

RTK20N60F

RTK20N60F – 600V 20A N-channel Si Power MOSFET

Features

- Low $R_{DS(ON)}$
- Low Gate Charge
- $R_{DS(ON)}$ (Typ)= 0.38Ω @ $V_{GS}=10V$
- 100% UIS Tested

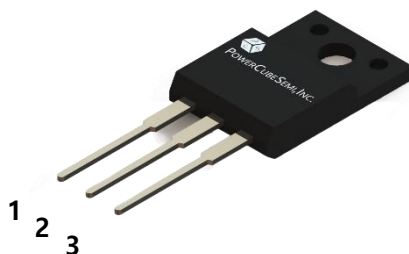
Applications

- Power Factor Correction, PFC
- Switched Mode Power Supplies
- LED Driver

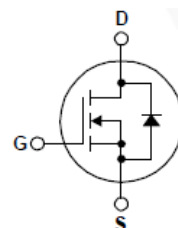
Pin Description

- 1 : Gate
2 : Drain
3 : Source

Part Number	Package	Note
RTK20N60F	TO-220F	



PKG type : TO-220F



Absolute Maximum Ratings $T_C=25^\circ\text{C}$ Unless Otherwise Noted

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to Source Voltage		600	V
V_{GSS}	Gate to Source Voltage		± 30	
I_D	Continuous Drain Current ($V_{GS}=10V$)	$T_C=25^\circ\text{C}$	20	A
		$T_C=100^\circ\text{C}$	12.5	
I_{DM}	Pulsed Drain Current	$T_C=25^\circ\text{C}$	80	A
P_D	Power dissipation TO-220F	$T_C=25^\circ\text{C}$	45	W
dv/dt	Peak Diode Recovery dv/dt		5.0	V/ns
E_{AS}	Avalanche Energy, Single Pulsed		720	mJ
T_J	Maximum Junction Temperature		-55 to 150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range		-55 to 150	$^\circ\text{C}$

Static Characteristics

$T_J = 25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Test Condition	Numerical			Unit
			Min	Typ.	Max.	
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	600	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 600V, V_{GS} = 0V$	-	-	10	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS} = \pm 30V, V_{DS} = 0V$	-	-	± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	-	4	V
$R_{DS(on)}$	Static Drain-Source on state resistance	$V_{GS} = 10V, I_D = 10A$	-	0.38	0.42	Ω

Dynamic Characteristics

Symbol	Parameter	Test Condition	Numerical			Unit
			Min	Typ.	Max.	
C_{iss}	Input capacitance	$V_{DS} = 25V, V_{GS} = 0V, f = 1\text{MHz}$	-	2962	-	pF
C_{oss}	Output capacitance		-	266	-	
C_{rss}	Reverse transfer capacitance		-	18	-	
$t_{d(on)}$	Turn-on Delay time	$V_{DD} = 250V, I_D = 20A, V_{GS} = 0V, R_G = 25\Omega$	-	20	-	ns
T_r	Turn-on Rise time		-	50	-	
$t_{d(off)}$	Turn-off Delay time		-	99	-	
T_f	Turn-off Fall time		-	20	-	

Gate Charge Characteristics

Symbol	Parameter	Test Condition	Numerical			Unit
			Min	Typ.	Max.	
$Q_{g(tot)}$	Total gate charge at 10V	$V_{DS} = 480V, I_D = 20A, V_{GS(on)} = 10V$	-	58	-	nC
Q_{gs}	Gate to source gate charge		-	17	-	
Q_{gd}	Gate to drain "Miller" charge		-	19	-	



Diode Characteristics

Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
I_{SD}	Continuous Source Current		-	20	A
I_{SM}	Pulsed Source Current		-	80	
V_{SD}	Drain to source diode forward voltage	$I_{SD}=20A$, $V_{GS} = 0V$	-	1.4	V
T_{rr}	Reverse recovery time	$I_F=20A$, $V_R=250V$, $dI_F/dt=100A/\mu s$	500	-	ns
Q_{rr}	Reverse recovery charge		7.5	-	μC
I_{rrm}	Reverse recovery current		30.3	-	A

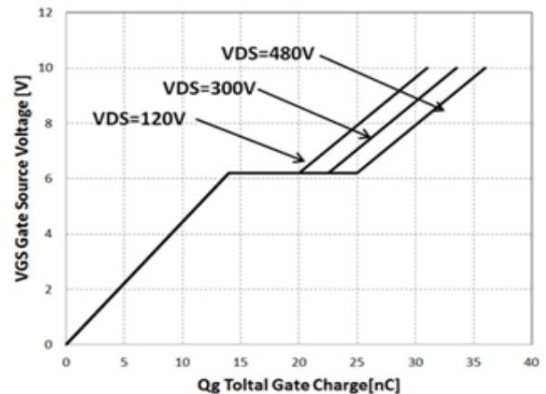
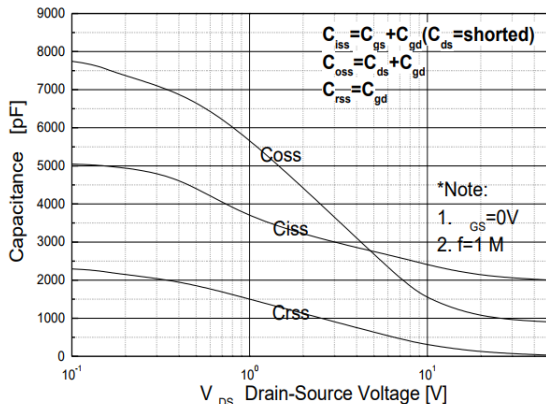
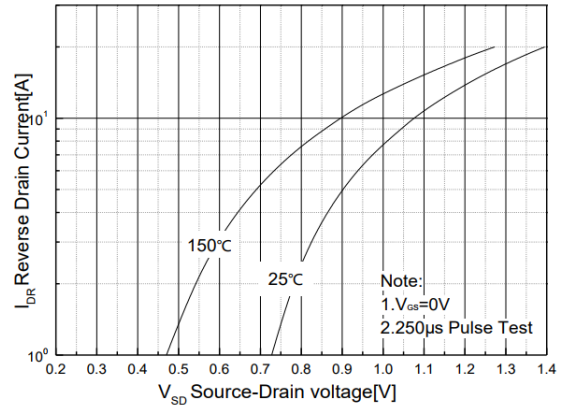
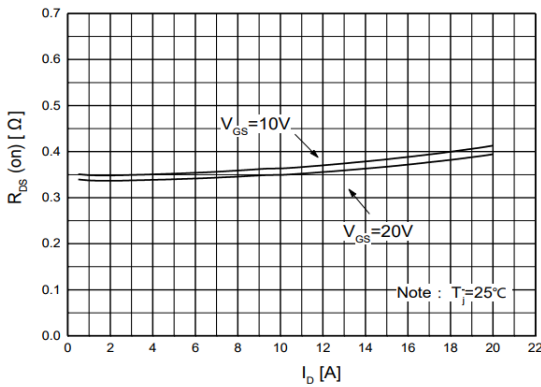
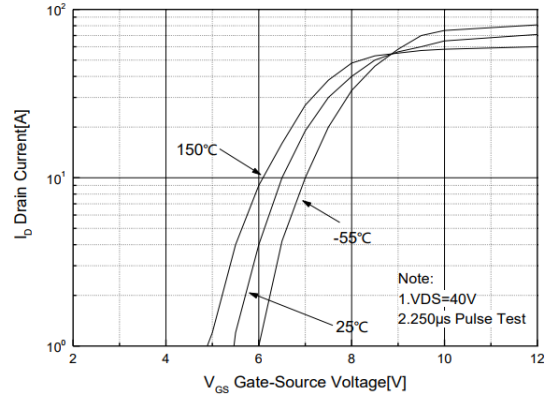
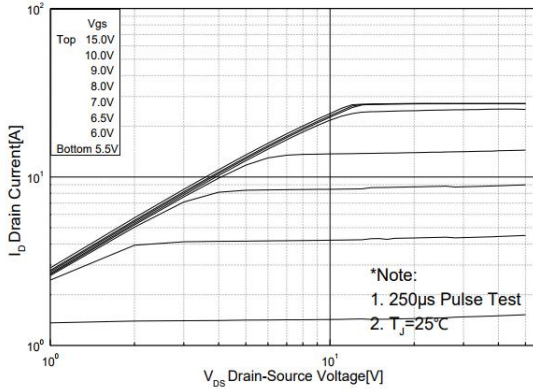
Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	2.98	$^{\circ}C/W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	110	$^{\circ}C/W$

NOTES :

1. Pulse width limited by maximum junction temperature.
2. $L=10mH$, $I_{AS}=12A$, Starting $T_J=25^{\circ}C$
3. $I_{SD}=20A$, $di/dt \leq 100A/\mu s$, $V_{DD} \leq BV_{DS}$, Starting $T_J=25^{\circ}C$

Typical Characteristics



Typical Characteristics

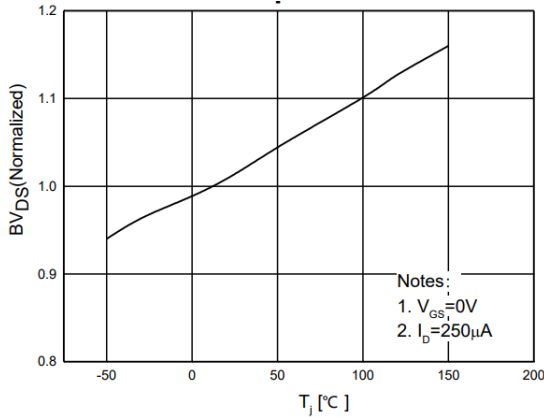


Figure 7. Breakdown Voltage Variation vs. Temperature

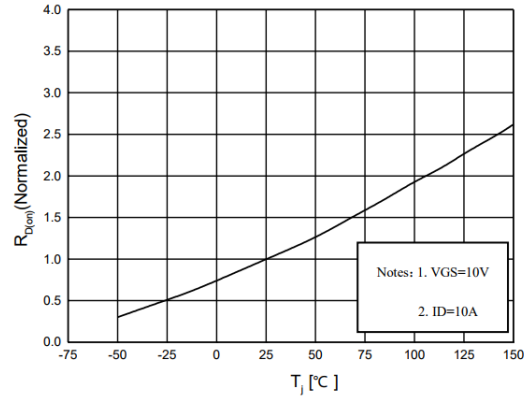


Figure 8. On-Resistance Variation vs. Temperature

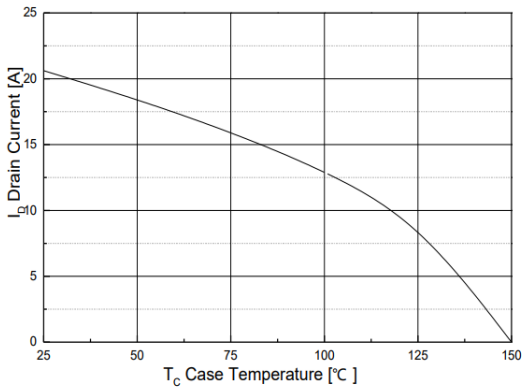


Figure 9. Maximum Drain Current vs. Case Temperature

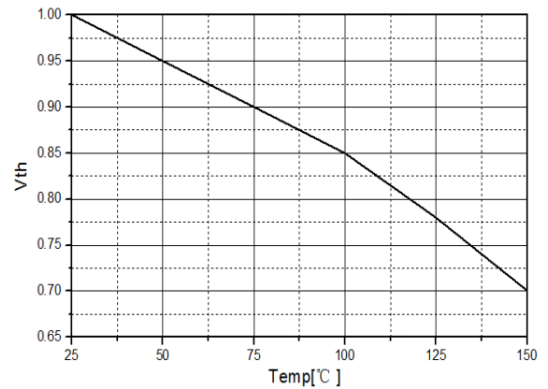


Figure 10. Gate Threshold Voltage Variation(Normalized) vs. Temperature

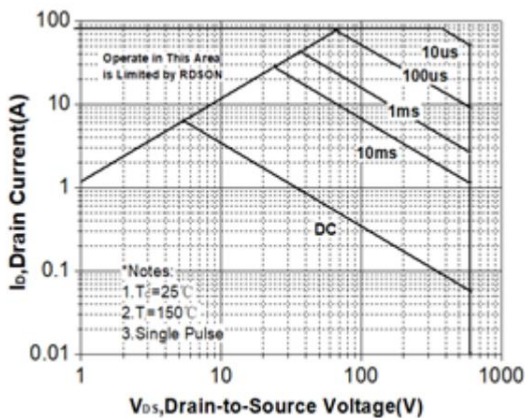


Figure 11. Maximum Safe Operating Area

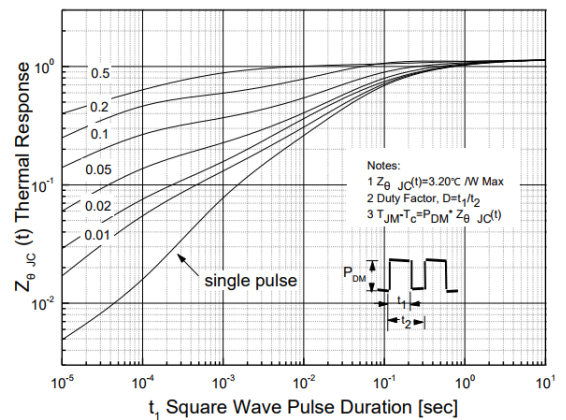
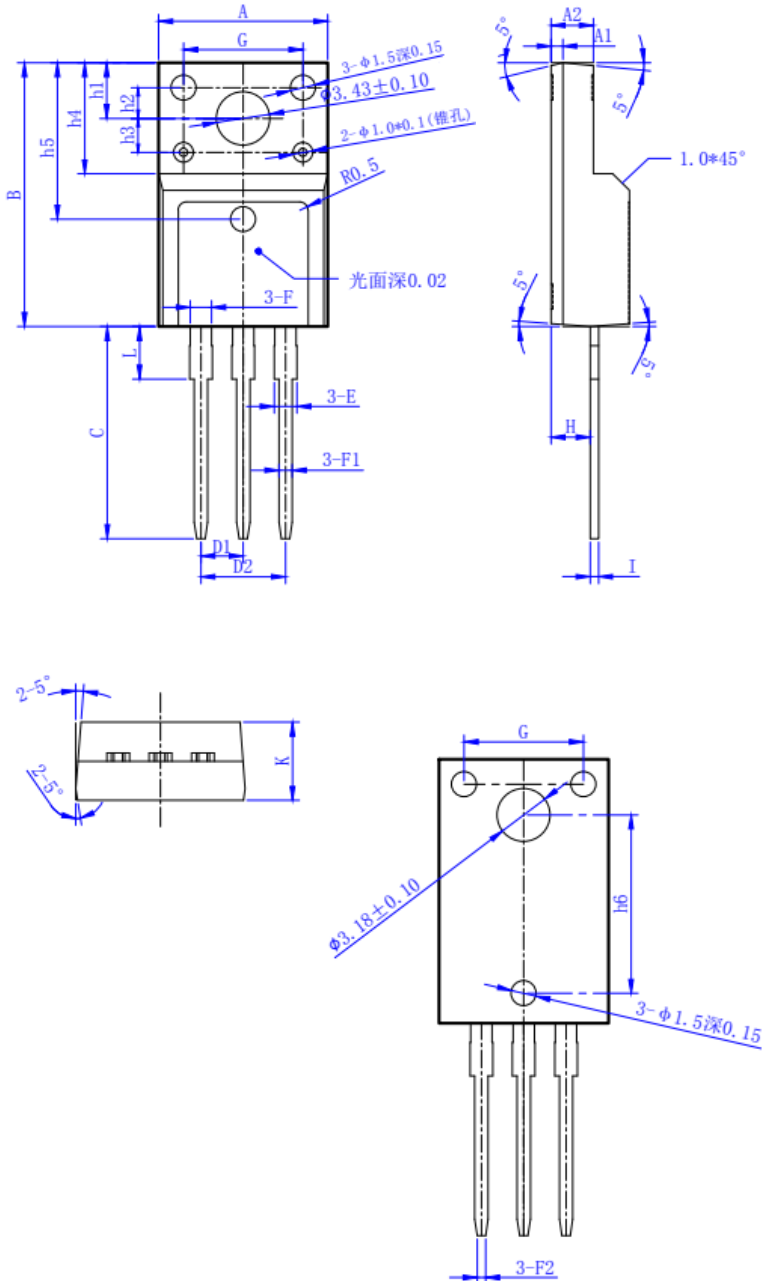


Figure 12. Transient Thermal Response Curve

Package Outline

Unit : mm



SYMBOL	DIMENSIONS		
	MIN	NOM	MAX
A	10.00	10.20	10.40
A1	-	0.70	-
A2	2.35	2.55	2.75
B	15.80	15.90	16.00
C	13.00	13.25	13.50
D1	2.54 BSC		
D2	5.08 BSC		
E	1.27	1.32	1.40
F	1.25	1.28	1.30
F1	0.75	0.80	0.85
F2	0.35	0.40	0.50
G	6.90	7.00	7.10
H	2.66	2.76	2.86
h1	3.20	3.30	3.40
h2	1.70	1.80	1.90
h3	2.00	2.10	2.20
h4	6.70	6.79	6.90
h5	9.30	9.41	9.50
h6	10.44	10.54	10.64
I	0.40	0.50	0.60
K	4.60	4.70	4.80
L	2.90	3.00	3.10