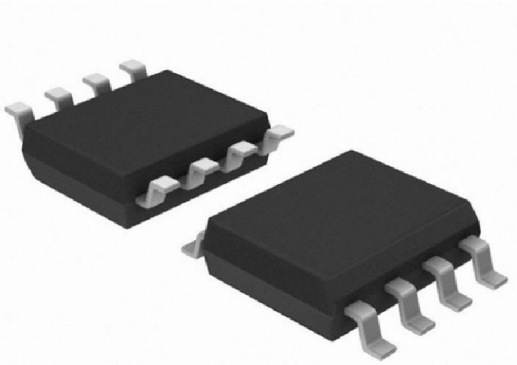
Description

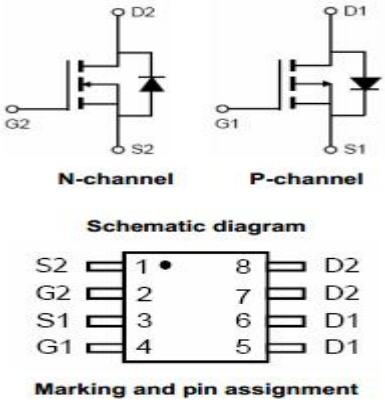
This P-Channel and N-channel MOSFETs use advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge. It can be used in a wide variety of applications.

Features

BVDSS	RDSON	ID
40V	26 mΩ	7.2A
-40V	40mΩ	-6.5A

1) Low gate charge.
2) Green device available.
3) Advanced high cell denity trench technology for ultra $R_{DS(ON)}$.
4) Excellent package for good heat dissipation.





Absolute Maximum Ratings T_C=25℃,unless otherwise noted

Symbol	Parameter	Ratings		Units
		N-Ch	P-Ch	
V_{DS}	Drain-Source Voltage	40	-40	V
V_{GS}	Gate-Source Voltage	±20	±20	V
I_D	Continuous Drain Current-[1]	7.2	-6.5	A
	Continuous Drain Current-T_C=100℃	5.6	-5.1	
	Pulsed Drain Current[2]	14.5	-13	
E_{AS}	Single Pulse Avalanche Energy[3]	28	66	mJ
P_D	Power Dissipation[4]	2.5	3.1	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	-55 to +150	℃

Thermal Characteristics

Symbol	Parameter	Ratings	Units
$R_{\Theta JC}$	Thermal Resistance,Junction to Case[1]	50	℃/W
$R_{\Theta JA}$	Thermal Resistance,Junction to Ambient[1]	85	

Package Marking and Ordering Information

Part NO.	Marking	Package
RYN40P8SP	RYN40P8SP	SOP-8

N-Channel Electrical Characteristics T_C=25℃ unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250μA	40	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=32V	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0A	---	---	±100	nA
On Characteristics						
$V_{GS(th)}$	GATE-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	1	1.5	2.5	V
$R_{DS(ON)}$	Drain-Source On Resistance[2]	V_{GS}=10V,I_D=6A	---	22	26	mΩ
		V_{GS}=2.5V,I_D=5A	---	---	---	
G_{FS}	Forward Transconductance	V_{DS}=5V, I_D=12A	---	14	---	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=15V, V_{GS}=0V, f=1MHz	---	593	---	pF
C_{oss}	Output Capacitance		---	76	---	
C_{rss}	Reverse Transfer Capacitance		---	56	---	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DS}=20V, V_{GS}=10V,R_{GEN}=3.3Ω	---	8.9	---	ns
t_r	Rise Time		---	2.2	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	41	---	ns
t_f	Fall Time		---	2.7	---	ns
Q_g	Total Gate Charge	V_{GS}=4.5V, V_{DS}=20V, I_D=6A	---	5.5	---	nC
Q_{gs}	Gate-Source Charge		---	1.25	---	nC
Q_{gd}	Gate-Drain “Miller” Charge		---	2.5	---	nC
Drain-Source Diode Characteristics						
V_{SD}	Source-Drain Diode Forward Voltage[2]	V_{GS}=0V,I_S=1A	---	---	1.2	V
t_{rr}	Reverse Recovery Time	I_F=7A,di/dt=100A/μS	---	---	---	ns
Q_{rr}	Reverse Recovery Charge		---	---	---	nC

Notes:

1. The data tested by surface mounted on a 1 inch^2 FR-4 board 2OZ copper.
2. The data tested by pulsed,pulse width≤300us,duty cycle≤2%
3. The EAS data shows Max.rating.The test condition is V_{DD}=25v,V_{GS}=10V,L=0.1mH,i_{AS}=17.8A
4. The power dissipation is limited by 150℃ junction temperature.

P-Channel Electrical Characteristics T_C=25℃ unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=-250μA	-40	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=-32V	---	---	-1	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0A	---	---	±100	nA
On Characteristics						
$V_{GS(th)}$	GATE-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=-250μA	-1.0	-1.6	-2.5	V
$R_{DS(ON)}$	Drain-Source On Resistance[2]	V_{GS}=-10V,I_D=-6A	---	32	40	mΩ
		V_{GS}=-4.5V,I_D=-4A	---	55	65	
G_{FS}	Forward Transconductance	V_{DS}=-5V, I_D=-6A	---	12	---	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=-15V, V_{GS}=0V, f=1MHz	---	1004	---	pF
C_{oss}	Output Capacitance		---	108	---	
C_{rss}	Reverse Transfer Capacitance		---	80	---	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DS}=-15V, V_{GS}=-10V,R_{GEN}=3.3Ω	---	19.2	---	ns
t_r	Rise Time		---	12.8	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	48.6	---	ns
t_f	Fall Time		---	4.6	---	ns
Q_g	Total Gate Charge	V_{GS}=-4.5V, V_{DS}=-20V, I_D=-6A	---	9	---	nC
Q_{gs}	Gate-Source Charge		---	2.54	---	nC
Q_{gd}	Gate-Drain “Miller” Charge		---	3.1	---	nC
Drain-Source Diode Characteristics						
V_{SD}	Source-Drain Diode Forward Voltage[2]	V_{GS}=0V,I_S=-1A	---	---	-1	V
t_{rr}	Reverse Recovery Time	I_F=-4A,di/dt=100A/μS	---	---	---	ns
Q_{rr}	Reverse Recovery Charge		---	---	---	nC

Notes:

1. The data tested by surface mounted on a 1 inch^2 FR-4 board 2OZ copper.
2. The data tested by pulsed,pulse width≤300us,duty cycle≤2%
3. The EAS data shows Max.rating.The test condition is V_{DD}=-25v,V_{GS}=-10V,L=0.1mH,i_{AS}=-27.2A
4. The power dissipation is limited by 150℃ junction temperature.

N-Channel Typical Characteristics T_J=25℃ unless otherwise noted

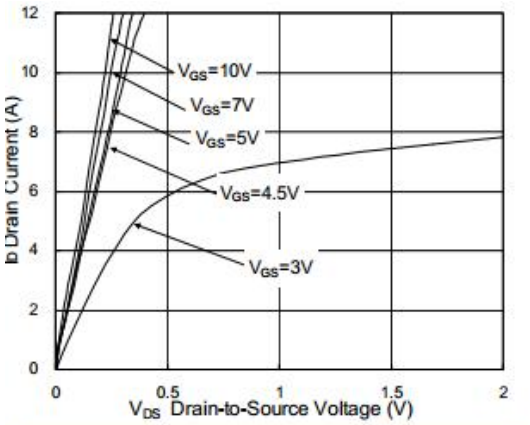


Fig.1 Typical Output Characteristics

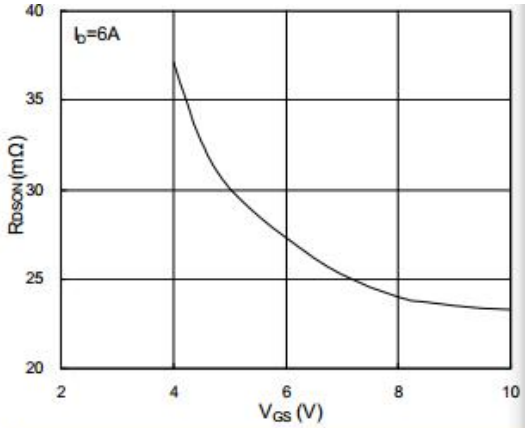


Fig.2 On-Resistance vs. G-S Voltage

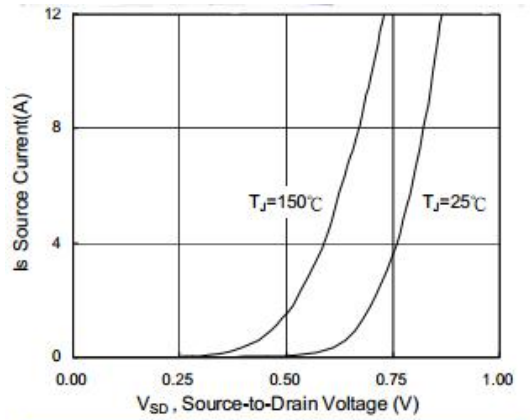


Fig.3 Forward Characteristics of Reverse

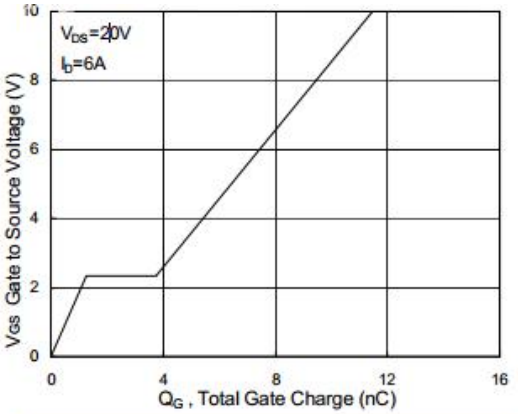


Fig.4 Gate-Charge Characteristics

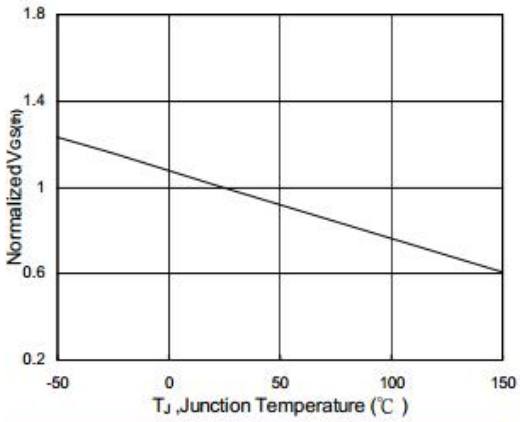


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

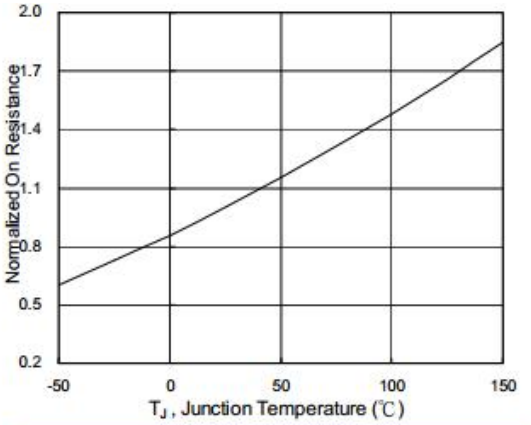


Fig.6 Normalized R_{DSON} vs. T_J

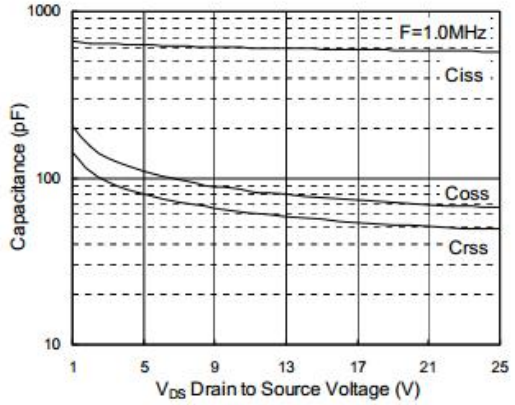


Fig.7 Capacitance

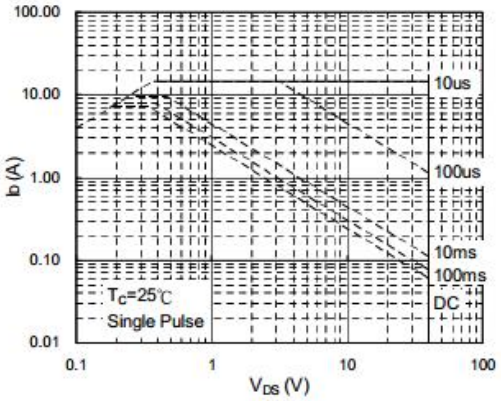


Fig.8 Safe Operating Area

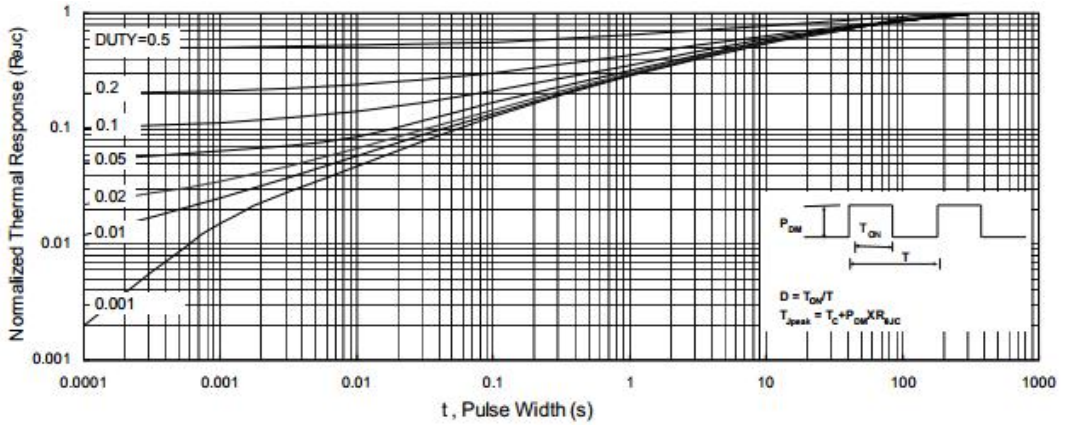


Fig.9 Normalized Maximum Transient Thermal Impedance

P-Channel Typical Characteristics T_J=25℃ unless otherwise noted

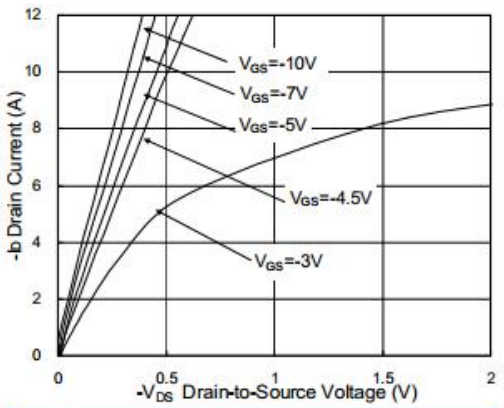


Fig.1 Typical Output Characteristics

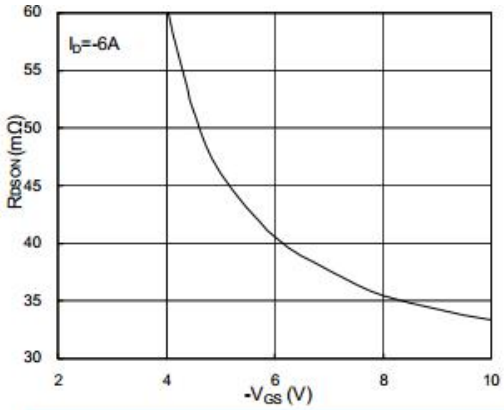


Fig.2 On-Resistance v.s Gate-Source

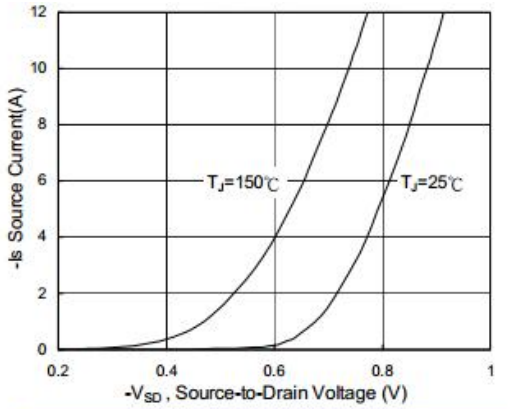


Fig.3 Forward Characteristics of Reverse

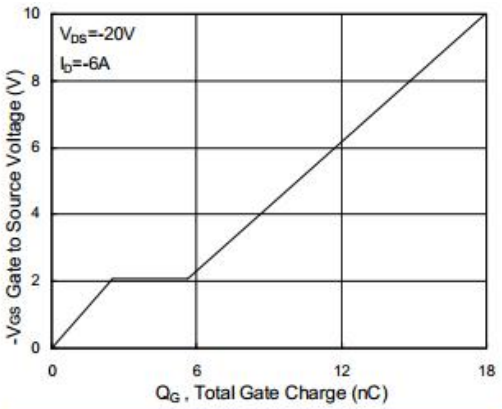


Fig.4 Gate-Charge Characteristics

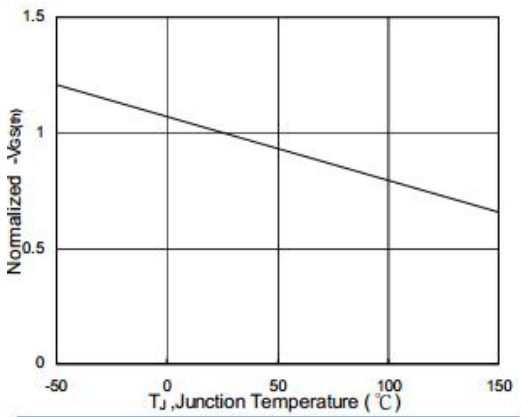


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

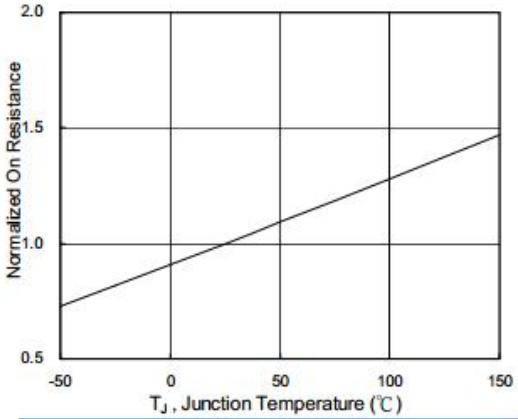


Fig.6 Normalized R_{DSON} v.s T_J

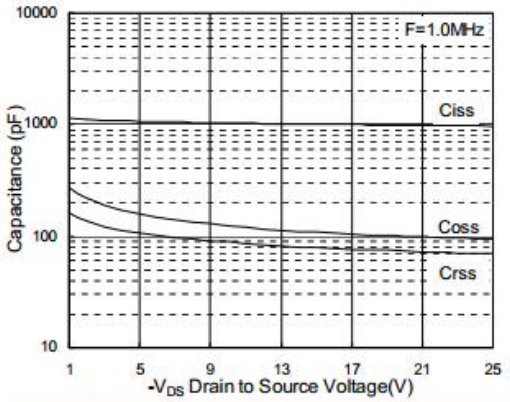


Fig.7 Capacitance

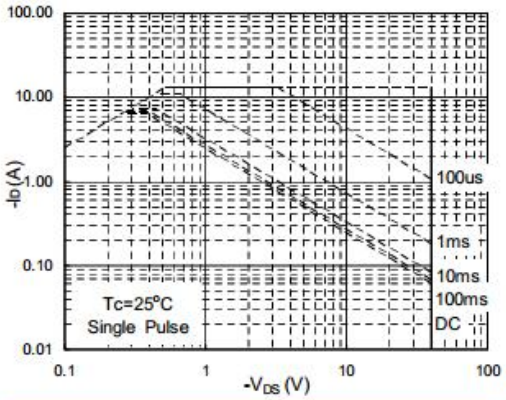


Fig.8 Safe Operating Area

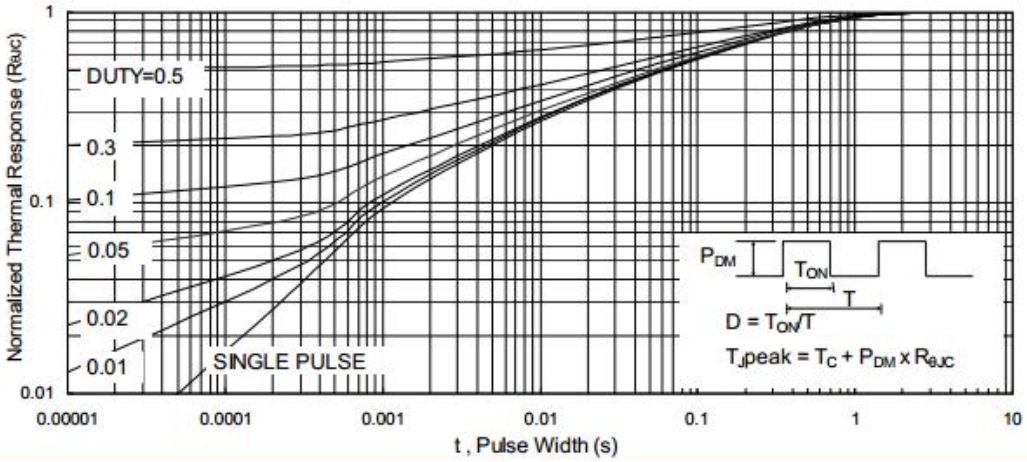


Fig.9 Normalized Maximum Transient Thermal Impedance