

650V N-Channel MOSFET

RCF10N65

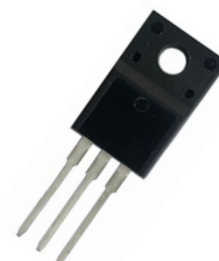
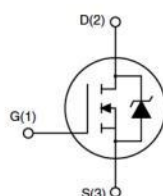
Features

- ▶ 650V, 10A, $R_{DS(ON)}(Max.)=0.95\Omega@V_{GS}=10V$
- ▶ Low Gate Charge
- ▶ Low C_{rss}
- ▶ 100% Avalanche Tested
- ▶ Fast Switching
- ▶ Improved dv/dt Capability

Application

- ▶ LED power supplies
- ▶ Cell Phone Charger
- ▶ Standby Power

V_{DSS}	650	V
I_D	10	A
P_D ($T_C=25^\circ C$)	40	W
$R_{DS(ON)}$	0.84	Ω



Ordering Information

Part Number	Package	Brand
RCF10N65	TO-220F	RC

TO-220F

Absolute Maximum Ratings($T_C=25^\circ C$ unless otherwise noted)

Symbol	Parameter		Value	Unit
V_{DSS}	Drain-Source Voltage		650	V
I_D	Drain Current	- Continuous($T_C=25^\circ C$)	10	A
		- Continuous($T_C=100^\circ C$)	6.3	A
I_{DM}	Drain Current	- Pulsed (Note1)	40	A
V_{GSS}	Gate-Source Voltage		± 30	V
E_{AS}	Single Pulsed Avalanche Energy	(Note2)	500	mJ
I_{AR}	Avalanche Current	(Note1)	10	A
E_{AR}	Repetitive Avalanche Energy	(Note1)	17.3	mJ
dv/dt	Peak Diode Recovery dv/dt	(Note3)	4.5	V/ns
P_D	Power Dissipation($T_C=25^\circ C$)		40	W
	-Derate above $25^\circ C$		0.32	W/ $^\circ C$
T_j	Operating Junction Temperature		150	$^\circ C$
T_{stg}	Storage Temperature Range		-55 to +150	$^\circ C$

Thermal Characteristics

Symbol	Parameter	Max	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	2.5	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	62.5	$^\circ C/W$

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Electrical Characteristics(Tc=25°C unless otherwise noted)

Symbol	Parameter	Test Conditons	Min	Typ	Max	Unit
Off Characteristics						
BV _{DSS}	Drain-source Breakdown Voltage	V _{GS} =0V ,I _D =250μA	650	--	--	V
Δ BV _{DSS} / Δ T _J	Breakdown Voltage Temperature Coefficient	I _D =250μA (Referenced to 25°C)	--	0.7	--	V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =650V, V _{GS} =0V	--	--	1	μA
		V _{DS} =520V, T _C = 125°C	--	--	10	μA
I _{GSSF}	Gate-Body Leakage Current,Forward	V _{GS} =+30V, V _{DS} =0V	--	--	100	nA
I _{GSSR}	Gate-Body Leakage Current,Reverse	V _{GS} =-30V, V _{DS} =0V	--	--	-100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D =250μA	2.0	--	4.0	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} = 10 V, I _D =5.0A	--	0.84	0.95	Ω
g _{FS}	Forward Transconductance	V _{DS} =20 V, I _D =5.0A (Note4)	--	8.5	--	S
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1.0MHz	--	1510	--	pF
C _{oss}	Output Capacitance		--	125	--	pF
C _{rss}	Reverse Transfer Capacitance		--	7	--	pF
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DD} = 325 V, I _D = 10 A, R _G = 25 Ω (Note4,5)	--	19.3	--	ns
t _r	Turn-On Rise Time		--	94	--	ns
t _{d(off)}	Turn-Off Delay Time		--	131	--	ns
t _f	Turn-Off Fall Time		--	73	--	ns
Q _g	Total Gate Charge	V _{DS} = 520 V, I _D =10 A, V _{GS} = 10 V(Note4,5)	--	38	--	nC
Q _{gs}	Gate-Source Charge		--	7.3	--	nC
Q _{gd}	Gate-Drain Charge		--	17.4	--	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain-Source Diode Forward Current		--	--	10	A
I _{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	40	A
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} =0V,I _S = 10.0A	--	--	1.4	V
t _{rr}	Reverse Recovery Time	V _{GS} =0V, I _S = 10.0A, d I _F /dt= 100A/μs (Note4)	--	368	--	ns
Q _{rr}	Reverse Recovery Charge		--	3.40	--	μC

Notes:

- 1、Repetitive Rating:Pulse Width Limited by Maximum Junction Temperature.
- 2、L = 12.6mH, I_{AS} =10.0A, V_{DD} =80V, R_G = 25 Ω, Starting T_J = 25°C.
- 3、I_{SD}≤10.0A, di/dt≤200A/μs, V_{DD}≤BV_{DSS}, Starting T_J = 25°C.
- 4、Pulse Test : Pulse Width ≤300 μ s, Duty Cycle≤2%.
- 5、Essentially Independent of Operating Temperature.

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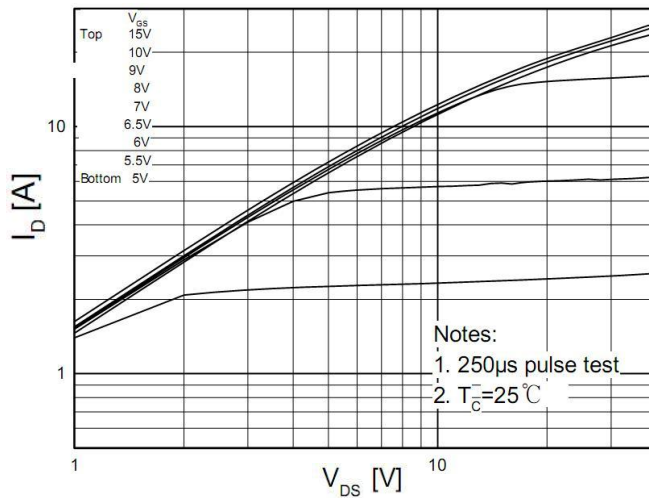


Fig.1: On-Regin Characteristics

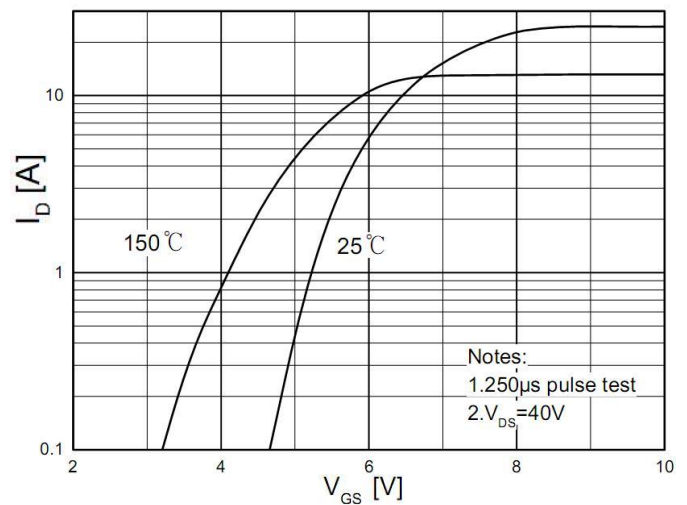


Fig.2: Transfer Characteristics

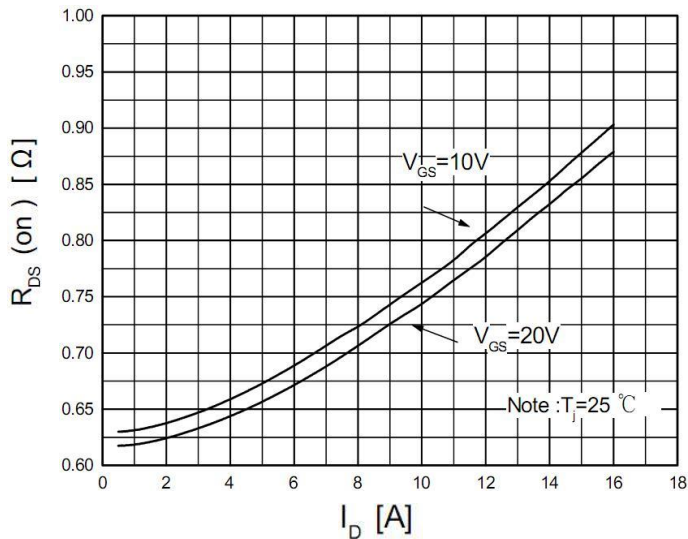


Fig.3: On-Resistance Variation vs. Drain Current and Gate Voltage

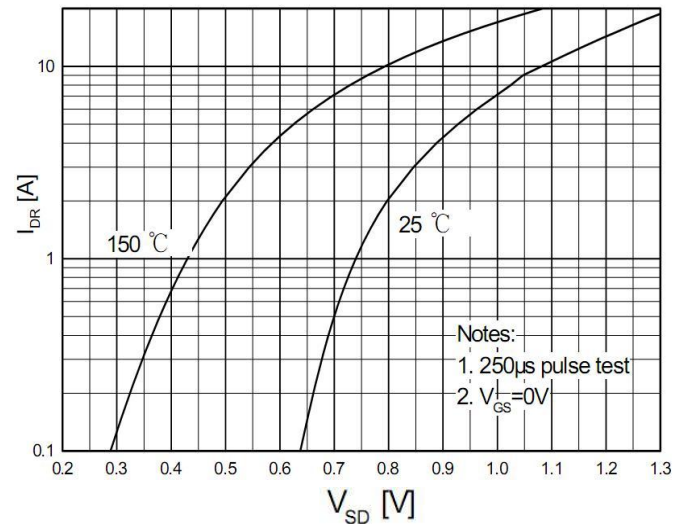


Fig.4: Body Diode Forward Voltage Variation vs. Source Current and Temperature

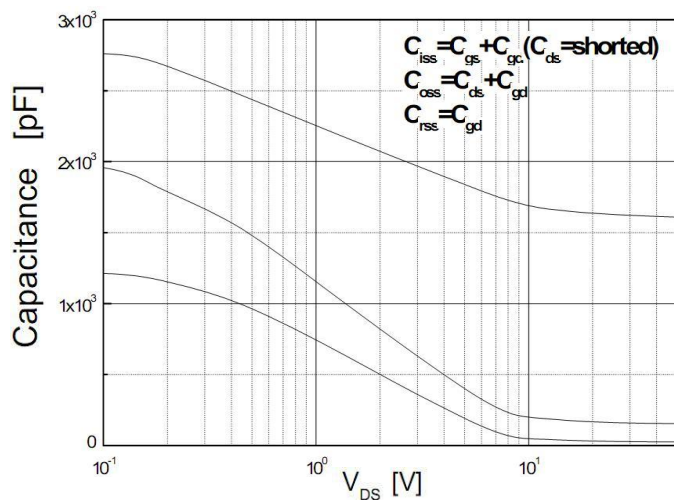


Fig.5: Capacitance Characteristics

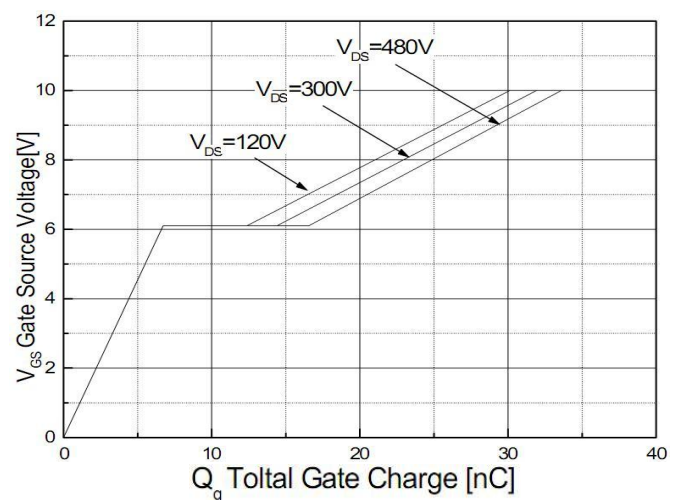


Fig.6: Gate Charge Characteristics

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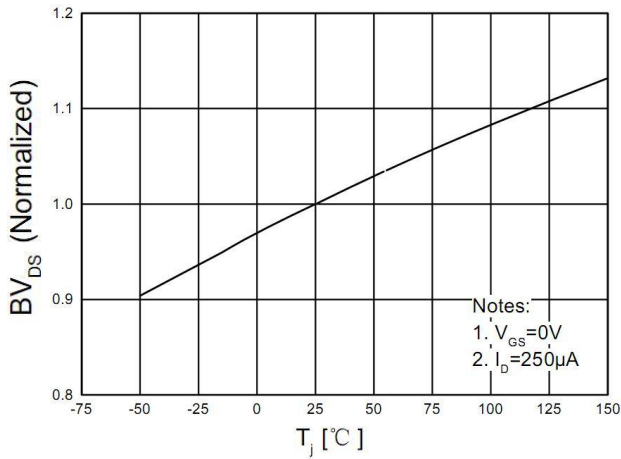


Fig.7 Breakdown Voltage Variation vs. Temperature

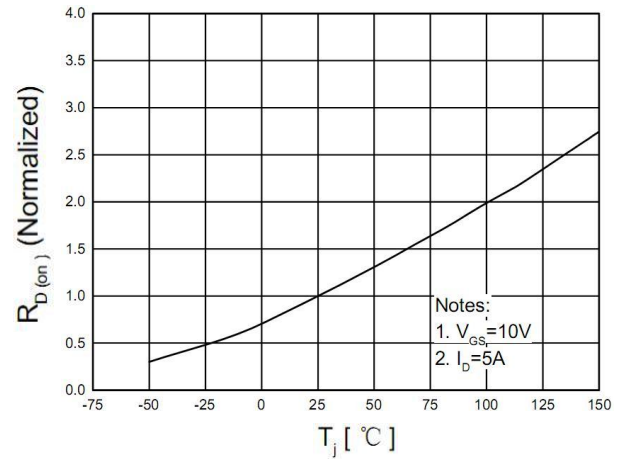


Fig.8 On-Resistance Variation vs. Temperature

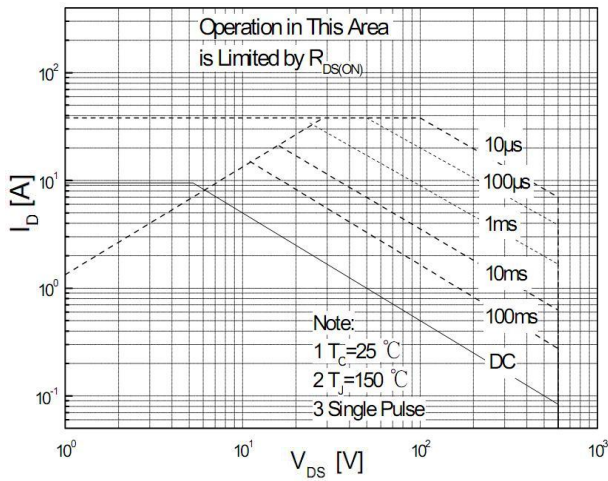


Fig.9 Maximum Safe Operating Area

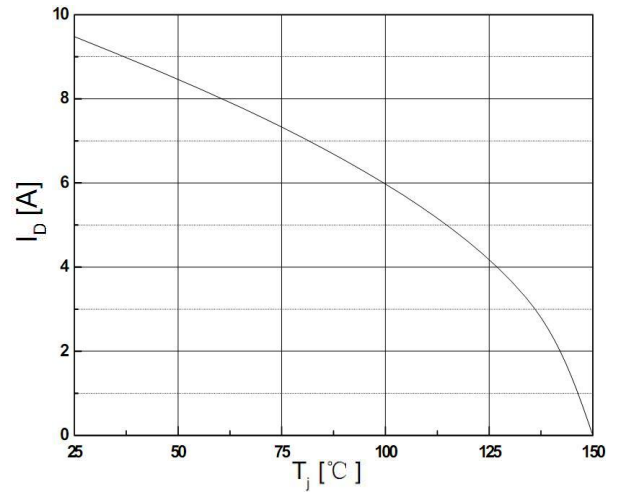
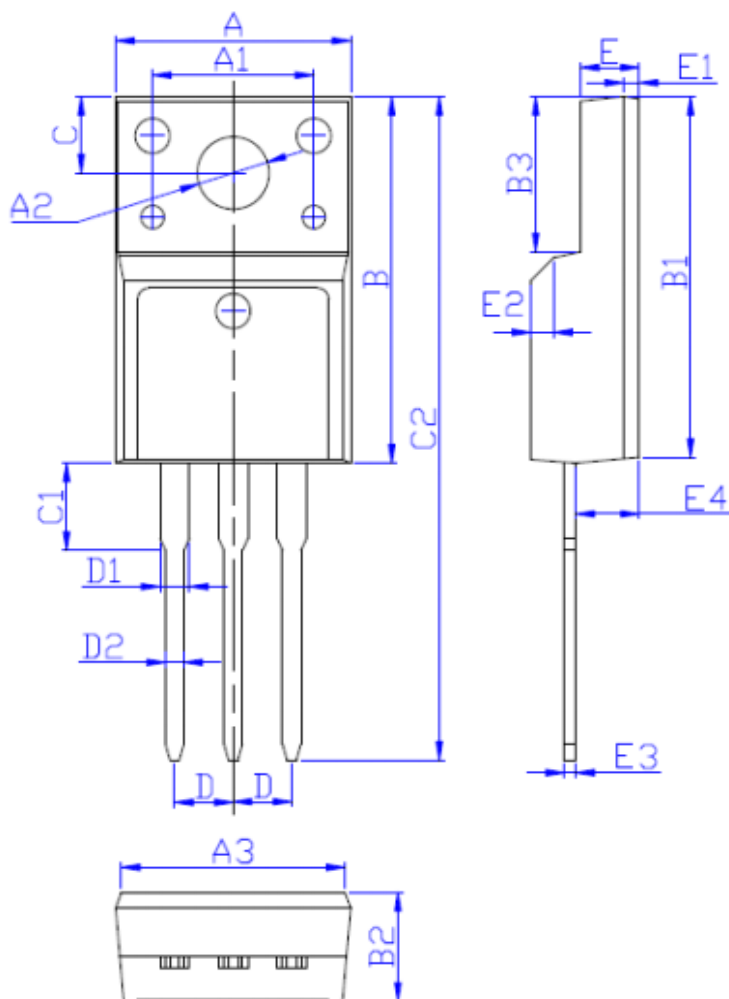


Fig.10 Maximum Drain Current Vs. Case Temperature

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Package Dimension:

TO-220F



DIM	MILLIMETERS
A	10.16 ± 0.30
A1	7.00 ± 0.20
A2	3.12 ± 0.20
A3	9.70 ± 0.30
B	15.90 ± 0.50
B1	15.60 ± 0.50
B2	4.70 ± 0.30
B3	6.70 ± 0.30
C	3.30 ± 0.25
C1	3.25 ± 0.30
C2	28.70 ± 0.50
D	Typical 2.54
D1	1.47 (MAX)
D2	0.80 ± 0.20
E	2.55 ± 0.25
E1	0.70 ± 0.25
E2	$1.0 \times 45^\circ$
E3	0.50 ± 0.20
E4	2.75 ± 0.30

(Unit:mm)