

650V N-Channel MOSFET

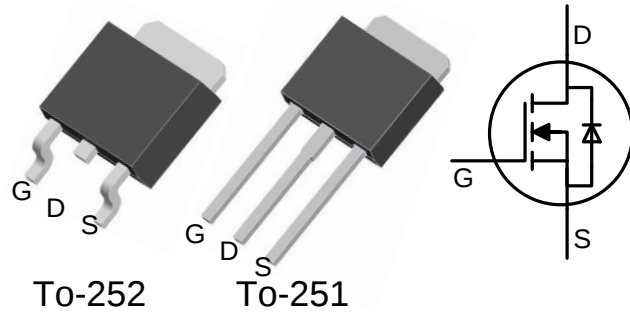
General Features

- 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

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



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

$T_C=25^{\circ}\text{C}$ 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°C	0.74		W/°C
V_{GS}	Gate-to-Source Voltage	±30		V
E_{AS}	Single Pulse Avalanche Energy L=10mH, $I_D=4\text{A}$	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		°C
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 _{θJC}	Thermal Resistance, Junction-to-Case	1.35		°C/W
R _{θJA}	Thermal Resistance, Junction-to-Ambient	100		

Electrical Characteristics

OFF Characteristics

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

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

ON Characteristics

 $T_C = 25^\circ\text{C}$ 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	$V_{DS} = V_{GS}$, $I_D=250\mu A$
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	$V_{DD}=325V$ $I_D=4.0A$ $V_{GS}=10V$ $R_G=20\Omega$
t_{rise}	Rise Time	--	--	--		
$t_{d(OFF)}$	Turn-off Delay Time	--	--	--		
t_{fall}	Fall Time	--	--	--		

Source-Drain Diode Characteristics
 $T_C=25^{\circ}\text{C}$ 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	$I_S=4.0\text{A}$, $V_{GS}=0\text{V}$
t_{rr}	Reverse Recovery Time	--	--	--	ns	$V_{GS}=0\text{V}$ $I_F=4.0\text{A}$, $di/dt=100\text{A}/\mu\text{s}$
Q_{rr}	Reverse Recovery Charge	--	--	--	nC	

NOTE:

[1] $T_J=+25^{\circ}\text{C}$ to $+150^{\circ}\text{C}$

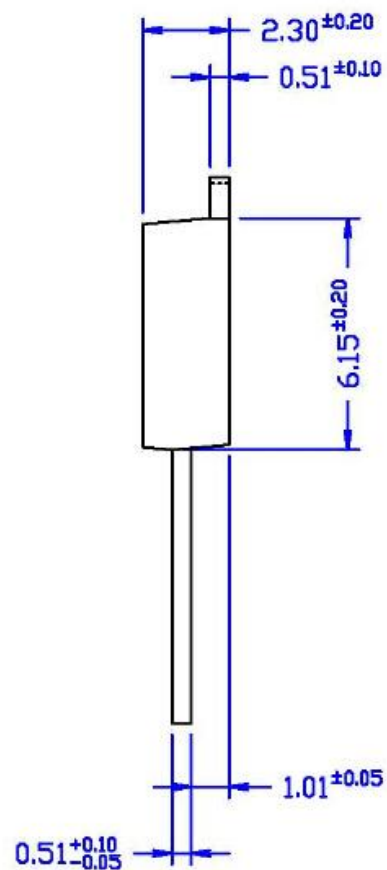
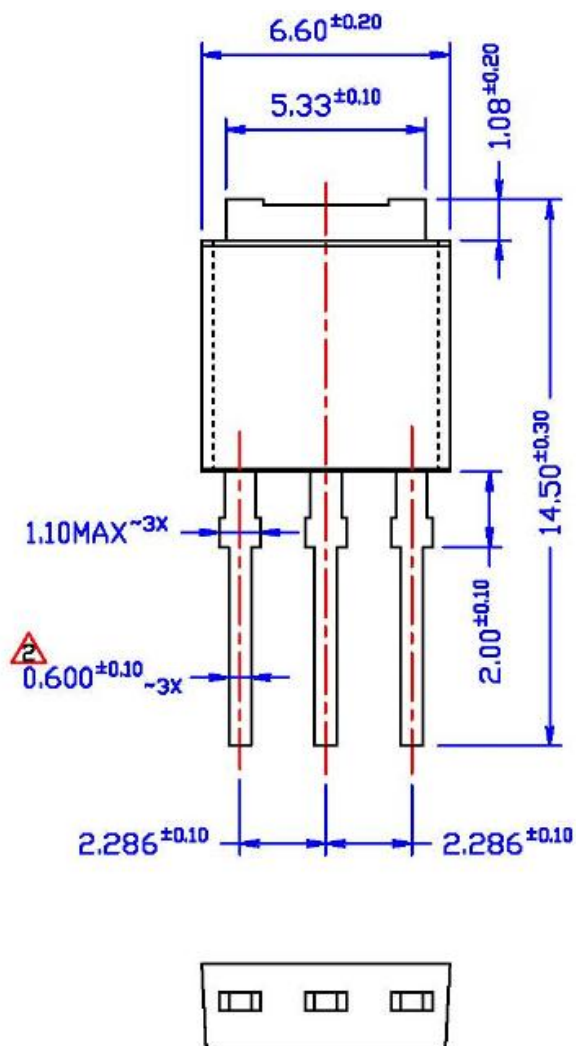
[2] Repetitive rating, pulse width limited by maximum junction temperature.

[3] $I_{SD}=4\text{A}$, $di/dt \leq 100\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, $T_J=+150^{\circ}\text{C}$

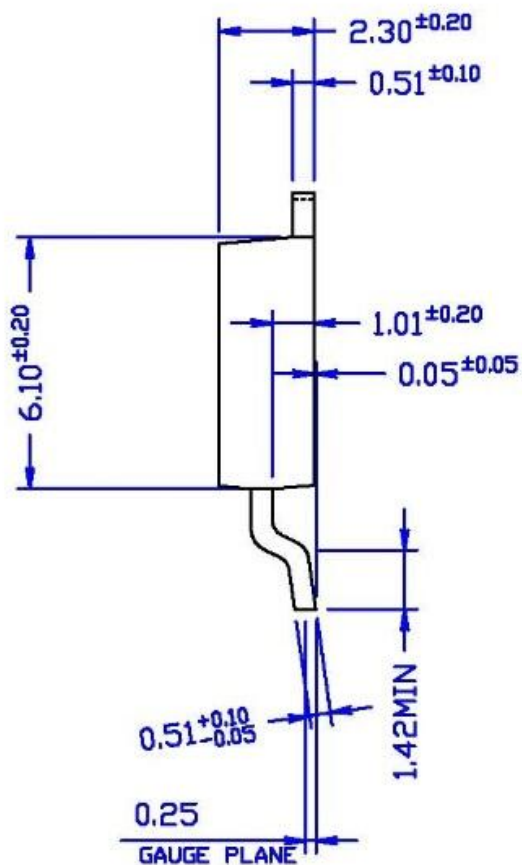
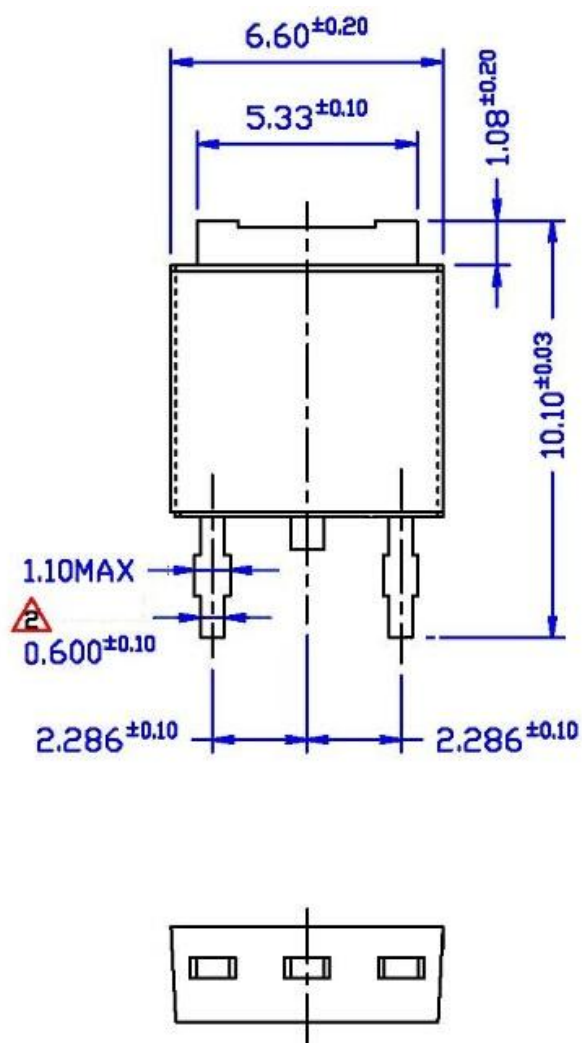
[4] Pulse width $\leq 380\mu\text{s}$; duty cycle $\leq 2\%$.

Package Dimensions

TO-251



TO-252





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