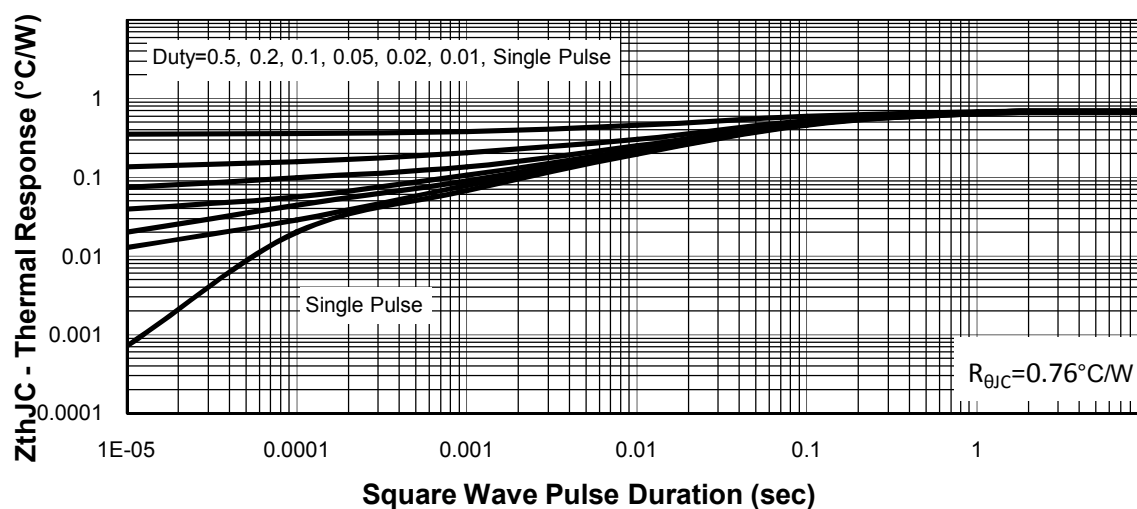
Ordering and Marking Information

Device	Marking	Package	Packaging	Quantity	Reel Size	Tape width
RUH60120M	RUH60120M	DFN5060	Tape&Reel	5000	13"	12mm

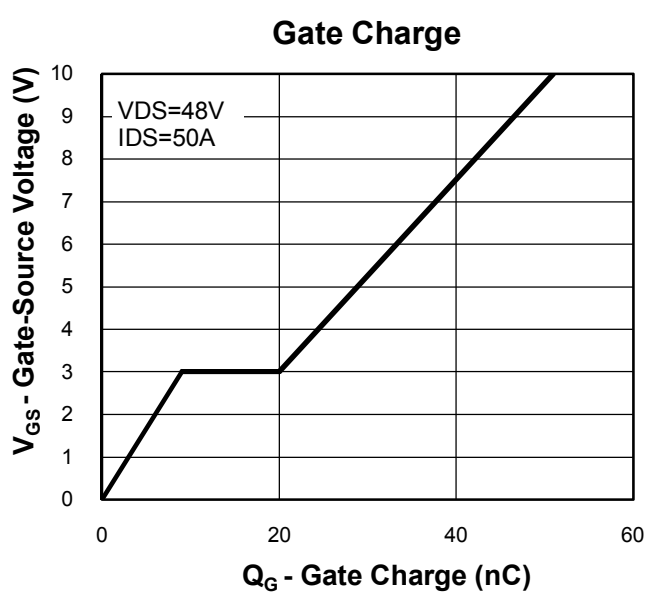
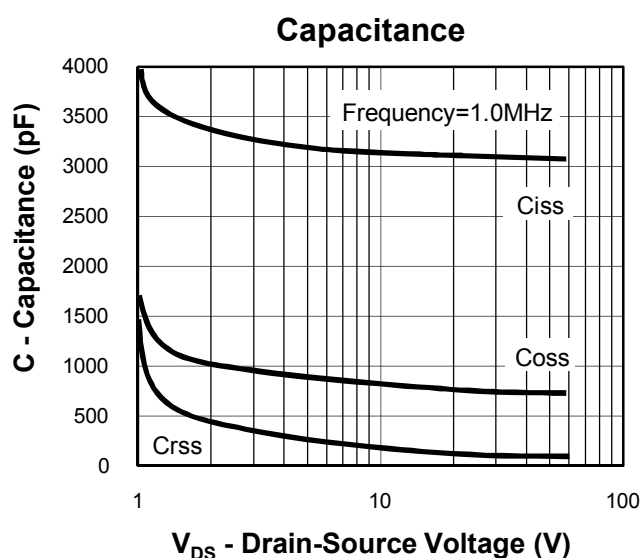
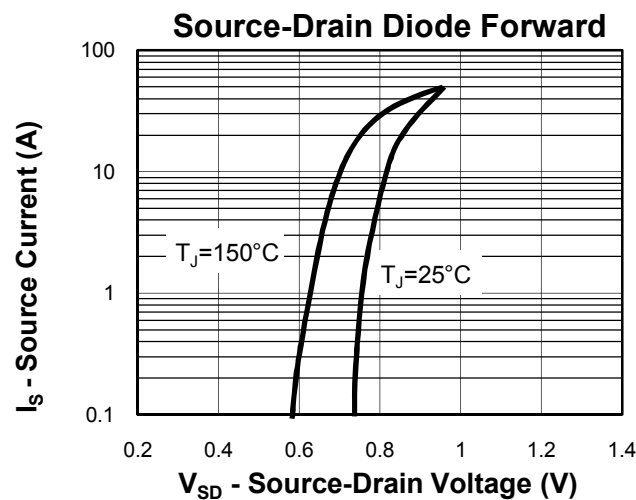
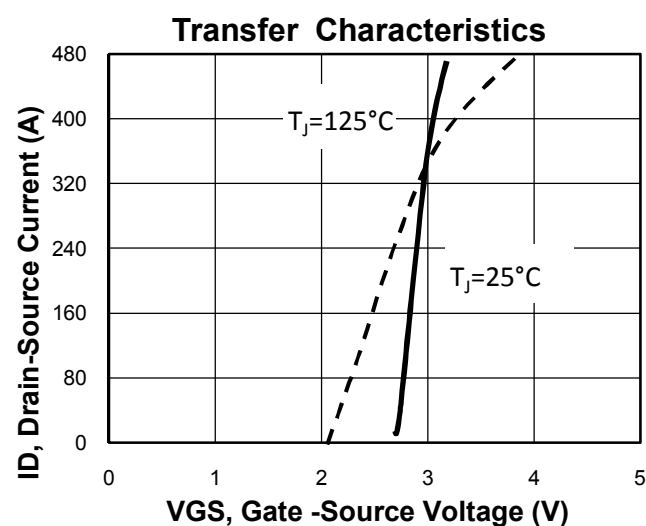
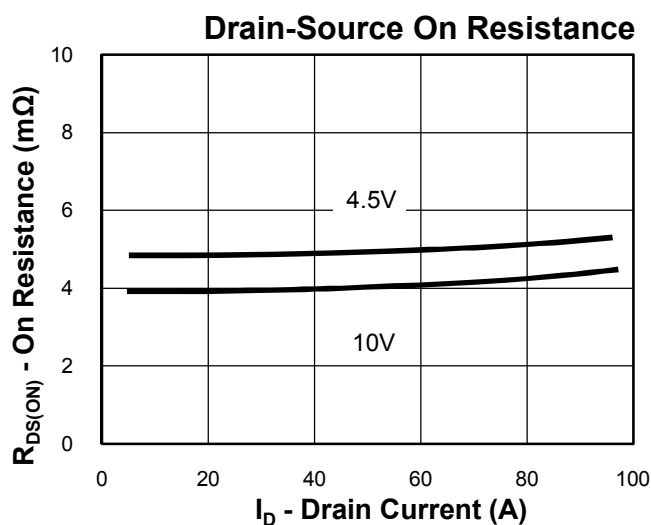
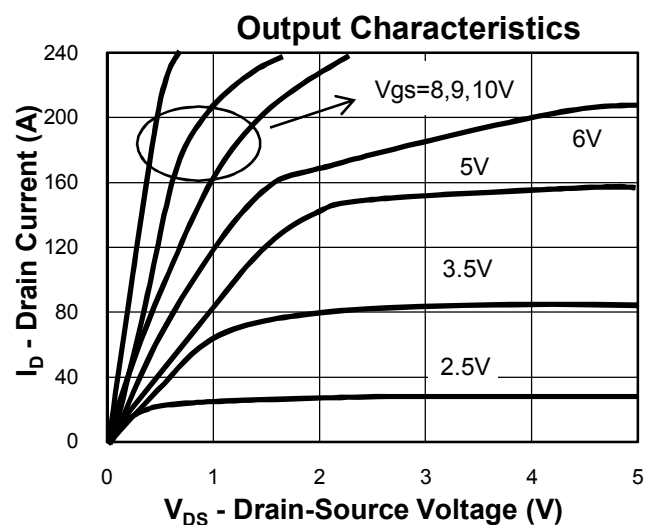
Typical Characteristics



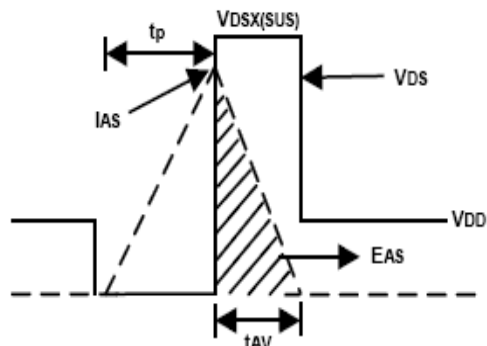
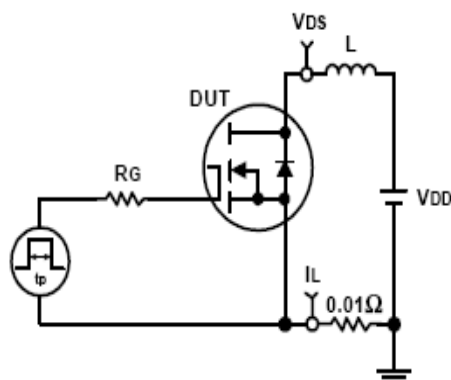
Thermal Transient Impedance



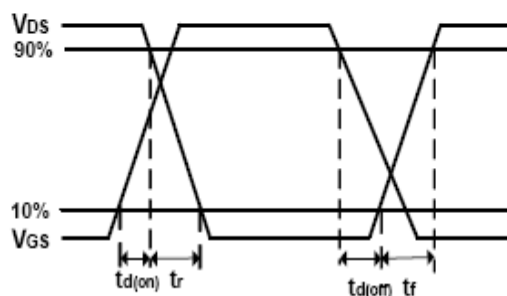
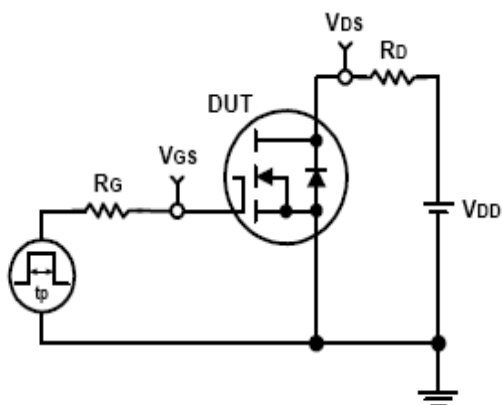
Typical Characteristics



Avalanche Test Circuit and Waveforms

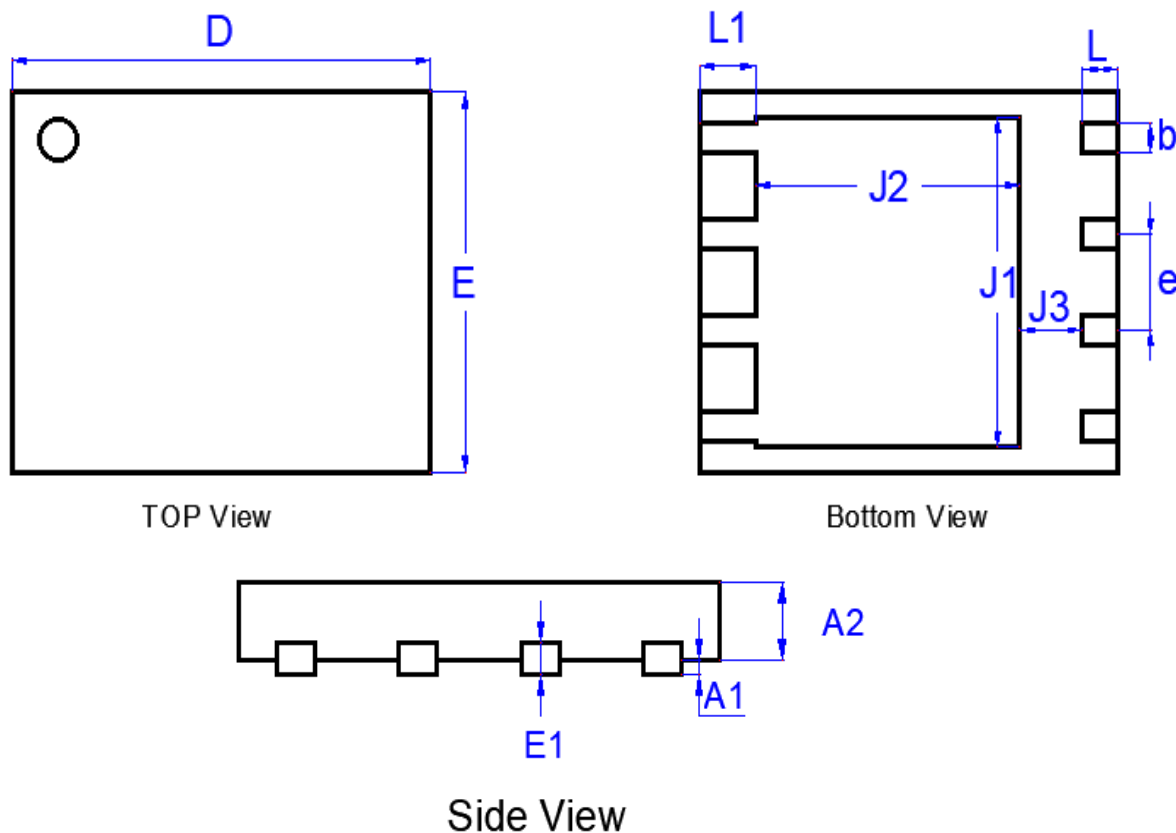


Switching Time Test Circuit and Waveforms



Package Information

DFN5060



NOTE:

1: ALL UNITS ARE IN MILLIMETER.

2: EJECTOR PIN MARK POSITION MAY VARY FROM DIFFERENT MOLD.

3: ALL DIMENSIONS REFER TO JEDEC.DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.

SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A1	—	—	0.15	—	—	0.006
A2	0.70	0.75	0.80	0.028	0.030	0.031
E1	0.185	0.235	0.285	0.007	0.009	0.011
b	0.350	0.400	0.450	0.014	0.016	0.018
e	1.220	1.270	1.320	0.048	0.050	0.052
D	5.900	6.000	6.100	0.232	0.236	0.240
E	4.900	5.000	5.100	0.193	0.197	0.201
J1	4.300	4.360	4.420	0.169	0.172	0.174
J2	3.700	3.800	3.900	0.146	0.150	0.154
J3	0.800	0.900	0.950	0.031	0.035	0.037
L	0.450	0.515	0.565	0.018	0.020	0.022
L1	0.750	0.800	0.850	0.030	0.031	0.033