

Features

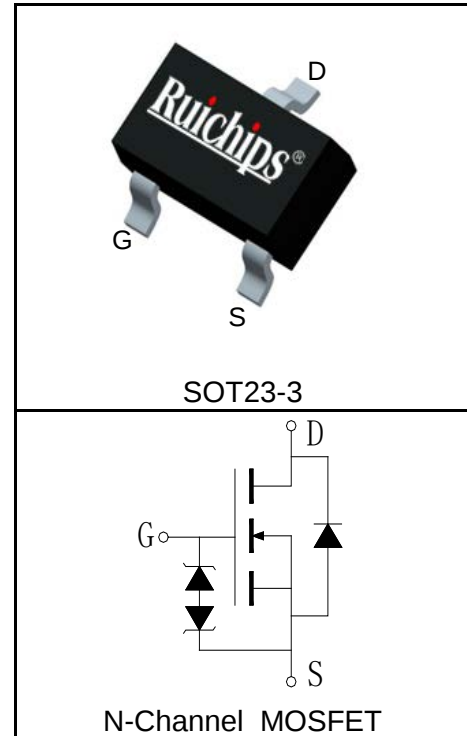
- 40V/12A,
 $R_{DS(ON)} = 17m\Omega(Typ.)@V_{GS}=10V$
 $R_{DS(ON)} = 24m\Omega(Typ.)@V_{GS}=4.5V$
- Uses Ruichips Advanced SGT™ Technology
- Ultra Low On-Resistance
- Very Fast Switching
- ESD protected
- Lead Free and Green Devices (RoHS Compliant)



Applications

- Load Switch
- Power Management
- Synchronous rectification

Pin Description



Absolute Maximum Ratings

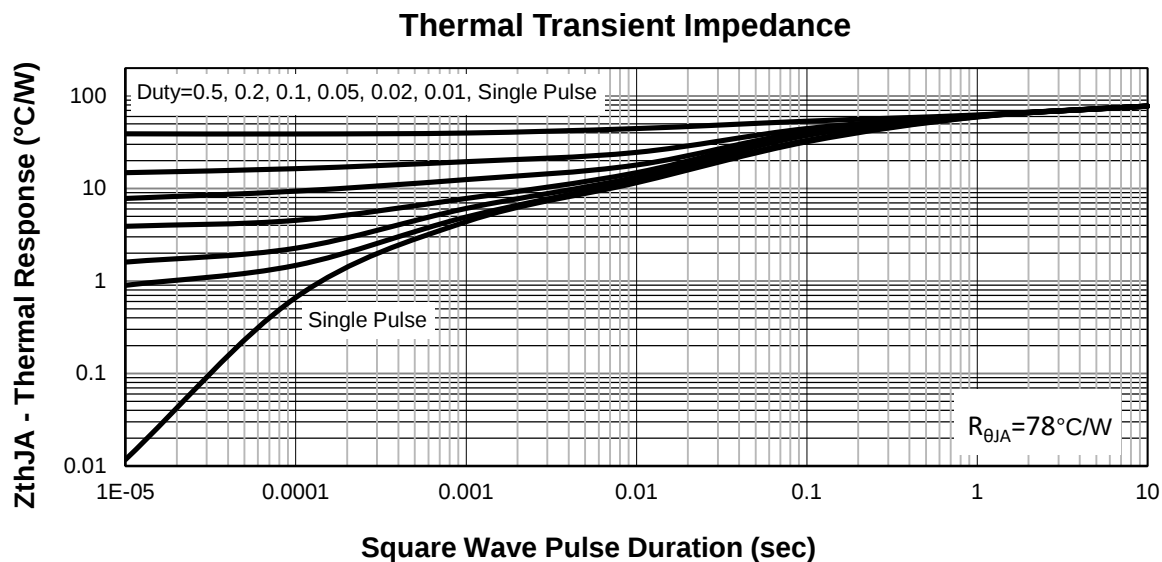
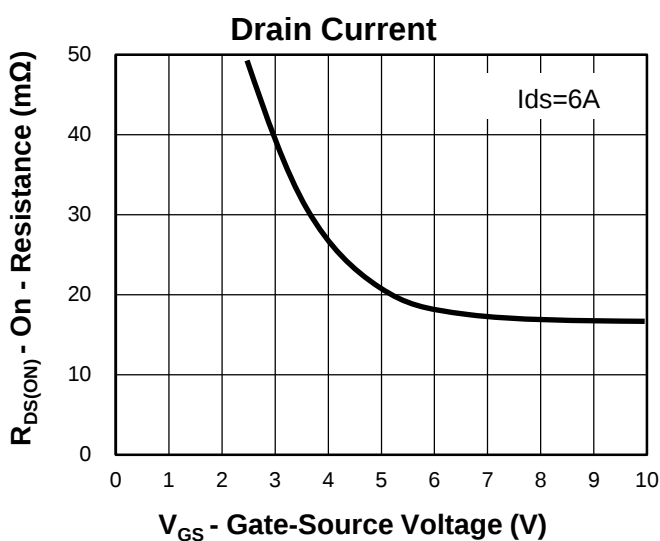
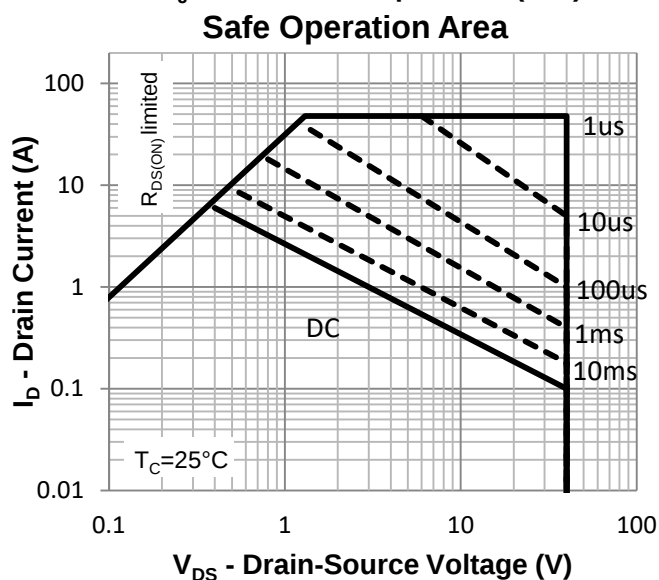
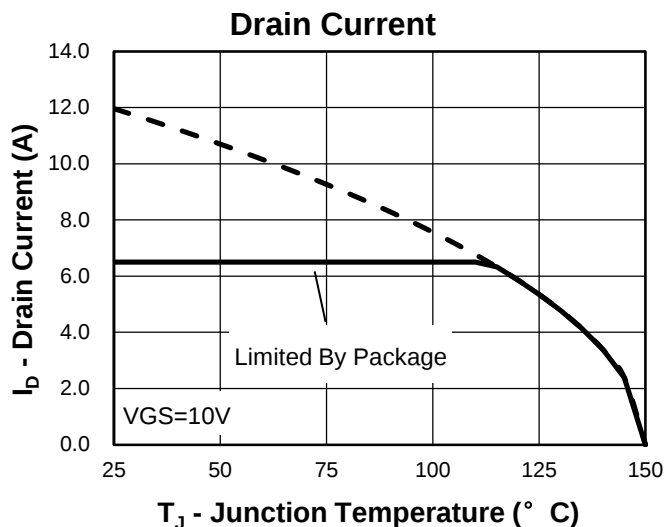
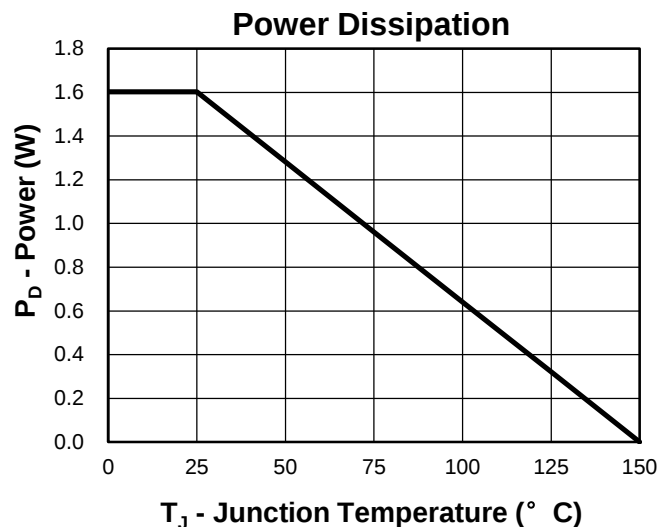
Symbol	Parameter		Rating	Unit
Common Ratings (T _A =25°C Unless Otherwise Noted)				
V _{DSS}	Drain-Source Voltage		40	V
V _{GSS}	Gate-Source Voltage		±20	
T _J	Maximum Junction Temperature		150	°C
T _{STG}	Storage Temperature Range		-55 to 150	°C
I _S	Diode Continuous Forward Current	T _A =25°C	12	A
Mounted on Large Heat Sink				
I _{DP} ^①	300μs Pulse Drain Current Tested	T _A =25°C	48	A
I _D ^②	Continuous Drain Current(V _{GS} =10V)	T _A =25°C	12	A
		T _A =70°C	9.5	
P _D	Maximum Power Dissipation	T _A =25°C	1.6	W
		T _A =70°C	1	
R _{θJC}	Thermal Resistance-Junction to Case		-	°C/W
R _{θJA} ^③	Thermal Resistance-Junction to Ambient		78	°C/W
Drain-Source Avalanche Ratings				
E _{AS} ^④	Avalanche Energy, Single Pulsed		TBD	mJ

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

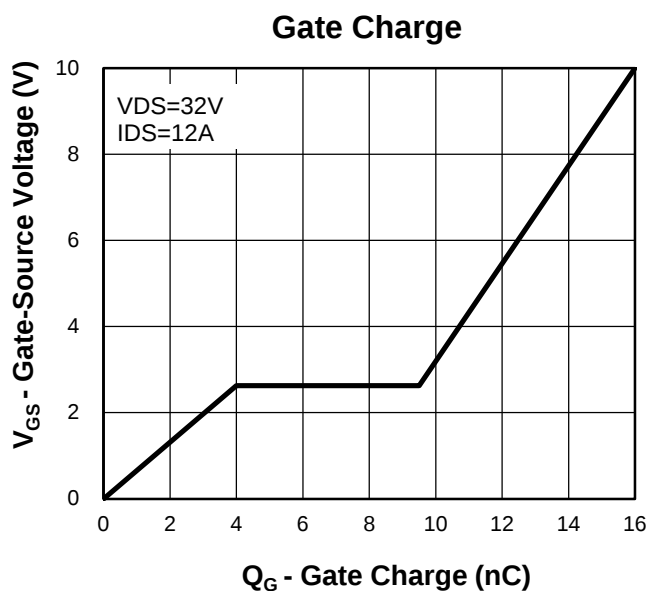
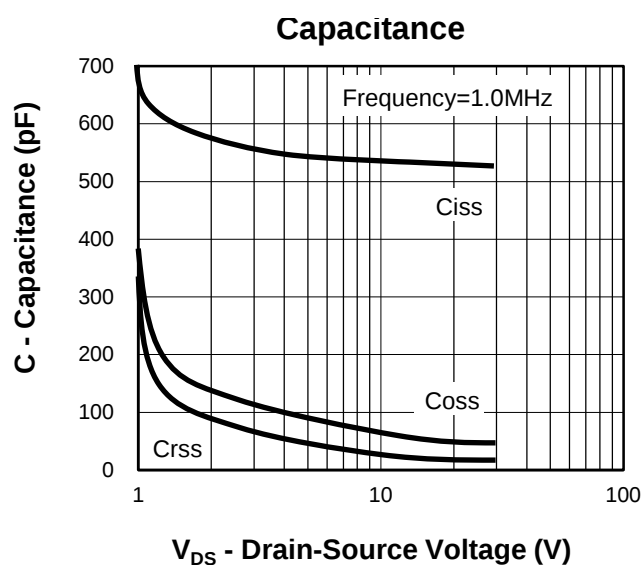
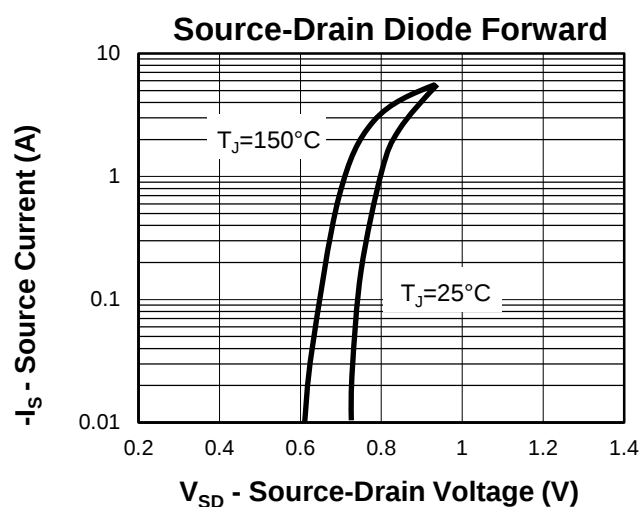
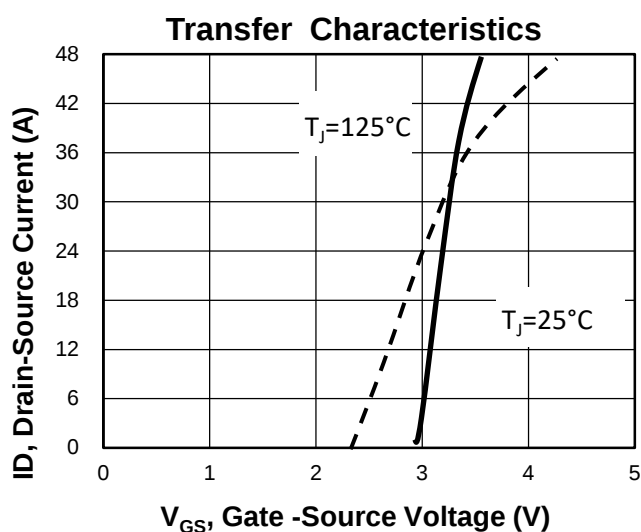
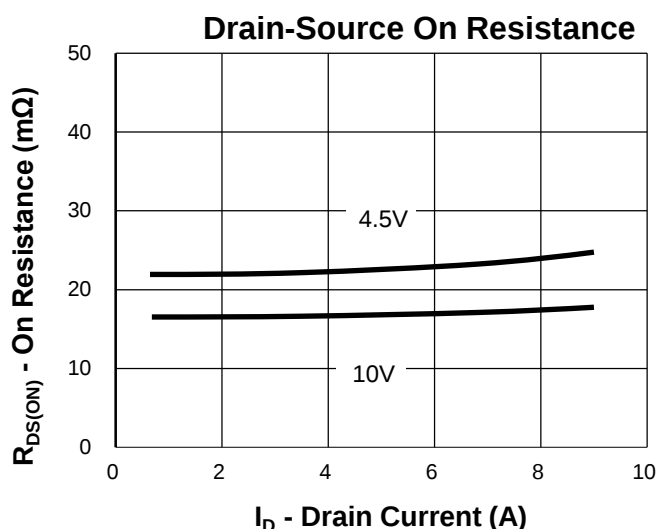
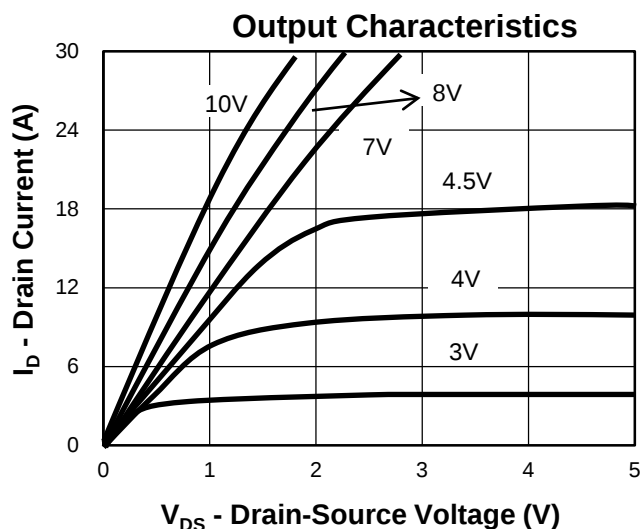
Symbol	Parameter	Test Condition	RUH40E12C			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	40			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =40V, V _{GS} =0V			1	μA
		T _J =125°C			30	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	1		2.5	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V			±10	μA
R _{DS(ON)} ^⑤	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =6A		17	20	mΩ
		V _{GS} =4.5V, I _{DS} =5A		24	28	mΩ
Diode Characteristics						
V _{SD} ^⑤	Diode Forward Voltage	I _{SD} =6A, V _{GS} =0V			1.2	V
t _{rr}	Reverse Recovery Time	I _{SD} =7A, dI _{SD} /dt=100A/μs		7.3		ns
Q _{rr}	Reverse Recovery Charge			2.1		nC
Dynamic Characteristics ^⑥						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz		1.4		Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =20V, Frequency=1.0MHz		545		pF
C _{oss}	Output Capacitance			63		
C _{rss}	Reverse Transfer Capacitance			5.2		
t _{d(ON)}	Turn-on Delay Time	V _{DD} =20V, I _{DS} =12A, V _{GEN} =10V, R _G =1Ω		4.5		ns
t _r	Turn-on Rise Time			9		
t _{d(OFF)}	Turn-off Delay Time			12		
t _f	Turn-off Fall Time			4		
Gate Charge Characteristics ^⑥						
Q _g	Total Gate Charge	V _{DS} =32V, V _{GS} =10V, I _{DS} =12A		16		nC
Q _{gs}	Gate-Source Charge			4		
Q _{gd}	Gate-Drain Charge			5.5		

- Notes:
- ① Pulse width limited by safe operating area.
 - ② Calculated continuous current based on maximum allowable junction temperature. The package limitation current is 6.5A.
 - ③ When mounted on 1 inch square copper board, $t \leq 10\text{sec}$. The value in any given application depends on the user's specific board design.
 - ④ Limited by T_{Jmax} . Starting $T_J = 25^{\circ}\text{C}$.
 - ⑤ Pulse test; Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
 - ⑥ Guaranteed by design, not subject to production testing.

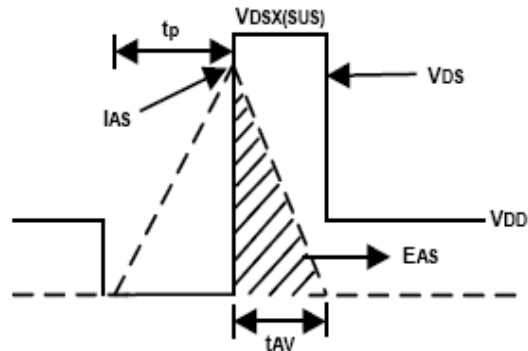
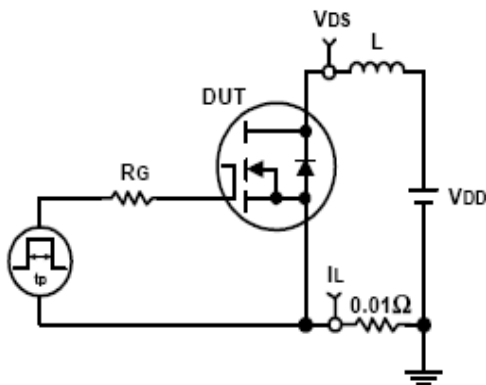
Typical Characteristics



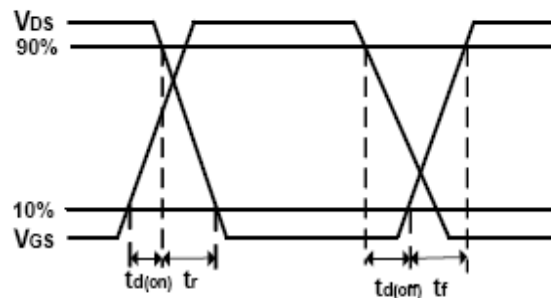
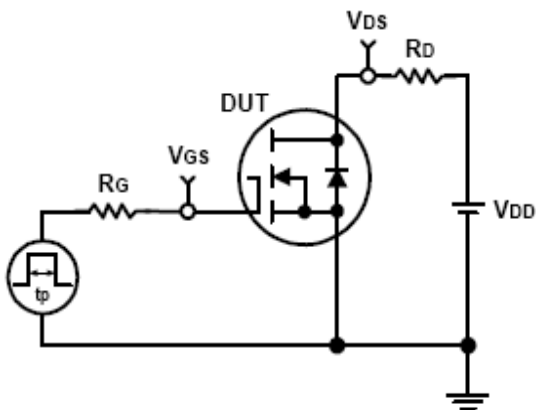
Typical Characteristics



Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms

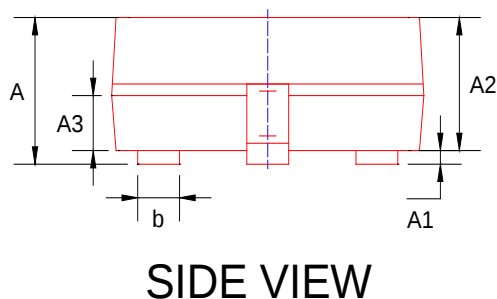
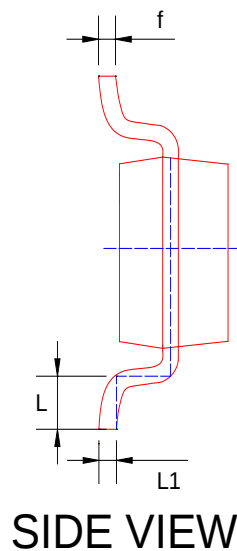
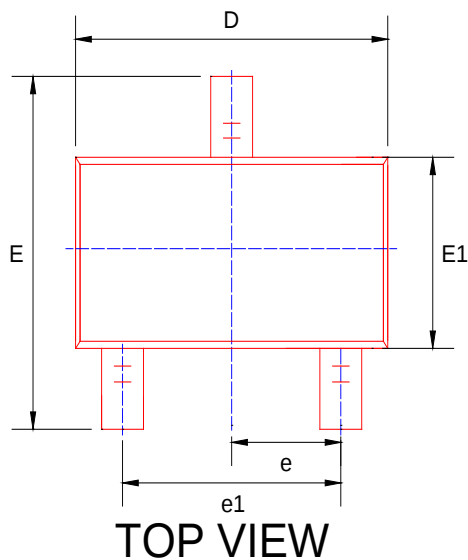


Ordering and Marking Information

Device	Marking	Package	Packaging	Quantity	Reel Size	Tape width
RUH40E12C	RUH40E12	SOT23-3	Tape&Reel	3000	7"	8mm

Package Information

SOT23-3



SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	—	—	1.300			0.051
A1	0.050	0.070	0.110	0.002	0.003	0.004
A2	1.050	1.100	1.150	0.041	0.043	0.045
A3	0.600	0.650	0.700	0.024	0.026	0.028
b	0.350	0.400	0.450	0.014	0.016	0.018
e	0.920	0.950	0.980	0.036	0.037	0.039
e1	1.850	1.900	1.950	0.073	0.075	0.077
D	2.820	2.870	2.920	0.111	0.113	0.115
E	2.650	2.800	2.950	0.104	0.110	0.116
E1	1.550	1.600	1.650	0.061	0.063	0.065
L	0.400	0.450	0.500	0.016	0.018	0.020
f	0.065	0.125	0.185	0.003	0.005	0.007
L1	0.25BSC			0.010BSC		