

RTK12N65C

RTK12N65C – 650V 12A N-channel Si Power MOSFET

Features

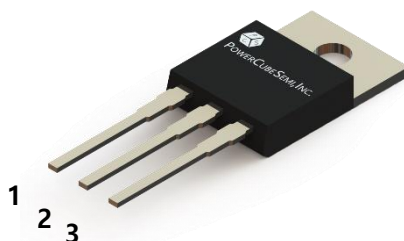
- Low $R_{DS(ON)}$
- Low gate charge (typ. $Q_G=45nC$)
- 100% UIS tested

Applications

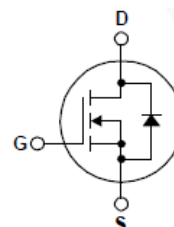
- Power Factor Correction
- Switched mode power supplies
- LED Driver

Pin Description

- 1 : Gate
2 : Drain
3 : Source



PKG type : TO-220



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

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to Source Voltage		650	V
V_{GSS}	Gate to Source Voltage		± 30	
T_J	Maximum Junction Temperature		150	$^{\circ}C$
T_{STG}	Storage Temperature Range		-55 to 150	$^{\circ}C$
I_S	Diode Continuous Forward Current		12	A
$I_{S, pulse}$	Diode Pulse Current		48	A
I_D	Continuous Drain Current ($V_{GS}=10V$)	$T_C=25^{\circ}C$	12	A
		$T_C=100^{\circ}C$	6.5	
I_{DM}	Pulsed Drain Current	$T_C=25^{\circ}C$	40	A
P_D	Power dissipation	$T_C=25^{\circ}C$	150	W
E_{AS}	Avalanche Energy, Single Pulsed		550	mJ

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	$V_{GS} = 0V, I_D = 250\mu A$	650	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 650V, V_{GS} = 0V$	-	-	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	$V_{GS} = 10V, I_D = 6A$	-	0.64	0.8	Ω

Dynamic Characteristics

Symbol	Parameter	Test Condition	Numerical			Unit
			Min	Typ.	Max.	
C_{iss}	Input capacitance	$V_{DS} = 25V, V_{GS} = 0V, f = 1\text{MHz}$	-	2230	-	pF
C_{oss}	Output capacitance		-	370	-	
C_{rss}	Reverse transfer capacitance		-	130	-	
$t_{d(on)}$	Turn-on Delay time	$V_{DS} = 320V, I_D = 12A, V_{GS} = 10V, R_G = 25\Omega$	-	25	-	ns
T_r	Turn-on Rise time		-	50	-	
$t_{d(off)}$	Turn-off Delay time		-	45	-	
T_f	Turn-off Fall time		-	30	-	

Gate Charge Characteristics

Symbol	Parameter	Test Condition	Numerical			Unit
			Min	Typ.	Max.	
$Q_{g(tot)}$	Total gate charge at 10V	$V_{DS} = 520V, I_D = 12A, V_{GS(on)} = 10V$	-	45	-	nC
Q_{gs}	Gate to source gate charge		-	8.4	-	
Q_{gd}	Gate to drain "Miller" charge		-	10	-	

Diode Characteristics

Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
V_{SD}	Drain to source diode forward voltage	$I_{SD}=12A, V_{GS} = 0V$	-	1.5	V
T_{rr}	Reverse recovery time	$I_F=12A, V_R=325V, di_F/dt=100A/\mu s$	300	-	ns
Q_{rr}	Reverse recovery charge		2.0	-	μC
I_{rrm}	Reverse recovery current		21.1	-	A

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	0.83	$^{\circ}C/W$

NOTE

1 : Pulse width limited by maximum junction temperature.

2 : $L=11mH, I_{AS}=10A$, Starting $T_J=25^{\circ}C$

3 : $I_{SD}=12A, di/dt \leq 100A/\mu s, V_{DD} \leq BV_{DS}$, Starting $T_J=25^{\circ}C$

Typical Characteristics

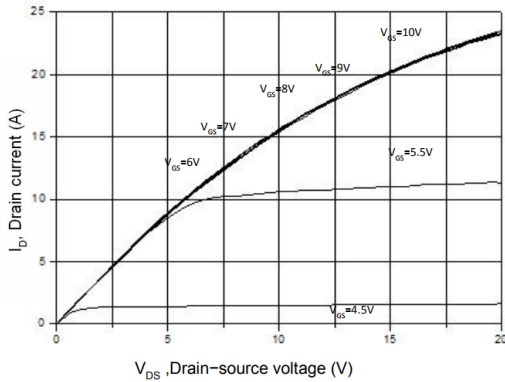


Figure 1. Typical output characteristics

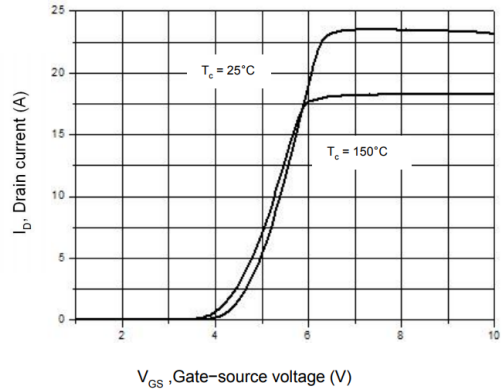


Figure 2. Transfer Characteristics

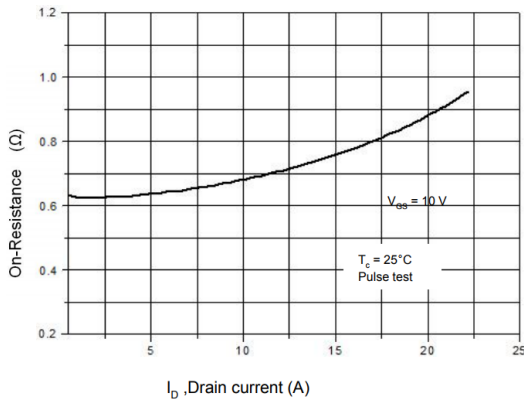


Figure 3. On-resistance variation vs. Drain current

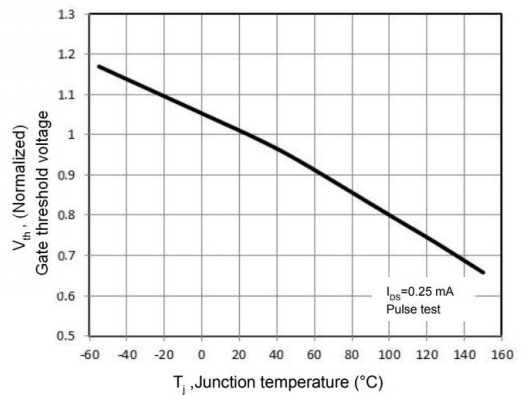


Figure 4. Threshold voltage vs. Temperature

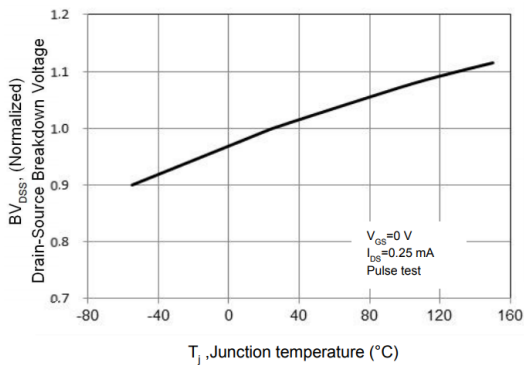


Figure 5. Breakdown Voltage vs. Temperature

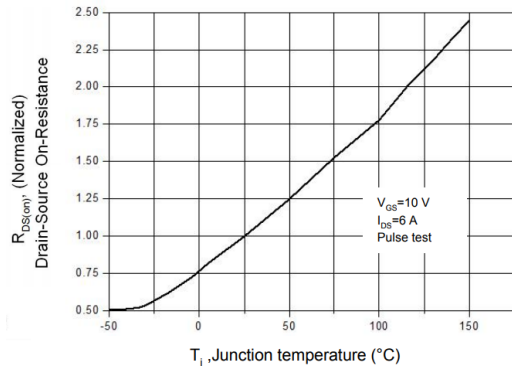


Figure 6. On-resistance vs. Temperature

Typical Characteristics

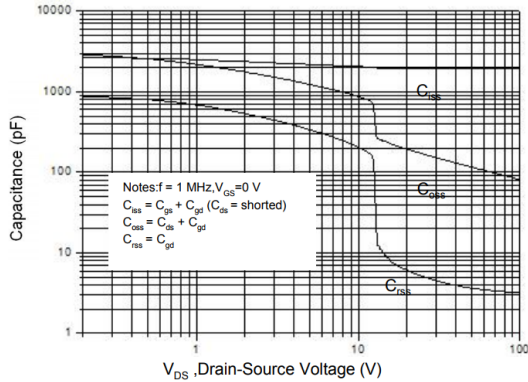


Figure 7. Capacitance Characteristics

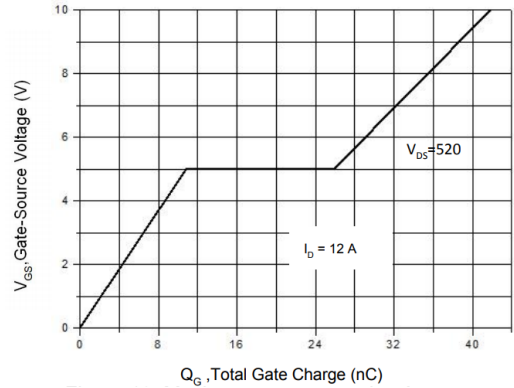


Figure 8. Gate charge characteristics

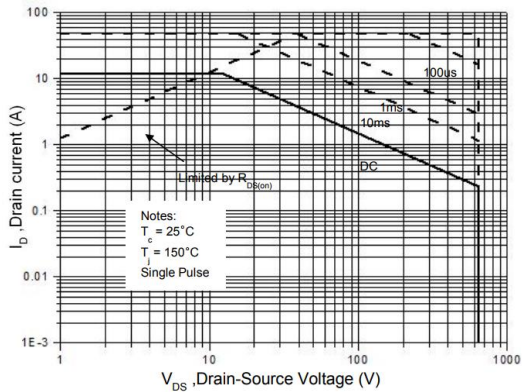


Figure 9. Maximum Safe Operating Area

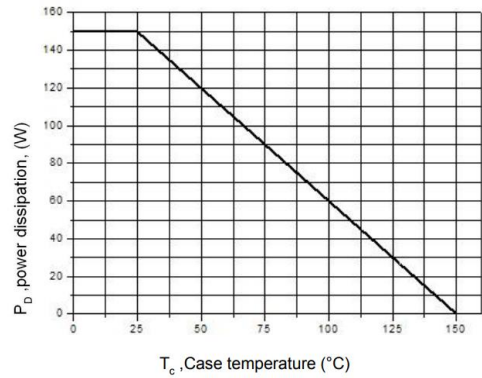


Figure 10. Power dissipation vs. Temperature

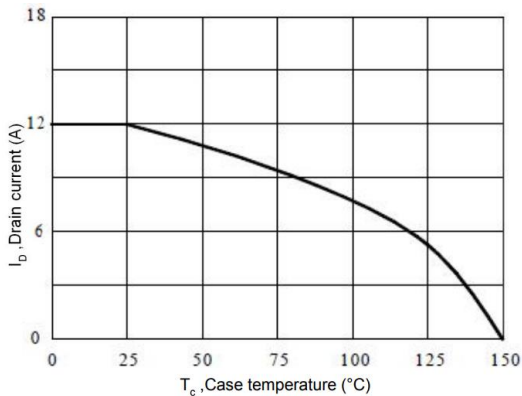


Figure 11. Continuous Drain Current vs. Temperature

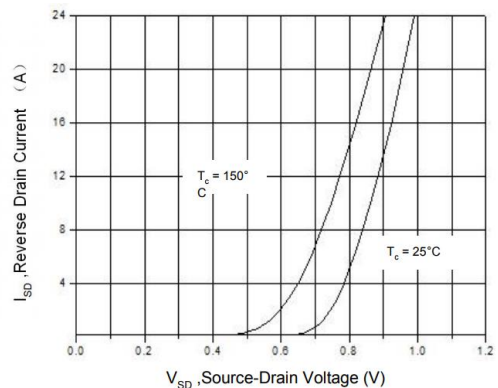


Figure 12. Body diode Transfer Characteristics

Typical Characteristics

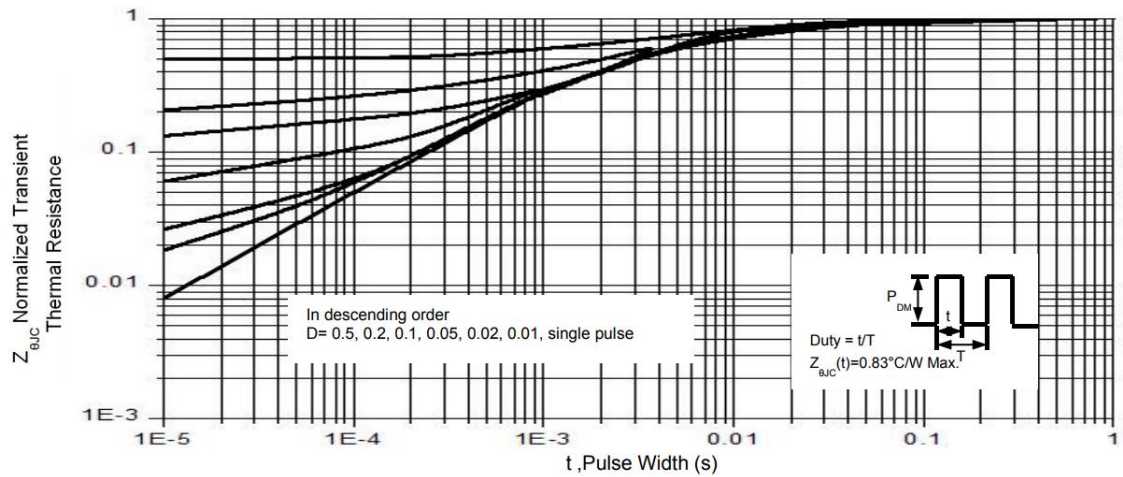
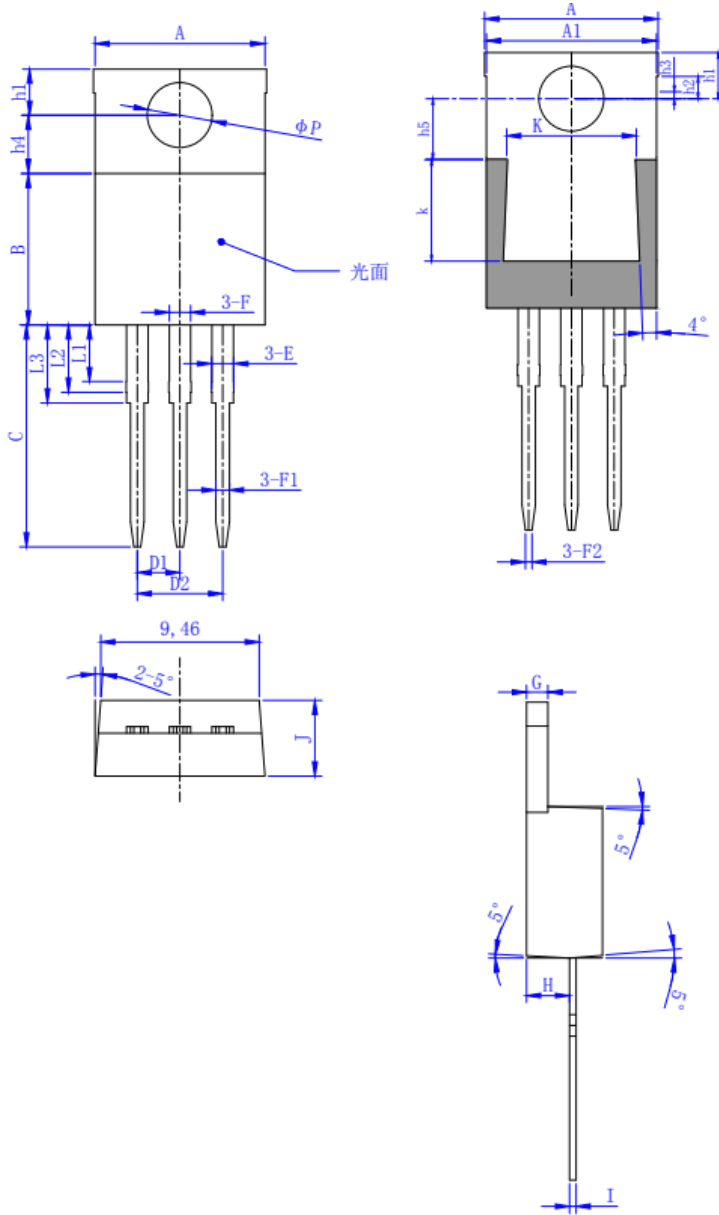


Figure 13. Transient Thermal Impedance

Package Outline

Unit : mm



SYMBOL	DIMENSIONS		
	MIN	NOM	MAX
A	10.1	10.3	10.5
A1	10.0	10.1	10.2
B	8.8	9.0	9.2
C	13.0	13.3	13.5
D1	2.54 BSC		
D2	5.08 BSC		
E	1.27	1.32	1.40
F	1.25	1.27	1.30
F1	0.75	0.80	0.85
F2	0.35	0.40	0.45
G	1.26	1.27	1.28
H	2.40	2.55	2.70
h1	2.70	2.74	2.80
h2	1.27	1.32	1.37
h3	0.40	0.42	0.45
h4	3.40	3.45	3.50
h5	3.60	3.63	3.65
I	0.35	0.38	0.45
J	4.45	4.50	4.60
K	7.60	7.70	7.80
k	6.00	6.03	6.05
L1	3.30	3.40	3.5
L2	3.90	4.00	4.10
L3	4.50	4.60	4.70
ΦP	3.75	3.80	3.90