

N沟道增强型场效应晶体管 N-CHANNEL MOSFET RC7N65

主要参数 MAIN CHARACTERISTICS

ID	7A
VDSS	650 V
Rdson-typ (@Vgs=10V)	1.1Ω
Qg-typ	32nC

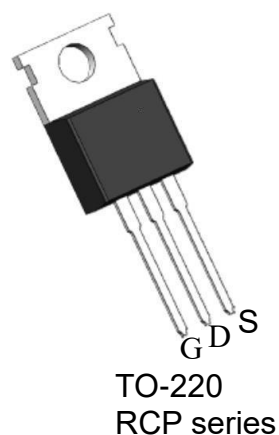
产品特性 FEATURES

低栅极电荷	Low gate charge
低 Crss (典型值 8.5pF)	Low Crss (typical 8.5pF)
开关速度快	Fast switching
100%经过雪崩测试	100% avalanche tested
高抗 dv/dt 能力	Improved dv/dt capability
RoHS 产品	RoHS product

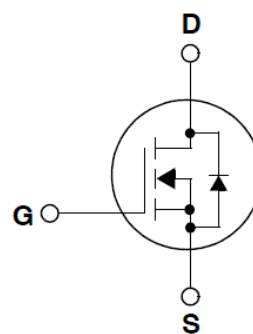
用途 APPLICATIONS

高频开关电源	High efficiency switch mode power supplies
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封装形式 Package



等效电路 Equivalent Circuit



绝对最大额定值 ABSOLUTE RATINGS (Tc25°C)

项目 Parameter	符号 Symbol	数值 Value	单位 Unit
		RC7N65	
最高漏极-源极直流电压 Drain-Source Voltage	V _{DS}	650	V
连续漏极电流* Drain Current -continuous *	I _D (T _C =25°C)	7	A
	I _D (T _C =100°C)	4.1	A
最大脉冲漏极电流 (注 1) Drain Current – pulse (note 1)	I _{DM}	28	A
最高栅源电压 Gate-Source Voltage	V _{GS}	±30	V
单脉冲雪崩能量 (注 2) Single Pulsed Avalanche Energy (note 2)	E _{AS}	80	mJ
雪崩电流 (注 1) Avalanche Current (note 1)	I _{AS}	4	A
重复雪崩能量 (注 1) Repetitive Avalanche Current (note 1)	E _{AR}	8	mJ
二极管反向恢复最大电压变化速率 (注 3) Peak Diode Recovery dv/dt (note 3)	dv/dt	5.0	V/ns
耗散功率 Power Dissipation	P _D (T _C =25°C)	97	W
	-Derate above 25°C	0.78	W/°C
最高结温及存储温度 Operating and Storage Temperature Range	T _J , T _{STG}	-55~+150	°C
引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes	T _L	300	°C

*漏极电流由最高结温限制

*Drain current limited by maximum junction temperature

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电特性 ELECTRICAL CHARACTERISTICS

项目 Parameter	符号 Symbol	测试条件 Tests conditions	最小 Min	典型 Typ	最大 Max	单位 Units
关态特性 Off –Characteristics						
漏-源击穿电压 Drain-Source Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	650	-	-	V
击穿电压温度特性 Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} /ΔT _J	I _D =250μA, referenced to 25°C	-	0.65	-	V/°C
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =650V, V _{GS} =0V, T _C =25°C	-	-	1	μA
		V _{DS} =520V, T _C =125°C	-	-	100	μA
栅极体漏电流 Gate-body leakage current	I _{GSS} (F/R)	V _{DS} =0V, V _{GS} =±30V	-	-	±100	nA
通态特性 On-Characteristics						
阈值电压 Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =250μA	2	-	4	V
静态导通电阻 Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =10V , I _D =3.5A	-	1.1	1.35	Ω
正向跨导 Forward Transconductance	g _{fs}	V _{DS} = 15V, I _D =3.5A (note 4)	-	11	-	S
动态特性 Dynamic Characteristics						
栅电阻 Gate Resistance	R _g	f=1.0MHz, V _{DS} OPEN	-	2.3	-	Ω
输入电容 Input capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz	-	1130	-	pF
输出电容 Output capacitance	C _{oss}		-	107	-	
反向传输电容 Reverse transfer capacitance	C _{rss}		-	8.5	-	
开关特性 Switching Characteristics						
延迟时间 Turn-On delay time	t _{d(on)}	V _{DS} =325V, I _D =7A, R _G =25Ω V _{GS} =10V (note 4, 5)	-	31	-	ns
上升时间 Turn-On rise time	t _r		-	20	-	ns
延迟时间 Turn-Off delay time	t _{d(off)}		-	78	-	ns
下降时间 Turn-Off Fall time	t _f		-	28	-	ns
栅极电荷总量 Total Gate Charge	Q _g	V _{DS} =520V , I _D =7A , V _{GS} =10V (note 4, 5)	-	32	-	nC
栅-源电荷 Gate-Source charge	Q _{gs}		-	4.6	-	nC
栅-漏电荷 Gate-Drain charge	Q _{gd}		-	14	-	nC
漏-源二极管特性及最大额定值 Drain-Source Diode Characteristics and Maximum Ratings						
正向最大连续电流 Maximum Continuous Drain-Source Diode Forward Current		I _S	-	-	7	A
正向最大脉冲电流 Maximum Pulsed Drain-Source Diode Forward Current		I _{SM}	-	-	28	A
正向压降 Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =7A	-	-	1.4	V
反向恢复时间 Reverse recovery time	t _{rr}	V _{GS} =0V, I _S =7A ,dI _F /dt=100A/μs (note 4)	-	410	-	ns
反向恢复电荷 Reverse recovery charge	Q _{rr}		-	1.9	-	μC

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热特性 THERMAL CHARACTERISTIC

项目 Parameter	符号 Symbol	RC7N65	单位 Unit
结到管壳的热阻 Thermal Resistance, Junction to Case	Rth(j-c)	1.29	°C/W
结到环境的热阻 Thermal Resistance, Junction to Ambient	Rth(j-A)	60	°C/W

注释:

- 1: 脉冲宽度由最高结温限制
- 2: L=10mH, I_{AS}=4A, V_{DD}=50V, R_G=25 Ω, 起始结温 T_J=25°C
- 3: I_{SD} ≤7A, di/dt ≤100A/μs, V_{DD} ≤BV_{DSS}, 起始结温 T_J=25°C
- 4: 脉冲测试: 脉冲宽度 ≤300μs, 占空比 ≤2%
- 5: 基本与工作温度无关

Notes:

- 1: Pulse width limited by maximum junction temperature
- 2: L=10mH, I_{AS}=4A, V_{DD}=50V, R_G=25 Ω, Starting T_J=25°C
- 3: I_{SD} ≤7A, di/dt ≤100A/μs, V_{DD} ≤BV_{DSS}, Starting T_J=25°C
- 4: Pulse Test: Pulse Width ≤300μs, Duty Cycle ≤2%
- 5: Essentially independent of operating temperature

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特性曲线 Typical Characteristics

Figure 1. Output Characteristics ($T_J = 25^\circ\text{C}$)

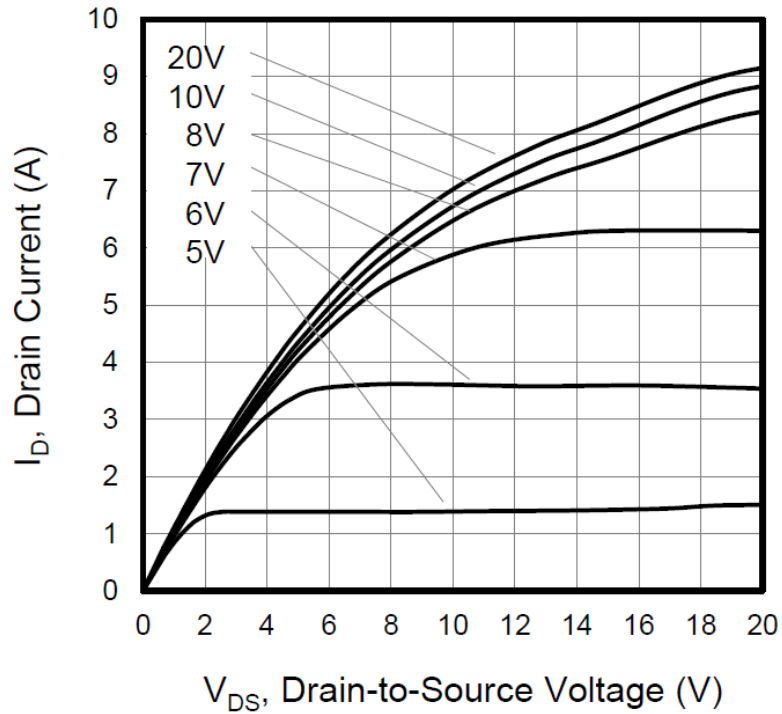


Figure 2. Body Diode Forward Voltage

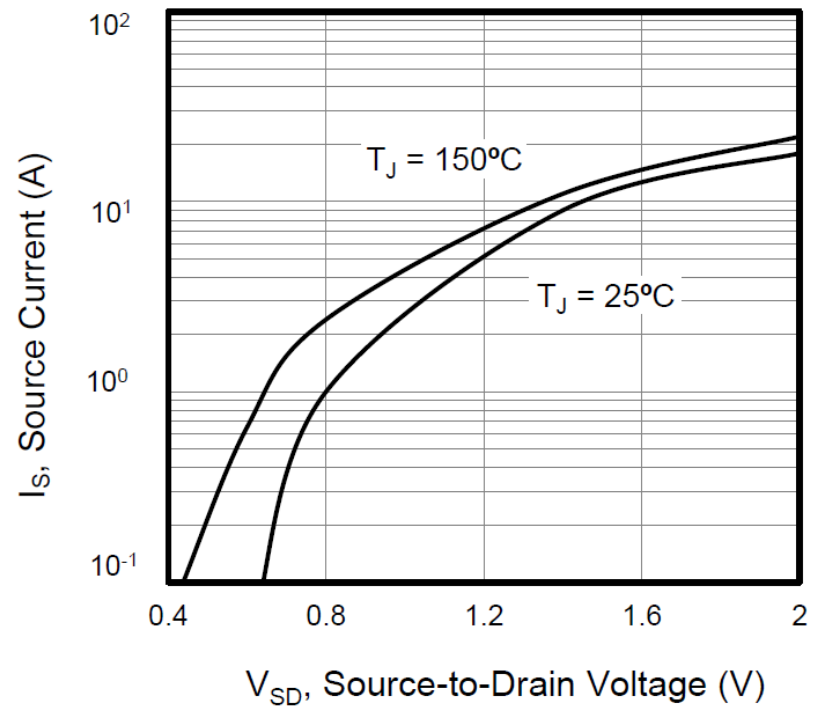


Figure 3. Drain Current vs. Temperature

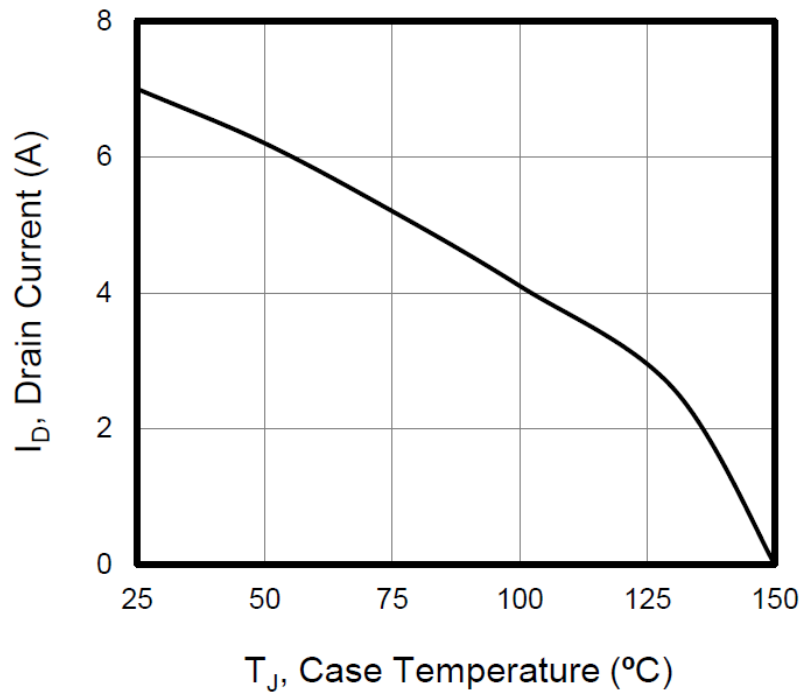


Figure 4. BV_{DSS} Variation vs. Temperature

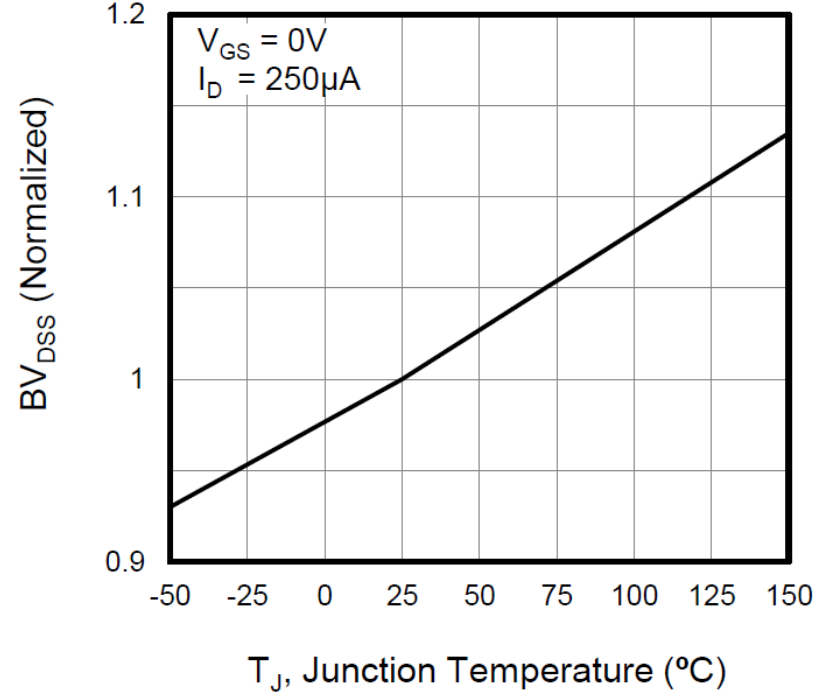


Figure 5. Transfer Characteristics

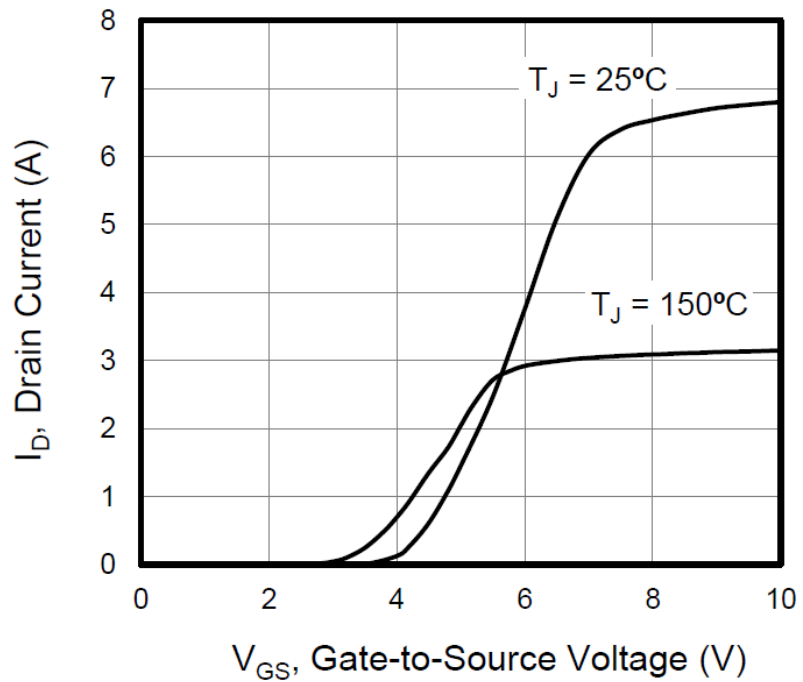
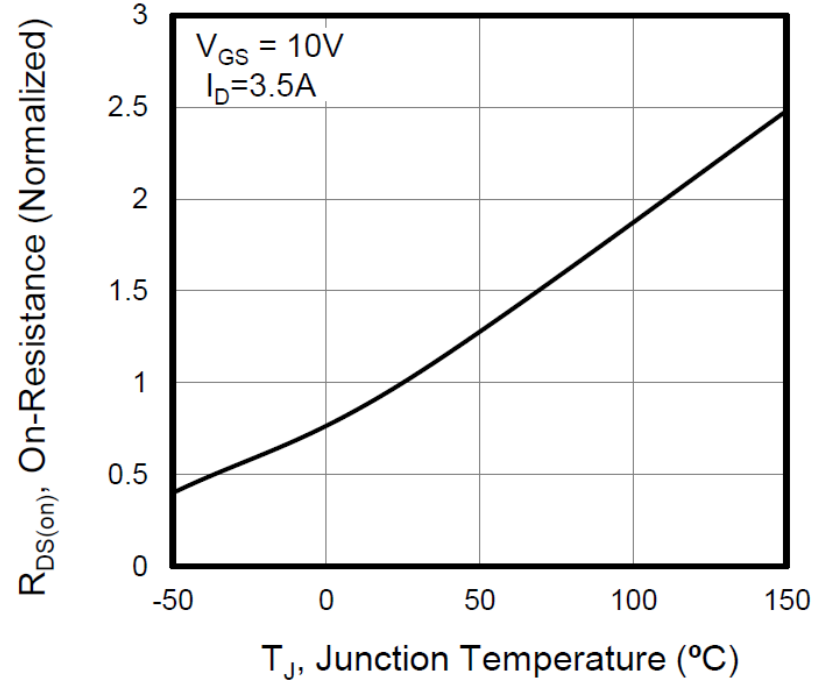


Figure 6. On-Resistance vs. Temperature



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Figure 7. Capacitance

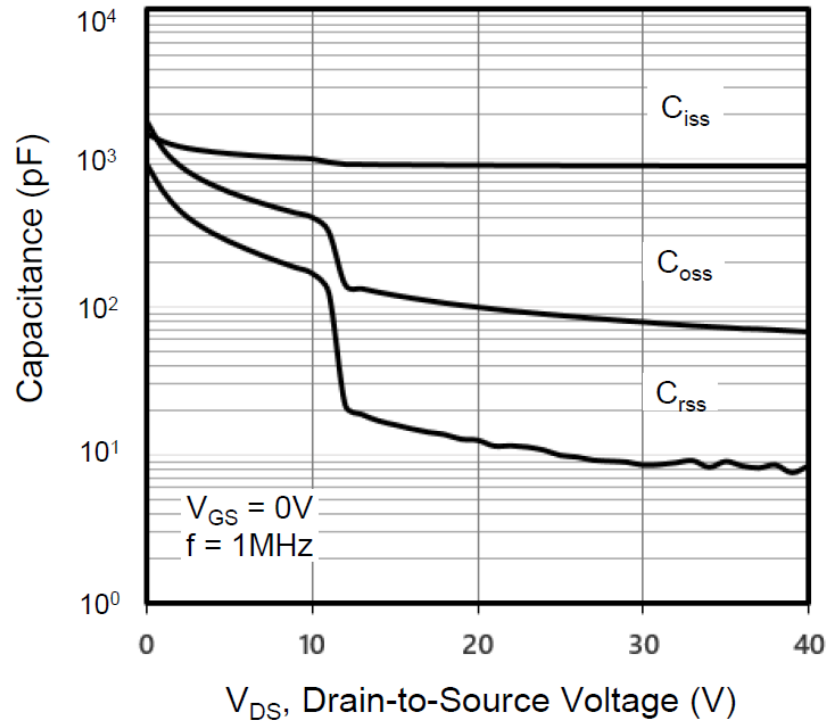


Figure 8. Gate Charge

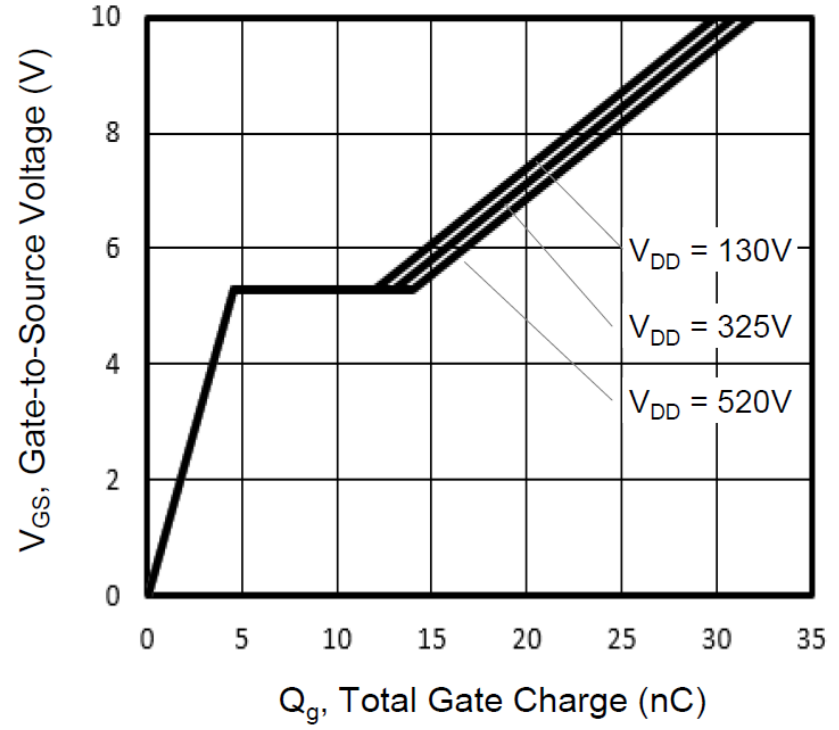
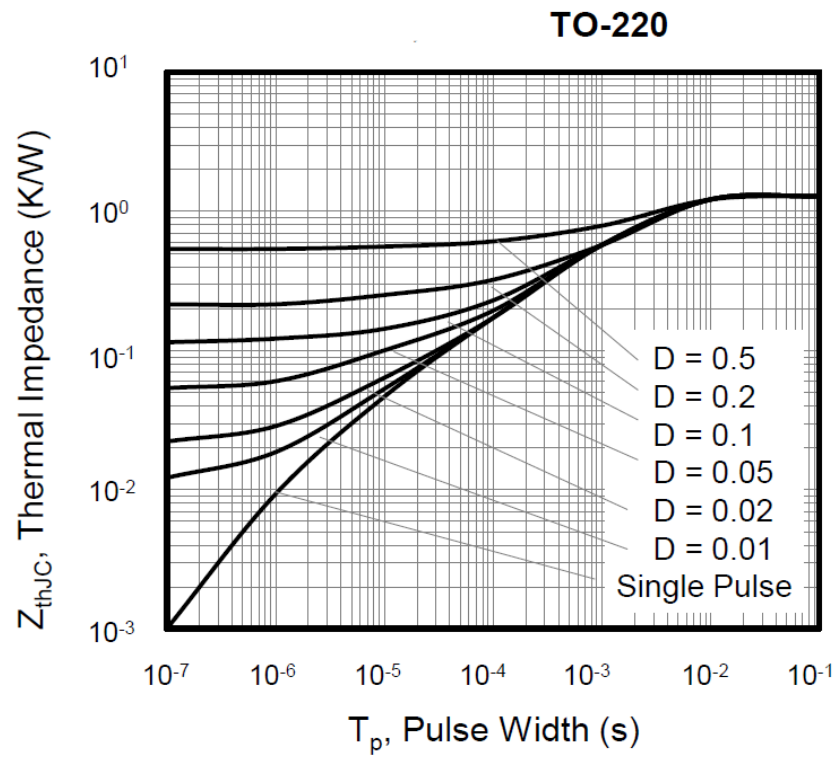


Figure 9. Transient Thermal Impedance



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Test Circuit & Waveform

Figure A: Gate Charge Test Circuit and Waveform

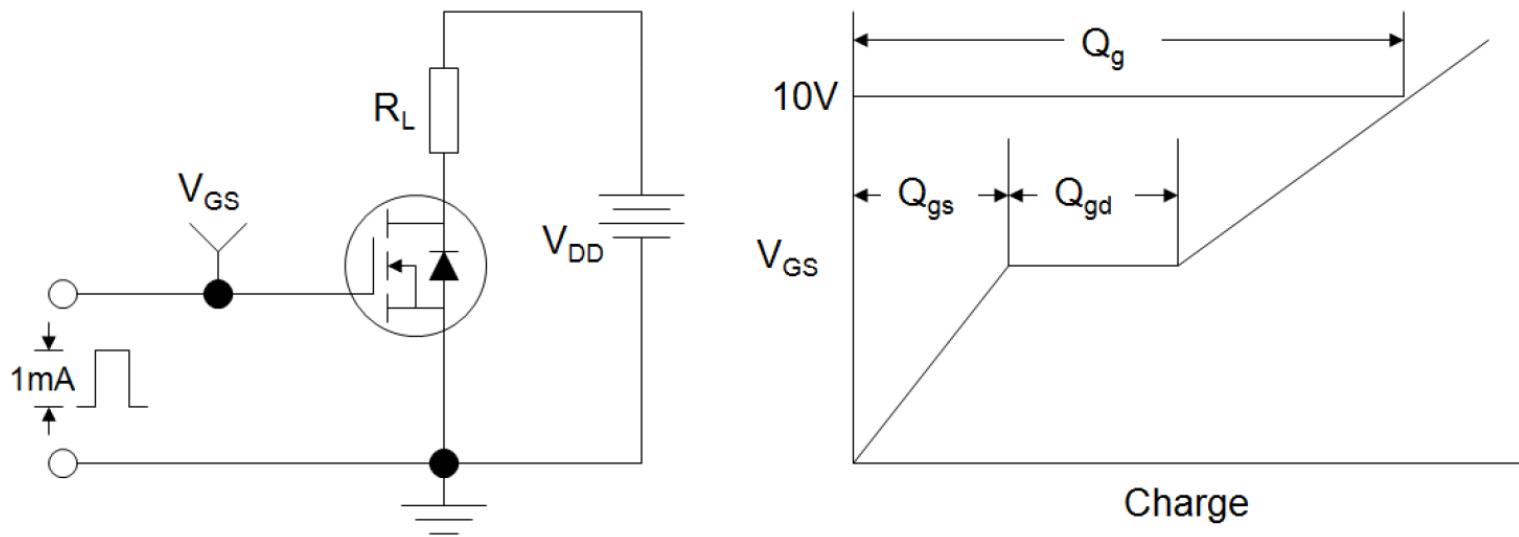


Figure B: Resistive Switching Test Circuit and Waveform

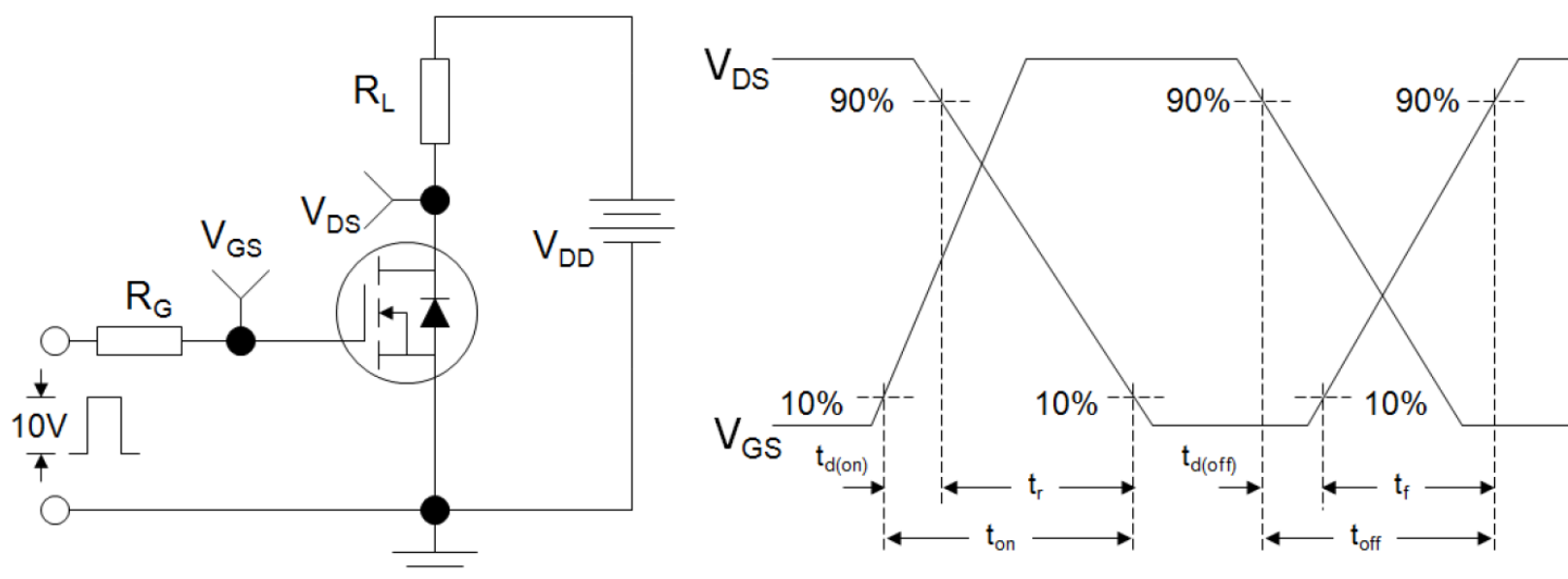
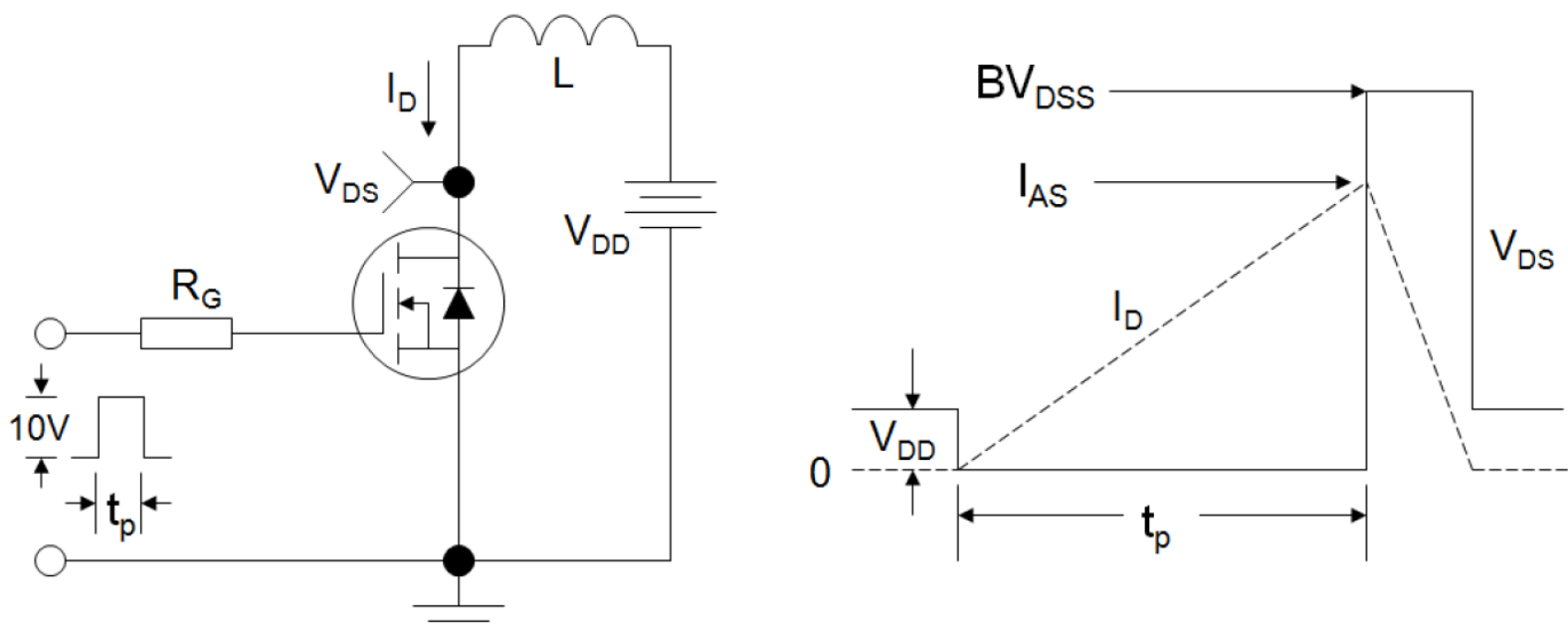
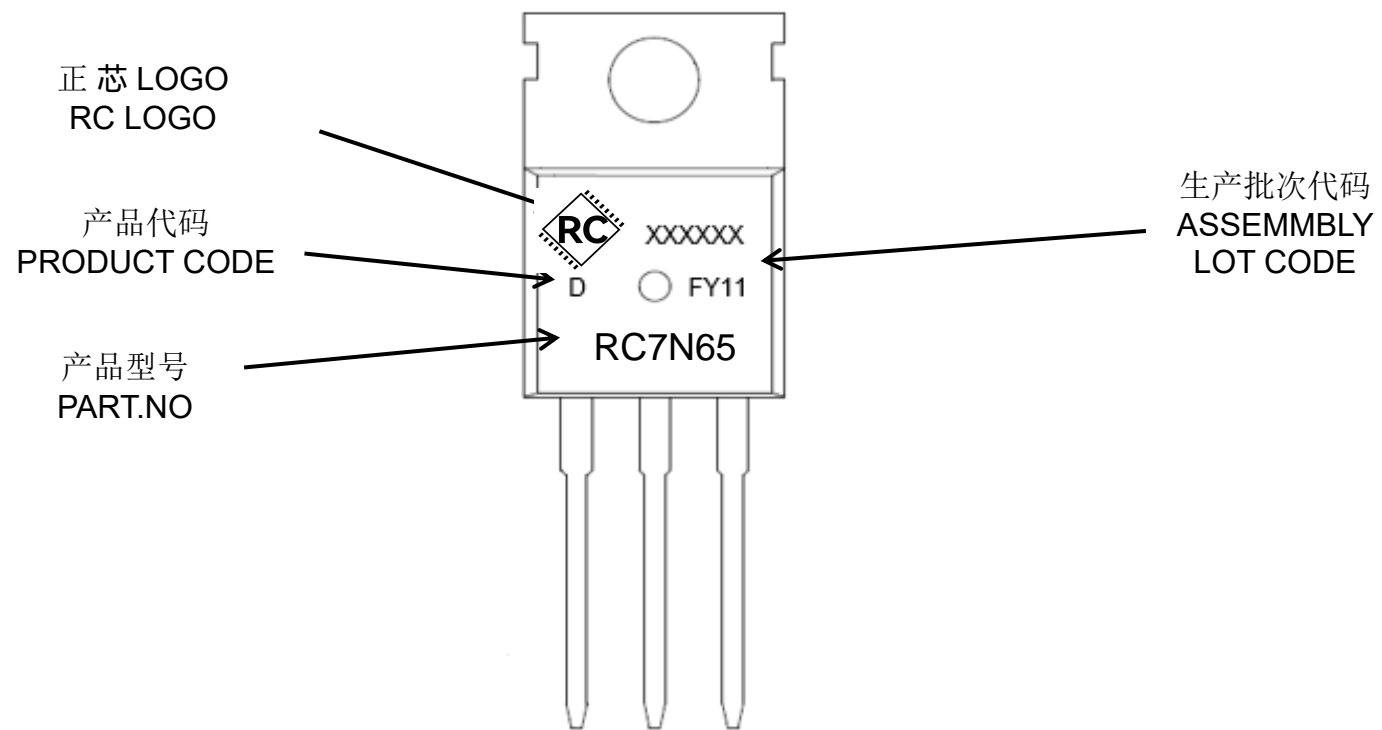


Figure C: Unclamped Inductive Switching Test Circuit and Waveform



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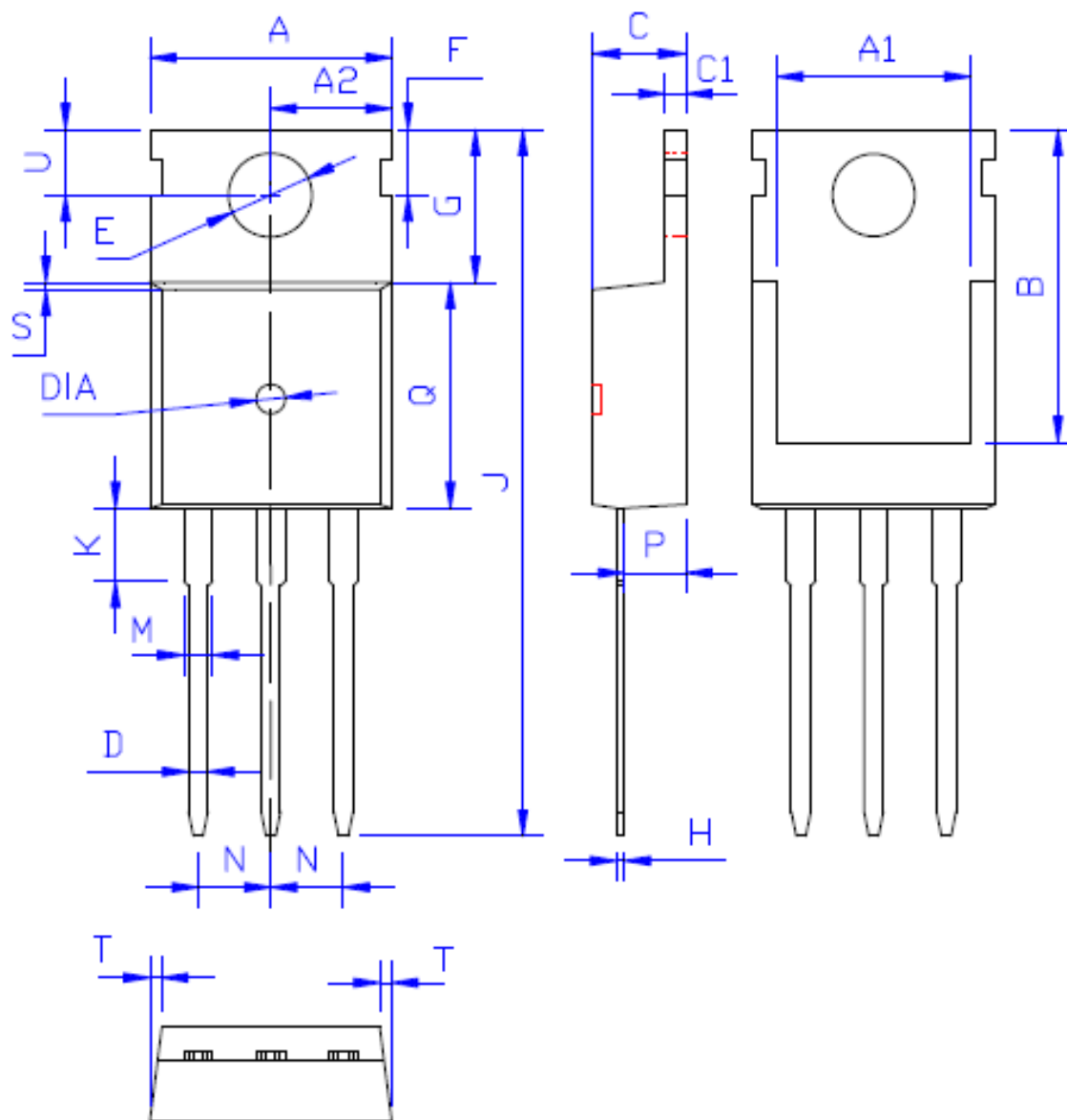


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N-CHANNEL MOSFET RC7N65

外形尺寸:

Package Dimension:

TO-220



DIM	MILLIMETERS
A	10.00 ± 0.30
A1	8.00 ± 0.30
A2	5.00 ± 0.30
B	13.20 ± 0.40
C	4.50 ± 0.20
C1	1.30 ± 0.20
D	0.80 ± 0.20
E	3.60 ± 0.20
F	3.00 ± 0.30
G	6.60 ± 0.40
H	0.50 ± 0.20
J	28.88 ± 0.50
K	3.00 ± 0.30
M	1.30 ± 0.30
N	Typical 2.54
P	2.40 ± 0.40
Q	9.20 ± 0.40
S	0.25 ± 0.15
T	0.25 ± 0.15
U	2.80 ± 0.30
DIA	宽 1.50 ± 0.10 深 0.50 MAX

(Unit: mm)