Ruichips®

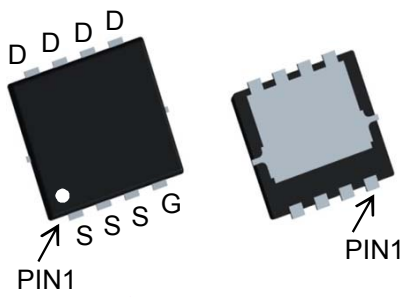
RUH60100M

N-Channel Advanced Power MOSFET

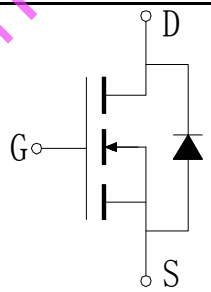
Features

- 60V/100A,
$R_{DS\ (ON)}$ =2.6mΩ(Typ.)@V_{GS}=10V
$R_{DS\ (ON)}$ =3.6mΩ(Typ.)@V_{GS}=4.5V
- Ultra Low On-Resistance
- Fast Switching Speed
- 100% avalanche tested
- Lead Free and Green Devices Available (RoHS Compliant)

Pin Description



PDFN5060



N-Channel MOSFET

Applications

- LED backlighting
- On board power for server
- Synchronous rectification

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	50	A
Mounted on Large Heat Sink				
I_{DP}①	300μs Pulse Drain Current Tested	T_C=25°C	400	A
I_D②	Continuous Drain Current@T_C(V_{GS}=10V)	T_C=25°C	100	A
		T_C=100°C	63	
	Continuous Drain Current@T_A(V_{GS}=10V)③	T_A=25°C	38	
		T_A=70°C	30	
P_D	Maximum Power Dissipation@T_C	T_C=25°C	126	W
		T_C=100°C	50	
	Maximum Power Dissipation@T_A③	T_A=25°C	4.2	
		T_A=70°C	2.7	

Symbol	Parameter	Rating	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	0.99	°C/W
$R_{\theta JA}$ ③	Thermal Resistance-Junction to Ambient	30	°C/W
Drain-Source Avalanche Ratings			
E_{AS} ④	Avalanche Energy, Single Pulsed	506	mJ

Electrical Characteristics (T_C=25°C Unless Otherwise Noted)

Symbol	Parameter	Test Condition	RUH60100M			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}=4.5V, I_{DS}=35A		3.6	4	mΩ
		V_{GS}=10V, I_{DS}=50A		2.6	3	mΩ
Diode Characteristics						
V_{SD} ⑤	Diode Forward Voltage	I_{SD}=50A, V_{GS}=0V			1.2	V
t_{rr}	Reverse Recovery Time	I_{SD}=50A, dI_{SD}/dt=100A/μs		29		ns
Q_{rr}	Reverse Recovery Charge			118		nC
Dynamic Characteristics ⑥						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz		1.2		Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=30V, Frequency=1.0MHz		5680		pF
C_{oss}	Output Capacitance			1450		
C_{rss}	Reverse Transfer Capacitance			85		
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=30V,I_{DS}=50A, V_{GEN}=10V,R_G=4.7Ω		13		ns
t_r	Turn-on Rise Time			9		
$t_{d(OFF)}$	Turn-off Delay Time			68		
t_f	Turn-off Fall Time			18		
Gate Charge Characteristics ⑥						
Q_g	Total Gate Charge	V_{DS}=48V, V_{GS}=10V, I_{DS}=50A		109		nC
Q_{gs}	Gate-Source Charge			21		
Q_{gd}	Gate-Drain Charge			31		

Notes:

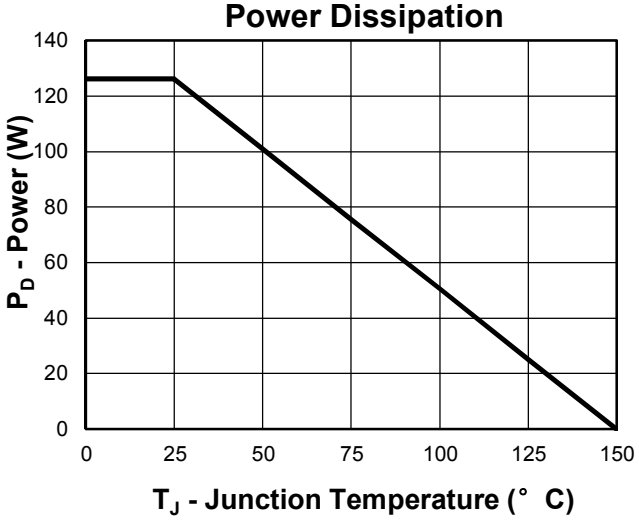
①Pulse width limited by safe operating area.
②Calculated continuous current based on maximum allowable junction temperature. The package limitation current is 50A.
③When mounted on 1 inch square copper board, t≤10sec.
④Limited by TJmax, IAS =45A, VDD = 48V, RG = 50Ω, Starting TJ = 25° C.
⑤Pulse test;Pulse width≤300μs, duty cycle≤2%.
⑥Guaranteed by design, not subject to production testing.

Ordering and Marking Information

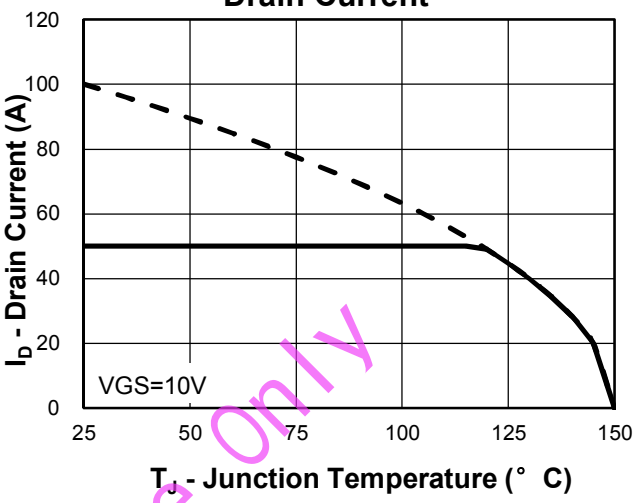
Device	Marking	Package	Packaging	Quantity	Reel Size	Tape width
RUH60100M	RUH60100M	PDFN5060	Tape&Reel	3000	13"	12mm

Typical Characteristics

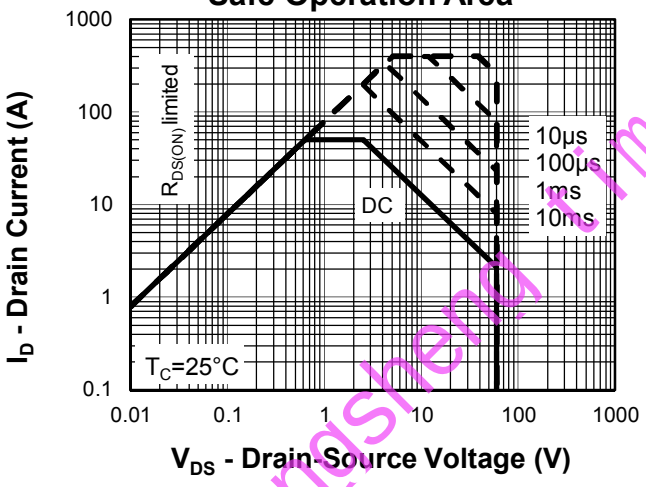
Power Dissipation



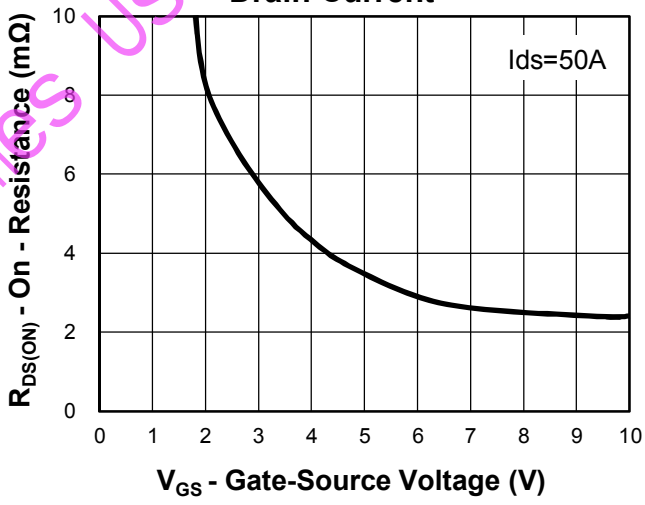
Drain Current



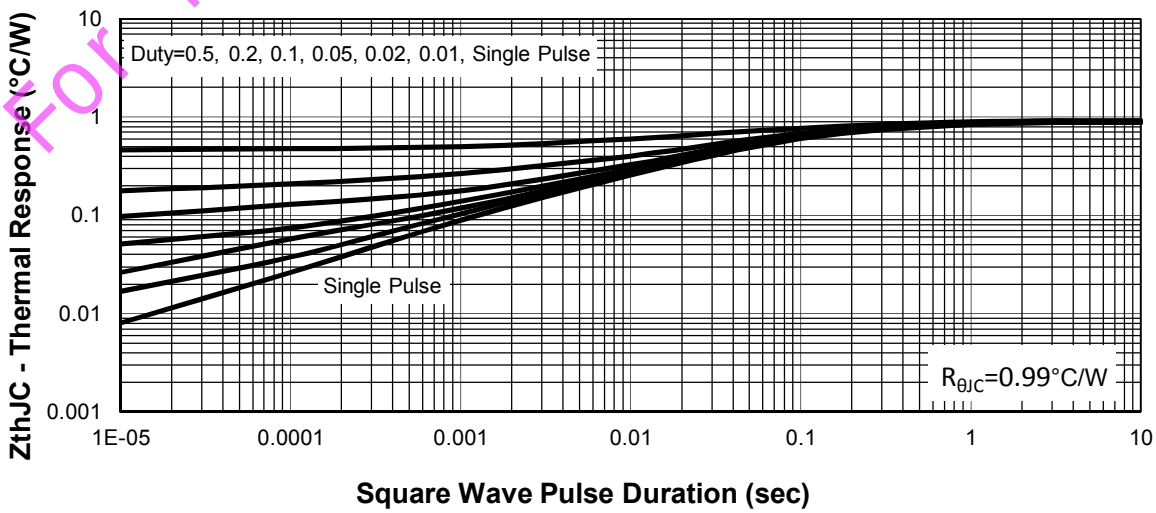
Safe Operation Area



Drain Current

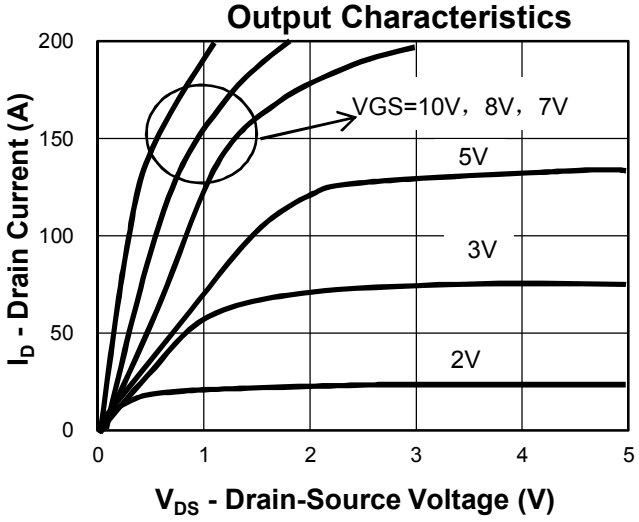


Thermal Transient Impedance

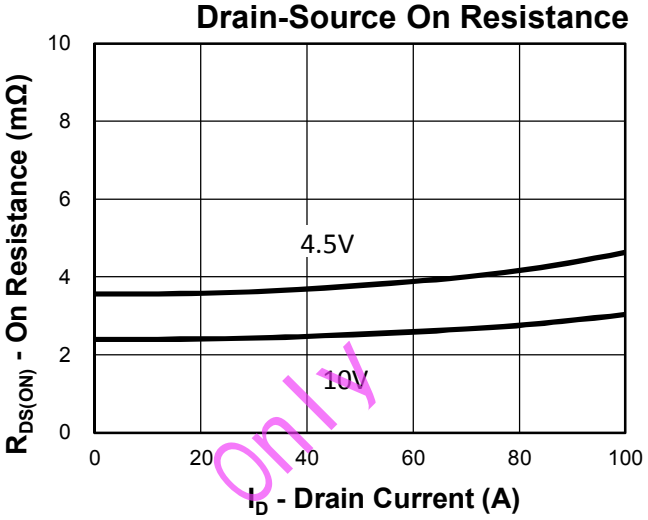


Typical Characteristics

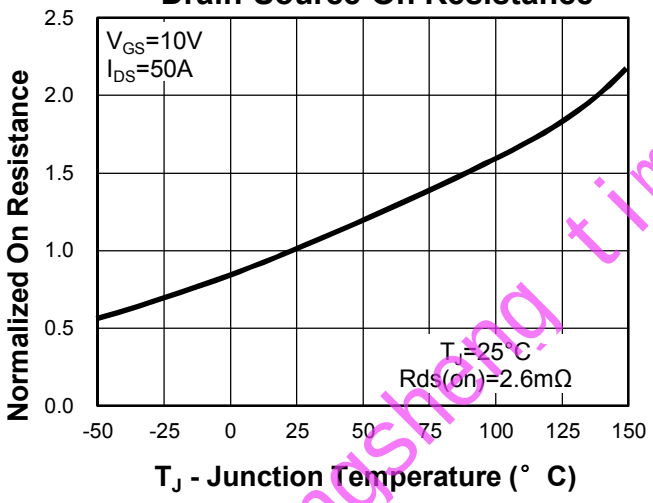
Output Characteristics



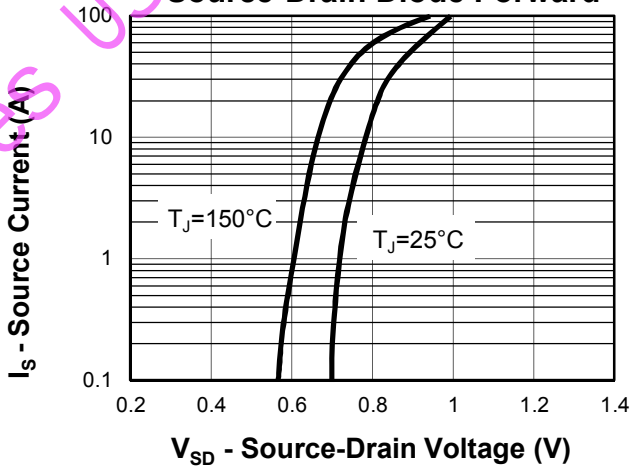
Drain-Source On Resistance



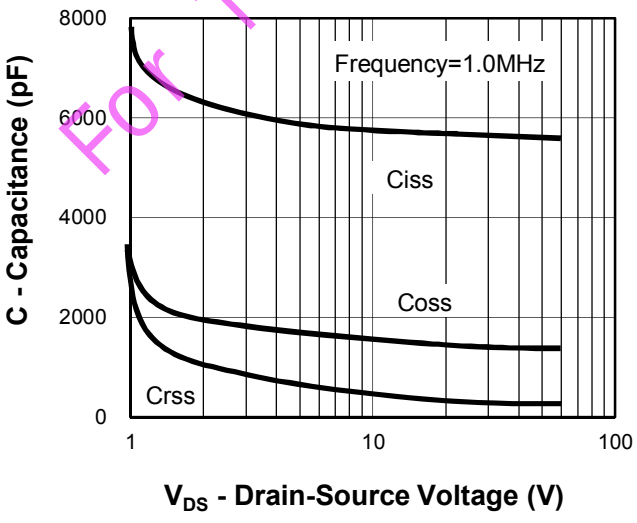
Drain-Source On Resistance



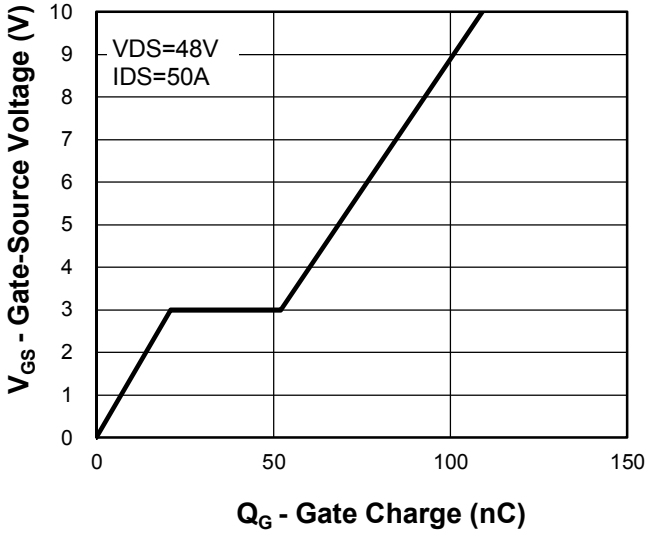
Source-Drain Diode Forward



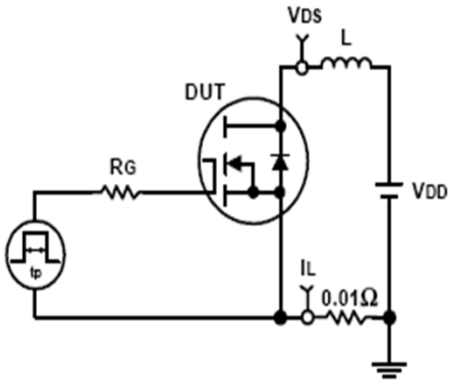
Capacitance

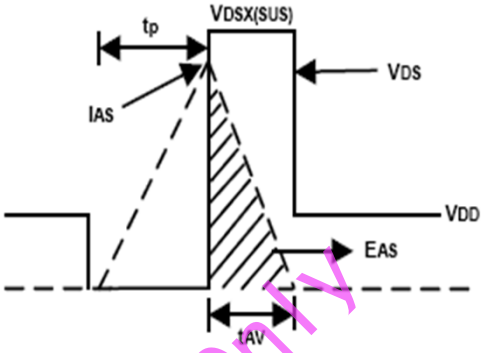


Gate Charge

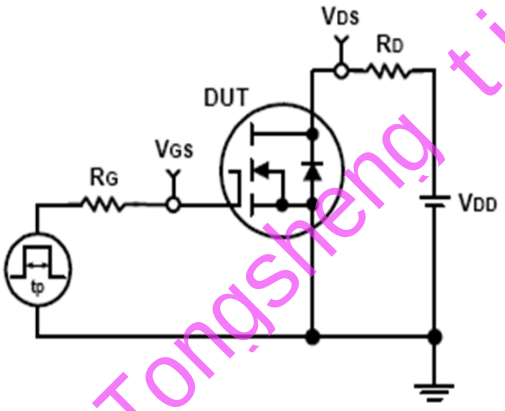


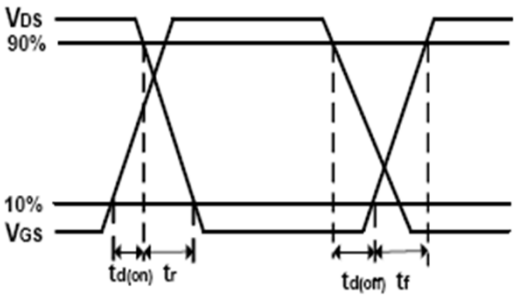
Avalanche Test Circuit and Waveforms





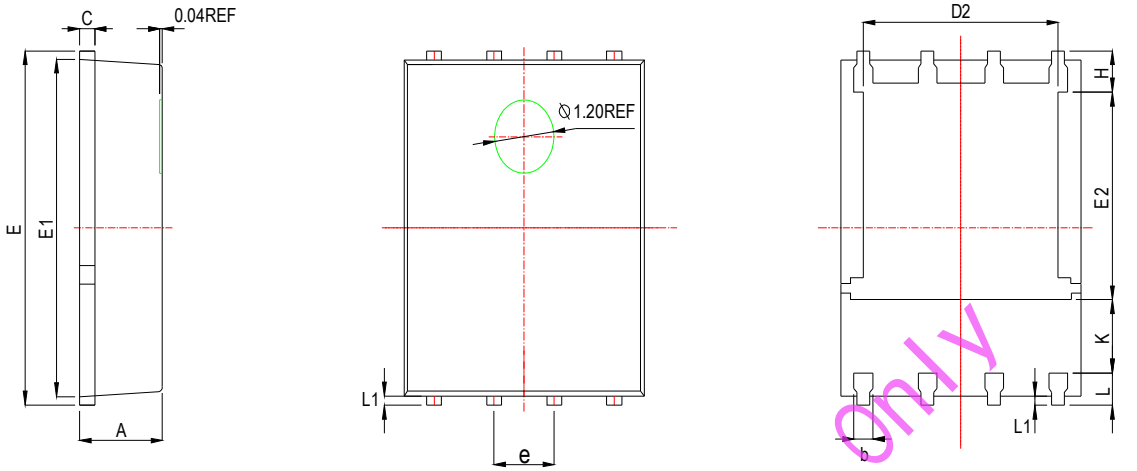
Switching Time Test Circuit and Waveforms



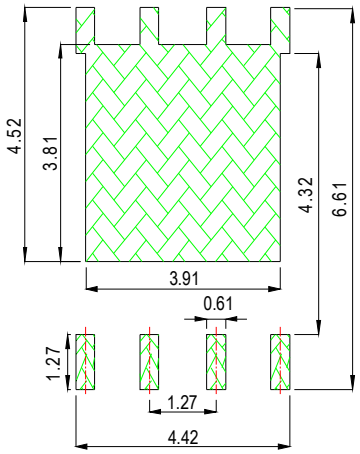


Package Information

PDFN5060



Land Pattern
(Only for Reference)



SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.90	1.00	1.10	0.035	0.039	0.043
b	0.33	0.42	0.51	0.013	0.017	0.020
c	0.20	0.25	0.30	0.008	0.010	0.012
D1	4.80	4.90	5.00	0.189	0.193	0.197
D2	3.61	3.79	3.96	0.142	0.149	0.156
E	5.90	6.00	6.10	0.232	0.236	0.240
E1	5.65	5.75	5.85	0.222	0.226	0.230
E2	3.38	3.58	3.78	0.133	0.141	0.149
e	1.27 BSC			0.005 BSC		
H	0.41	0.51	0.61	0.016	0.020	0.024
k	1.10			0.043		
L	0.51	0.61	0.71	0.020	0.024	0.028
L1	0.06	0.13	0.20	0.002	0.005	0.008
a	0°		12°	0°		12°