



GENERAL DESCRIPTION

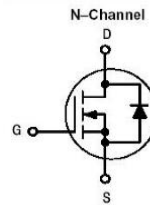
The RZC3004D is the high cell density trench N-Channel MOSFET, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications.

The RZC3004D meet the ROHS and Green Product requirement with full function reliability approved.

PIN CONFIGURATION



TO-252



FEATURES

- 30V/80A, $R_{DS(ON)} = 4m\Omega$ $V_{GS} = 10V$ (TYP.)
- 30V/80A, $R_{DS(ON)} = 7m\Omega$ $V_{GS} = 4.5V$ (TYP.)
- 100% EAS Guaranteed
- Green Device Available
- Supper Low Gate Charge
- Excellent Cdv/dt effect decline
- Advanced high cell density Trench technology
- TO-252 package design

APPLICTIONS

- Load Switch
- Battery Powered System
- Hard Switch and High Frequency Circuits
- UPS.

ORDERING INFORMATION

Part Number	Package	Top Marking
RZC3004D	TO-252	D3004

**MAXIMUM RATINGS** ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Value	Units	
Drain to Source Voltage	V_{DSS}	30	V	
Gate to Source Voltage	V_{GSS}	± 20	V	
Continuous Drain Current	I_D	25 $^\circ\text{C}$	80	A
		70 $^\circ\text{C}$	57	A
Pulsed Drain Current (note 1)	$I_{D(pulse)}$	160	A	
Single Pulse Avalanche Energy	E_{AS}	115	mJ	
Avalanche Current	I_{AS}	48	A	
Maximum Power Dissipation	25 $^\circ\text{C}$ P_D	53	W	
Thermal Resistance, Junction to Case	$R_{\theta JC}$	62	$^\circ\text{C}/\text{W}$	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	2.8	$^\circ\text{C}/\text{W}$	
Operating Junction Temperature	T_J	150	$^\circ\text{C}$	
Storage Temperature	T_{STG}	-55-+150	$^\circ\text{C}$	
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)	T_L	260	$^\circ\text{C}$	

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°C)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX	Units
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _{DS} =250uA	30			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =30V, V _{GS} =0V T _J =25°C			1	uA
		V _{DS} = 30V, 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	1.5	2.0	V
Drain to Source On-state Resistance _(note 2)	R _{DS(ON)}	V _{GS} =10V, I _D =30A		4	6	mΩ
		V _{GS} = 4.5V, I _D =15A		7	9	mΩ
Forward Transconductance	g _{fs}	I _D =30A, V _{DS} =5V		43		S
Input Capacitance	C _{ISS}	V _{DS} =15V , V _{GS} =0V , f=1MHz		2295		pF
Output Capacitance	C _{OSS}			267		
Reverse Transfer Capacitance	C _{RSS}			210		
Total Gate Charge (10V)	Q _G	V _{DD} =15V , V _{GS} =4.5V , I _D =15A		20		nC
Gate-Source Charge	Q _{GS}			7.5		
Gate-Drain Charge	Q _{GD}			7		
Turn-On Delay Time	T _{d(on)}	V _{DD} =15V, V _{GS} =4.5V R _G =3.3Ω, I _D =15A		8		nS
Rise Time	T _r			15		
Turn-Off Delay Time	T _{d(off)}			37		
Fall Time	T _f			11		
Drain-Source Diode Forward Voltage	V _{SD}	I _S =1A, V _{GS} =0V, T _C =25°C			1.0	V
Maximum Continuous Drain-Source Diode Forward Current	I _D	T _C =25°C			80	A
Maximum Pulse Drain-Source Diode Forward Current	I _{DSM}				160	A
Reverse Recovery Time	trr	I _S =30A, T _J =25°C Di/Dt=100A/uS		14		nS
Reverse Recovery Charge	Q _{rr}			5		nC

Note : 1.The data tested by surface mounted on a 1 inch²FR-4 board with 20Z 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}=48A

4.The power dissipation is limited by 150°C junction temperature

5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation



TYPICAL CHARACTERISTICS

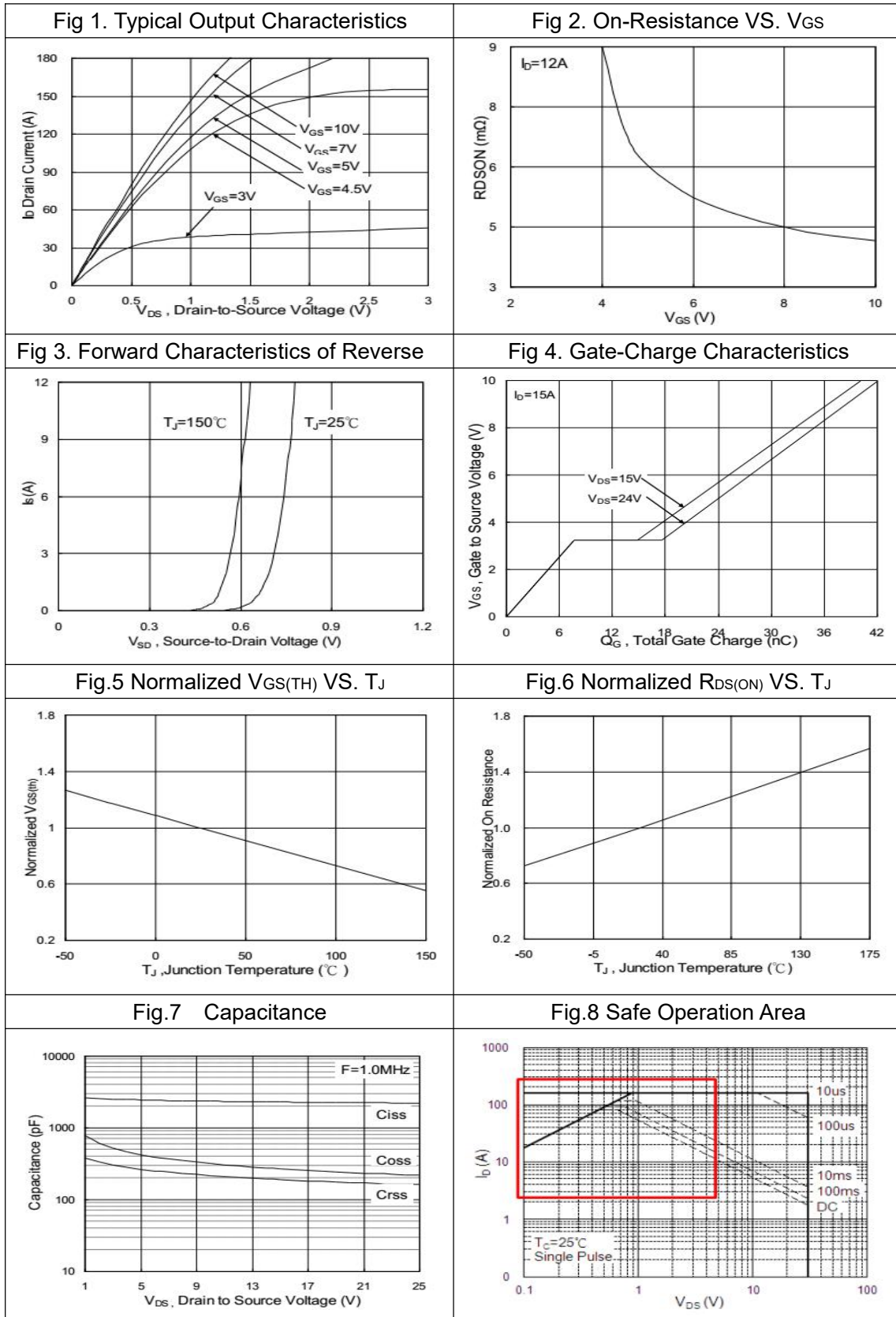
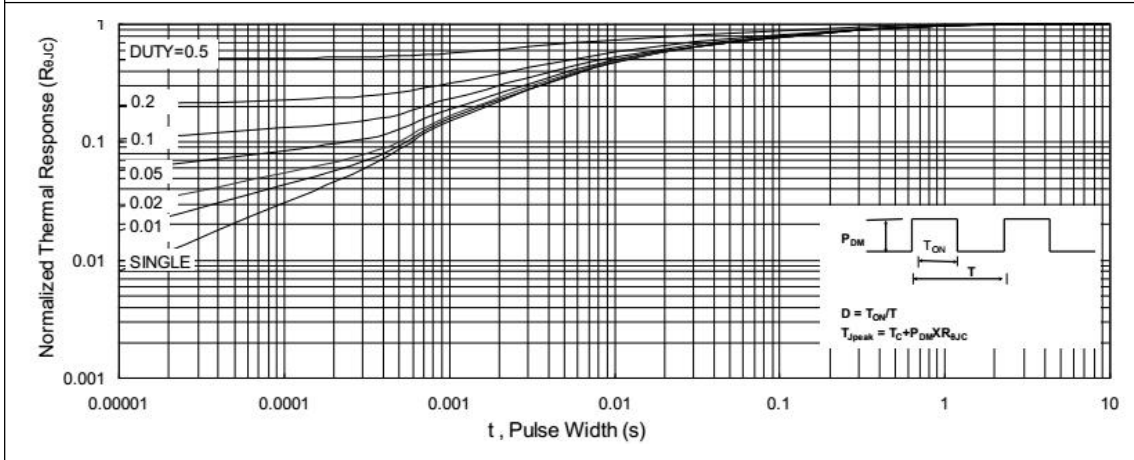




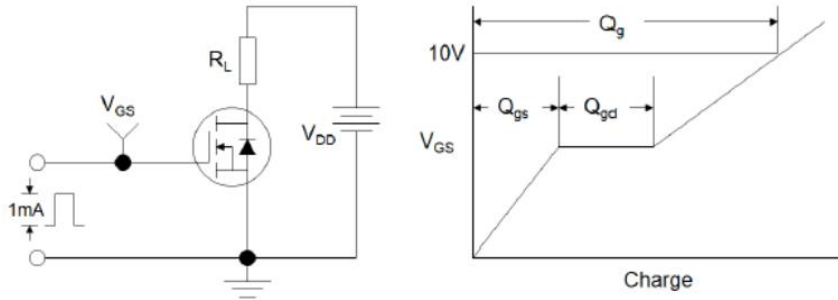
Fig.9 Maximum Effective Transient Thermal Impedance, Junction to Case



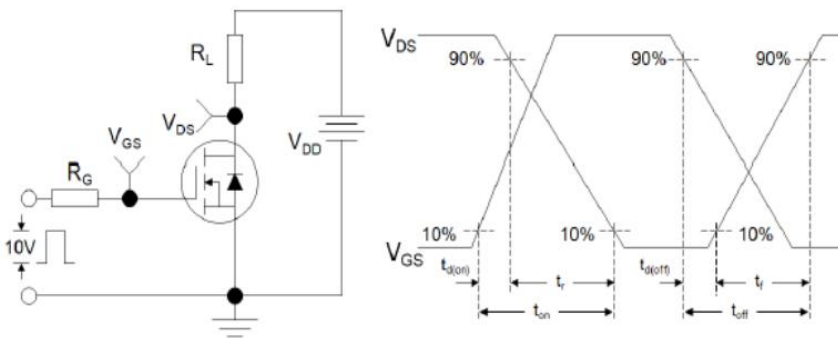


TEST CIRCUITS

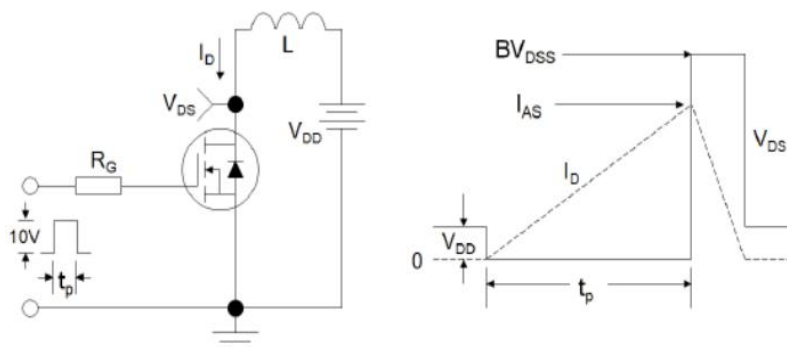
Gate Charge Test Circuit and Waveform



Resistive Switching Test Circuit and Waveform



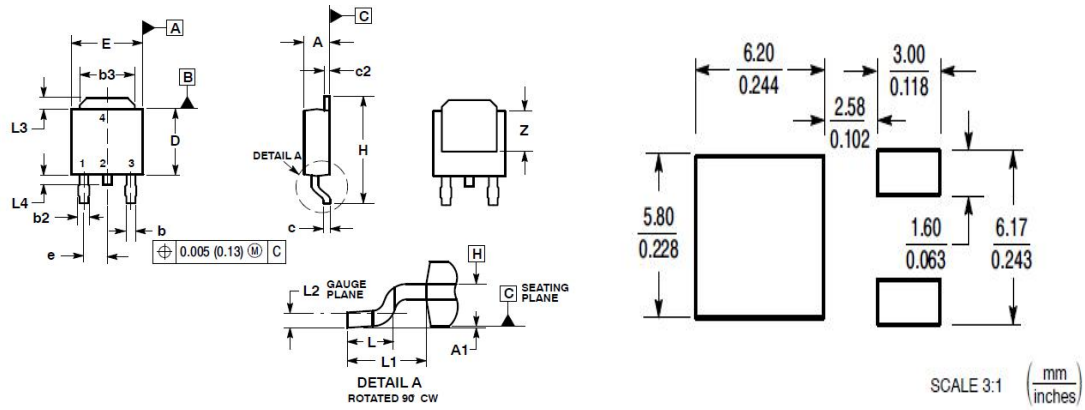
Unclamped Inductive Switching Test Circuit and Waveform





PACKAGE DIMENSIONS

TO-252



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.086	0.094	2.18	2.38
A1	0.000	0.005	0.00	0.13
b	0.025	0.035	0.63	0.89
b2	0.030	0.045	0.76	1.14
b3	0.180	0.215	4.57	5.46
c	0.018	0.024	0.46	0.61
c2	0.018	0.024	0.46	0.61
D	0.235	0.245	5.97	6.22
E	0.250	0.265	6.35	6.73
e	0.090 BSC		2.29 BSC	
H	0.370	0.410	9.40	10.41
L	0.055	0.070	1.40	1.78
L1	0.108 REF		2.74 REF	
L2	0.020 BSC		0.51 BSC	
L3	0.035	0.050	0.89	1.27
L4	---	0.040	---	1.01
Z	0.155	---	3.93	---