FH2050DC

N-Channel Trench Power MOSFET

◆ General Description

The FH2050DC is the N-Channel logic enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology. This high density process is especially tailored to minimize on-state resistance.

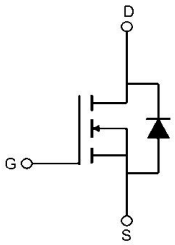
◆ Features

- $R_{DS(ON)}$ ≦265 mΩ@V_{GS}=10V
- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability

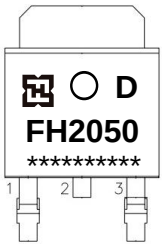
◆ Applications

- DC/DC Converter
- Load Switch
- LCD/ LED Display inverter

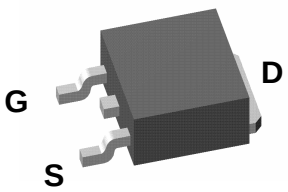
TO-252



Schematic diagram



Marking and pin assignment



TO-252 top view

Absolute Maximum Ratings T_C=25℃ unless otherwise specified

Symbol	Parameter		Max.	Units
V_{DSS}	Drain-Source Voltage		250	V
V_{GSS}	Gate-Source Voltage		± 25	V
I_D	Continuous Drain Current note5	T_C = 25℃	15	A
I_D	Continuous Drain Current note5	T_C = 100℃	10	A
I_{DM}	Pulsed Drain Current note3		60	A
P_D	Power Dissipation note2	T_C = 25℃	35	W
I_{AS}	Avalanche Current note3,6		5	A
E_{AS}	Single Pulse Avalanche Energy note3,6		125	mJ
$R_{\theta JC}$	Thermal Resistance, Junction to Case		3.6	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient note1,4		62.5	℃/W
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +150	℃

◆ Electrical Characteristics (T_J=25℃, unless otherwise n Specified)

Static

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS} =0V, I_D=250μA	250	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} =V_{GS}, I_D=250μA	2	-	4	V
I_{GSS}	Gate Body Leakage	V_{DS} =0V, V_{GS} =±25V	-	-	±100	nA
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =200V, V_{GS} =0V	-	-	1	μA
$R_{DS(ON)}$	Drain-Source On On-Resistance	V_{GS} =10V, I_D=7A	-	220	265	mΩ
V_{SD}	Diode Forward Voltage	I_S=1A, V_{GS} =0V	-	0.74	1	V

Dynamic

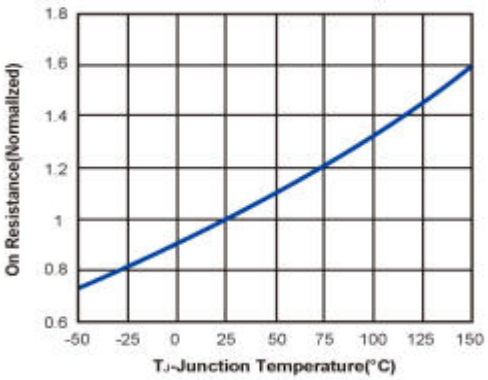
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge	V_{DD}=200V V_{GS} =10V I_D=14A	-	70.8	-	nC
Q_{gs}	Gate-Source Charge		-	16.2	-	
Q_{gd}	Gate-Drain Charge		-	23.9	-	
C_{iss}	Input Capacitance	V_{DS} =25V V_{GS} =0V f=1MHz	-	3480	-	pF
C_{oss}	Output Capacitance		-	112	-	
C_{rss}	Reverse Transfer Capacitance		-	51	-	
$t_{d(on)}$	Turn-On Delay Time	V_{DD}=125V V_{GS}=10V R_L =18 Ω R_G=25Ω I_D=7A	-	53	-	ns
t_r	Turn-On Rise Tim Time		-	62.6	-	
$t_{d(off)}$	Turn-Off Delay Time		-	198	-	
t_f	Turn-Off Fall Time		-	83.5	-	

Notes:

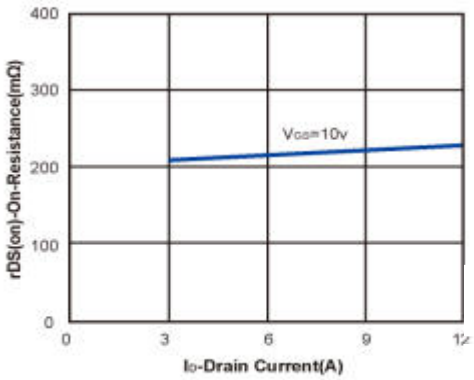
1. The value of $R_{\theta JC}$ is measured in a still air environment with TA =25°C and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.
2. The power dissipation P_D is based on $T_{J(MAX)}$=150°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
3. Single pulse width limited by junction temperature $T_{J(MAX)}$=150°C.
4. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to case $R_{\theta JC}$ and case to ambient.
5. The maximum current rating is package limited.
6. The EAS data shows Max. rating. The test condition is V_{DS}=150V,V_{GS}=10V,L=10mH

◆ Typical Characteristics (T_J =25℃ Noted)

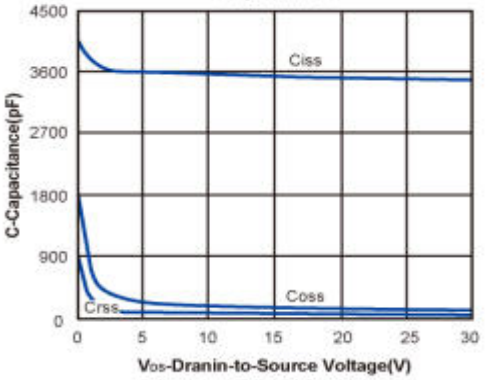
On Resistance vs. Junction Temperature



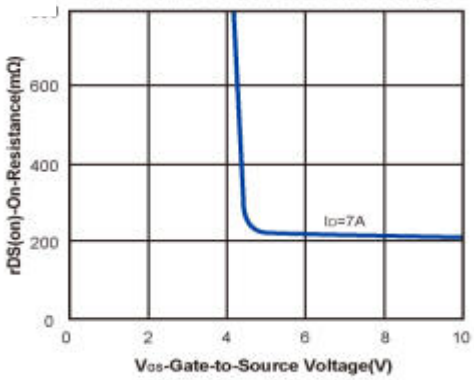
On Resistance vs. Drain Current



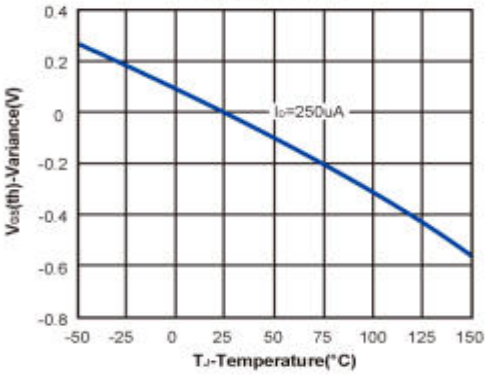
Capacitance



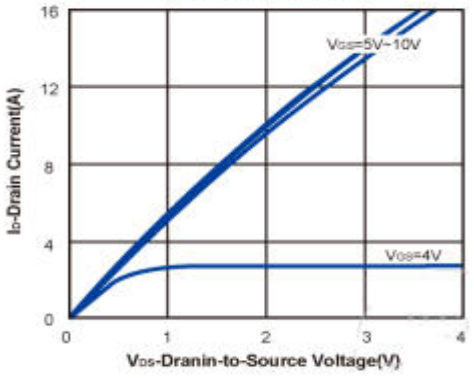
On Resistance vs. Gate-to-Source Voltage



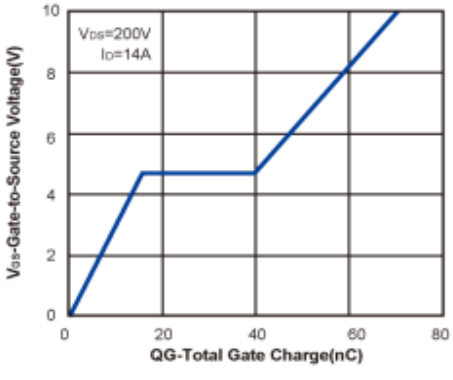
Threshold Voltage



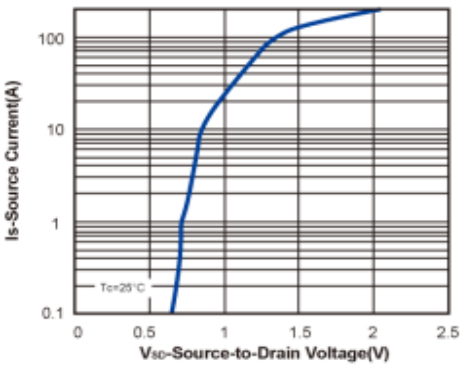
On-Region Characteristics

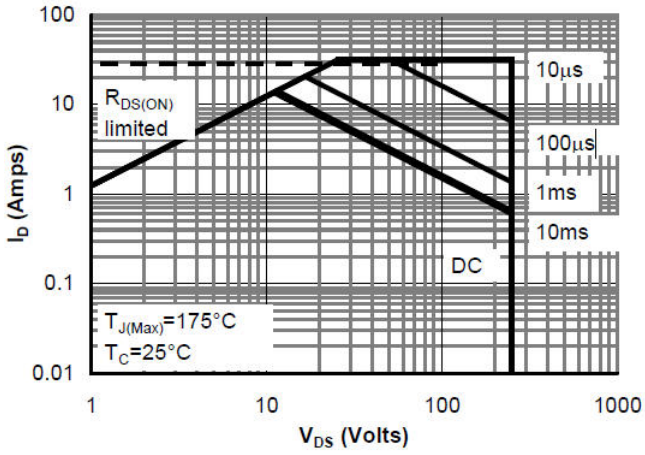


Gate Charge

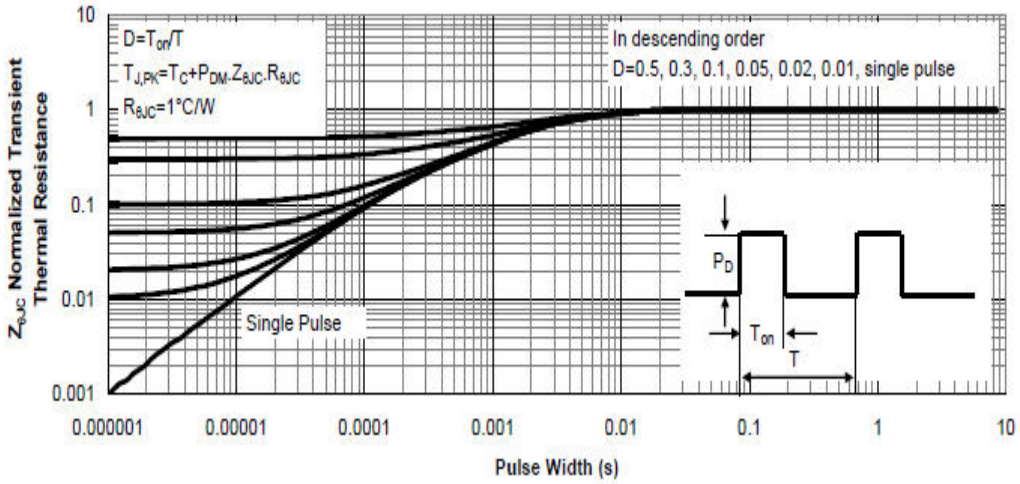


Body-diode characteristics



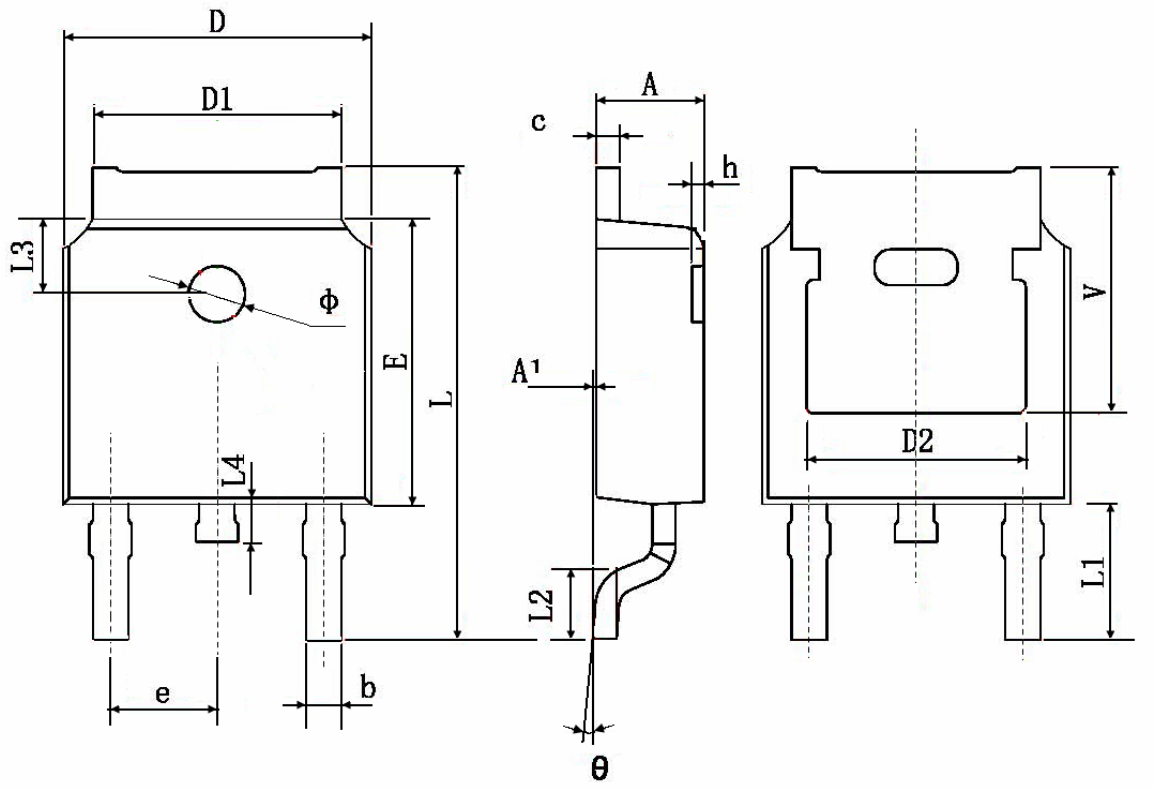


Maximum Forward Biased Safe Operating Area



Normalized Maximum Transient Thermal Impedance

Package Information : TO-252



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	