FH2045D

N-Channel Enhancement Mode Power MOSFET

Description

The FH2045D uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

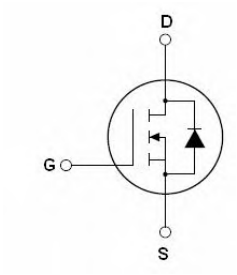
Application

- Load switching
- Hard switched and high frequency circuits
- Uninterruptible power supply

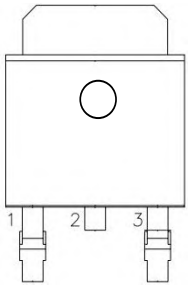
General Features

- V_{DS} =20V,I_D =80A
  $R_{DS(ON)}$ = 3.2 mΩ (Typ) @ V_{GS}=4.5V
  $R_{DS(ON)}$ = 4.0 mΩ (Typ) @ V_{GS}=2.5V
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability
- Excellent package for good heat dissipation

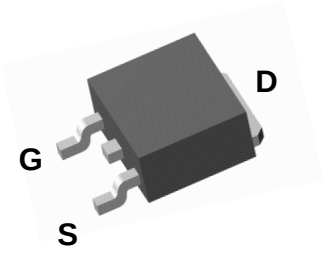
TO-252



Schematic diagram



Marking and pin assignment



TO-252 top view

Absolute Maximum Ratings@T_j=25°C(unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	±12	V
I_D@T_A=25℃	Drain Current, V_{GS} @ 4.5V[3]	80	A
I_D@T_A=70℃	Drain Current, V_{GS} @ 4.5V[3]	65	A
I_{DM}	Pulsed Drain Current[1]	160	A
P_D@T_A=25℃	Total Power Dissipation	3.13	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Value	Unit
Rthj-c	Maximum Thermal Resistance, Junction-case	5	℃/W
Rthj-a	Maximum Thermal Resistance, Junction-ambient[3]	40	℃/W

Electrical Characteristics@T_j=25°C(unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	20	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=4.5V, I_D=20A	-	3.2	4.5	mΩ
		V_{GS}=2.5V, I_D=12A	-	4.0	6.0	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=1mA	0.6	-	0.9	V
g_{fs}	Forward Transconductance	V_{DS}=5V, I_D=20A	-	130	-	S
I_{DSS}	Drain-Source Leakage Current	V_{DS}=16V, V_{GS}=0V	-	-	10	uA
I_{GSS}	Gate-Source Leakage	V_{GS}=±12V, V_{DS}=0V	-	-	±100	nA
Q_g	Total Gate Charge	I_D=20A	-	62	99.2	nC
Q_{gs}	Gate-Source Charge	V_{DS}=10V	-	4	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=4.5V	-	21	-	nC
$t_{d(on)}$	Turn-on Delay Time	V_{DS}=10V	-	12	-	ns
t_r	Rise Time	I_D=1A	-	20	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=3.3Ω	-	100	-	ns
t_f	Fall Time	V_{GS}=5V	-	80	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	4000	6400	pF
C_{oss}	Output Capacitance	V_{DS}=10V	-	780	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	625	-	pF
R_g	Gate Resistance	f=1.0MHz	-	1.4	2.8	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage[2]	I_S=2.5A, V_{GS}=0V	-	-	1.2	V
t_{rr}	Reverse Recovery Time	I_S=20A, V_{GS}=0V,	-	43	-	ns
Q_{rr}	Reverse Recovery Charge	dI/dt=100A/μs	-	26	-	nC

Notes:

1.Pulse width limited by Max. junction temperature.

2.Pulse test

3.Surface mounted on 1 in^2 2oz copper pad of FR4 board, t ≤10sec; 135°C/W when mounted on min. copper pad.

4.Maximum current limited by package.

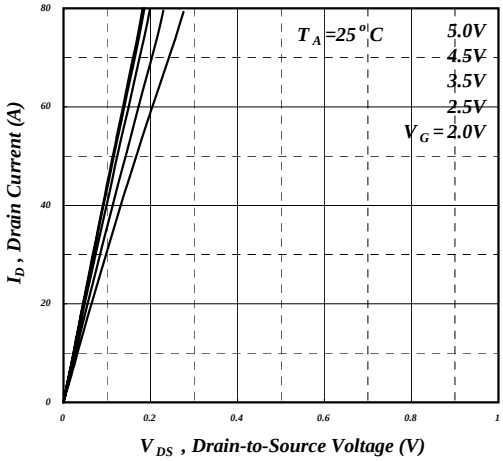


Fig 1. Typical Output Characteristics

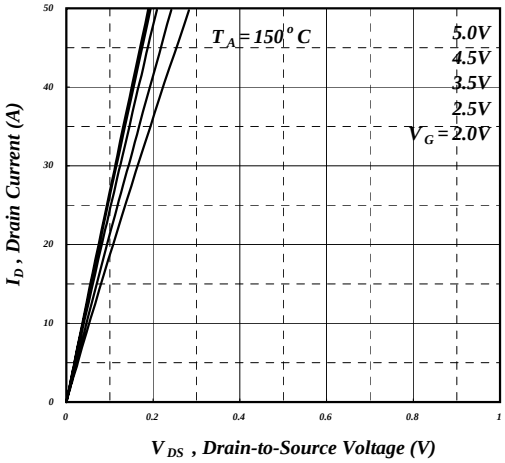


Fig 2. Typical Output Characteristics

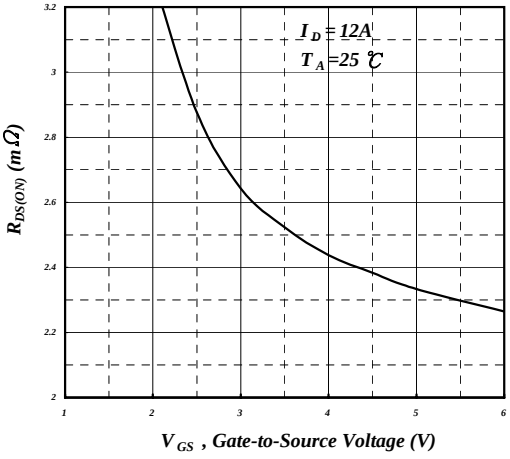


Fig 3. On-Resistance v.s. Gate Voltage

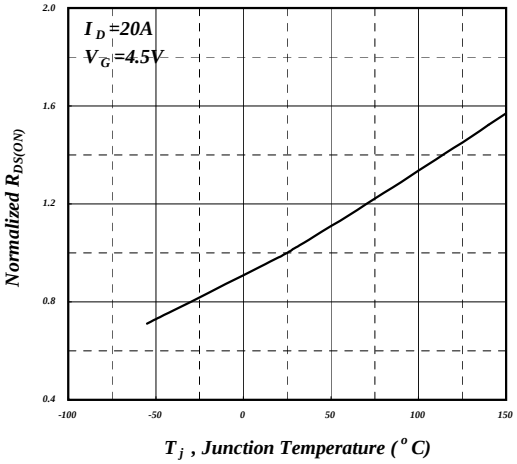


Fig 4. Normalized On-Resistance v.s. Junction Temperature

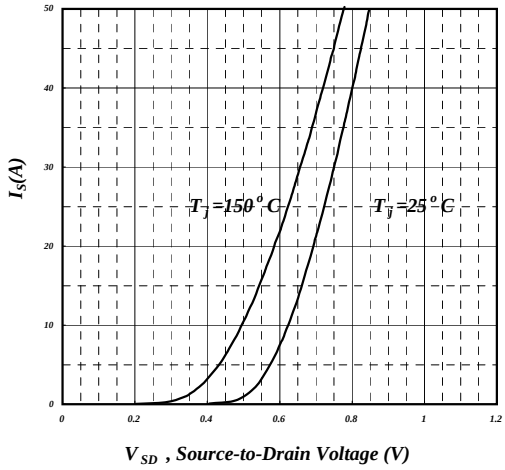


Fig 5. Forward Characteristic of Reverse Diode

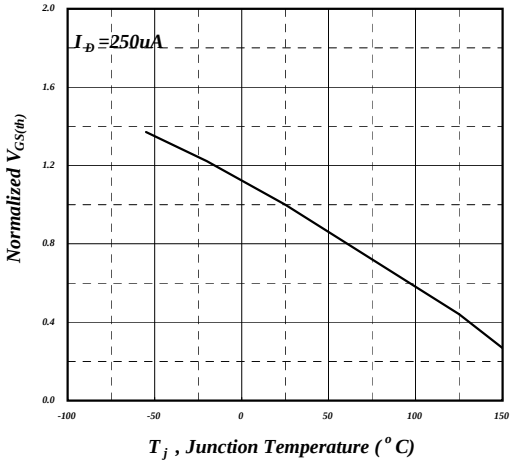


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

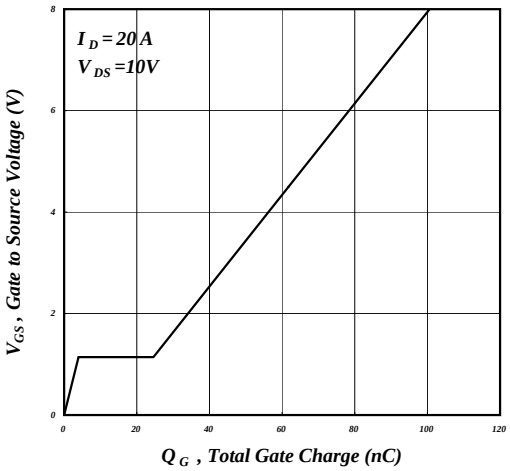


Fig 7. Gate Charge Characteristics

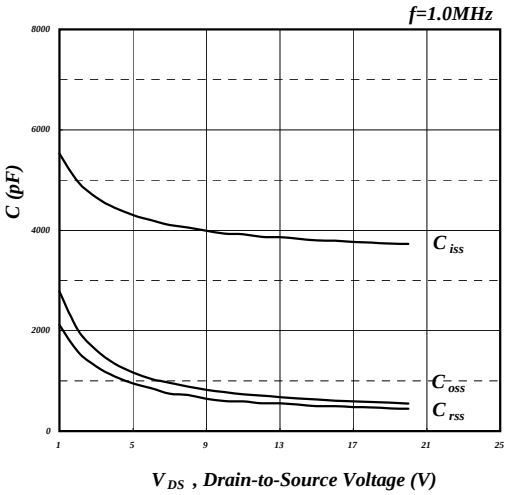


Fig 8. Typical Capacitance Characteristics

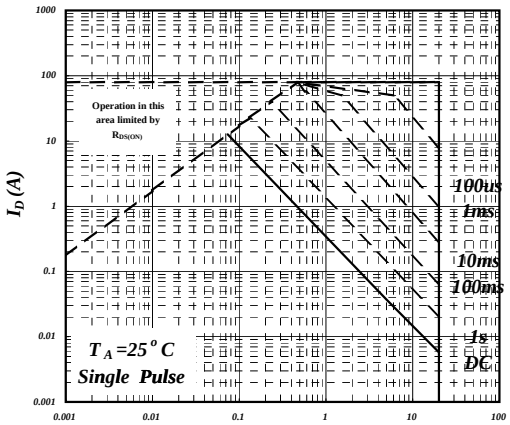


Fig 9. Maximum Safe Operating Area

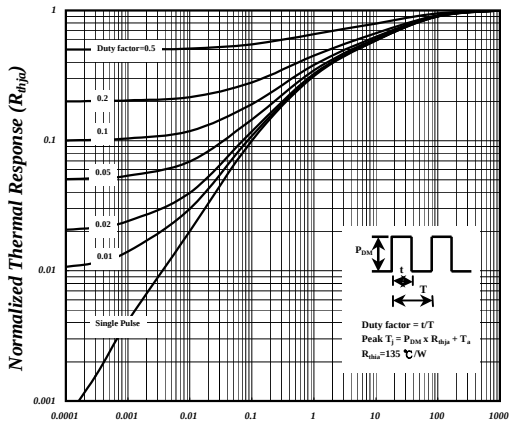


Fig 10. Effective Transient Thermal Impedance

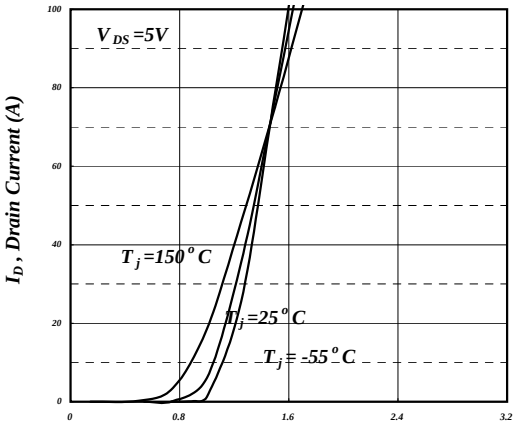


Fig 11. Transfer Characteristics

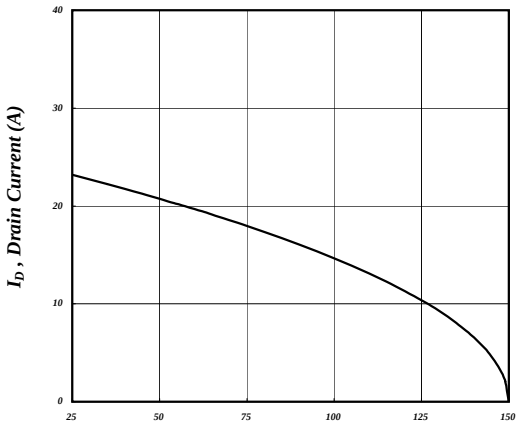


Fig 12. Drain Current v.s. Ambient Temperature

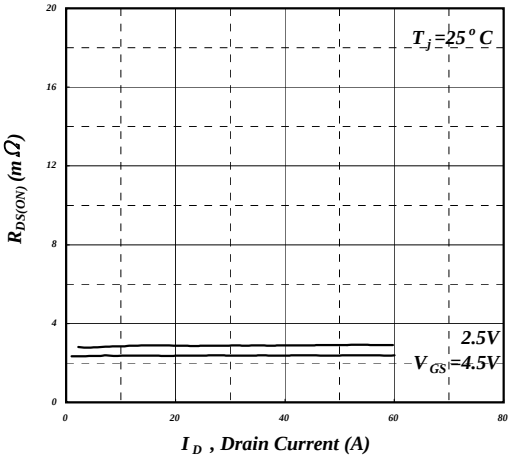


Fig 13. Typ. Drain-Source on State Resistance

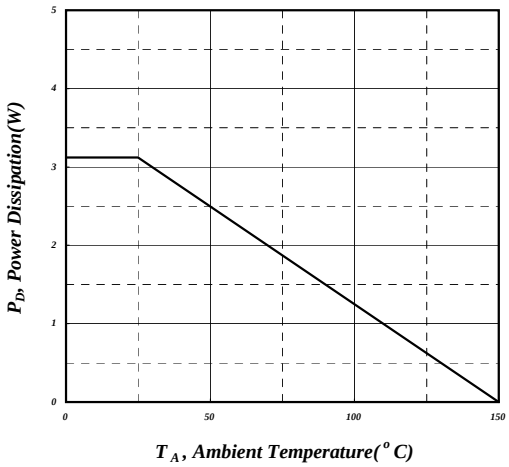
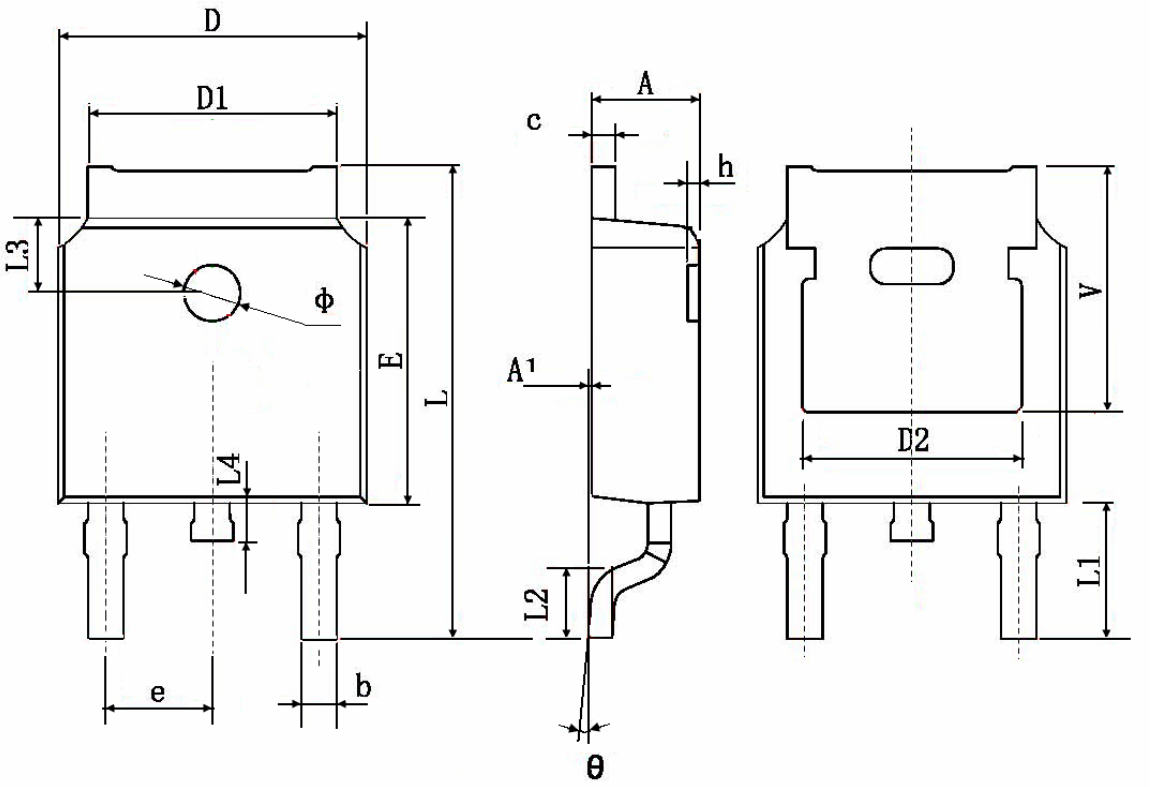


Fig 14. Total Power Dissipation

TO-252 Package Information



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.	