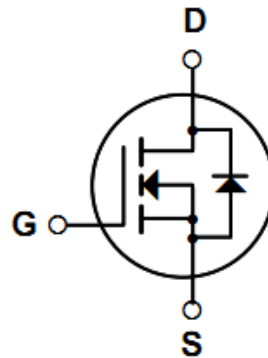
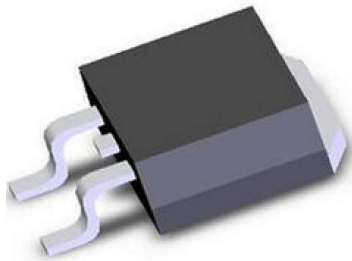


## Description

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)  $V_{DS}=71V, I_D=90A, R_{DS(on)} < 6.8m\ \Omega @ V_{GS}=10V$
- 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 $T_C=25^\circ\text{C}$ , unless otherwise noted

Symbol	Parameter	Ratings	Units
$V_{DS}$	Drain-Source Voltage	71	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Continuous Drain Current <sup>-1</sup>	90	A
	Continuous Drain Current- $T_C=100^\circ\text{C}$	63	
	Pulsed Drain Current	320	A
$P_D$	Power Dissipation	170	W
$E_{AS}$	Single Pulse Avalanche Energy <sup>5</sup>	550	mJ
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	-55 to +175	$^\circ\text{C}$

## Thermal Characteristics

Symbol	Parameter	Ratings	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case <sup>2</sup>	0.88	$^\circ\text{C}/\text{W}$

## Package Marking and Ordering Information

Part NO.	Marking	Package
RYN71A90T	N71A90T	TO-263

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>Off Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\ \mu\text{A}$	71	74	---	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{GS}=0V, V_{DS}=500V$	---	---	1	$\mu\text{A}$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 30V, V_{DS}=0V$	---	---	$\pm 100$	nA
<b>On Characteristics<sup>3</sup></b>						
$V_{GS(th)}$	GATE-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\ \mu\text{A}$	2	3	4	V
$R_{DS(ON)}$	Drain-Source On Resistance	$V_{GS}=10V, I_D=40A$	---	5.9	6.8	$\text{m}\Omega$
<b>Dynamic Characteristics<sup>4</sup></b>						
$C_{iss}$	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, f=1\text{MHz}$	---	4871	---	pF
$C_{oss}$	Output Capacitance		---	630.6	---	
$C_{rss}$	Reverse Transfer Capacitance		---	410.3	---	
<b>Switching Characteristics<sup>4</sup></b>						
$t_{d(on)}$	Turn-On Delay Time	$V_{DS}=30V, I_D=42A,$ $R_{GEN}=10\ \Omega,$ $V_{GS}=10V$	---	36.1	---	ns
$t_r$	Rise Time		---	54.3	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	85.2	---	ns
$t_f$	Fall Time		---	37.3	---	ns
$Q_g$	Total Gate Charge	$V_{GS}=10V, V_{DS}=48V,$ $I_D=84A$	---	85.7	---	nC
$Q_{gs}$	Gate-Source Charge		---	23.2	---	nC
$Q_{gd}$	Gate-Drain "Miller" Charge		---	31.2	---	nC
<b>Drain-Source Diode Characteristics</b>						
$V_{SD}$	Source-Drain Diode Forward Voltage <sup>3</sup>	$V_{GS}=0V, I_S=20A$	---	---	1.2	V
$t_{rr}$	Reverse Recovery Time	$I_F=84A$	---	88.3	---	ns
$Q_{rr}$	Reverse Recovery Charge	$diF/dt=100A/\mu\text{s}$ (Note3)	---	65.9	---	nC

### Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\ \mu\text{s}$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production
5. EAS condition:  $T_j=25^\circ\text{C}, V_{DD}=35V, V_G=10V, L=0.5\text{mH}, R_g=25\Omega$

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

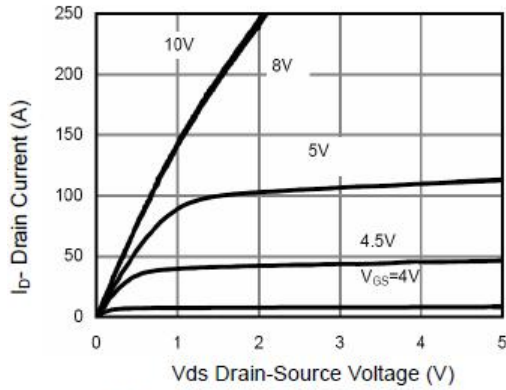


Figure 1 Output Characteristics

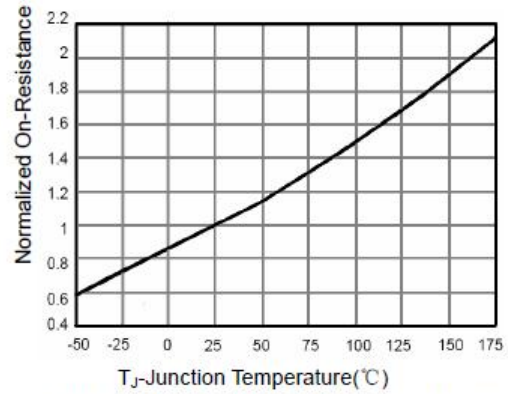


Figure 4  $R_{dson}$ -Junction Temperature

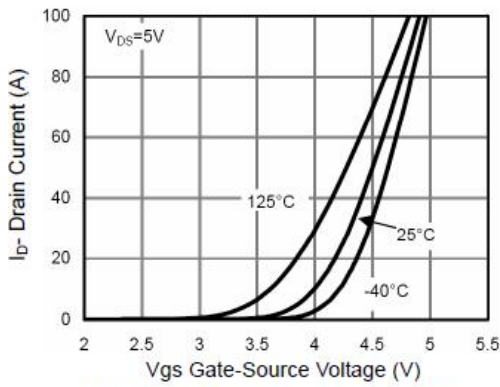


Figure 2 Transfer Characteristics

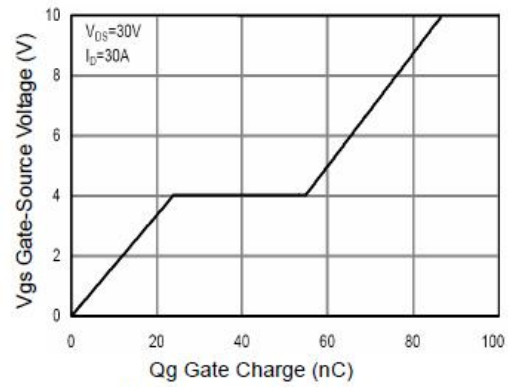


Figure 5 Gate Charge

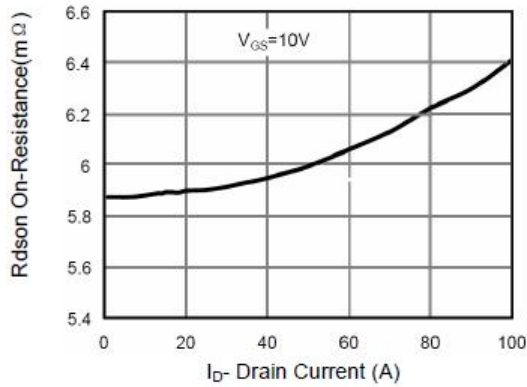


Figure 3  $R_{dson}$ - Drain Current

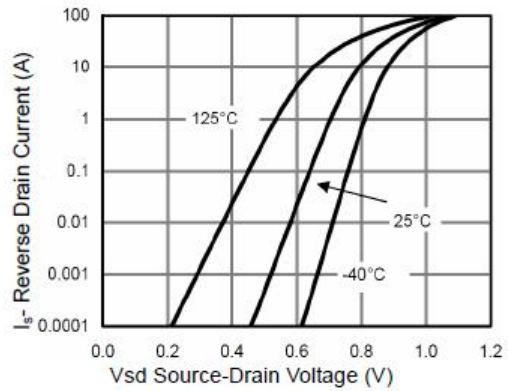


Figure 6 Source- Drain Diode Forward

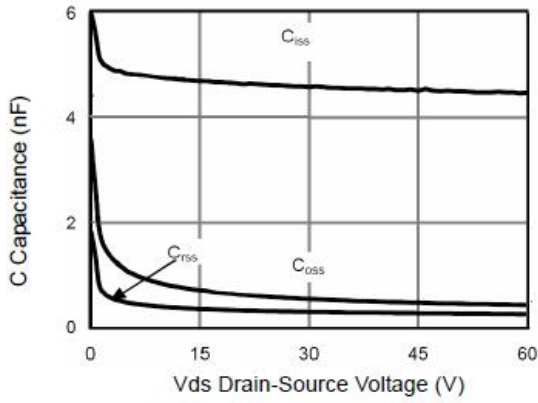


Figure 7 Capacitance vs Vds

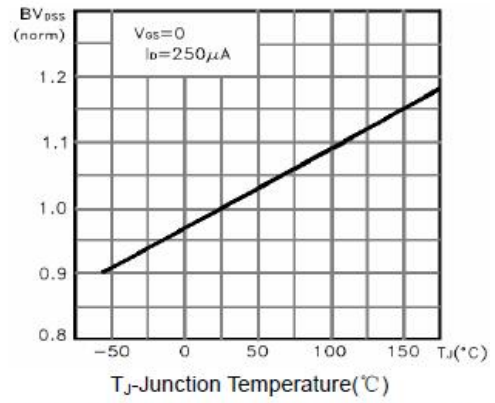


Figure 9  $BV_{DSS}$  vs Junction Temperature

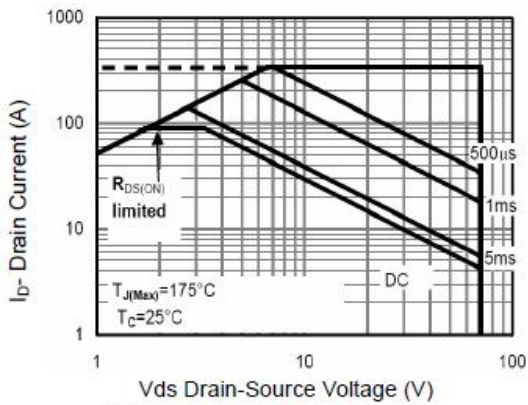


Figure 8 Safe Operation Area

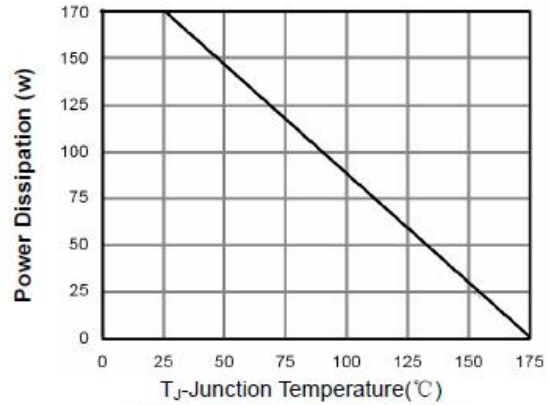


Figure 10 Power De-rating

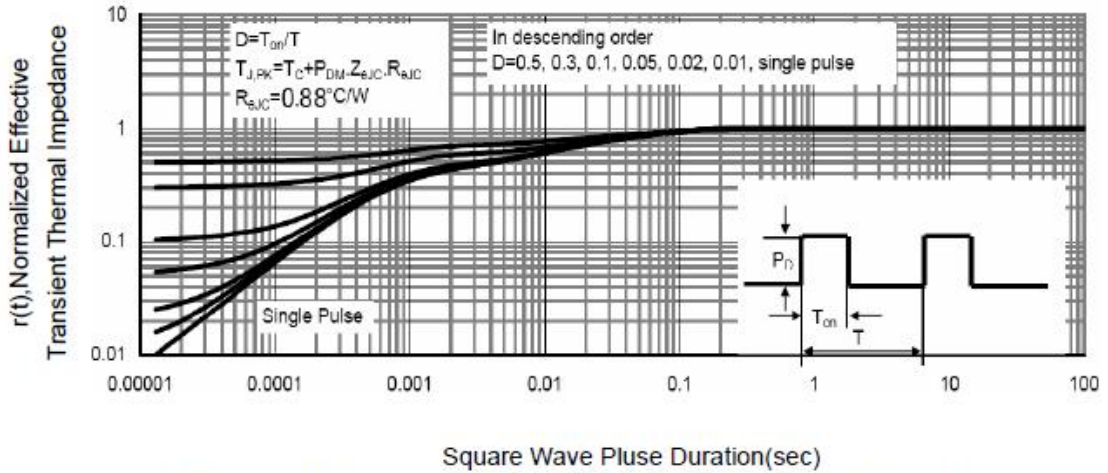


Figure 11 Normalized Maximum Transient Thermal Impedance