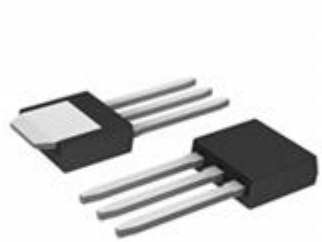
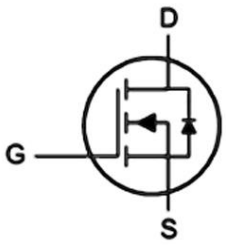
Description

This N-Channel MOSFET uses 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

1) V_{DS}=60V,I_D=50A,$R_{DS(ON)}$< 20mΩ @V_{GS}=10V
2) Low gate charge.
3) Green device available.
4) Advanced high cell denity trench technology for ultra $R_{DS(ON)}$.
5) Excellent package for good heat dissipation.





Absolute Maximum Ratings T_C=25℃,unless otherwise noted

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Continuous Drain Current-	50	A
	Continuous Drain Current-T_C=100℃	35.4	
	Pulsed Drain Current[1]	-	
E_{AS}	Single Pulse Avalanche Energy[2]	300	mJ
P_D	Power Dissipation T_C=25℃/ T_C=100℃	85	W
		-	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +175	℃

Thermal Characteristics

Symbol	Parameter	Ratings	Units
$R_{\theta JC}$	Thermal Resistance,Junction to Case	1.8	℃/W

Package Marking and Ordering Information

Part NO.	Marking	Package
RYN60FAC	RYN60FAC	TO-251

Electrical Characteristics T_C=25℃ unless otherwise noted

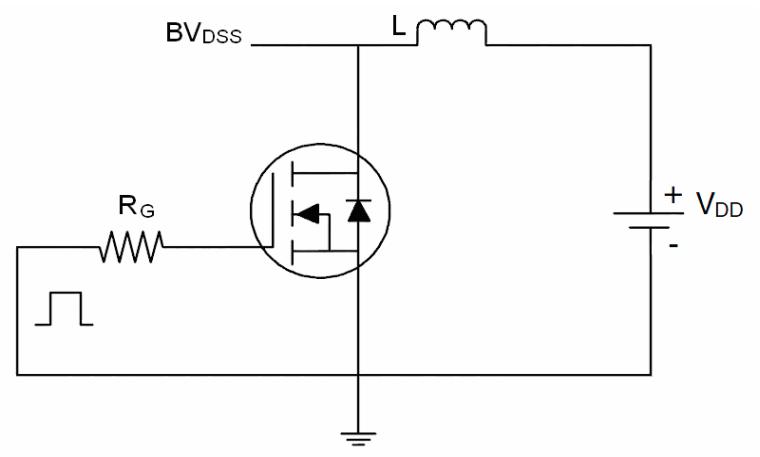
Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250μA	60	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=60V	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0V	---	---	±100	nA
On Characteristics						
$V_{GS(th)}$	GATE-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	1.4	1.9	2.5	V
$R_{DS(ON)}$	Drain-Source On Resistance[3]	V_{GS}=10V,I_D=20A	---	14	20	mΩ
		V_{GS}=4.5V	---	---	---	
G_{FS}	Forward Transconductance	V_{DS}=5V, I_D=20A	18	-	---	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{D=30}$V, V_{GS}=0V, f=1MHz	---	2050	--	pF
C_{oss}	Output Capacitance		---	158	---	
C_{rss}	Reverse Transfer Capacitance		---	120	---	
R_g	Gate Resistance	f=1MHz	---	--	-	Ω
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time[3]	V_{DD}=30V, I_D=-A, V_{GS}=10V,R_{GEN}=3Ω	---	7.4	---	ns
t_r	Rise Time[2,3]		---	5.1	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	28.2	---	ns
t_f	Fall Time[2,3]		---	5.5	---	ns
Q_g	Total Gate Charge[3]	V_{GS}=10V, V_{DS}=30V, I_D=20A	---	50	30	nC
Q_{gs}	Gate-Source Charge		---	6	---	nC
Q_{gd}	Gate-Drain “Miller” Charge		---	15	---	nC
Drain-Source Diode Characteristics						
V_{SD}	Source-Drain Diode Forward Voltage[3]	V_{GS}=0V,I_S=20A,Tj=25℃	---	---	1.2	V
t_{rr}	Reverse Recovery Time[3]	I_F=20A,di/dt=100A/μS	---	48	--	ns
Q_{rr}	Reverse Recovery Charge		---	40	---	nC

Notes:

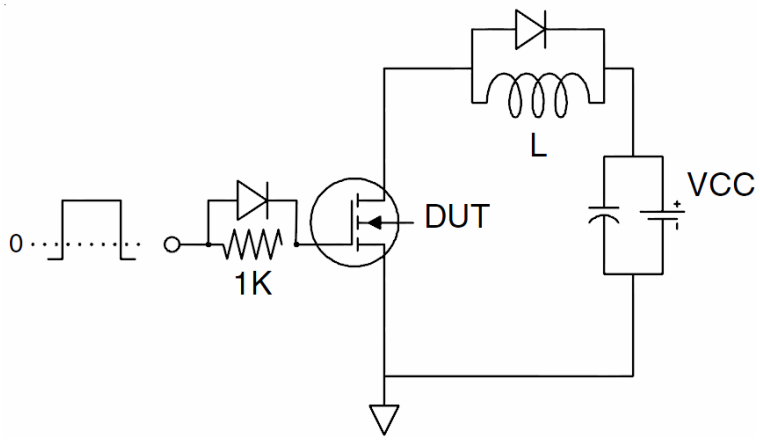
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. EAS condition : Tj=25℃,VDD=30V,VG=10V,L=0.5mH,Rg=25Ω

Test Circuit

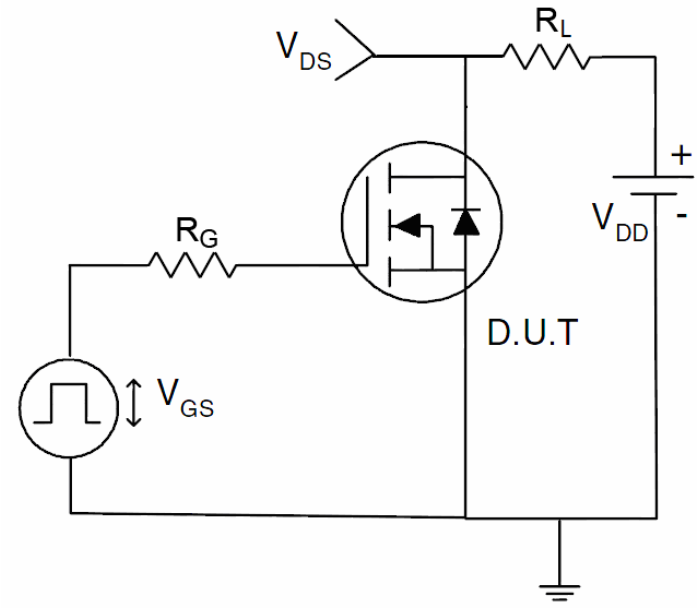
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

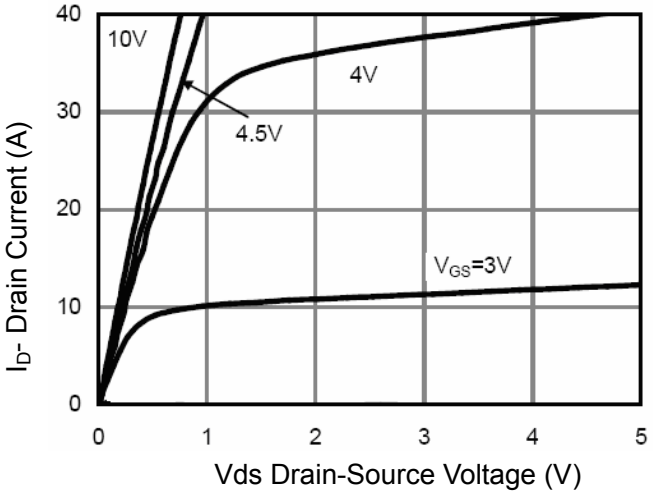


Figure 1 Output Characteristics

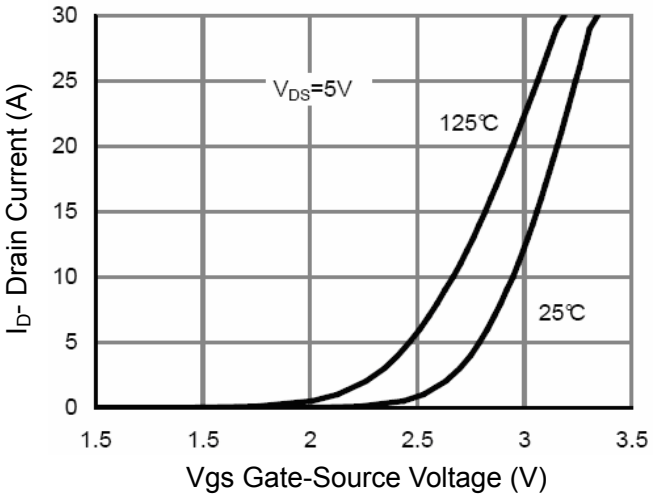


Figure 2 Transfer Characteristics

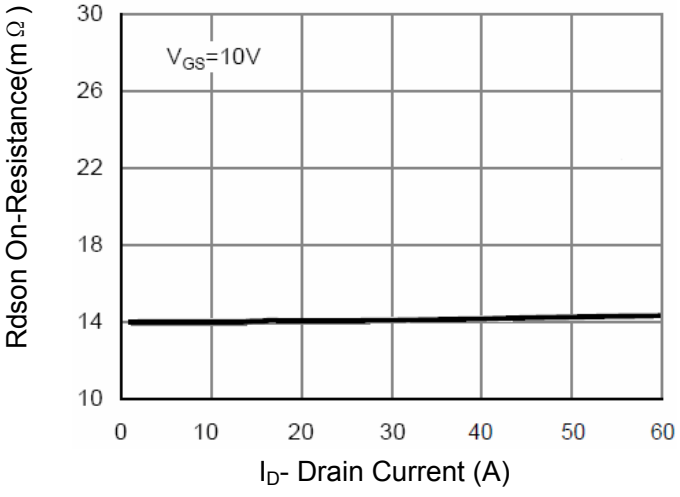


Figure 3 Rdson- Drain Current

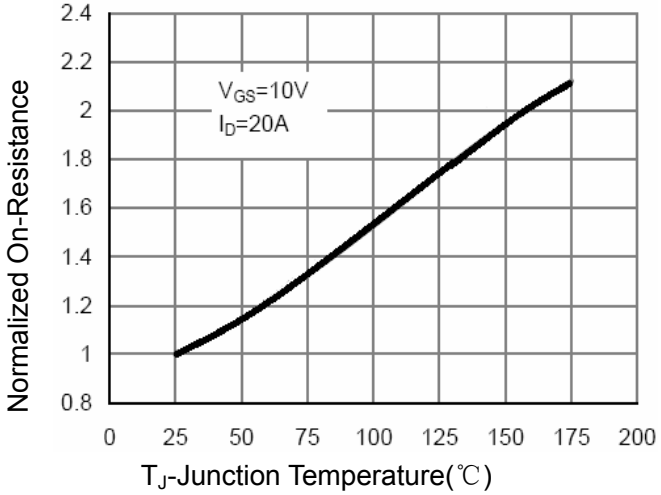


Figure 4 Rdson-Junction Temperature

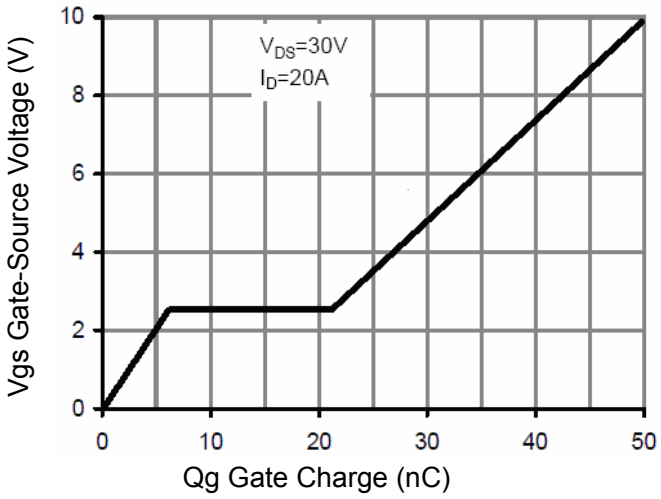


Figure 5 Gate Charge

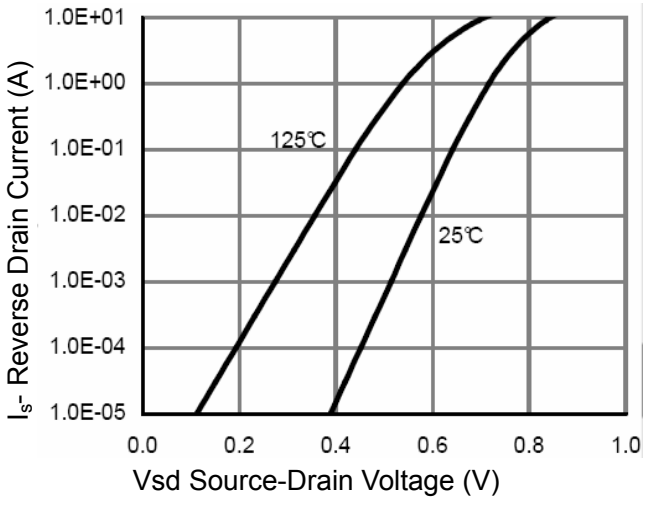


Figure 6 Source- Drain Diode Forward

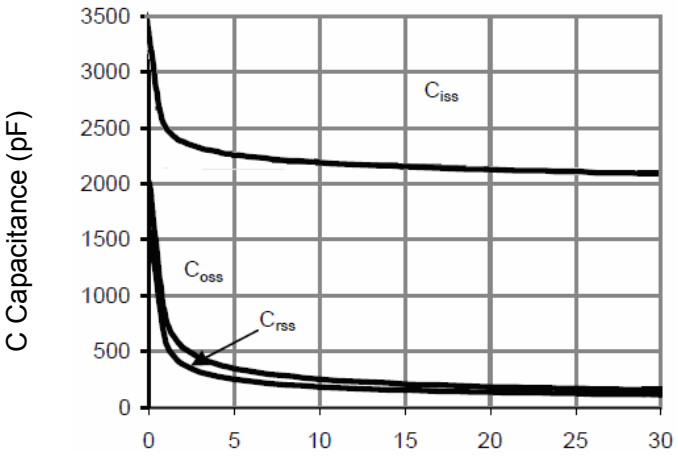


Figure 7 Capacitance vs Vds

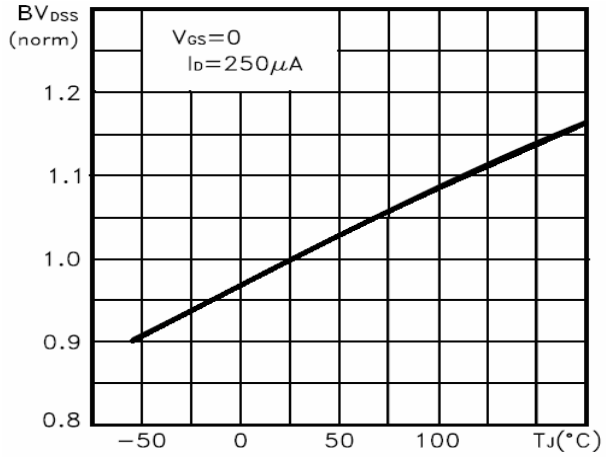


Figure 9 BV_{DSS} vs Junction Temperature

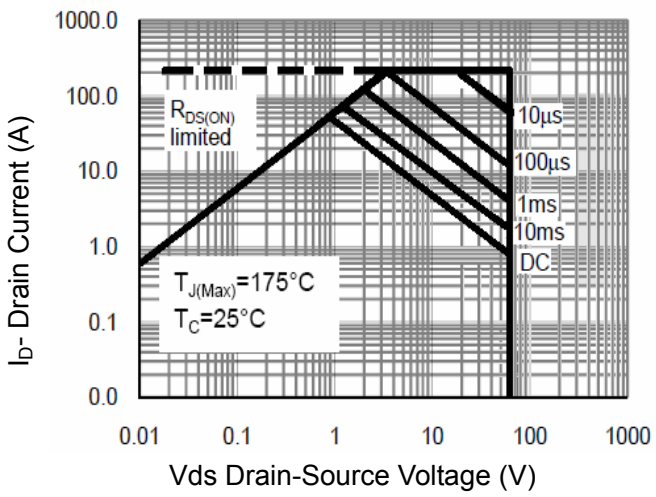


Figure 8 Safe Operation Area

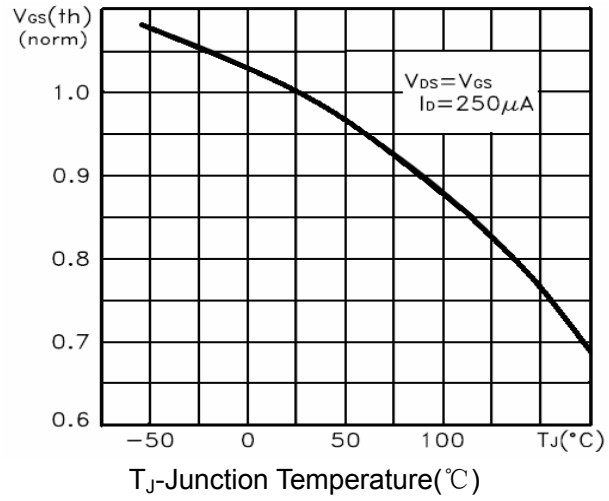


Figure 10 $V_{GS(th)}$ vs Junction Temperature

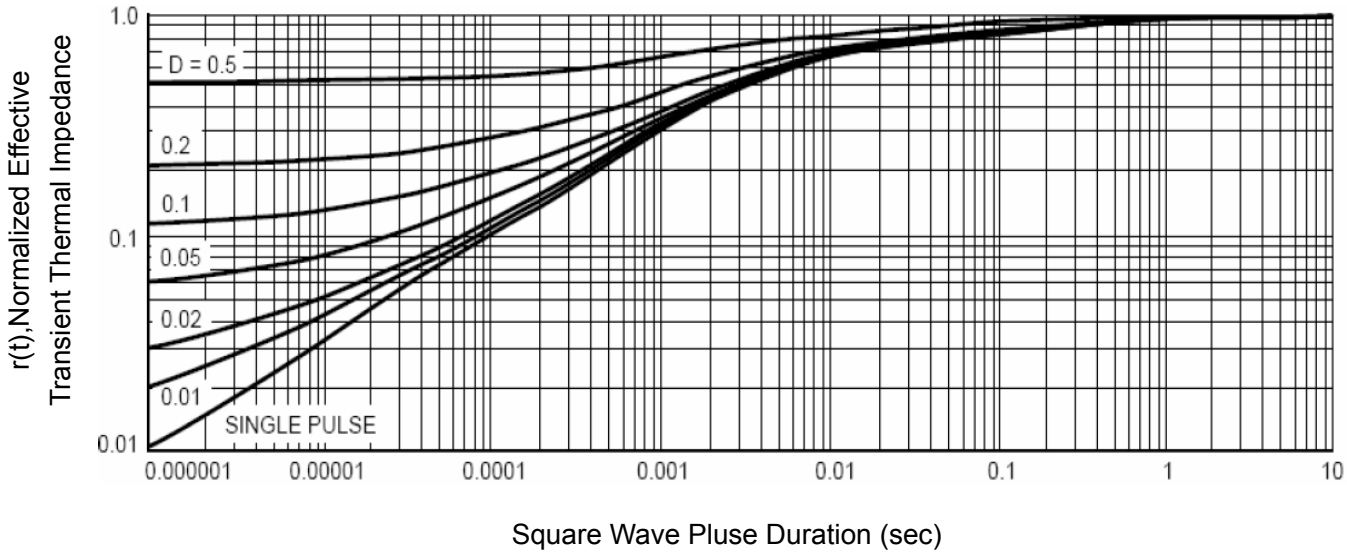


Figure 11 Normalized Maximum Transient Thermal Impedance