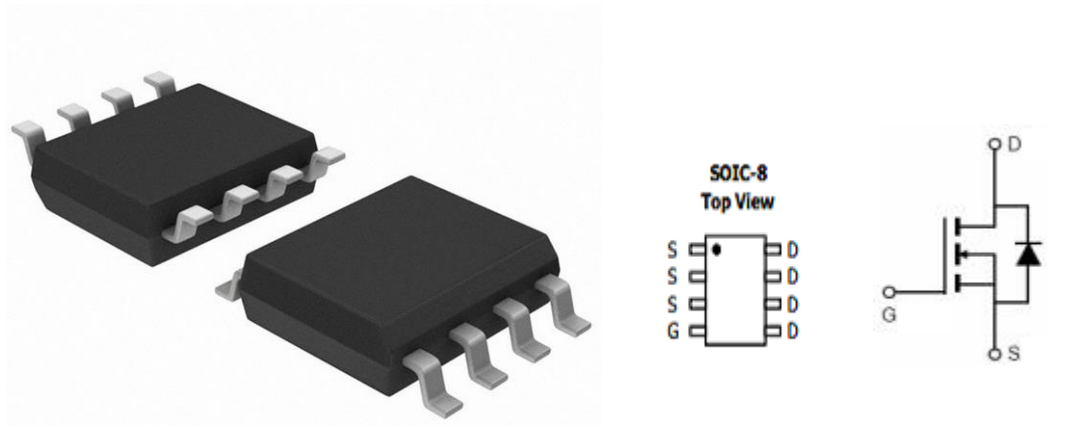


Description

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) $V_{DS}=30V, I_D=12A, R_{DS(ON)} < 12m\ \Omega @ V_{GS}=10V$
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra $R_{DS(ON)}$.
- 5) Excellent package for good heat dissipation.



Absolute Maximum Ratings $T_C=25^\circ C$, unless otherwise noted

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current ⁻¹	12	A
	Continuous Drain Current- $T_C=100^\circ C$	6	
	Pulsed Drain Current	50	
P_D	Power Dissipation	2.5	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ C$

Thermal Characteristics

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case ²	50	$^\circ C/W$

Package Marking and Ordering Information

Part NO.	Marking	Package
RYN30B2SP	30B2SP	SOP-8

Electrical Characteristics $T_C=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\ \mu\text{A}$	30	33	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS}=0V, V_{DS}=30V$	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0A$	---	---	± 100	nA
On Characteristics³						
$V_{GS(th)}$	GATE-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\ \mu\text{A}$	1	1.6	3	V
$R_{DS(ON)}$	Drain-Source On Resistance	$V_{GS}=10V, I_D=10A$	---	8	12	m Ω
		$V_{GS}=4.5V, I_D=5A$	---	11	16	
G_{FS}	Forward Transconductance	$V_{DS}=5V, I_D=10A$	15	---	---	S
Dynamic Characteristics⁴						
C_{iss}	Input Capacitance	$V_{DS}=15V, V_{GS}=0V,$ $f=1\text{MHz}$	---	1550	---	pF
C_{oss}	Output Capacitance		---	300	---	
C_{rss}	Reverse Transfer Capacitance		---	180	---	
Switching Characteristics⁴						
$t_{d(on)}$	Turn-On Delay Time	$V_{DD}=25V, I_D=1A,$ $R_{GEN}=6\ \Omega, V_{GS}=10V$	---	30	---	ns
t_r	Rise Time		---	20	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	100	---	ns
t_f	Fall Time		---	80	---	ns
Q_g	Total Gate Charge	$V_{GS}=4.5V, V_{DS}=15V$ $I_D=10A$	---	13	---	nC
Q_{gs}	Gate-Source Charge		---	5.5	---	nC
Q_{gd}	Gate-Drain "Miller" Charge		---	3.5	---	nC
Drain-Source Diode Characteristics						
V_{SD}	Source-Drain Diode Forward Voltage ³	$V_{GS}=0V, I_S=10A$	---	---	1.2	V

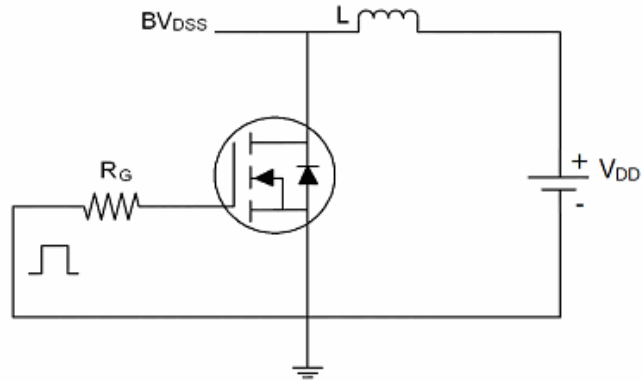
Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10\text{ sec}$.
3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

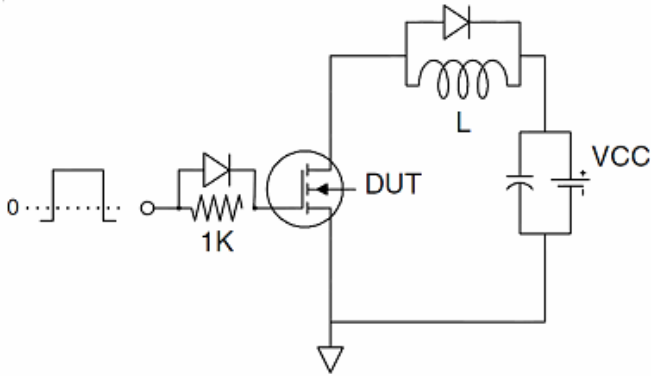
Typical Characteristics $T_J=25^{\circ}\text{C}$ unless otherwise noted

Test Circuit

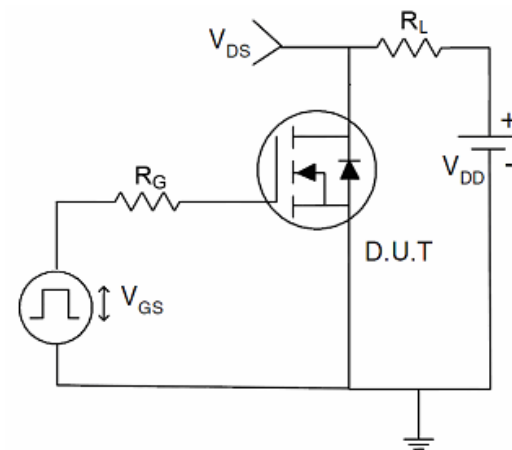
1) E_{AS} Test Circuits



2) Gate Charge Test Circuit:



3) Switch Time Test Circuit:



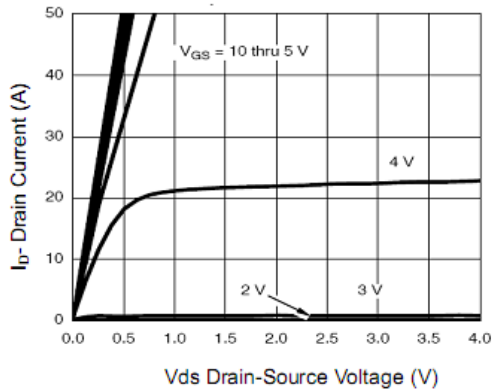


Figure 1 Output Characteristics

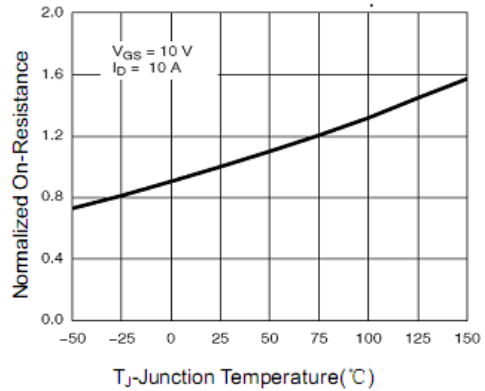


Figure 4 R_{Dson} -Junction Temperature

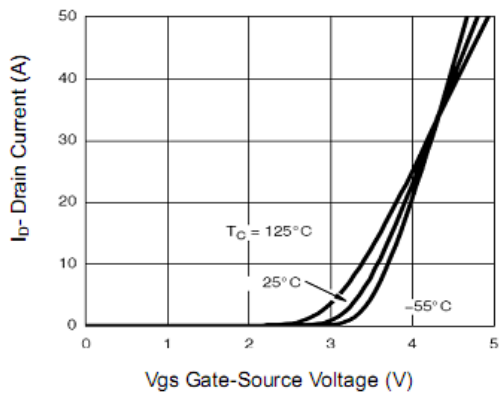


Figure 2 Transfer Characteristics

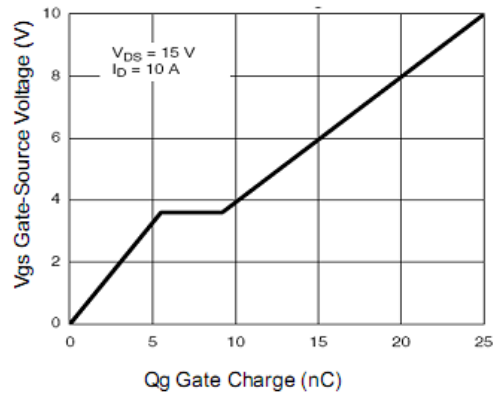


Figure 5 Gate Charge

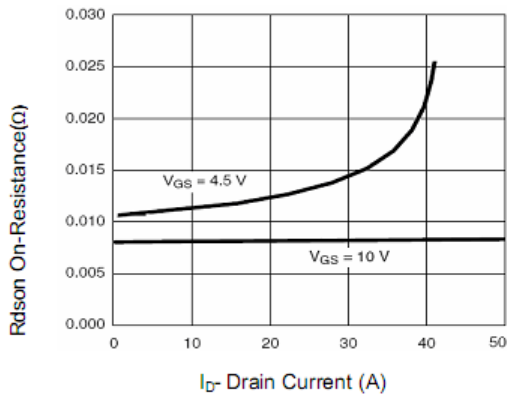


Figure 3 R_{Dson} - Drain Current

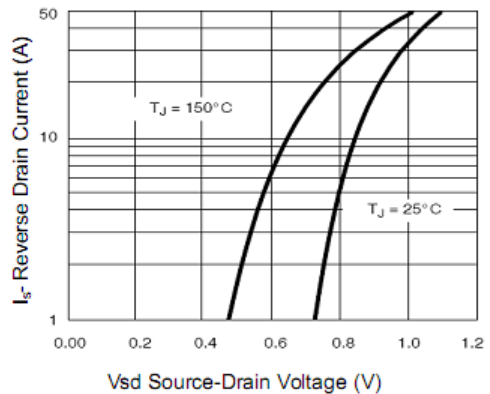


Figure 6 Source- Drain Diode Forward

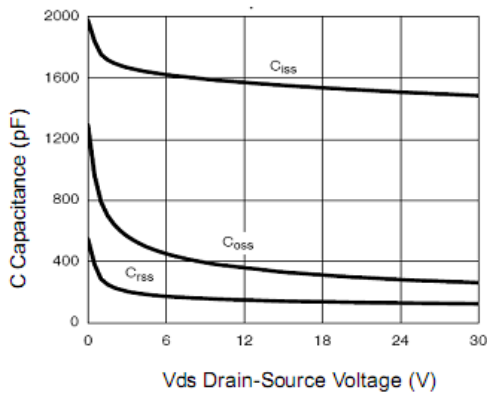


Figure 7 Capacitance vs Vds

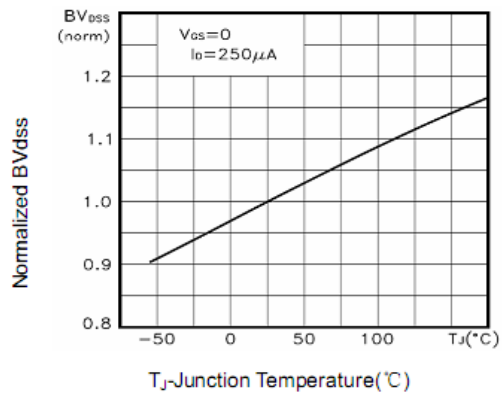


Figure 9 BV_{DSS} vs Junction Temperature

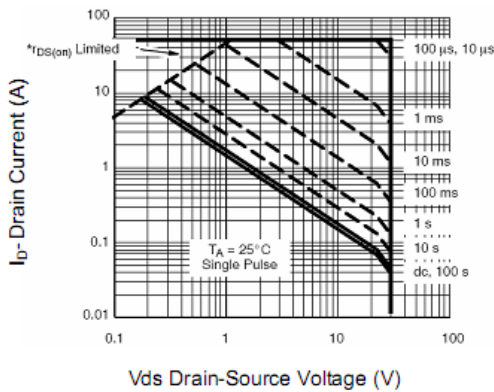


Figure 8 Safe Operation Area

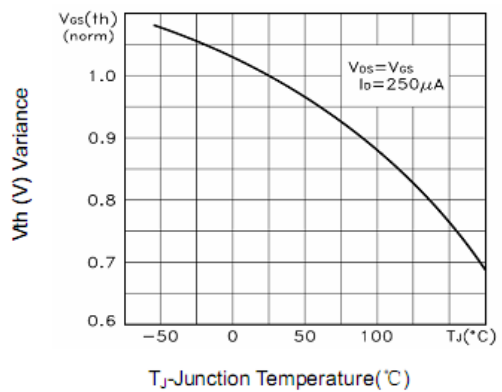


Figure 10 $V_{GS(th)}$ vs Junction Temperature

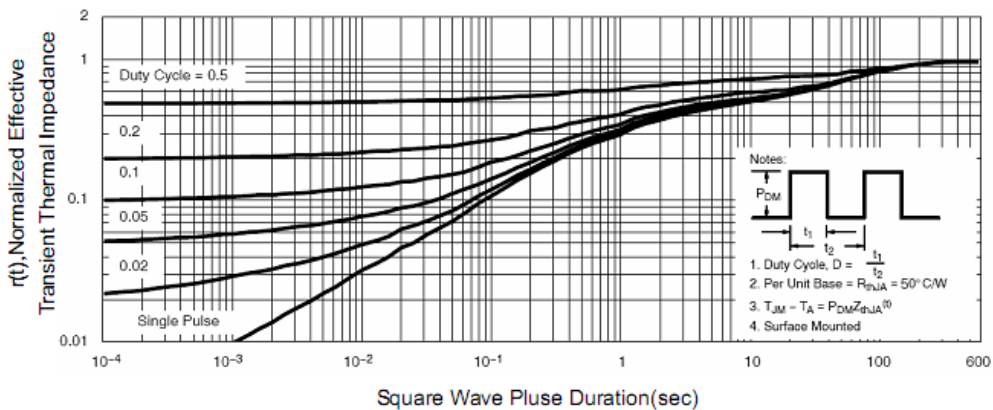


Figure 11 Normalized Maximum Transient Thermal Impedance