

Features

- 40V/20A,
- $R_{DS(ON)} = 16m\Omega(Typ.)@V_{GS}=10V$
- $R_{DS(ON)} = 23m\Omega(Typ.)@V_{GS}=4.5V$
- 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)

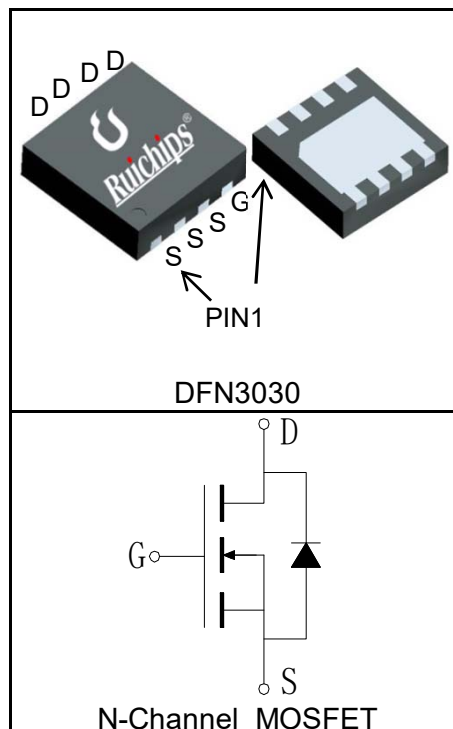
Applications

- DC/DC Converters
- PD Wireless Charging
- On Board Power for Server
- Synchronous Rectification



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		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	20	A
Mounted on Large Heat Sink				
I _{DP} ^①	300μs Pulse Drain Current Tested	T _C =25°C	80	A
I _D ^②	Continuous Drain Current@T _C (V _{GS} =10V)	T _C =25°C	20	A
		T _C =100°C	12.5	
	Continuous Drain Current@T _A (V _{GS} =10V) ^③	T _A =25°C	9.5	
		T _A =70°C	7.6	
P _D	Maximum Power Dissipation@T _C	T _C =25°C	27	W
		T _C =100°C	11	
	Maximum Power Dissipation@T _A ^③	T _A =25°C	3.6	
		T _A =70°C	2.3	

Symbol	Parameter	Rating	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	4.6	°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	36	mJ

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

Symbol	Parameter	Test Condition	RUH4022M3			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		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} =8A		23	30	mΩ
		V _{GS} =10V, I _{DS} =10A		16	20	mΩ
Diode Characteristics						
V _{SD} ⑤	Diode Forward Voltage	I _{SD} =10A, V _{GS} =0V			1.2	V
g _{fs}	Transconductance	V _{DS} =5V, I _{DS} =10A		15	35	S
t _{rr}	Reverse Recovery Time	I _{SD} =20A, dI _{SD} /dt=100A/μs		9		ns
Q _{rr}	Reverse Recovery Charge			2.3		nC
Dynamic Characteristics⑥						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz		1.2		Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =20V, Frequency=1.0MHz		435		pF
C _{oss}	Output Capacitance			85		
C _{rss}	Reverse Transfer Capacitance			3.5		
t _{d(ON)}	Turn-on Delay Time	V _{DD} =20V, I _{DS} =20A, V _{GEN} =10V, R _G =4.7Ω		3		ns
t _r	Turn-on Rise Time			21		
t _{d(OFF)}	Turn-off Delay Time			8		
t _f	Turn-off Fall Time			5		
Gate Charge Characteristics⑥						
Q _g	Total Gate Charge	V _{DS} =32V, V _{GS} =10V, I _{DS} =20A		6.5		nC
Q _{gs}	Gate-Source Charge			1.8		
Q _{gd}	Gate-Drain Charge			0.7		

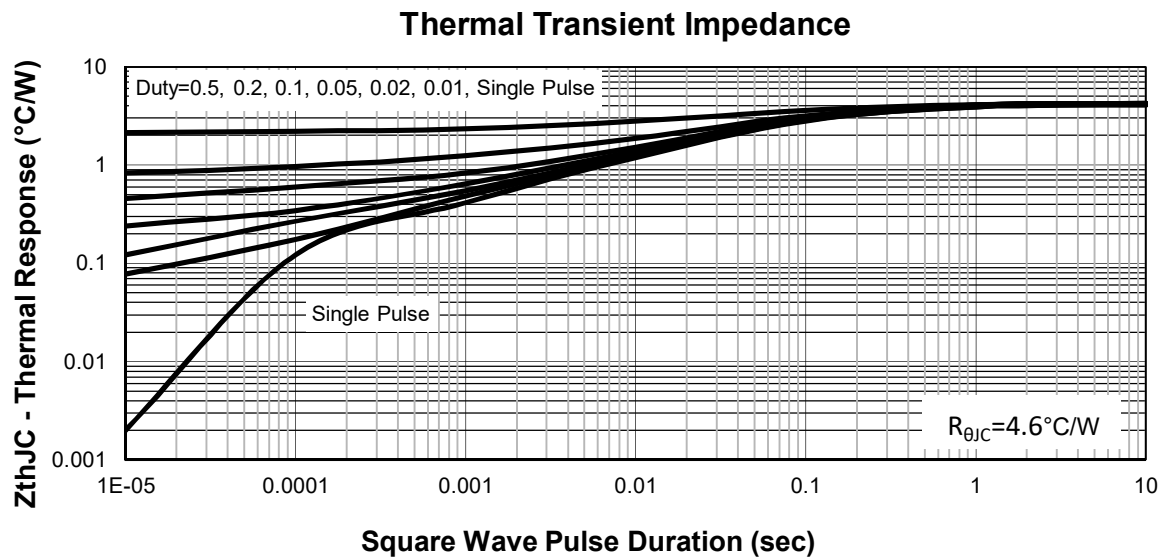
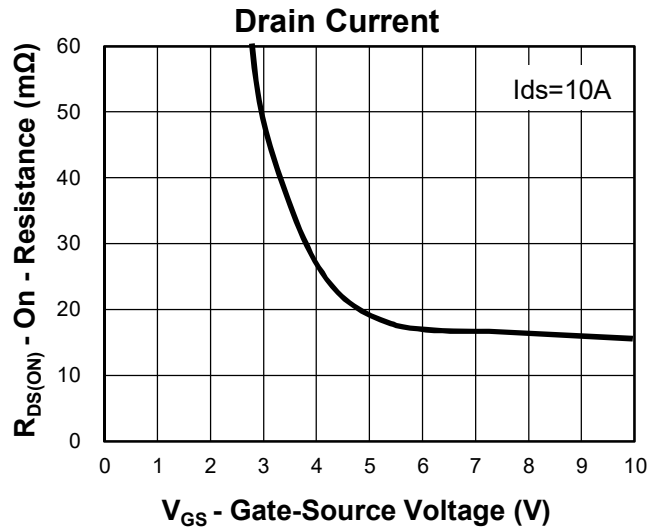
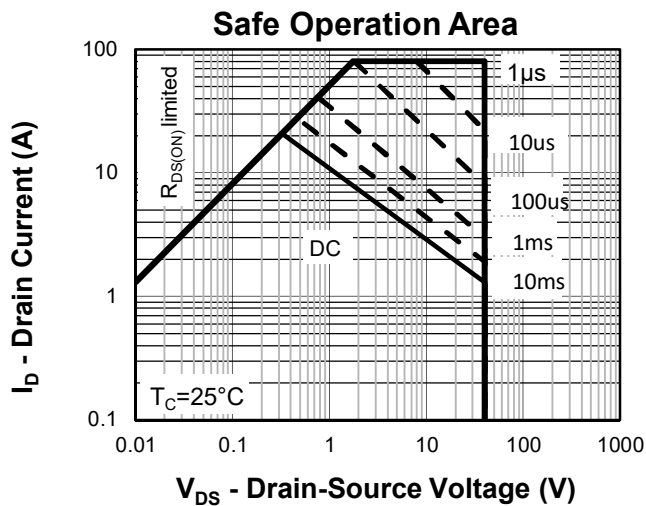
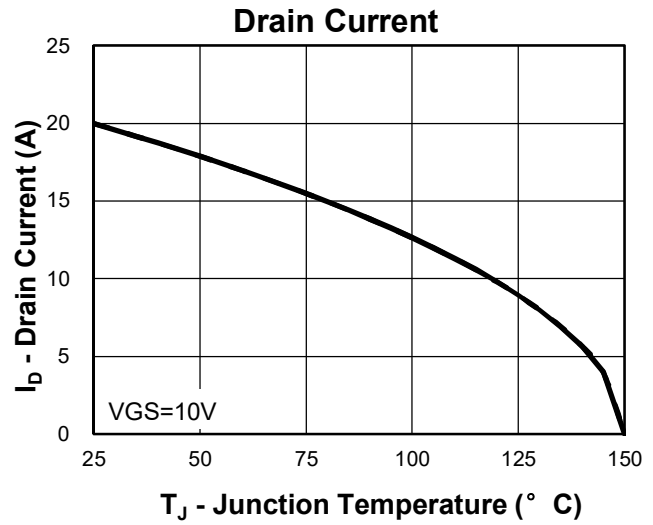
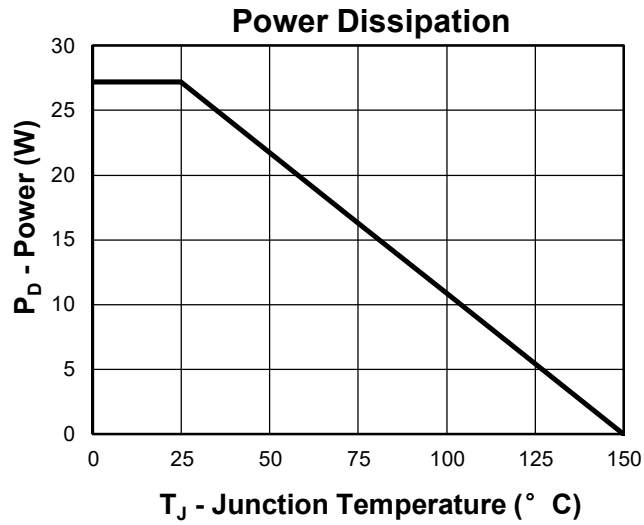
Notes:

- 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 This value is based on starting $T_J=25^{\circ}\text{C}$, $L=0.5\text{mH}$, $R_G=50\Omega$, $I_{AS}=12\text{A}$, $V_{DD}=24\text{V}$;
100% FT tested at $L=0.5\text{mH}$, $I_{AS}=6\text{A}$.
- ⑤ Pulse test ; Pulse width 300s, duty cycle 2%.
- ⑥ Guaranteed by design, not subject to production testing.

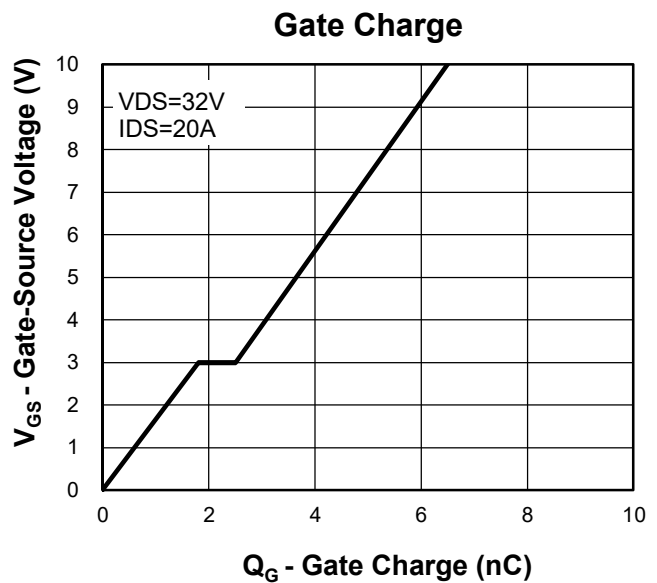
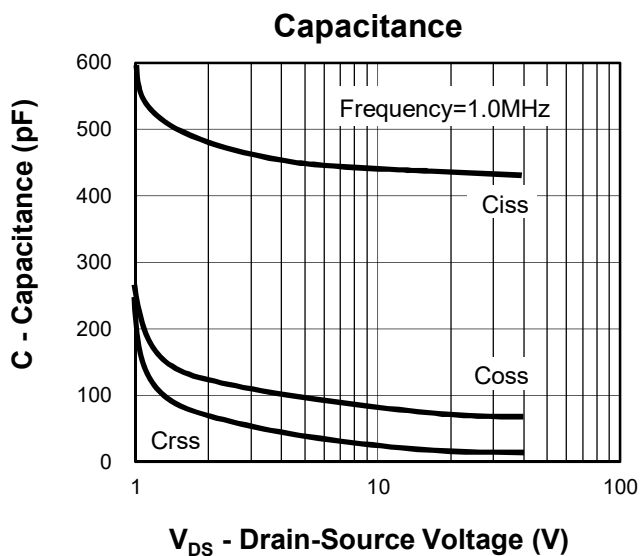
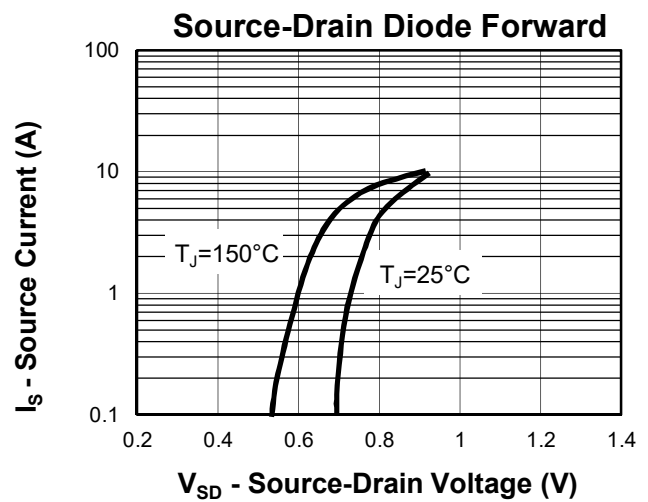
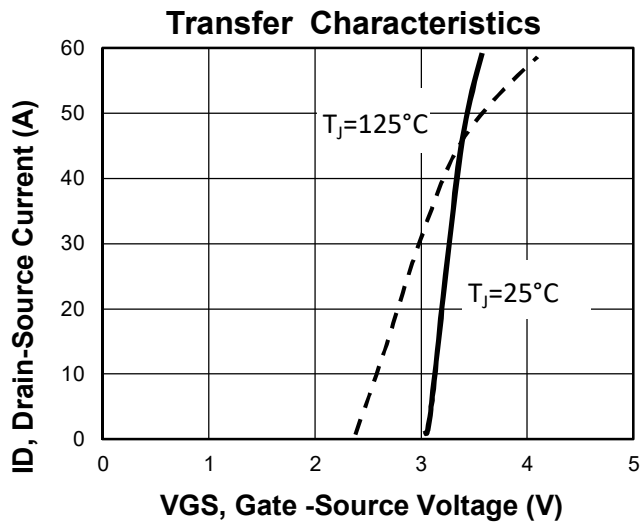
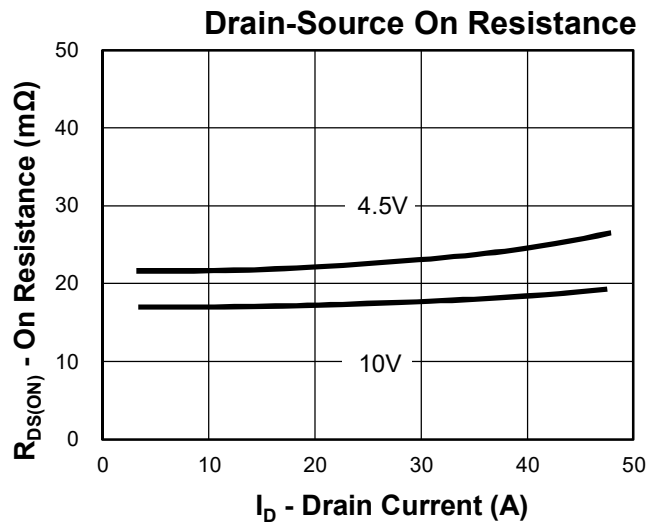
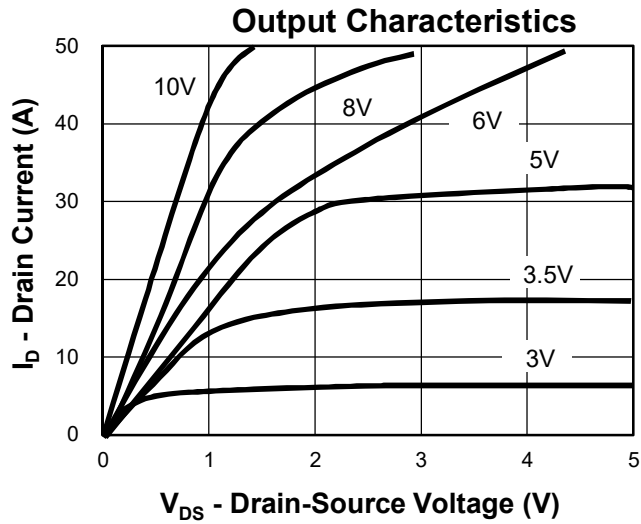
Ordering and Marking Information

Device	Marking	Package	Packaging	Quantity	Reel Size	Tape width
RUH4022M3	RUH4022	DFN3030	Tape&Reel	5000	13"	12mm

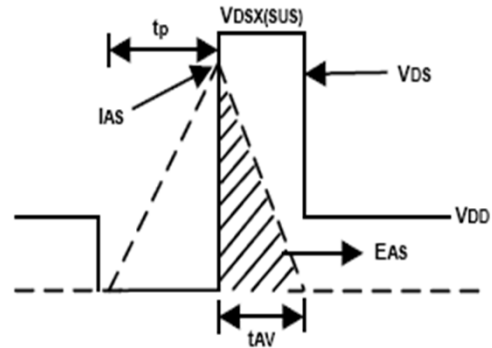
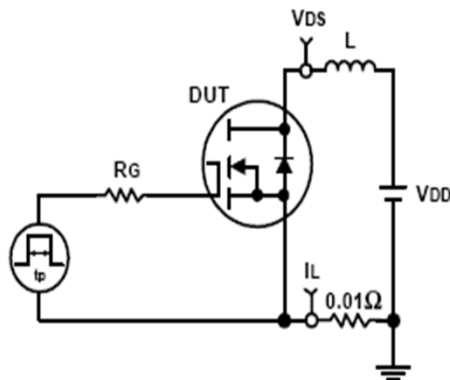
Typical Characteristics



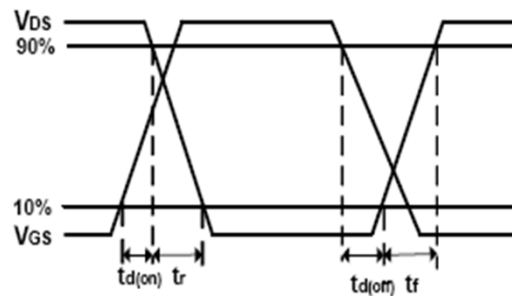
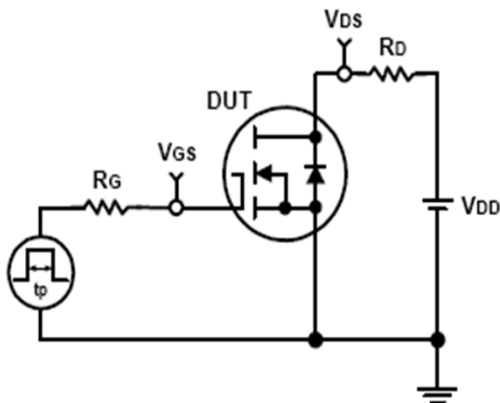
Typical Characteristics



Avalanche Test Circuit and Waveforms

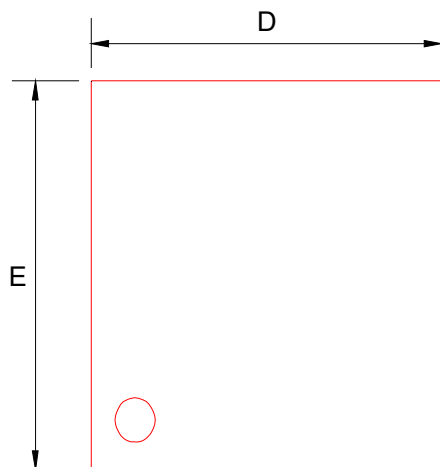


Switching Time Test Circuit and Waveforms

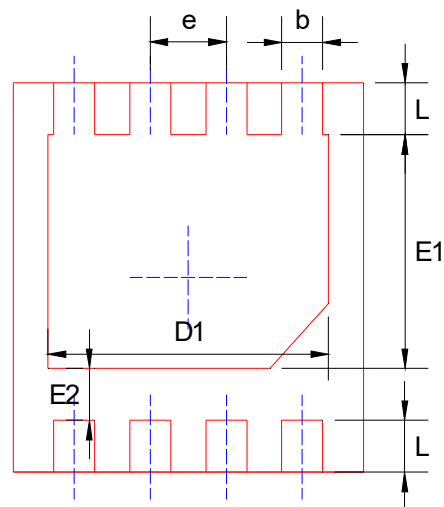


Package Information

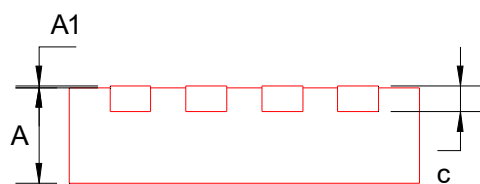
DFN3030



TOP VIEW



DORSAL VIEW



SIDE VIEW

SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.700	0.750	0.800	0.028	0.030	0.031
A1	0.000	0.015	0.050	0.000	0.001	0.002
b	0.300	0.350	0.400	0.012	0.014	0.016
c	0.100	0.200	0.300	0.004	0.008	0.012
D	2.900	3.000	3.100	0.114	0.118	0.122
E	2.900	3.000	3.100	0.114	0.118	0.122
D1	2.350	2.400	2.450	0.093	0.094	0.096
E1	1.750	1.800	1.850	0.069	0.071	0.073
E2	0.350	0.400	0.450	0.014	0.016	0.018
L	0.300	0.400	0.500	0.012	0.016	0.020
e	0.625	0.650	0.675	0.025	0.026	0.027