

N-CHANNEL MOSFET

RCP170N8F3A/RCA170N8F3A/RCS170N8F3A

主要参数 MAIN CHARACTERISTICS

ID	185A
VDSS	85V
Rdson-typ (@Vgs=10V)	2.95mΩ
Qg-typ	124nC

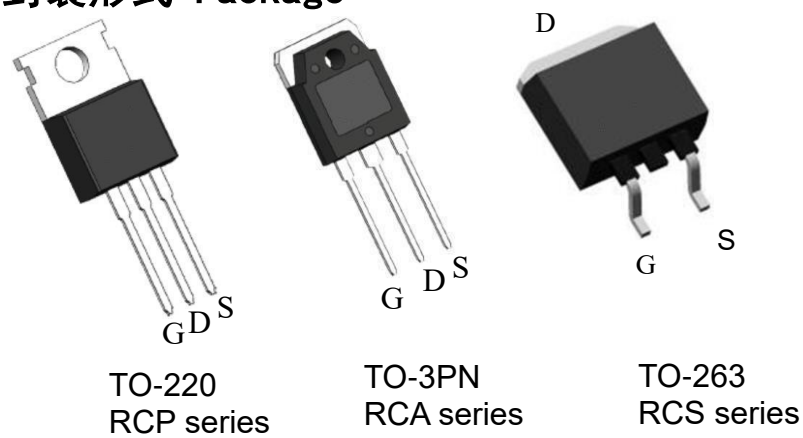
用途 APPLICATIONS

开关电源	Switch Mode Power Supplies
电机驱动	Motor Drive
逆变器	Power Management in Inverter System
电池管理系统	Battery Management System

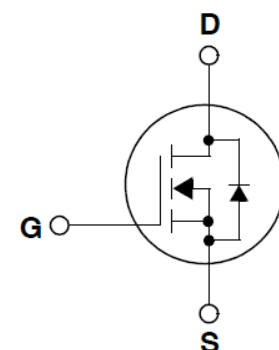
产品特性 FEATURES

低栅极电荷	Low gate charge
低 Crss (典型值 97pF)	Low Crss (typical 97pF)
开关速度快	Fast switching
100%经过雪崩测试	100% avalanche tested
100%经过热阻测试	100% DVDS tested
100%经过 RG 测试	100% Rg tested
RoHS 产品	RoHS product
SGT 工艺	SGT process

封装形式 Package



等效电路 Equivalent Circuit



绝对最大额定值 ABSOLUTE RATINGS (Tc=25°C)

项目 Parameter	符号 Symbol	数值 Value		单位 Unit
		RCP/S170N8F3A	RCA170N8F3A	
最高漏极-源极直流电压 Drain-Source Voltage	VDSS	85		V
连续漏极电流* Drain Current -continuous *	Id (Tc=25°C), Silicon Limited	185		A
	Id (Tc=25°C), Package Limited	120		A
	Id (Tc=100°C), Silicon Limited	117.2		A
最大脉冲漏极电流 (注 1) Drain Current – pulse (note 1)	IDM	480		A
最高栅源电压 Gate-Source Voltage	VGS	±20		V
单脉冲雪崩能量 (注 2) Single Pulsed Avalanche Energy (note 2)	EAS	450		mJ
雪崩电流 (注 1) Avalanche Current (note 1)	IAR	30		A
重复雪崩能量 (注 1) Repetitive Avalanche Current (note 1)	EAR	26		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	Pd (TC=25°C)	208.3	380	W
	-Derate above 25°C	1.67	3.04	W/°C
最高结温及存储温度 Operating and Storage Temperature Range	TJ, TSTG	150, -55~+150		°C
引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes	TL	260		°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	85	96	-	V
击穿电压温度特性 Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} /Δ T _J	I _D =250μA, referenced to 25℃	-	0.1	-	V/℃
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =85V _{GS} =0V, T _C =25℃	-	-	1	μA
		V _{DS} =68V, T _C =125℃	-	-	100	μA
栅极体漏电流 Gate-body leakage current	I _{GSS} (F/R)	V _{DS} =0V, V _{GS} =±20V	-	-	±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	2.0	-	4.0	V
静态导通电阻 Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =10V , I _D =50A	-	2.95	4	mΩ
正向跨导 Forward Transconductance	g _{fs}	V _{DS} = 5V, I _D =50A (note 4)	-	84	-	S
动态特性 Dynamic Characteristics						
栅电阻 Gate Resistance	R _g	f=1.0MHz, V _{DS} OPEN	-	1.9	-	Ω
输入电容 Input capacitance	C _{iss}	V _{DS} =42.5V, V _{GS} =0V, f=1.0MHz	-	6234	-	pF
输出电容 Output capacitance	C _{oss}		-	1181	-	
反向传输电容 Reverse transfer capacitance	C _{rss}		-	97	-	
开关特性 Switching Characteristics						
延迟时间 Turn-On delay time	t _{d(on)}	V _{DS} =42.5V, I _D =50A, R _G =3Ω V _{GS} =10V (note 4, 5)	-	41	-	ns
上升时间 Turn-On rise time	t _r		-	68	-	ns
延迟时间 Turn-Off delay time	t _{d(off)}		-	76	-	ns
下降时间 Turn-Off Fall time	t _f		-	44	-	ns
栅极电荷总量 Total Gate Charge	Q _g	V _{DS} =42.5V , I _D =50A , V _{GS} =10V (note 4, 5)	-	124	-	nC
栅—源电荷 Gate-Source charge	Q _{gs}		-	28	-	nC
栅—漏电荷 Gate-Drain charge	Q _{gd}		-	69	-	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		-	-	120	A
正向最大脉冲电流 Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}		-	-	480	A
正向压降 Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =50A	-	-	1.2	V
反向恢复时间 Reverse recovery time	t _{rr}	V _{GS} =0V, I _S =30A ,dI _F /dt=100A/μs (note 4)	-	80	-	ns
反向恢复电荷 Reverse recovery charge	Q _{rr}		-	112	-	nC

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热特性 THERMAL CHARACTERISTIC

项目 Parameter	符号 Symbol	RCP/S170N8F3A	RCA170N8F3A	单位 Unit
结到管壳的热阻 Thermal Resistance, Junction to Case	Rth(j-c)	0.60	0.33	℃/W
结到环境的热阻 Thermal Resistance, Junction to Ambient	Rth(j-A)	62.5	40	℃/W

注释:

1: 脉冲宽度由最高结温限制

2: L=1.0mH, VGS=10V, VDD=48V, RG=25 Ω,起始结温 TJ=25℃
3: ISD ≤120A,di/dt ≤300A/μs,VDD≤BVDSS,起始结温 TJ=25℃

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=1.0mH, VGS=10V, VDD=48V, RG=25 Ω,Starting TJ=25℃

3: ISD ≤120A,di/dt ≤300A/μs,VDD≤BVDSS, Starting TJ=25℃

4: Pulse Test: Pulse Width ≤300μs,Duty Cycle≤2%

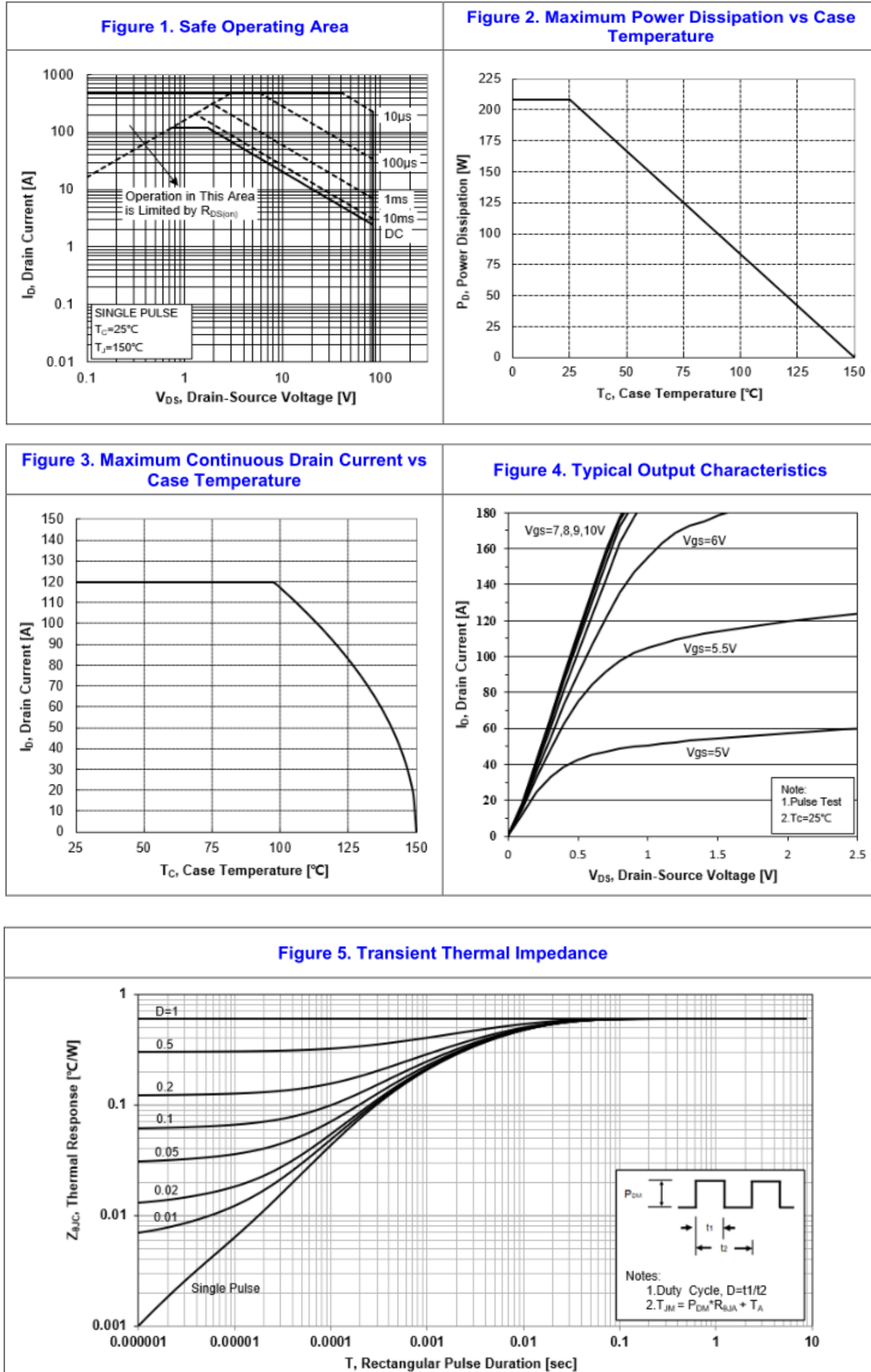
5: Essentially independent of operating temperature

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Typical Characteristics

典型特性曲线



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Figure 6. Typical Transfer Characteristics

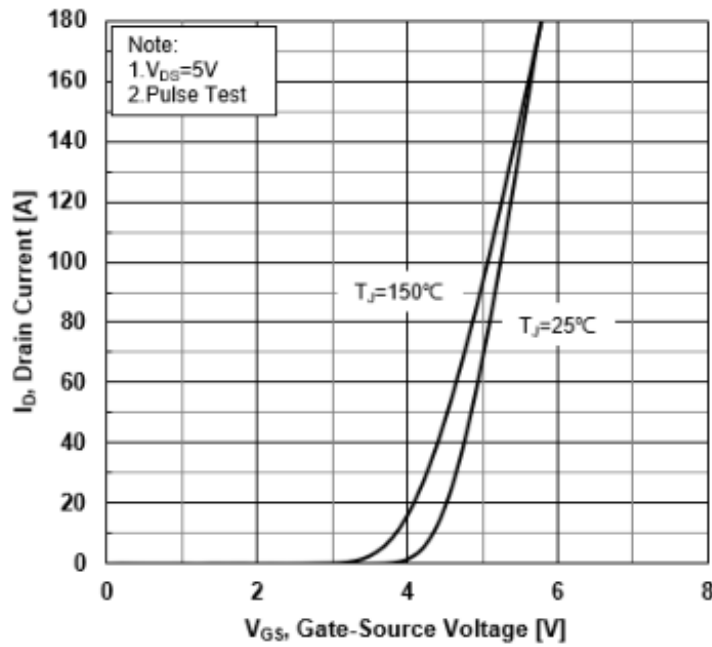


Figure 7. Source-Drain Diode Forward Characteristics

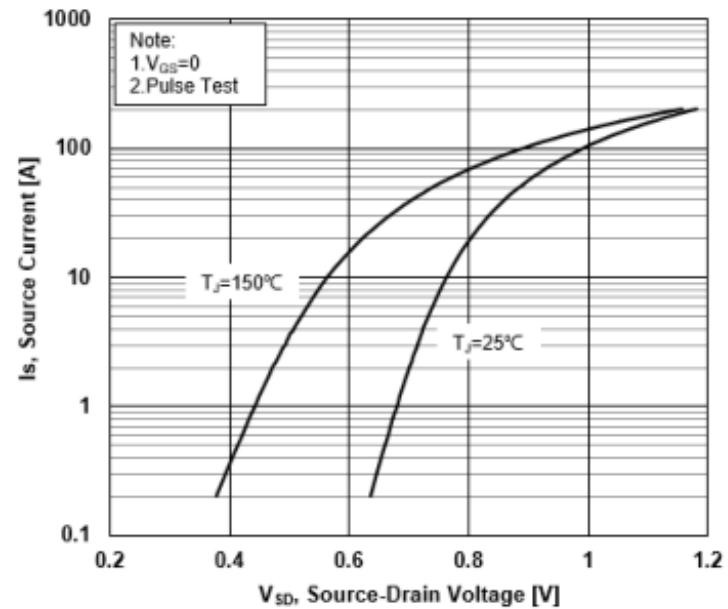


Figure 8. Drain-Source On-Resistance vs Drain Current

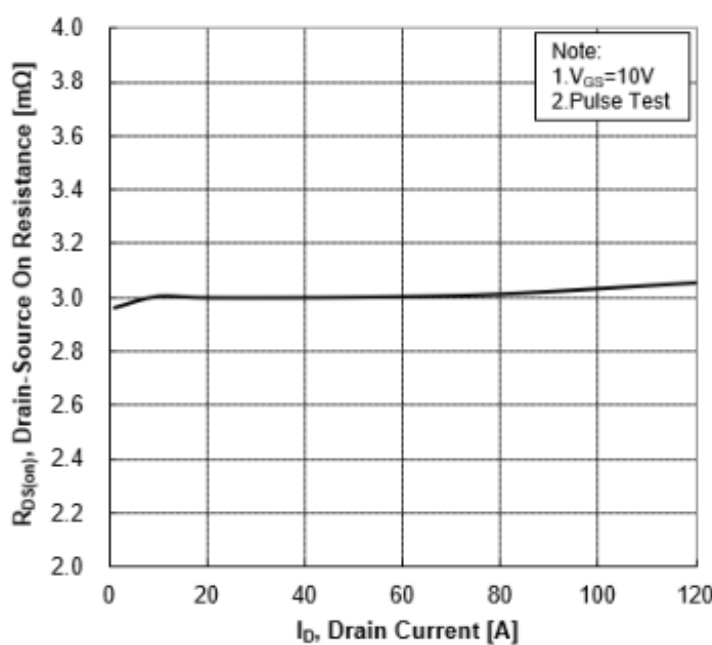


Figure 9. Normalized On-Resistance vs Junction Temperature

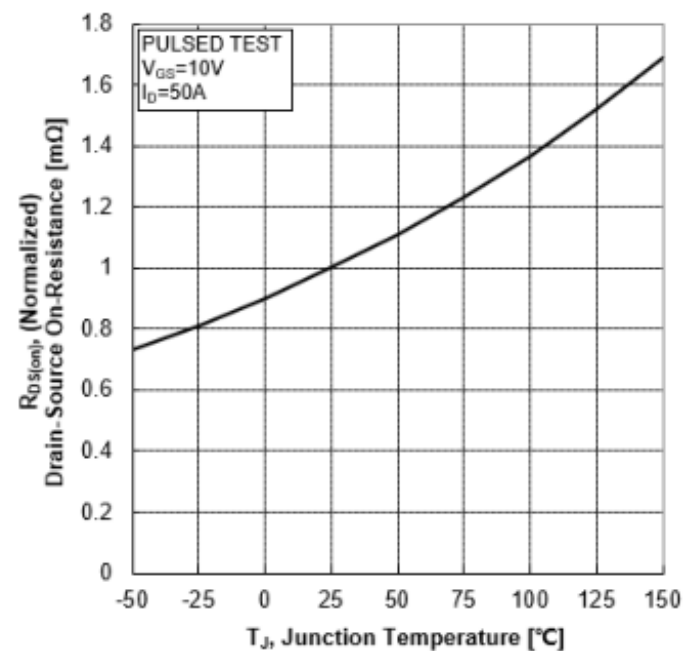


Figure 10. Normalized Threshold Voltage vs Junction Temperature

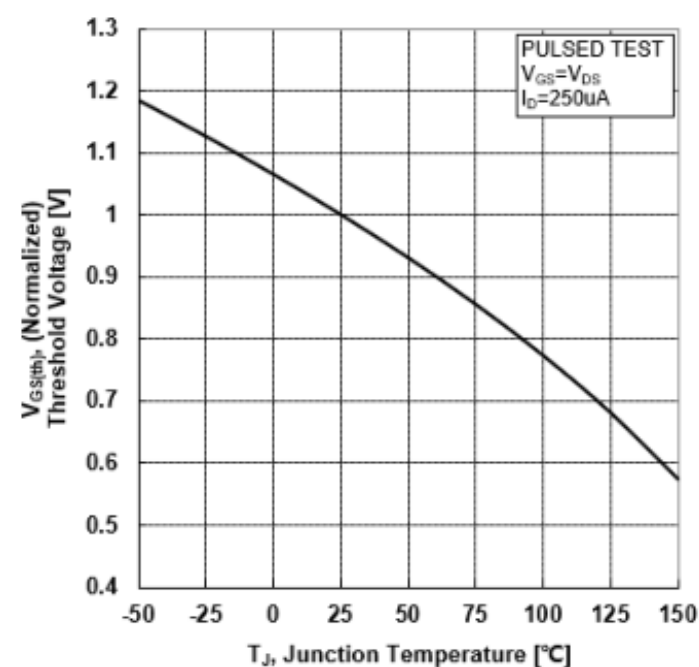
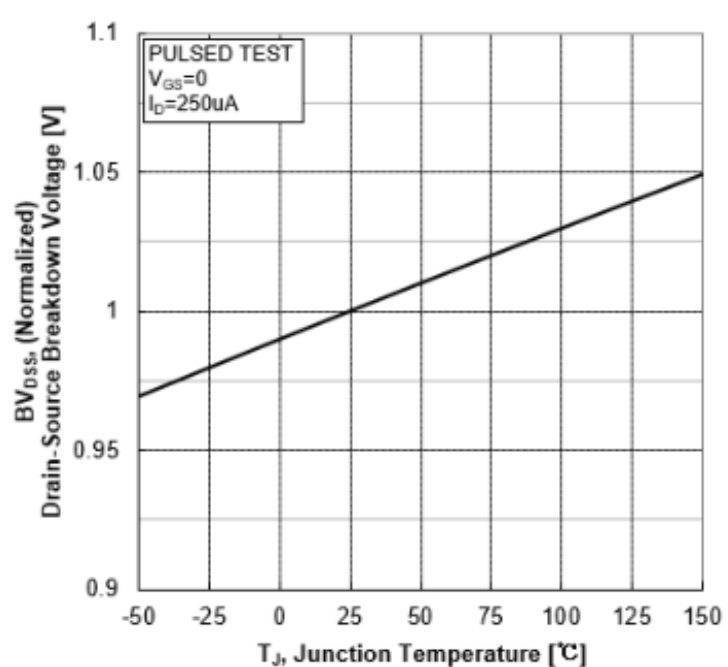


Figure 11. Normalized Breakdown Voltage vs Junction Temperature



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Figure 12. Capacitance Characteristics

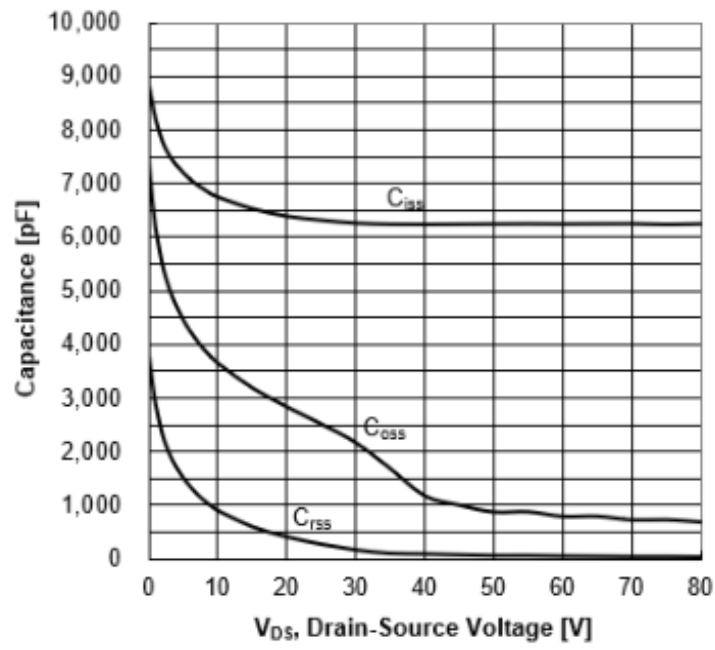
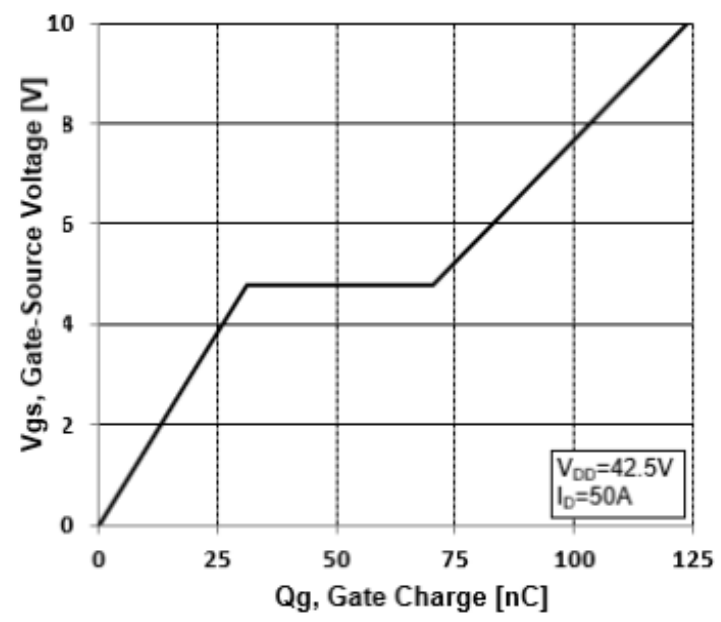


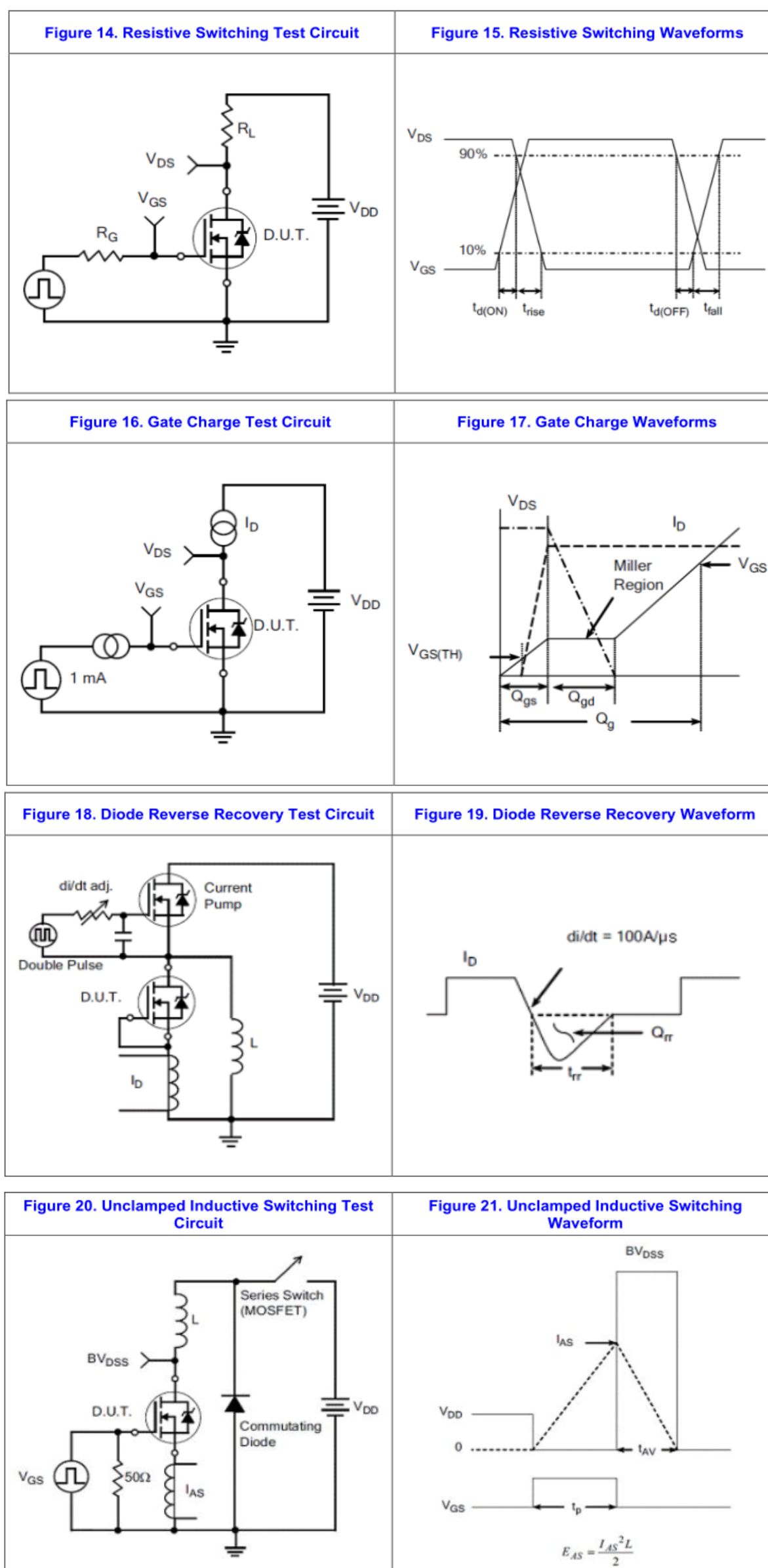
Figure 13. Typical Gate Charge vs Gate-Source Voltage



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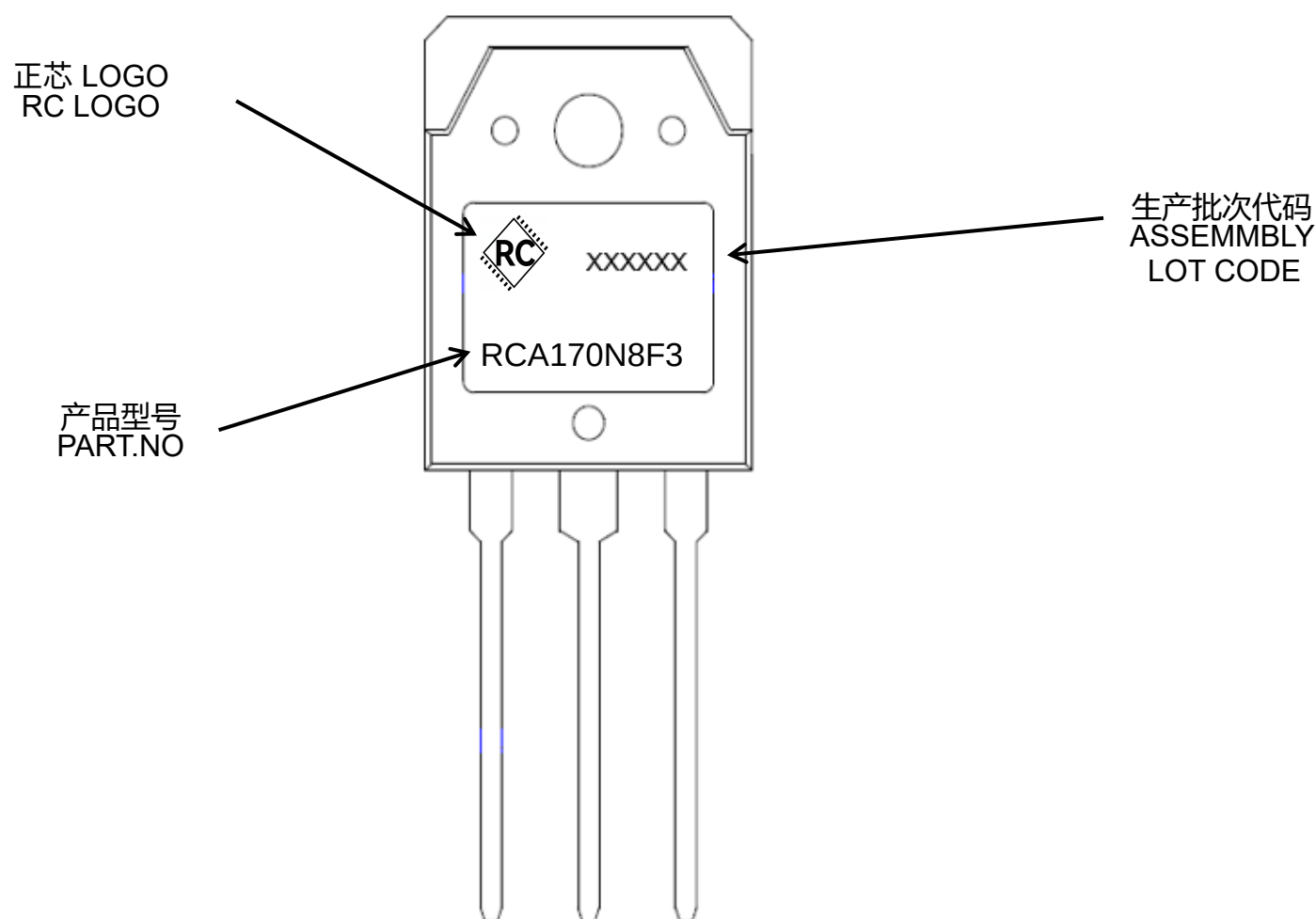
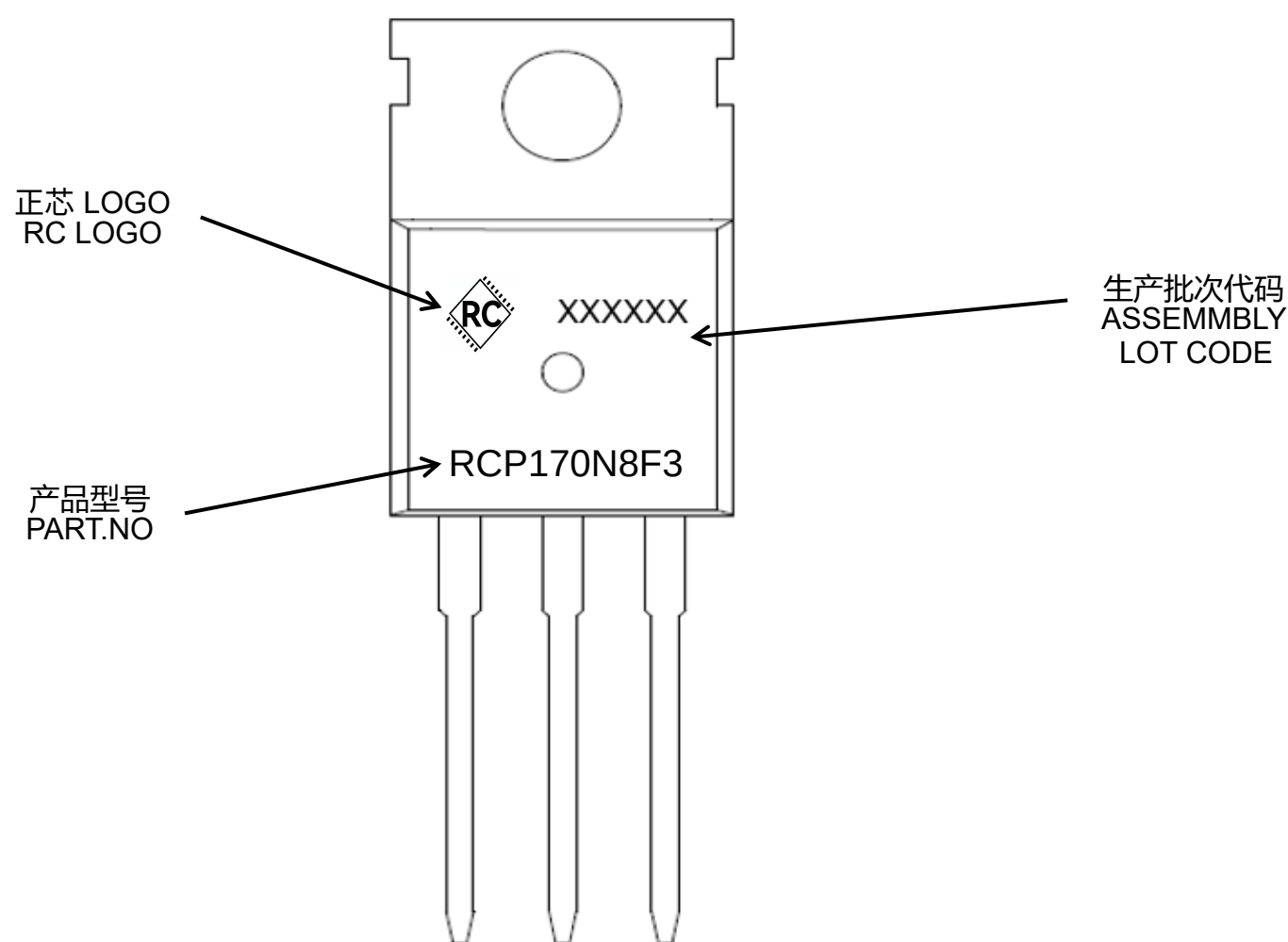
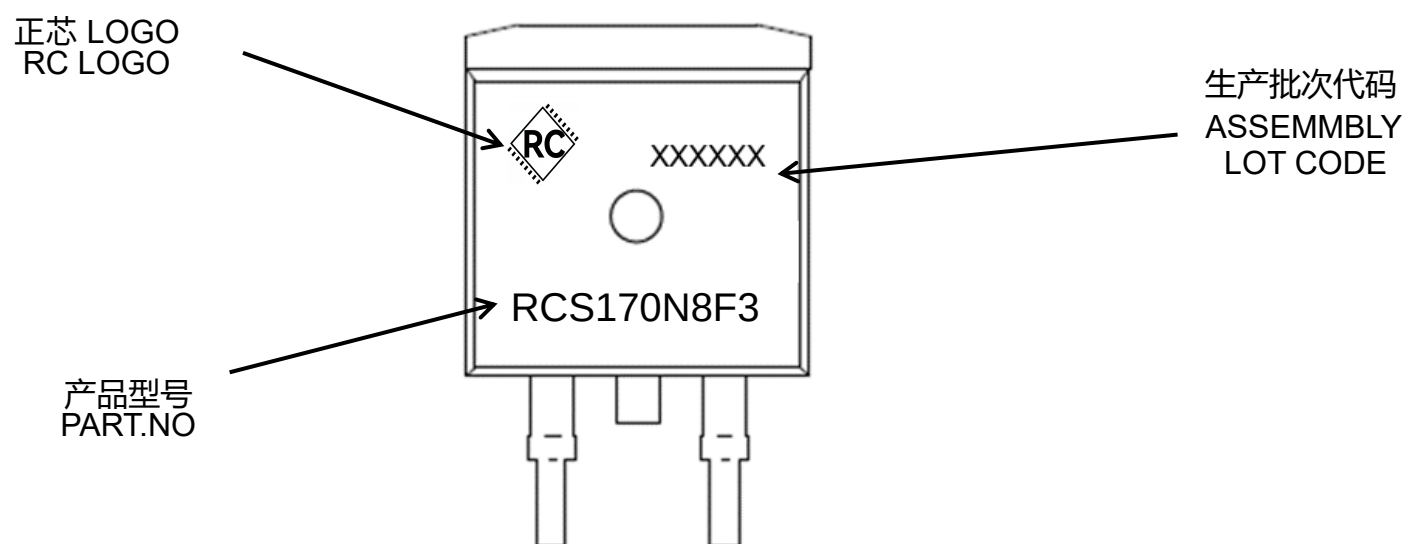
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Test Circuit & Waveform



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印记 Marking:



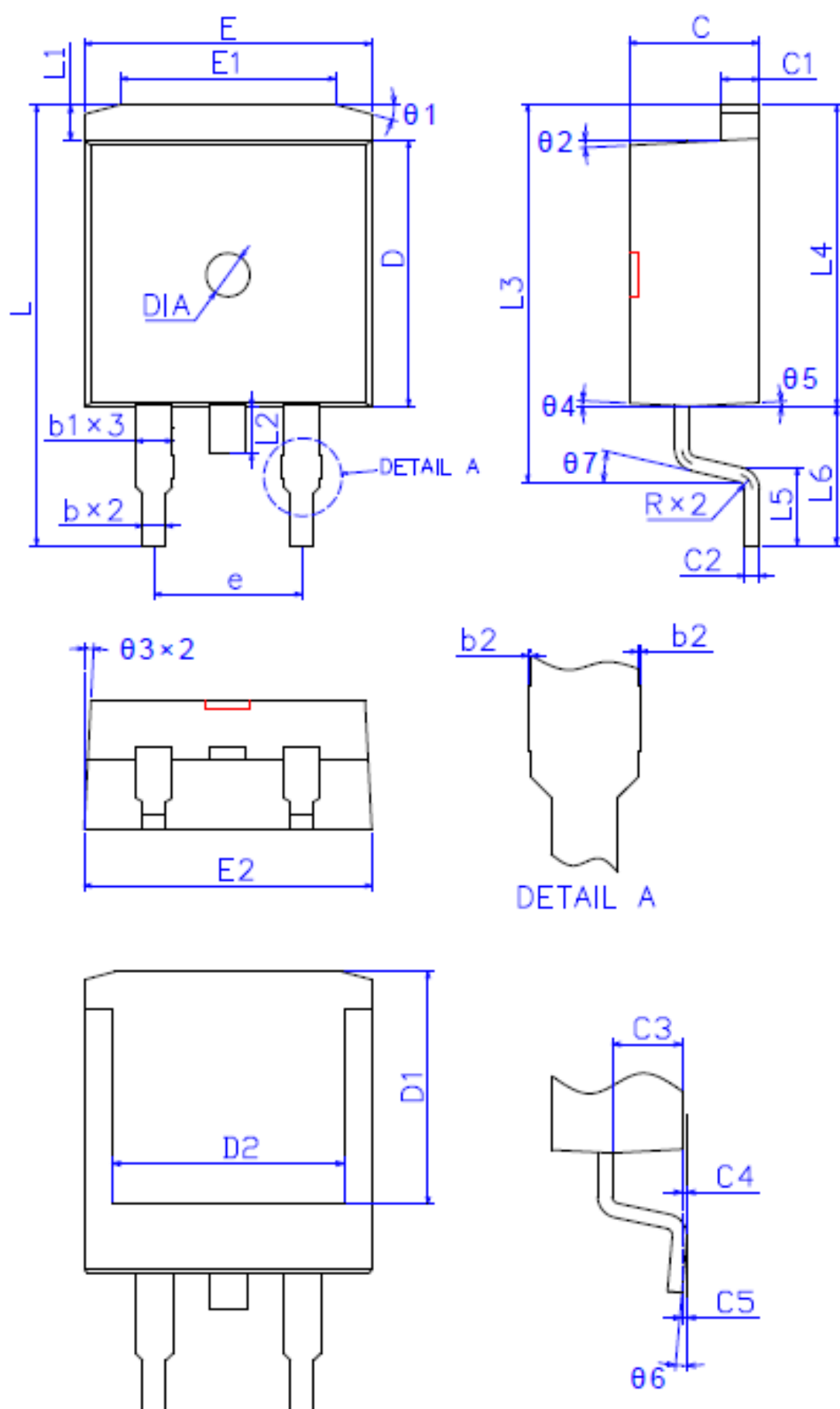
N-CHANNEL MOSFET

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外形尺寸:

Package Dimension:

TO-263



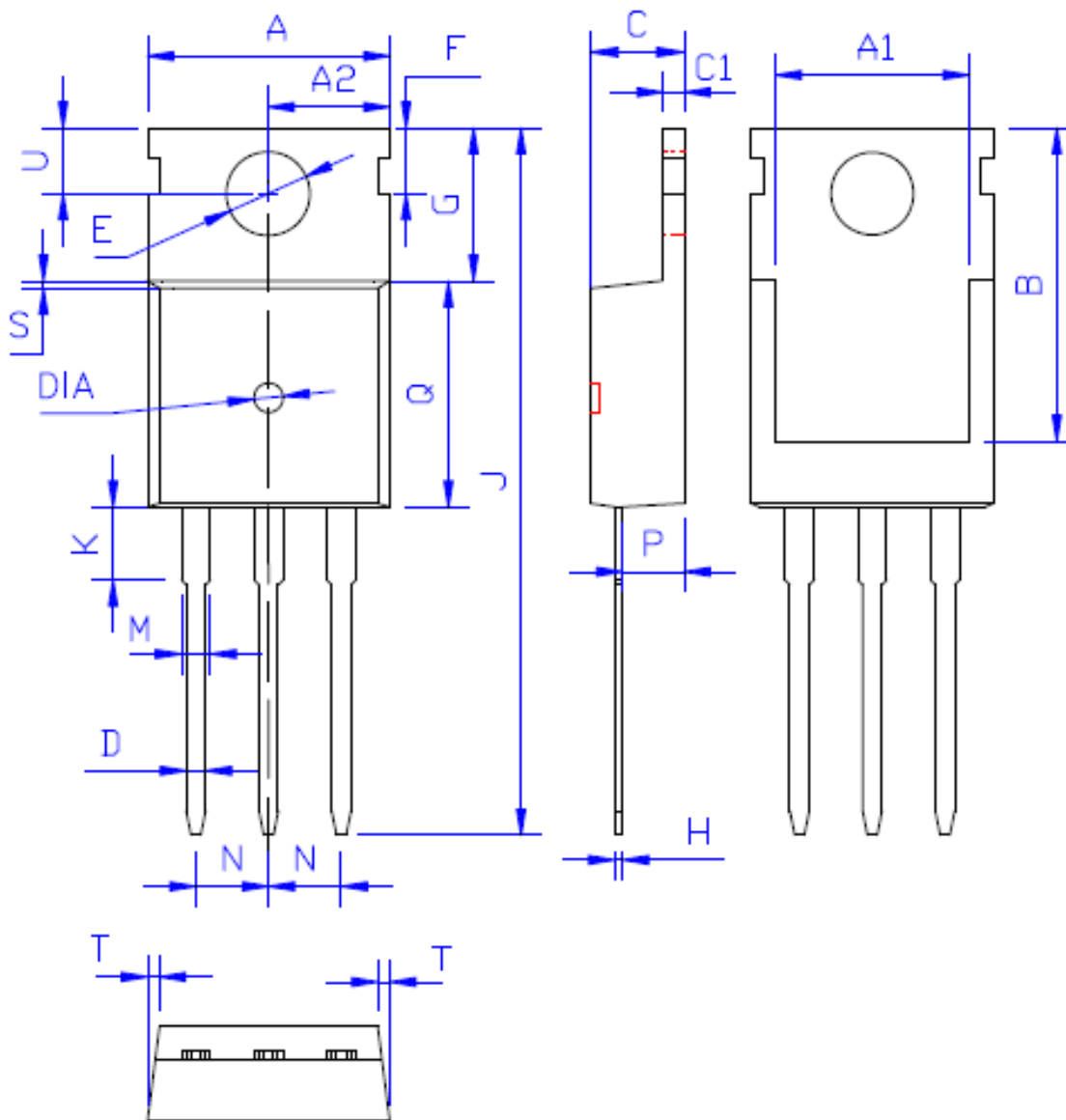
标注	尺寸(mm)
E	9.88±0.10
E1	7.40±0.20
E2	9.90±0.15
L	15.20±0.25
L1	1.30±0.15
L2	1.60±0.10
L3	13.00±0.20
L4	10.40±0.15
L5	2.60±0.15
L6	4.80±0.20
b	0.80±0.07
b1	1.27±0.07
b2	0.05±0.07
C	4.48±0.10
C1	1.30±0.07
C2	0.50±0.07
C3	2.40±0.06
C4	0.10±0.08
C5	0.10±0.08
D	9.20±0.10
D1	8.00±0.10
D2	8.00±0.10
R	0.50±0.10
θ1	15° ±2°
θ2	3° ±2°
θ3	3° ±2°
θ4	3° ±2°
θ5	3° ±2°
θ6	0° ~6°
θ7	13° ±2°
e	5.08±0.10
DIA	宽 1.50±0.10 深 0.30±0.15

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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)

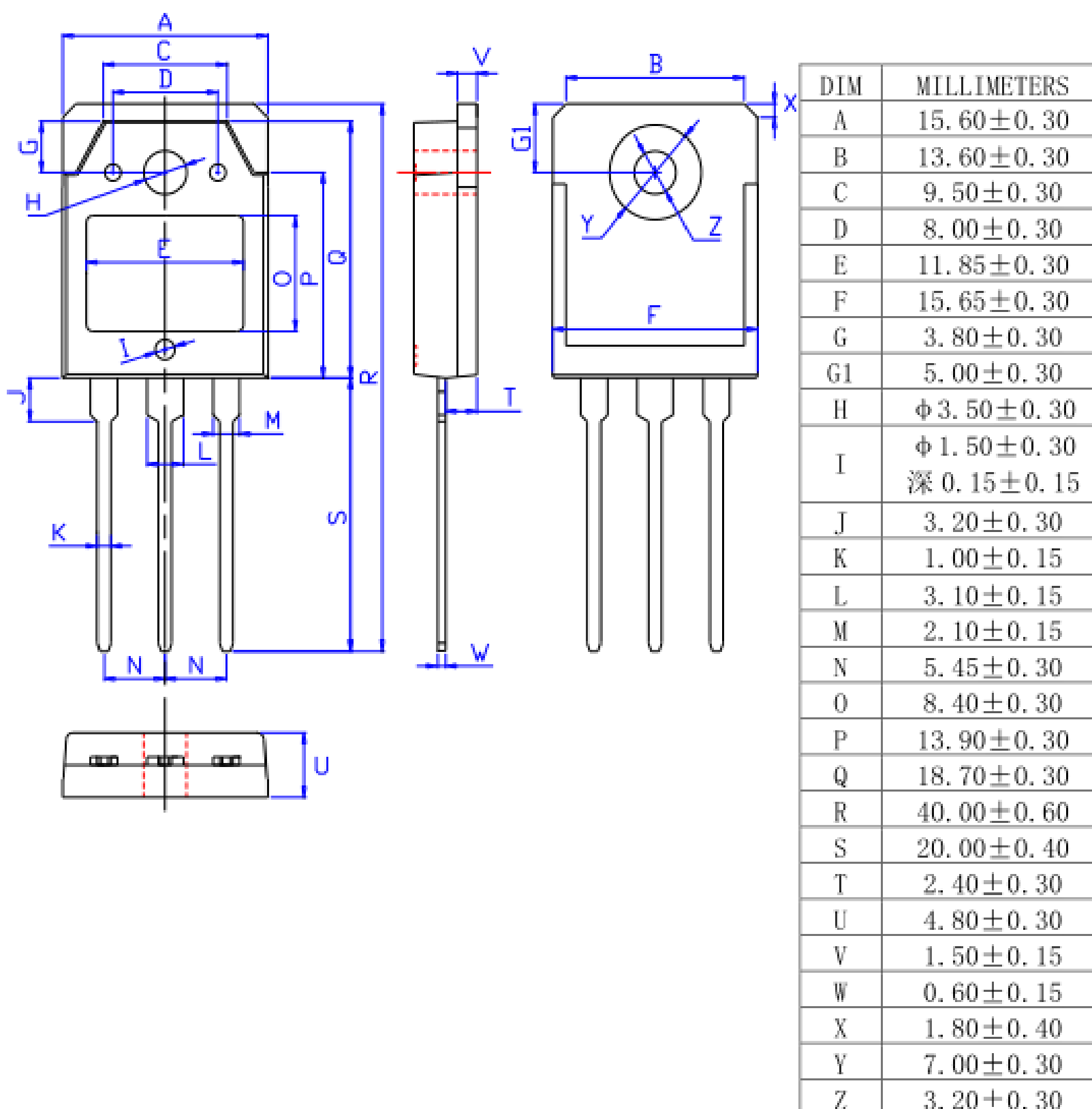
N-CHANNEL MOSFET

RCP170N8F3A/RCA170N8F3A/RCS170N8F3A

外形尺寸:

Package Dimension:

TO-3PN



(Units: mm)