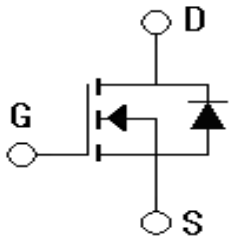
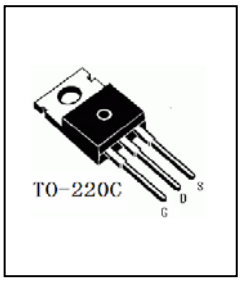
JCS12N60T

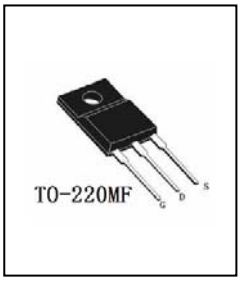
MAIN CHARACTERISTICS

I_D	12 A
V_{DSS}	600 V
Rdson(@Vgs=10V)	0.65Ω
Qg	39nC

Package







APPLICATIONS

- High efficiency switch mode power supplies
- Electronic lamp ballasts based on half bridge
- UPS

FEATURES

- Low gate charge
- Low C_{rss} (typical 23pF)
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability
- RoHS product

ORDER MESSAGE

Order codes	Marking	Package	Halogen Free	Packaging	Device Weight
JCS12N60CT-O-C-N-B	JCS12N60CT	TO-220C	NO	Tube	2.15 g(typ)
JCS12N60FT-O-F-N-B	JCS12N60FT	TO-220MF	NO	Tube	2.20 g(typ)
JCS12N60FT-R-F-N-B	JCS12N60FT	TO-220MF	YES	Tube	2.20 g(typ)

ABSOLUTE RATINGS (Tc=25℃)

Parameter	Symbol	Value		Unit
		JCS12N60CT	JCS12N60FT	
Drain-Source Voltage	V_{DSS}	600	600	V
Drain Current -continuous	I_D T=25℃	12	12*	A
	T=100℃	7.6	7.6*	A
Drain Current - pulse （note 1）	I_{DM}	48	48*	A
Gate-Source Voltage	V_{GSS}	±30		V
Single Pulsed Avalanche Energy（note 2）	E_{AS}	880		mJ
Avalanche Current（note 1）	I_{AR}	12		A
Repetitive Avalanche Current（note 1）	E_{AR}	25		mJ
Peak Diode Recovery dv/dt（note 3）	dv/dt	4.5		V/ns
Power Dissipation	P_D T_C=25℃	250	51	W
	-Derate above 25℃	2.0	0.41	W/℃
Operating and Storage Temperature Range	T_J，T_{STG}	55～+150		℃
Maximum Lead Temperature for Soldering Purposes	T_L	300		℃

*Drain current limited by maximum junction temperature

ELECTRICAL CHARACTERISTICS

arameter	Symbol	Tests conditions	Min	Typ	Max	Units
Off –Characteristics						
Drain-Source Voltage	BV_{DSS}	I_D=250μA, V_{GS}=0V	600	-	-	V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	I_D=250μA, referenced to 25℃	-	0.5	-	V/℃
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=600V,V_{GS}=0V, T_C=25℃	-	-	1	μA
		V_{DS}=480V, T_C=125℃	-	-	10	μA
Gate-body leakage current, forward	I_{GSSF}	V_{DS}=0V, V_{GS} =30V	-	-	100	nA
Gate-body leakage current, reverse	I_{GSSR}	V_{DS}=0V, V_{GS} =-30V	-	-	-100	nA
On-Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS} , I_D=250μA	3.0	-	5.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS} =10V , I_D=6A	-	0.56	0.65	Ω
Forward Transconductance	g_{fs}	V_{DS} = 40V, I_D=6A（note 4）	-	13	-	S
Dynamic Characteristics						
Input capacitance	C_{iss}	V_{DS}=25V, V_{GS} =0V, f=1.0MH_Z	-	1790	2410	pF
Output capacitance	C_{oss}		-	175	229	pF
Reverse transfer capacitance	C_{rss}		-	23	31	PF

ELECTRICAL CHARACTERISTICS

Switching Characteristics						
Turn-On delay time	t_d(on)	V_{DD}=300V,I_D=12A,R_G=25Ω （note 4，5）	-	78	102	ns
Turn-On rise time	t_r		-	133	175	ns
Turn-Off delay time	t_d(off)		-	233	305	ns
Turn-Off Fall time	t_f		-	104	160	ns
Total Gate Charge	Q_g	V_{DS} =480V , I_D=12A V_{GS} =10V （note 4，5）	-	39	52	nC
Gate-Source charge	Q_{gs}		-	8.5	-	nC
Gate-Drain charge	Q_{gd}		-	20	-	nC
Drain-Source Diode Characteristics and Maximum Ratings						
Maximum Continuous Drain -Source Diode Forward Current	I_S		-	-	12	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}		-	-	48	A
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=12A	-	-	1.39	V
Reverse recovery time	t_{rr}	V_{GS}=0V, I_S=12A dI_F/dt=100A/μs (note 4)	-	418	-	ns
Reverse recovery charge	Q_{rr}		-	4.85	-	μC

THERMAL CHARACTERISTIC

Parameter	Symbol	Max		Unit
		JCS12N60CT	JCS12N60FT	
Thermal Resistance, Junction to Case	$R_{th(j-c)}$	0.5	2.45	℃/W
Thermal Resistance, Junction to Ambient	$R_{th(j-A)}$	62.5	62.5	℃/W

Notes:

1：Pulse width limited by maximum junction temperature

2：L=11.2mH, I_{AS}=12A, V_{DD}=50V, R_G=25 Ω,Starting T_J=25℃

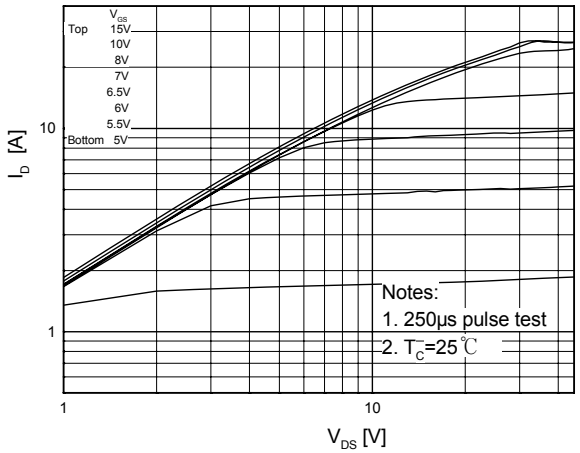
3：I_{SD} ≤12A,di/dt ≤300A/μs,VDD≤BV_{DSS}, Starting T_J=25℃

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

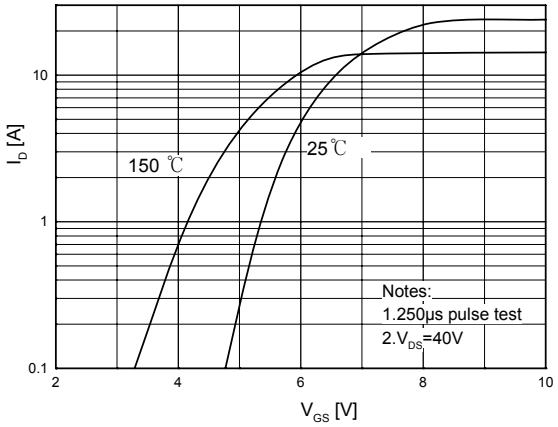
5：Essentially independent of operating temperature

ELECTRICAL CHARACTERISTICS (curves)

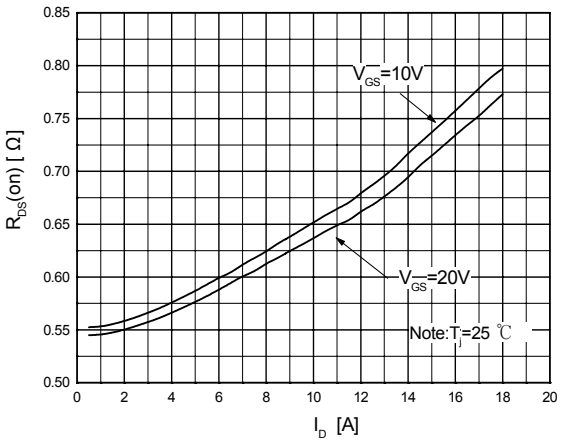
On-Region Characteristics



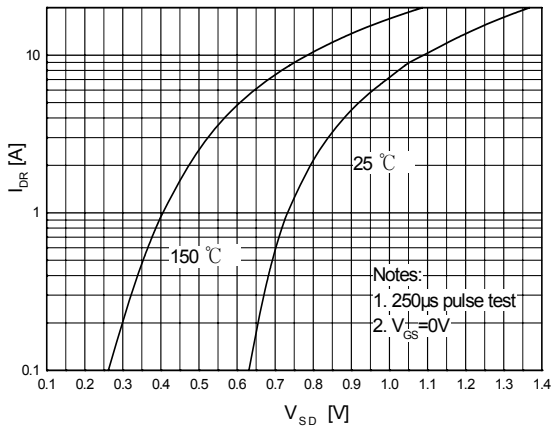
Transfer Characteristics



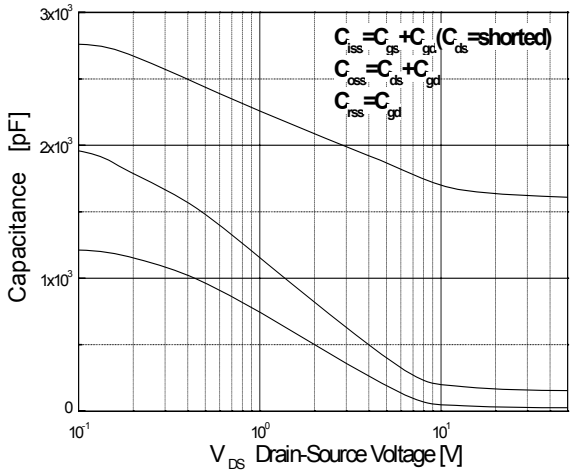
On-Resistance Variation vs. Drain Current and Gate Voltage



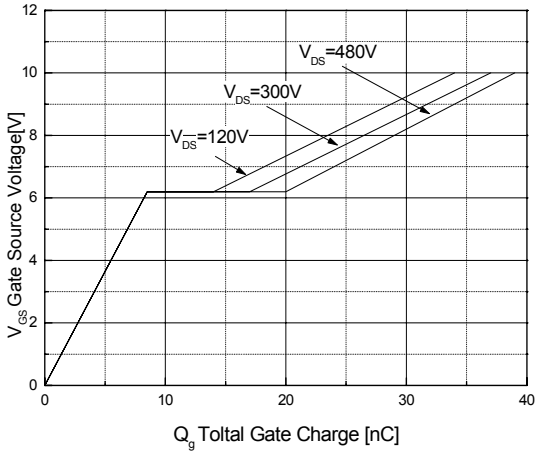
Body Diode Forward Voltage Variation vs. Source Current and Temperature



Capacitance Characteristics

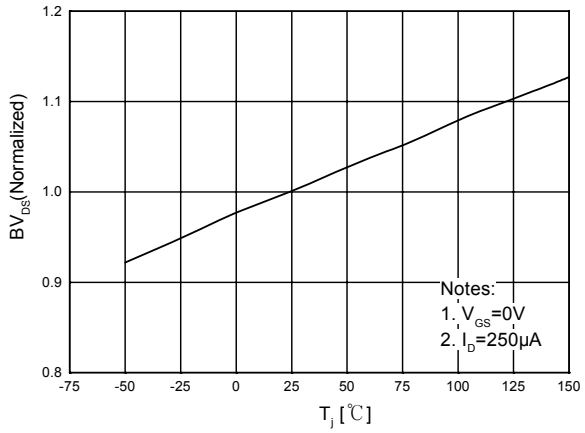


Gate Charge Characteristics

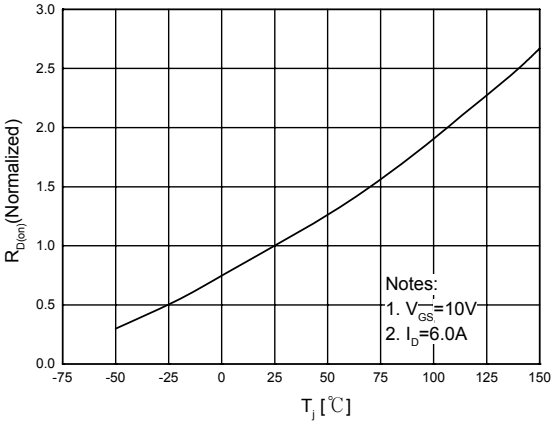


ELECTRICAL CHARACTERISTICS (curves)

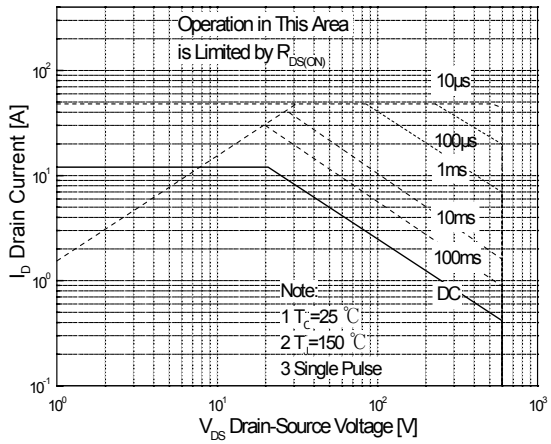
Breakdown Voltage Variation vs. Temperature



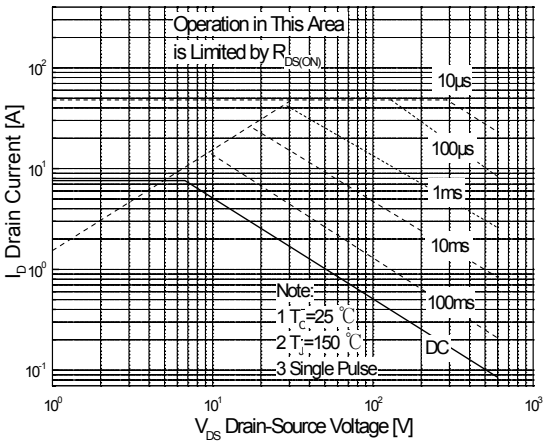
On-Resistance Variation vs. Temperature



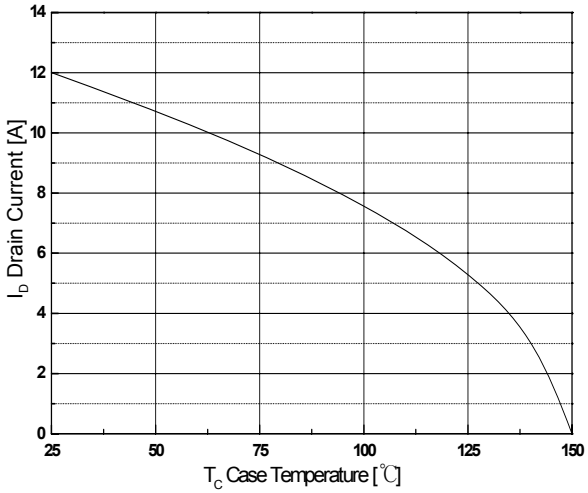
Maximum Safe Operating Area For JCS12N60CT



Maximum Safe Operating Area For JCS12N60FT

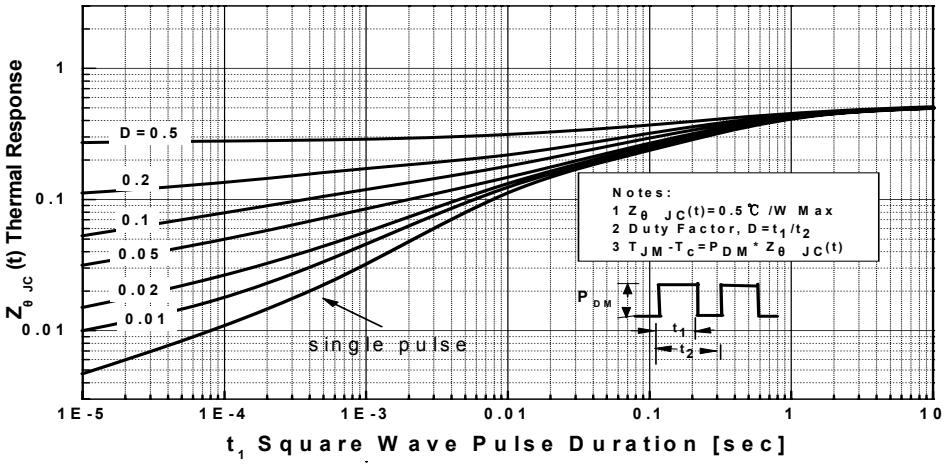


Maximum Drain Current vs. Case Temperature

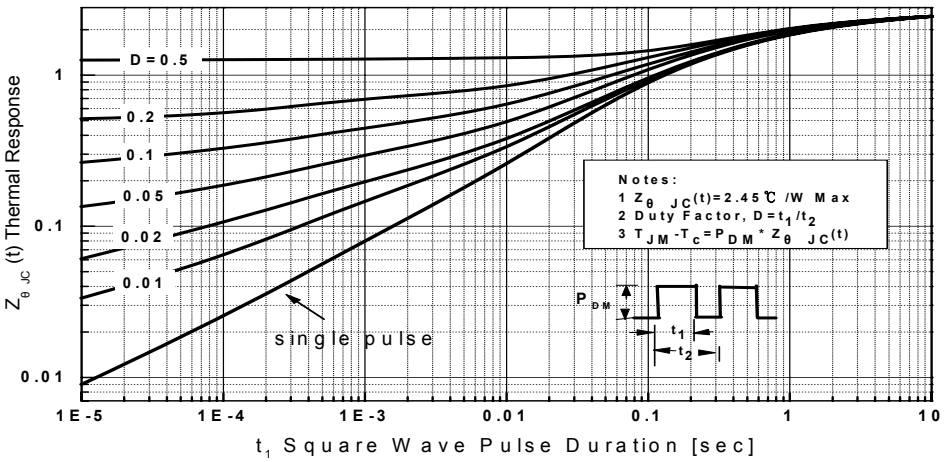


ELECTRICAL CHARACTERISTICS (curves)

Transient Thermal Response Curve For JCS12N60CT



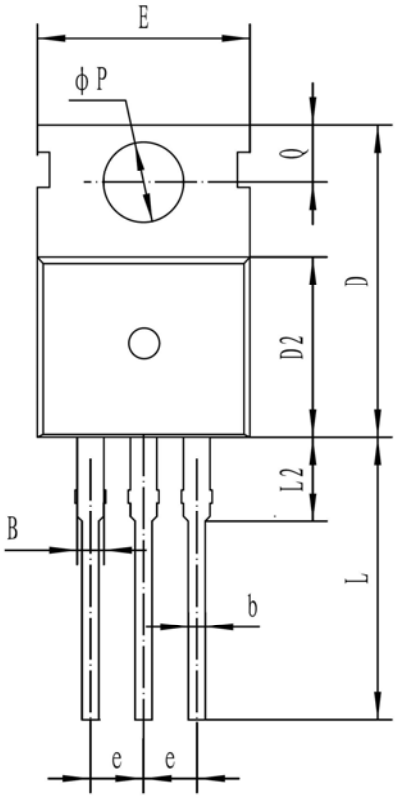
Transient Thermal Response Curve For JCS12N60FT

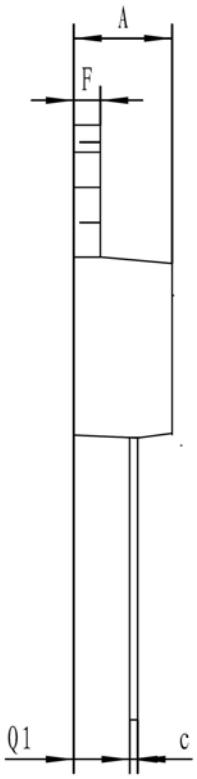


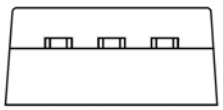
PACKAGE MECHANICAL DATA

TO-220C

Unit：mm





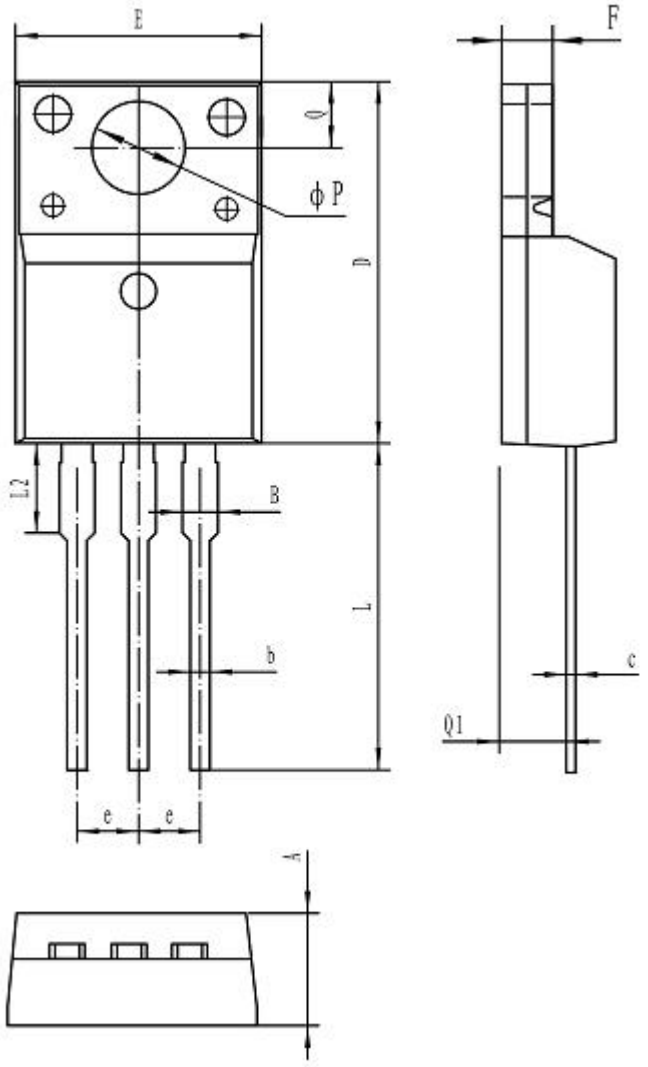


symbol	MIN	MAX
A	4.30	4.70
B	1.10	1.40
b	0.70	0.95
c	0.40	0.65
D	15.20	16.20
D2	9.00	9.40
E	9.70	10.10
e	2.39	2.69
F	1.25	1.40
L	12.60	13.60
L2	2.80	3.20
Q	2.60	3.00
Q1	2.20	2.60
P	3.50	3.80

PACKAGE MECHANICAL DATA

TO-220MF

Unit：mm



Symbol	MIN	MAX
A	4.5	4.9
B	-	1.47
b	0.7	0.9
c	0.45	0.6
D	15.67	16.07
E	9.96	10.36
e	2.54TYPE	
F	2.34	2.74
L	12.58	13.38
L2	3.13	3.33
ΦP	3.08	3.28
Q	3.2	3.4
Q1	2.56	2.96

NOTE

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2. We strongly recommend customers check carefully on the trademark when buying our product, if there is any question, please don't be hesitate to contact us.
3. Please do not exceed the absolute maximum ratings of the device when circuit designing.
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