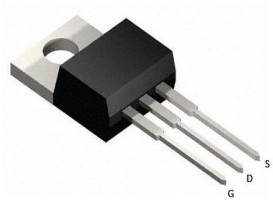
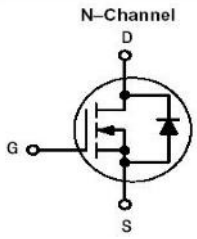
GENERAL DESCRIPTION

The RZC4005T is the high cell density trenched N-Channel MOSFET, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications.

The RZC4005T meet the ROHS and Green Product requirement 100% EAS guaranteed with full function reliability approved.

PIN CONFIGURATION





FEATURES

- 40V/90A, $R_{DS(ON)}$ =5mΩ V_{GS} = 10V (TPY.)
- 40V/90A, $R_{DS(ON)}$ =7mΩ V_{GS} = 4.5V (TPY.)
- 100% EAS Guaranteed
- Green Device Available
- Supper Low Gate Charge
- Excellent Cdv/dt effect decline
- Advanced high cell density Trench technology
- TO-220 package design

APPLICTIONS

- Power Management in Note book
- Portable Equipment
- Battery Powered System
- DC/DC Converter
- Load Switch

ORDERING INFORMATION

Part Number	Package	Top Marking
RZC4005T	TO-220	T4005

MAXIMUM RATINGS (Ta = 25℃)

Parameter	Symbol		Value	Units
Drain to Source Voltage	V_{DSS}		40	V
Gate to Source Voltage	V_{GSS}		±20	V
Continuous Drain Current	25℃	I_D	90	A
	70℃		57	A
Pulsed Drain Current (NOTE 1)	$I_{D(pulse)}$		270	A
Avalanche Current	I_{AS}		47	A
Maximum Power Dissipation (NOTE 2)	25℃	P_D	87	W
Single Pulse Avalanche Energy	EAS		110	mJ
Operating Junction Temperature	T_J		150	°C
Storage Temperature	T_{STG}		-55-+150	°C
Lead Temperature for Soldering Purposes (1/8″ from case for 10 s)	T_L		260	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

ELECTRICAL CHARACTERISTICS (TA = 25℃)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX	Units
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_{DS}=250uA	40			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}= 32V,V_{GS}=0V T_J=25°C			1	uA
		V_{DS}= 32V,V_{GS}=0V T_J=55°C			5	uA
Gate Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V			±100	nA
Gate threshold voltage	$V_{GS(TH)}$	V_{DS}=V_{GS},I_D=250μA	1.0		2.5	V
Drain to Source On-state Resistance (note 2)	$R_{DS(ON)}$	V_{GS}=10V,I_D=30A		5	6.5	mΩ
		V_{GS}= 4.5V,I_D=20A		7	9	mΩ
Drain-Source Diode Forward Voltage	V_{SD}	I_s=1A,V_{GS}=0V		0.8	1	V
Gate Resistance	Rg	V_{DS}=0V ,V_{GS}=0V , f=1MHz		1.4		Ω
Input Capacitance	C_{ISS}	V_{DS}=15V , V_{GS}=0V , f=1MHz		3415		pF
Output Capacitance	C_{OSS}			282		pF
Reverse Transfer Capacitance	C_{RSS}			210		pF
Total Gate Charge (10V)	Q_G	V_{DD}=32V , V_{GS}=4.5V , I_D=20A		30		nC
Gate-Source Charge	Q_{GS}			7		nC
Gate-Drain Charge	Q_{GD}			13		nC
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=20V, V_{GS}=10V R_G=3.3Ω,I_D=20A		10		nS
Rise Time	Tr			34		
Turn-Off Delay Time	$T_{d(off)}$			56		
Fall Time	Tf			15		
DIODE CHARACERISTICS						
Drain-Source Diode Forward Voltage (note 2)	V_{SD}	Is=1A,V_{GS}=0V			1.0	V
Continuous Source Current(note 1,3)	Is	V_G=V_D=0V, Force Current			90	A
Reverse Recovery Time	trr	I_F=30A,TJ=25℃ di/dt=100A/us,		4.5		nS
Reverse Recovery Charge	Qrr			0.5		nC

Note 1. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.

Note 2.Pulse Test.Pulse width≤300uS,Duty Cycle≤1%.

Note 3. L=1mH,V_{DD}=25V.I_{AS}=47A. Starting T_J=25℃

TYPICAL CHARACTERISTICS

Fig 1. Typical Output Characteristics

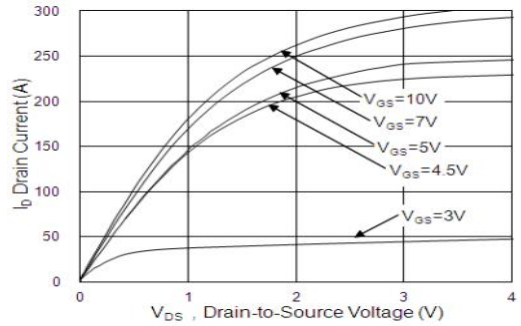


Fig 2. On-Resistance VS. V_{GS}

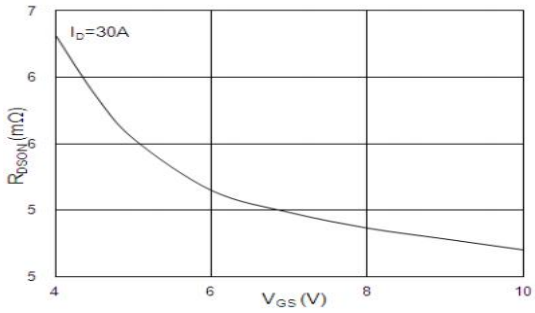


Fig 3. Forward Characteristics of Reverse

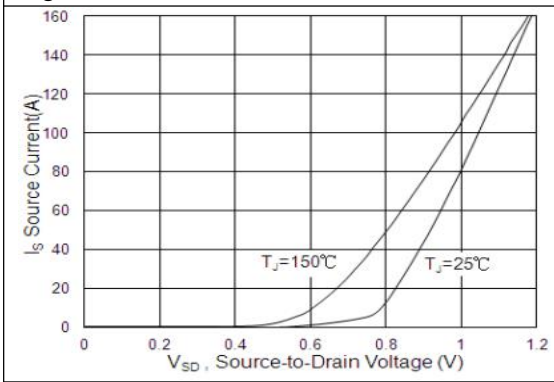


Fig 4. Gate-Charge Characteristics

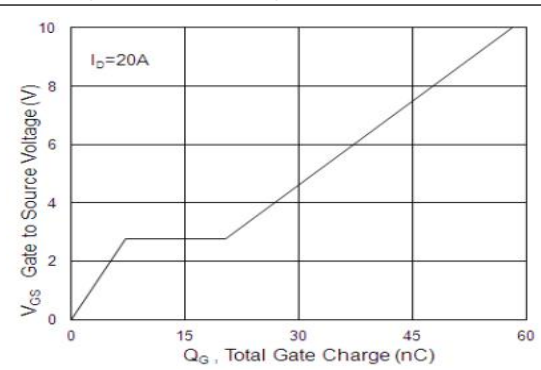


Fig.5 Normalized $V_{GS(TH)}$ VS. T_J

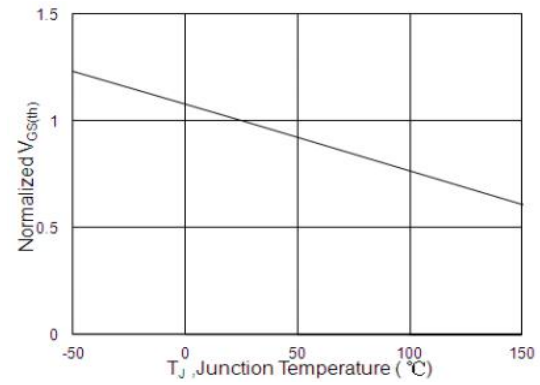


Fig.6 Normalized $R_{DS(ON)}$ VS. T_J

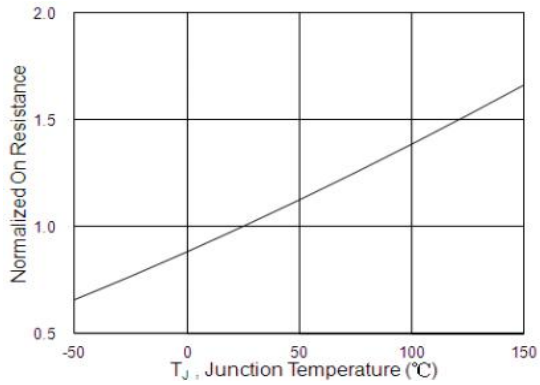


Fig.7 Capacitance

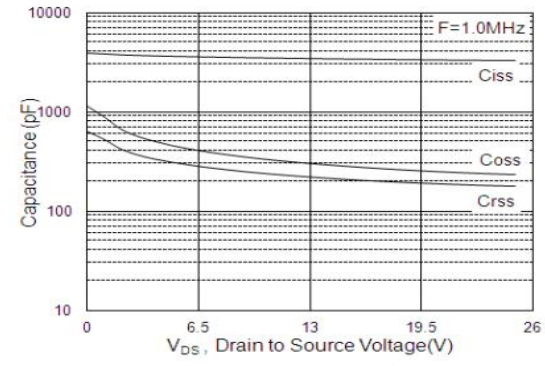


Fig.8 Safe Operation Area

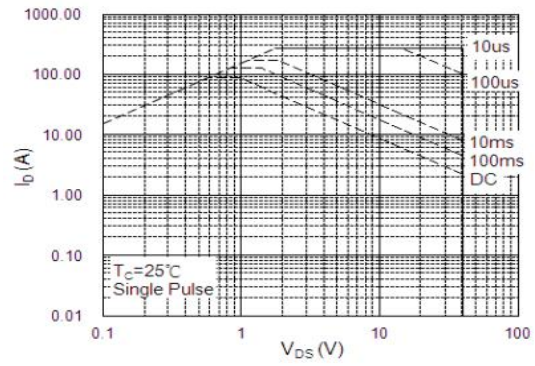
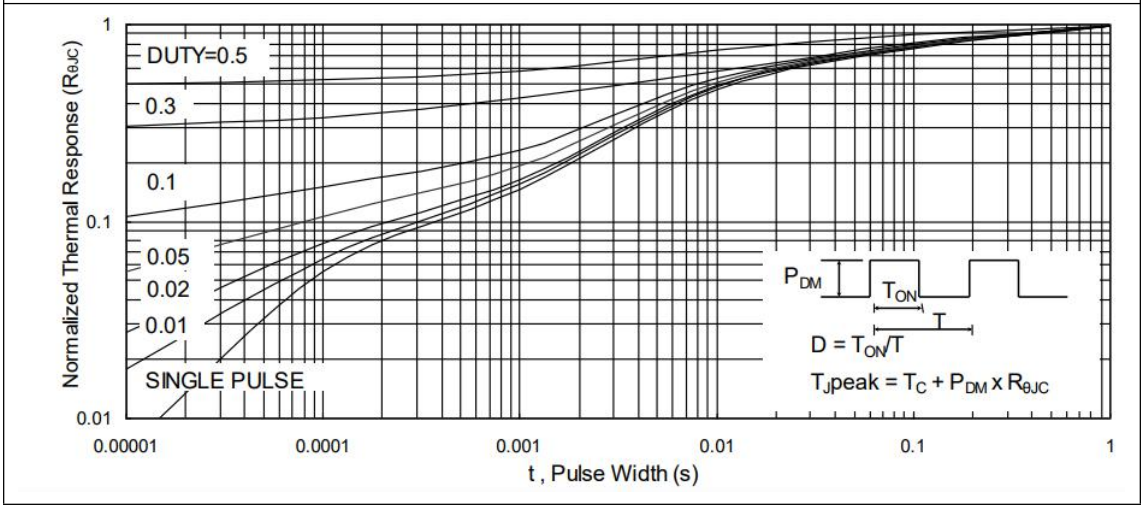
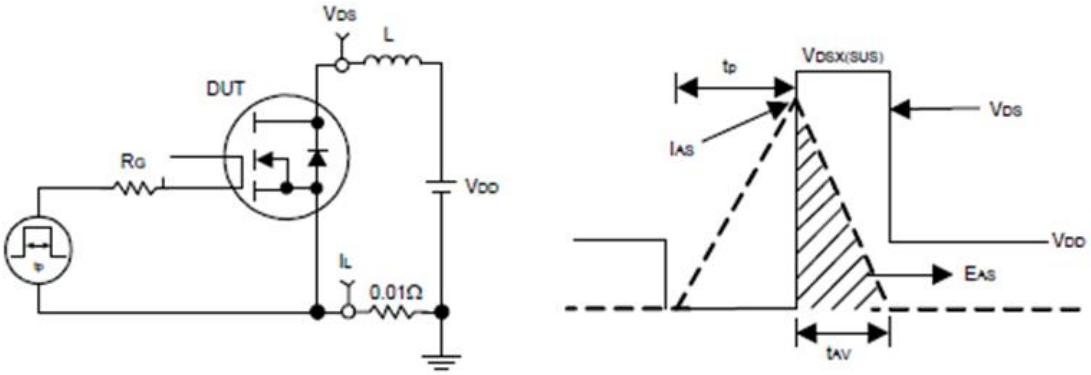


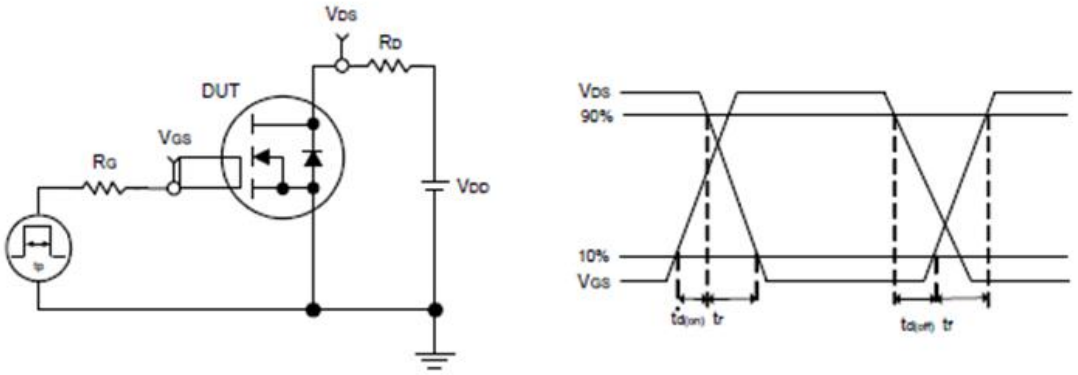
Fig.9 Normalized Maximum Transient Thermal Impedance



Avalanche Test Circuit and Waveform



Switching Time Test Circuit and Waveform



PACKAGE DIMENSIONS

TO-220