

RTK10N50F

RTK10N50F – 500V 10A N-channel Si Power MOSFET

Features

- Proprietary New Planar Technology
- $R_{DS(ON)}$ (Typ)= 0.45Ω @ $V_{GS}=10V$
- 100% UIS Tested

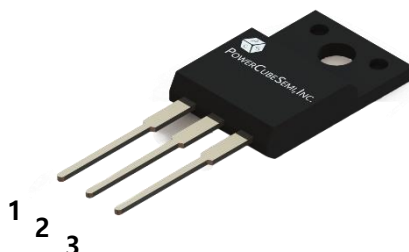
Applications

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

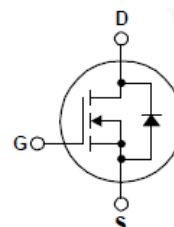
Pin Description

- 1 : Gate
2 : Drain
3 : Source

Part Number	Package	Note
RTK10N50F	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		500	V
V_{GSS}	Gate to Source Voltage		± 30	
I_D	Continuous Drain Current ($V_{GS}=10V$)	$T_C=25^\circ\text{C}$	10	A
I_{DM}	Pulsed Drain Current	$T_C=25^\circ\text{C}$	40	A
P_D	Power dissipation	$T_C=25^\circ\text{C}$	42	W
E_{AS}	Avalanche Energy, Single Pulsed		700	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	$V_{GS} = 0V, I_D = 250\mu A$	500	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 500V, V_{GS} = 0V$	-	-	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	$V_{GS} = 10V, I_D = 5A$	-	0.45	0.75	Ω

Dynamic Characteristics

Symbol	Parameter	Test Condition	Numerical			Unit
			Min	Typ.	Max.	
C_{iss}	Input capacitance	$V_{DS} = 25V, V_{GS} = 0V, f = 1\text{MHz}$	-	1650	-	pF
C_{oss}	Output capacitance		-	148	-	
C_{rss}	Reverse transfer capacitance		-	7	-	
$t_{d(on)}$	Turn-on Delay time	$V_{DS} = 250V, I_D = 10A, V_{GS} = 10V, R_G = 25\Omega$	-	50	-	ns
T_r	Turn-on Rise time		-	23	-	
$t_{d(off)}$	Turn-off Delay time		-	54	-	
T_f	Turn-off Fall time		-	25	-	

Gate Charge Characteristics

Symbol	Parameter	Test Condition	Numerical			Unit
			Min	Typ.	Max.	
$Q_{g(tot)}$	Total gate charge at 10V	$V_{DS} = 400V, I_D = 10A, V_{GS(on)} = 10V$	-	32	-	nC
Q_{gs}	Gate to source gate charge		-	9	-	
Q_{gd}	Gate to drain "Miller" charge		-	10	-	



Diode Characteristics

Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
I_{SD}	Continuous Source Current		-	10	A
I_{SM}	Pulsed Source Current		-	40	
V_{SD}	Drain to source diode forward voltage	$I_{SD}=10A$, $V_{GS} = 0V$	-	1.5	V
T_{rr}	Reverse recovery time	$I_F=12A$, $V_R=325V$, $dI_F/dt=100A/\mu s$	370	-	ns
Q_{rr}	Reverse recovery charge		3.4	-	μC

Thermal Characteristics

Symbol	Parameter	Value	Unit
		TO-220F	
$R_{\theta JC}$	Thermal Resistance, Junction to Case	3.13	$^{\circ}C/W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	110	$^{\circ}C/W$

Typical Characteristics

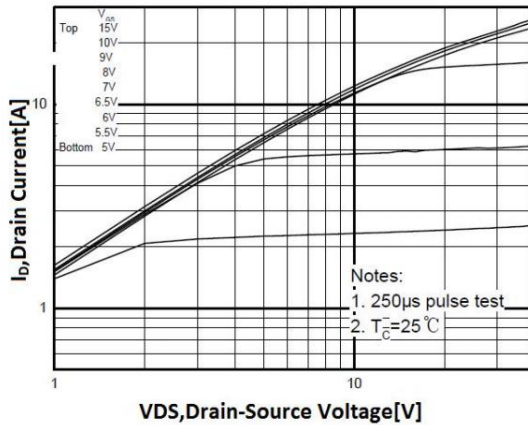


Figure 1. Output Characteristics at $T_c=25^\circ\text{C}$

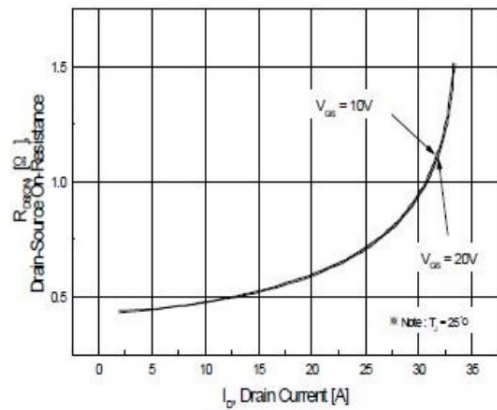


Figure 2. On-Resistance vs. Drain Current and Gate Voltage

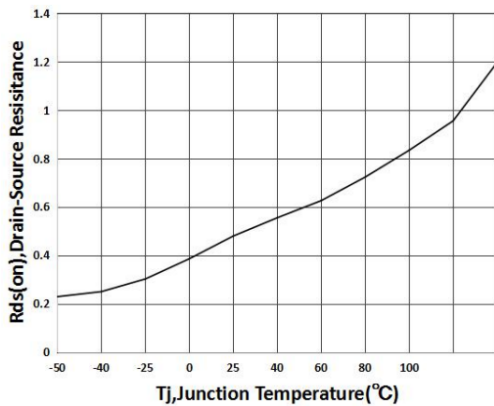


Figure 3. Normalized On-Resistance vs. Temperature

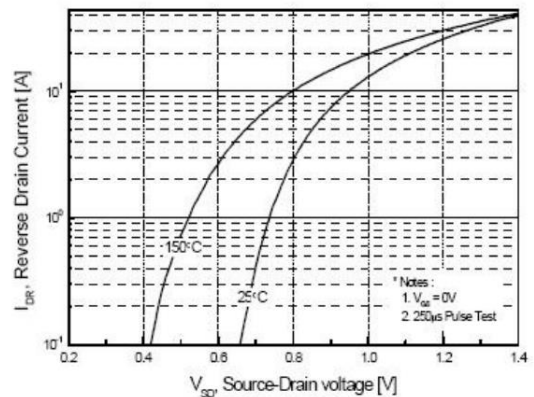


Figure 4. Typical Source to Drain Diode Forward Voltage

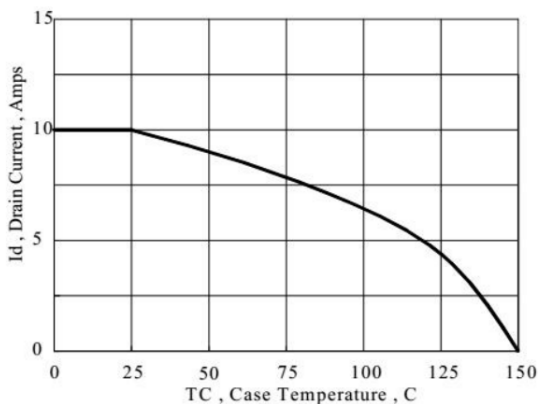


Figure 5. Maximum Drain Current vs. Case Temperature

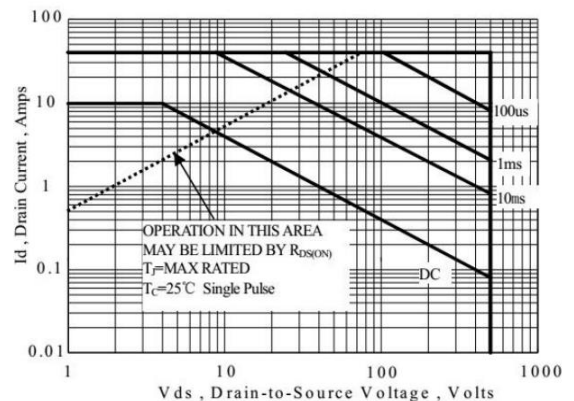
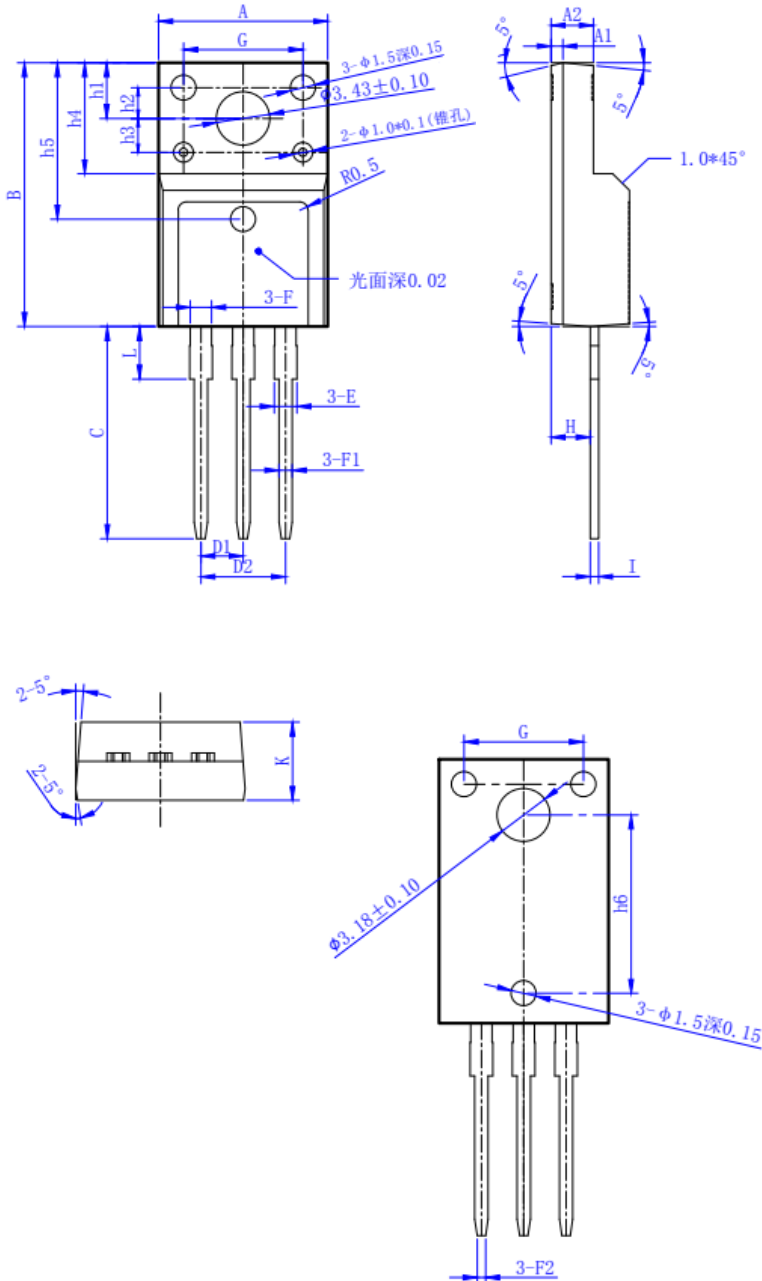


Figure 6. Maximum Safe Operating Area

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