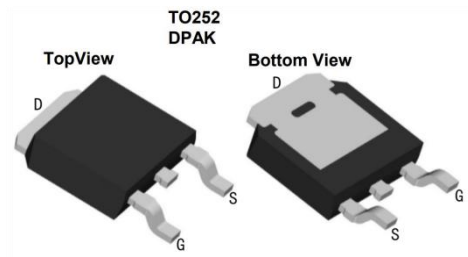




Product Summary

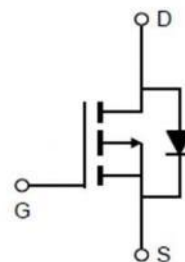
$V_{(BR)DSS}$	$R_{DS(ON)} \max$	$I_D \max$
-40V	$<40m\Omega @ V_{GS}=-10V$	-18A
	$<55m\Omega @ V_{GS}=-4.5V$	

Package & Internal Circuit



Description and Applications

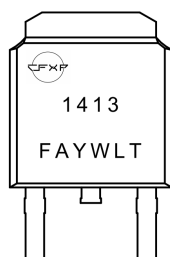
- Trench Power MOSFET Technology
- Low $R_{DS(ON)}$ and Low Thermal Resistance
- RoHS and Halogen-Free Complaint
- High Current Switching
- 100% UIS Tested
- 100% Rg Tested



Ordering Information

Part Number	Package Type	Package Qty
CFD1413	TO-252	2,500/Tape & Reel

Marking Information



Green product

CFXP--Logo
1413--Part Number
F--Fab location
A--Assembly location
Y--Year
W--Week
LT--Lot sequence

Absolute Maximum Rating ($T_a=25^\circ\text{C}$ unless otherwise noted)

Parameter		Symbol	Value	Units
Drain-Source Voltage		V_{DS}	-40	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current - Continuous	$T_c=25^\circ\text{C}$	I_D	-18	A
	$T_c=100^\circ\text{C}$		-12	A
Pulsed Drain Current		I_{DM}	-60	mJ
Power Dissipation	$T_c=25^\circ\text{C}$	P_D	50	W
	$T_c=100^\circ\text{C}$		25	W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to 175	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient	$R_{\theta JA}$	40	50	$^{\circ}\text{C/W}$
Maximum Junction-to-Case	$R_{\theta JC}$	2	3	$^{\circ}\text{C/W}$

Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Static Parameters						
BV_{DSS}	Drain-Source Breakdown Voltage	$I_D=-250\mu\text{A}$, $V_{GS}=0\text{V}$	-40			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=-40\text{V}$, $V_{GS}=0\text{V}$			-1	μA
		$T_J=55^{\circ}\text{C}$			-5	μA
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}$, $V_{GS}=\pm 20\text{V}$			± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=-250\mu\text{A}$	-1.8	-2.0	-3.0	V
$R_{DS(on)}$	Drain-Source on-Resistance	$V_{GS}=-10\text{V}$, $I_D=-12\text{A}$		30	40	m Ω
		$V_{GS}=-4.5\text{V}$, $I_D=-8\text{A}$		48	58	m Ω
g_{FS}	Forward Transconductance	$V_{DS}=-5\text{V}$, $I_D=-12\text{A}$			18	S
V_{SD}	Body Diode Forward Voltage	$I_S = -1\text{A}$, $V_{GS} = 0\text{V}$		-	-1.0	V
I_S	Maximum Body-Diode Continuous Current				-15	A
Dynamic parameters						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}$ $V_{DS}=-20\text{V}$ $f=1.0\text{MHz}$		910		pF
C_{oss}	Output Capacitance			100		pF
C_{rss}	Reverse Transfer Capacitance			53		pF
R_g	Gate resistance	$f=1.0\text{MHz}$		10		Ω
Switching Parameters						
Q_g	Total Gate Charge	$V_{GS}=-10\text{V}$ $V_{DS}=-20\text{V}$ $I_D=-12\text{A}$		15.4		nC
Q_{gs}	Gate Source Charge			3.1		nC
Q_{gd}	Gate Drain Charge			3.2		nC
$t_{D(on)}$	Turn-On Delay Time	$V_{GS}=-10\text{V}$ $V_{DS}=-20\text{V}$ $R_L=2.6\Omega$ $R_G=3\Omega$		6.5		ns
t_r	Turn-On Rise Time			8		ns
$t_{D(off)}$	Turn-Off Delay Time			42		ns
t_f	Turn-Off Fall Time			38		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F = -12\text{A}$ $di/dt = 100 \text{ A}/\mu\text{s}$		20.8		ns
Q_{rr}	Body Diode Reverse Recovery Charge			8.8		nC

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

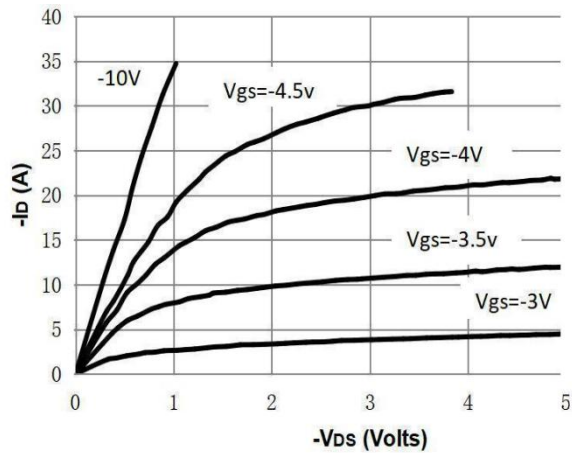


Figure 1: On-Region Characteristics

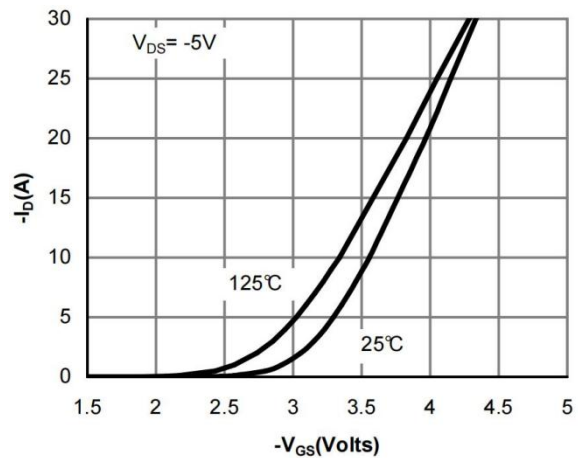


Figure 2: Transfer Characteristics

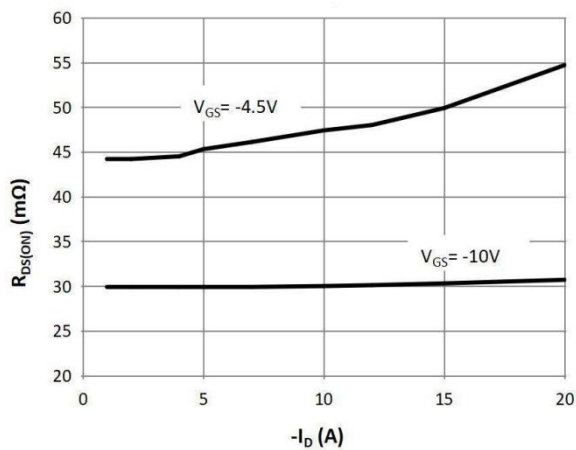


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

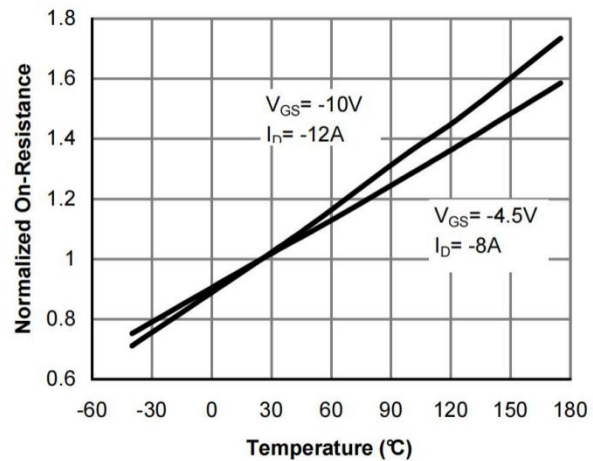


Figure 4: On-Resistance vs. Junction Temperature

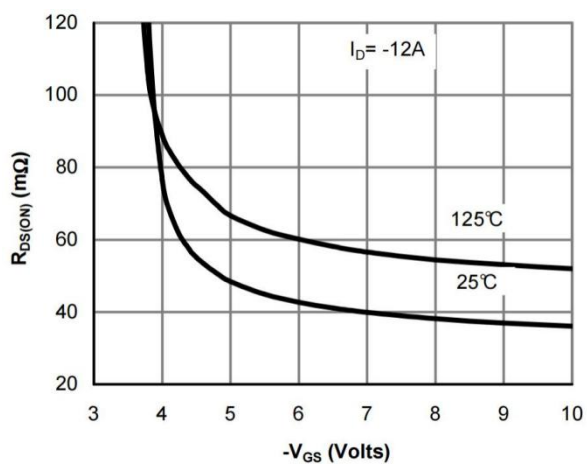


Figure 5: On-Resistance vs. Gate-Source Voltage

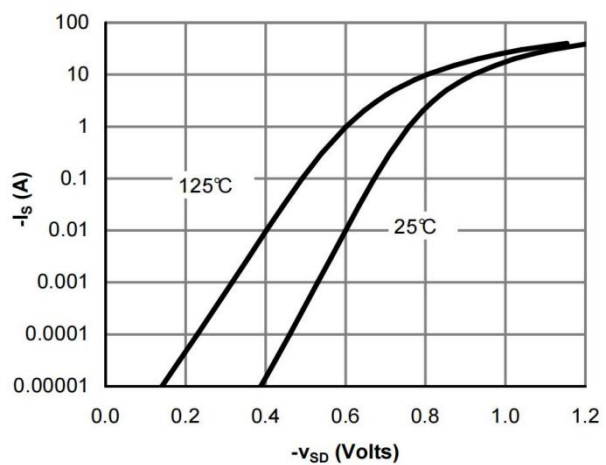


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

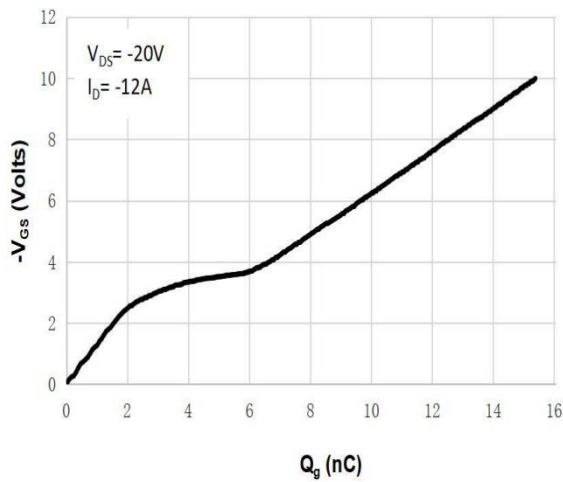


Figure 7: Gate-Charge Characteristics

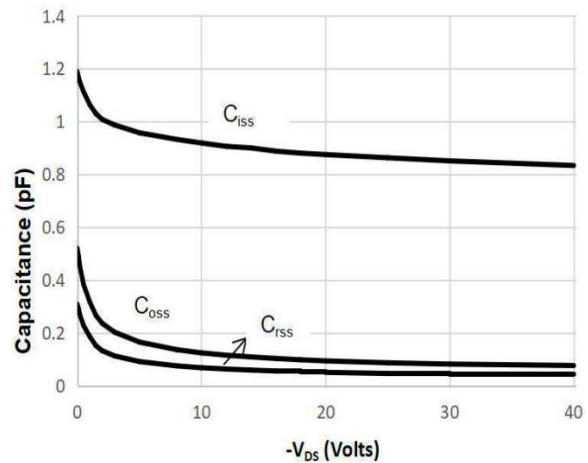


Figure 8: Capacitance Characteristics

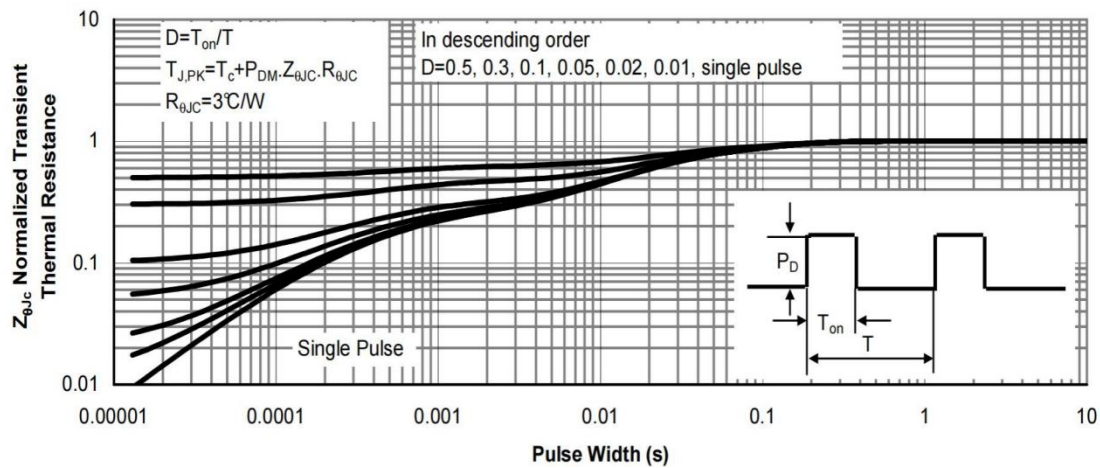
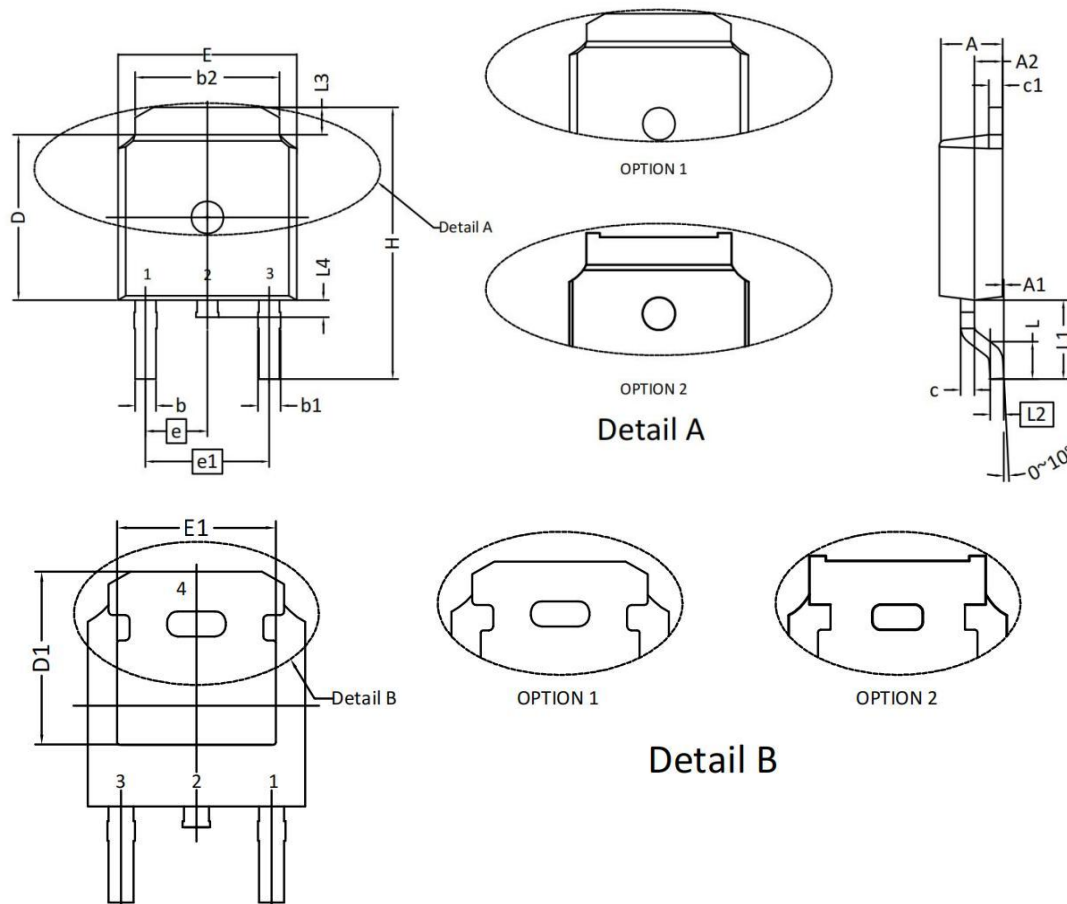


Figure 9: Normalized Maximum Transient Thermal Impedance

TO-252 Package



SYMBOLS	DIMENSION IN MM			DIMENSION IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	2.184	2.286	2.400	0.086	0.090	0.094
A1	0.000	---	0.200	0.000	---	0.008
A2	0.889	1.041	1.170	0.035	0.041	0.046
b	0.635	0.762	0.889	0.025	0.030	0.035
b1	0.680	0.840	1.143	0.027	0.033	0.045
b2	4.953	5.340	5.500	0.195	0.210	0.217
c	0.450	0.508	0.610	0.018	0.020	0.024
c1	0.450	0.508	0.630	0.018	0.020	0.025
D	5.969	6.096	6.223	0.235	0.240	0.245
D1	5.210	5.249	5.480	0.205	0.207	0.216
E	6.350	6.604	6.800	0.250	0.260	0.268
E1	4.318	4.826	5.230	0.170	0.190	0.206
e	2.286 BSC			0.090 BSC		
e1	4.572 BSC			0.180 BSC		
H	9.398	10.033	10.500	0.370	0.395	0.413
L	1.270	1.520	2.032	0.050	0.060	0.080
L1	2.921 REF.			0.115 REF.		
L2	0.408	0.508	0.608	0.016	0.020	0.024
L3	0.889	1.016	1.270	0.035	0.040	0.050
L4	0.600	---	1.016	0.024	---	0.040

Important Notice

This document contains information that is proprietary to CF-xpower Semiconductor Corp. (“CF-xpower”), and is subject to change without notice. Any part of this document may not be used, reproduced, duplicated or disclosed in any form or any means without the prior written permission of CF-xpower.

CF-xpower does not warrant or represent that any license, either express or implied, is granted under any CF-xpower’s patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which CF-xpower’s products or services are used. In addition, CF-xpower does not assume any liability for the occurrence of infringing on any patent or other intellectual property rights of a third party.

CF-xpower reserves the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete.