650V N-Channel MOSFET

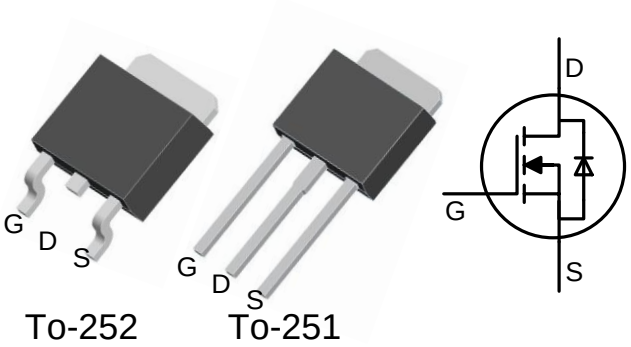
BV_{DSS}	$R_{DS(ON)}$ (Max.)	I_D
650V	2.6Ω	4.0A

General Features

- Low ON Resistance
- Low Gate Charge
- Fast Switching
- 100% Avalanche Tested
- RoHS Compliant/Lead Free
- Halogen-free available

Applications

- High Efficiency SMPS
- Adaptor/Charger
- Active PFC
- LCD Panel Power



Ordering Information

Part Number	Package	Marking	Remark
FTU04N65C	TO-251（I-PAK）	04N65C	RoHS
FTU04N65CG	TO-251（I-PAK）	04N65CG	Halogen-free
FTD04N65C	TO-252（D-PAK）	04N65C	RoHS
FTD04N65CG	TO-252（D-PAK）	04N65CG	Halogen-free

Absolute Maximum Ratings

T_C=25℃ unless otherwise specified

Symbol	Parameter	FTU04N65C	FTD04N65C	Unit
V_{DSS}	Drain-to-Source Voltage[1]	650		V
I_D	Continuous Drain Current	4.0		A
P_D	Power Dissipation	92.5		W
	Derating Factor above 25℃	0.74		W/℃
V_{GS}	Gate-to-Source Voltage	±30		V
E_{AS}	Single Pulse Avalanche Energy L=10mH, I_D=4A	80		mJ
dv/dt	Peak Diode Recovery dv/dt[3]	4.5		V/ns
T_L	Soldering Temperature Distance of 1.6mm from case for 10 seconds	300		℃
T_J and T_{STG}	Operating and Storage Temperature Range	-55 to 150		

Caution: Stresses greater than those listed in the "Absolute Maximum Ratings" may cause permanent damage to the device.

Thermal Characteristics

Symbol	Parameter	FTU04N65C	FTD04N65C	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.35		℃/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	100		

Electrical Characteristics

OFF Characteristics

T_C =25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	650	--	--	V	V_{GS}=0V, I_D=250μA
$\triangle BV_{DSS}/\triangle T_J$	Breakdown Voltage Temperature Coefficient	--	0.65	--	V/℃	Reference to 25℃, I_D=250μA
I_{DSS}	Drain-to-Source Leakage Current	--	--	20	μA	V_{DS}=650V, V_{GS}=0V
		--	--	100		V_{DS}=520V, V_{GS}=0V, T_C=125℃
I_{GSS}	Gate-to-Source Leakage Current	--	--	100	nA	V_{GS}=+30V
		--	--	-100		V_{GS}=-30V

ON Characteristics

T_C =25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	--	2.4	2.6	Ω	V_{GS}=10V, I_D=2.0A[4]
$V_{GS(TH)}$	Gate Threshold Voltage	2.0		4.0	V	V_{DS} = V_{GS}, I_D=250μA
gfs	Forward Transconductance		--	--	S	V_{DS} =15V, I_D=4.0A[4]

Dynamic Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
C_{ISS}	Input Capacitance	--	--	--	pF	V_{GS}=0V V_{DS}=25V f=1.0MHz Figure 14
C_{OSS}	Output Capacitance	--	--	--		
C_{RSS}	Reverse Transfer Capacitance	--	--	--		
Q_G	Total Gate Charge	--	--	--	nC	V_{DD}=325V I_D=4.0A Figure 15
Q_{GS}	Gate-to-Source Charge	--	--	--		
Q_{GD}	Gate-to-Drain (Miller) Charge	--	--	--		

Resistive Switching Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$t_{d(ON)}$	Turn-on Delay Time	--	--	--	ns	V_{DD}=325V I_D=4.0A V_{GS}=10V R_G=20Ω
t_{rise}	Rise Time	--	--	--		
$t_{d(OFF)}$	Turn-off Delay Time	--	--	--		
t_{fall}	Fall Time	--	--	--		

Source-Drain Diode Characteristics

T_C=25℃ unless otherwise specified

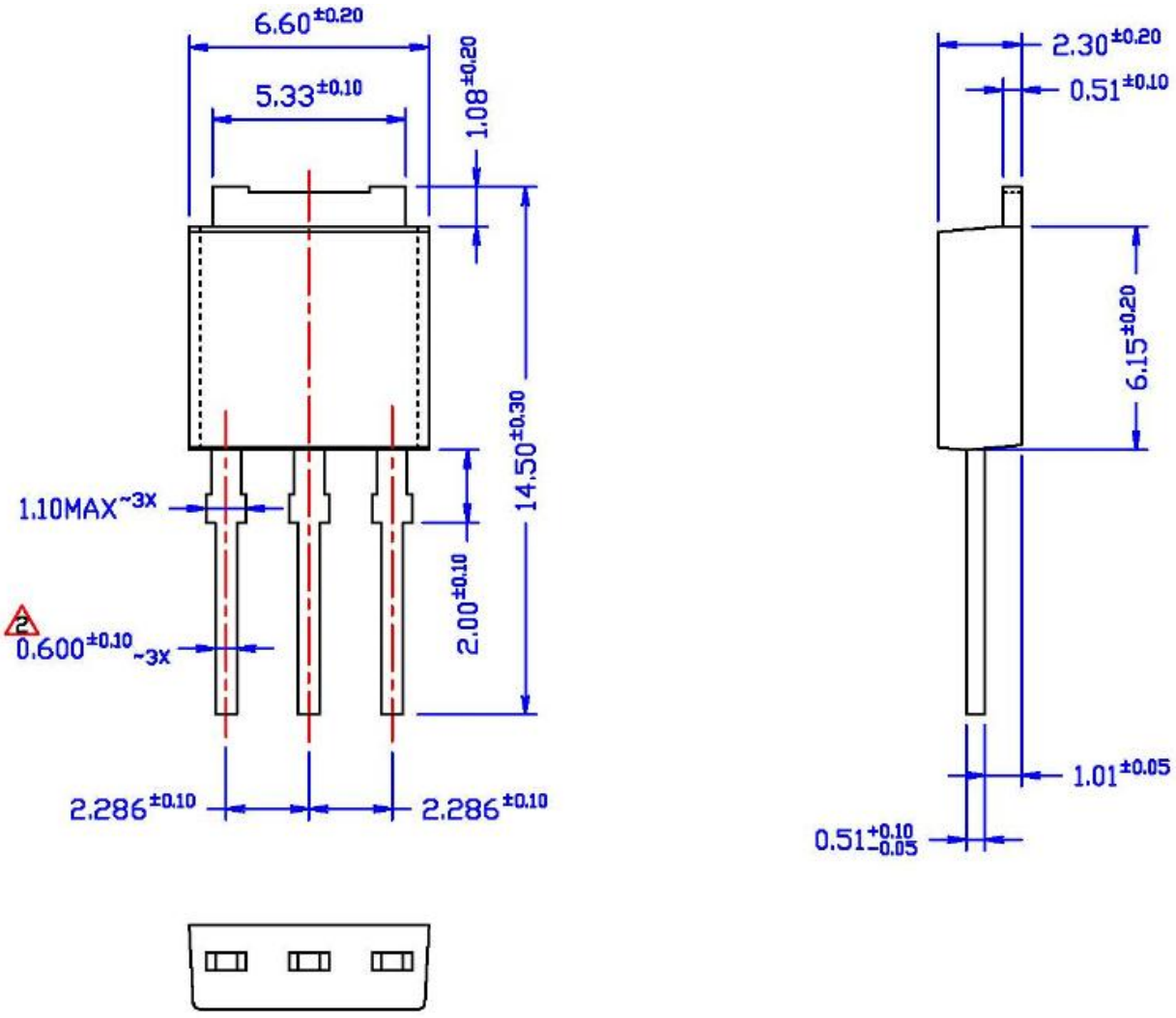
Symbol	Parameter	Min	Typ.	Max.	Units	Test Conditions
I_{SD}	Continuous Source Current (Body Diode)	--	--	4.0	A	Integral P-N diode in MOSFET
I_{SM}	Maximum Pulsed Current(Body Diode)	--	--	16	A	
V_{SD}	Diode Forward Voltage	--	--	1.2	V	I_S=4.0A, V_{GS}=0V
t_{rr}	Reverse Recovery Time	--	--	--	ns	V_{GS}=0V I_F=4.0A,di/dt=100A/μs
Q_{rr}	Reverse Recovery Charge	--	--	--	nC	

NOTE：

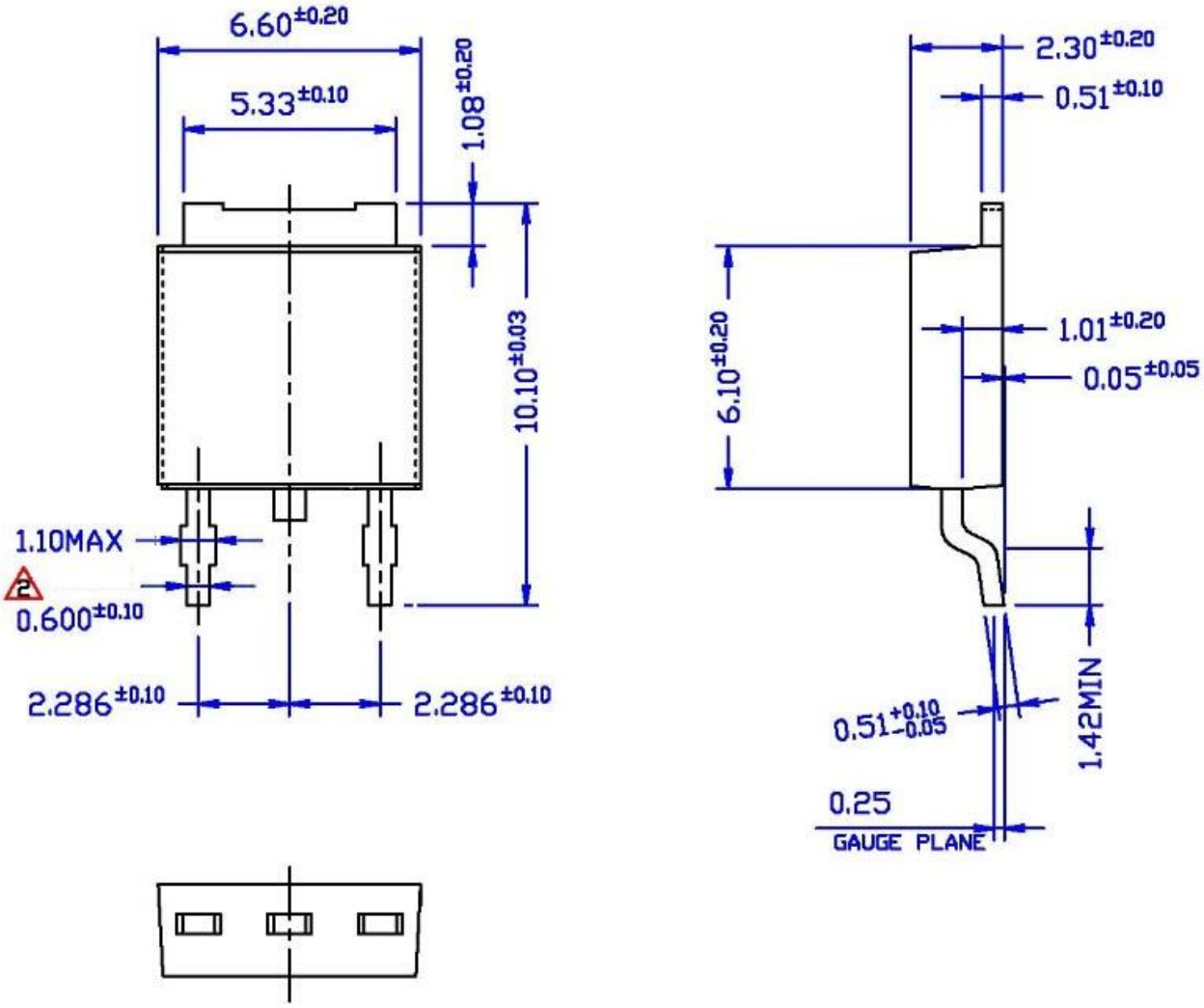
[1] T_J=+25℃ to +150℃
[2] Repetitive rating, pulse width limited by maximum junction temperature.
[3] I_{SD}=4A, di/dt≤100A/μs, V_{DD}≤BV_{DSS}, T_J=+150℃
[4] Pulse width≤380μs; duty cycle≤2%.

Package Dimensions

TO-251



TO-252


6.60±0.20
5.33±0.10
1.08±0.20
10.10±0.03
1.10MAX
0.600±0.10
2.286±0.10
2.286±0.10
2.30±0.20
0.51±0.10
6.10±0.20
1.01±0.20
0.05±0.05
0.51+0.10 -0.05
1.42MIN
0.25
GAUGE PLANE

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