

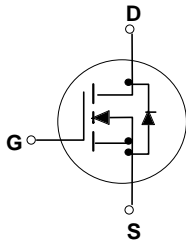
- Capable of 2.5V Gate Drive
- Small Size & Ultra\_Low  $R_{DS(ON)}$
- RoHS Compliant & Halogen-Free

$BV_{DSS}$	20V
$R_{DS(ON)}$	4.5m $\Omega$
$I_D^3$	80A

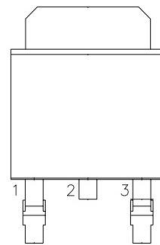
## Description

FH2045 series are from Advanced Power innovated design and silicon process technology to achieve the lowest possible on-resistance and fast switching performance. It provides the designer with an extreme efficient device for use in a wide range of power applications.

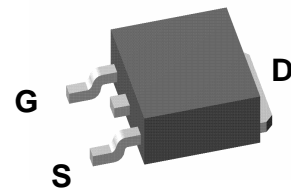
### TO-252



Schematic diagram



Marking and pin assignment



TO-252 top view

## Absolute Maximum Ratings @ $T_j=25^\circ\text{C}$ (unless otherwise specified)

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	20	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	V
$I_D@T_A=25^\circ\text{C}$	Drain Current, $V_{GS}$ @ 4.5V <sup>3</sup>	80	A
$I_D@T_A=70^\circ\text{C}$	Drain Current, $V_{GS}$ @ 4.5V <sup>3</sup>	65	A
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	160	A
$P_D@T_A=25^\circ\text{C}$	Total Power Dissipation	3.13	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

## Thermal Data

Symbol	Parameter	Value	Unit
Rthj-c	Maximum Thermal Resistance, Junction-case	5	$^\circ\text{C}/\text{W}$
Rthj-a	Maximum Thermal Resistance, Junction-ambient <sup>3</sup>	40	$^\circ\text{C}/\text{W}$

**Electrical Characteristics @ $T_j=25^{\circ}\text{C}$  (unless otherwise specified)**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	20	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=4.5V, I_D=20A$	-	-	4.5	$m\Omega$
		$V_{GS}=2.5V, I_D=12A$	-	-	6	$m\Omega$
$V_{GS(th)}$	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	$\mu A$
$I_{GSS}$	Gate-Source Leakage	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	$\pm 100$	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	$R_G=3.3\Omega$	-	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	$\Omega$

**Source-Drain Diode**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{SD}$	Forward On Voltage <sup>2</sup>	$I_S=2.5A, V_{GS}=0V$	-	-	1.2	V
$t_{rr}$	Reverse Recovery Time	$I_S=20A, V_{GS}=0V,$	-	43	-	ns
$Q_{rr}$	Reverse Recovery Charge	$di/dt=100A/\mu s$	-	26	-	nC

**Notes:**

1. Pulse width limited by Max. junction temperature.
2. Pulse test
3. Surface mounted on 1 in<sup>2</sup> 2oz copper pad of FR4 board,  $t \leq 10\text{sec}$ ;  $135^{\circ}\text{C/W}$  when mounted on min. copper pad.
4. Maximum current limited by package.

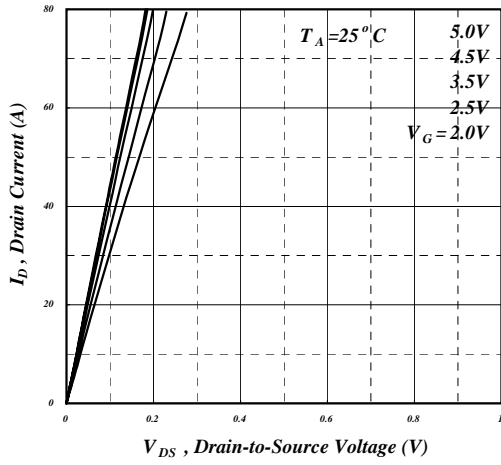


Fig 1. Typical Output Characteristics

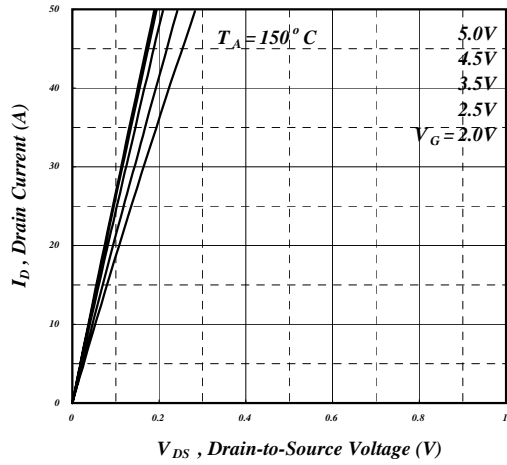


Fig 2. Typical Output Characteristics

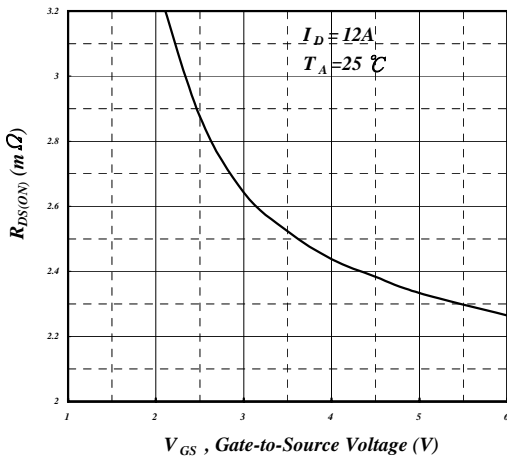


Fig 3. On-Resistance v.s. Gate Voltage

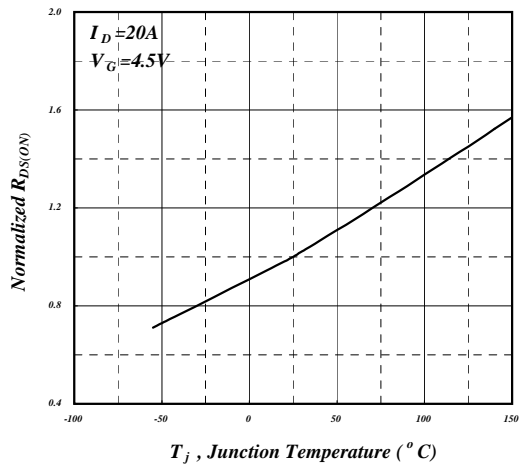


Fig 4. Normalized On-Resistance v.s. Junction Temperature

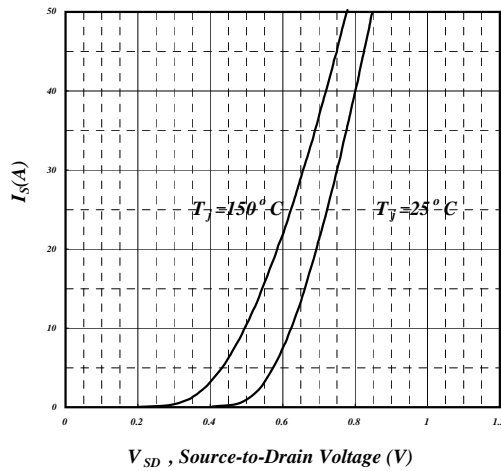


Fig 5. Forward Characteristic of Reverse Diode

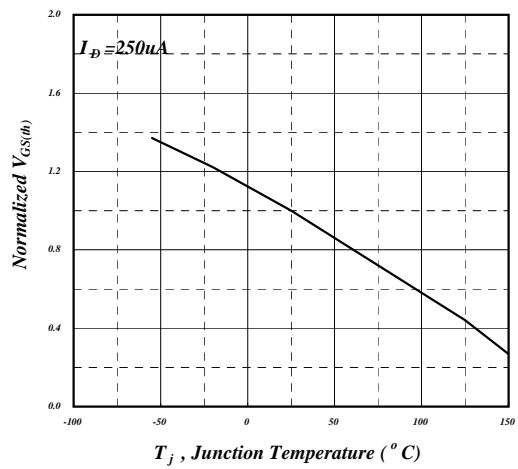


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

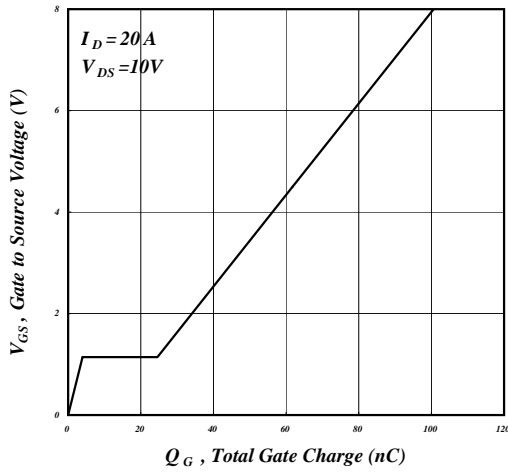


Fig 7. Gate Charge Characteristics

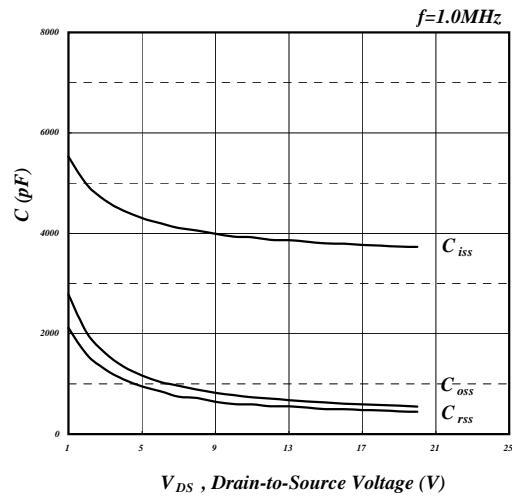


Fig 8. Typical Capacitance Characteristics

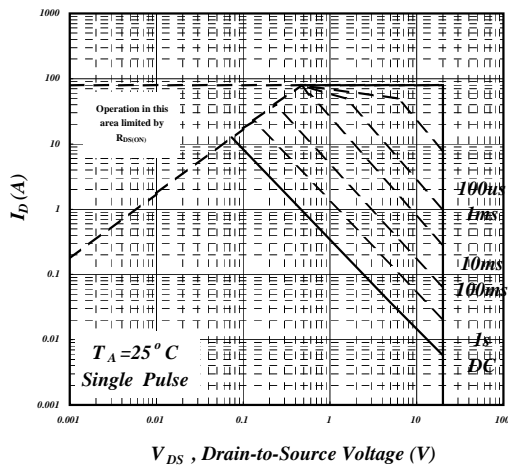


Fig 9. Maximum Safe Operating Area

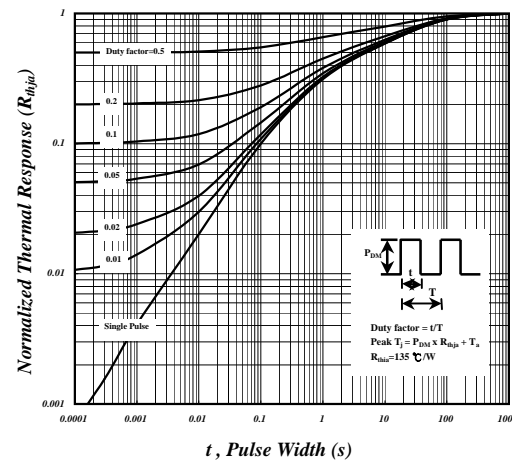


Fig 10. Effective Transient Thermal Impedance

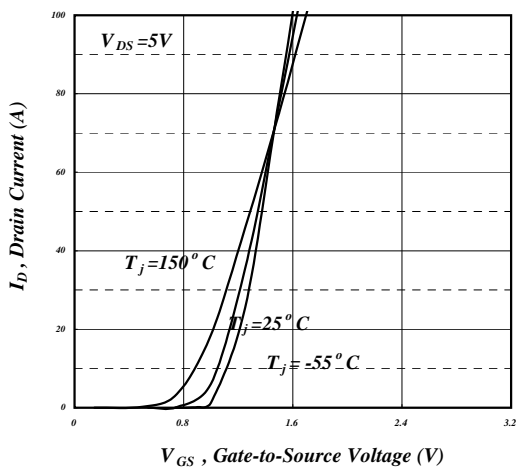


Fig 11. Transfer Characteristics

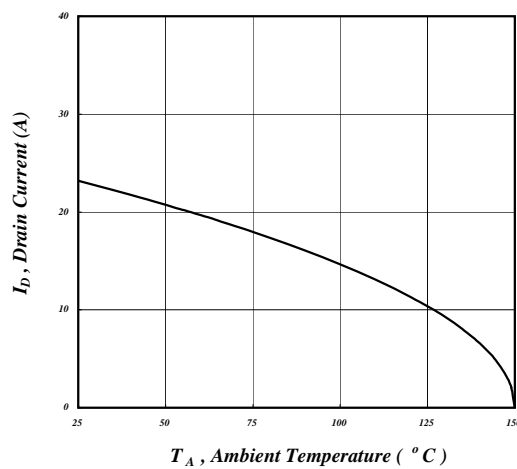


Fig 12. Drain Current v.s. Ambient Temperature

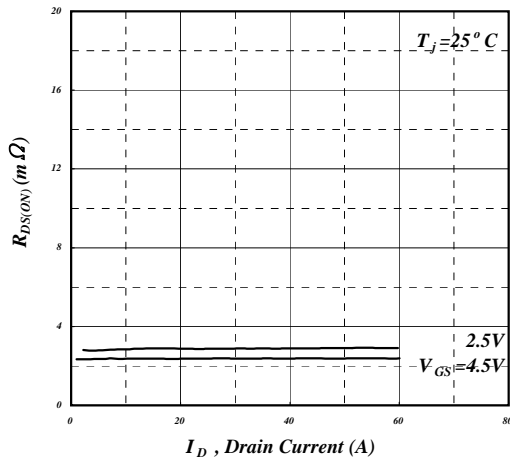


Fig 13. Typ. Drain-Source on State Resistance

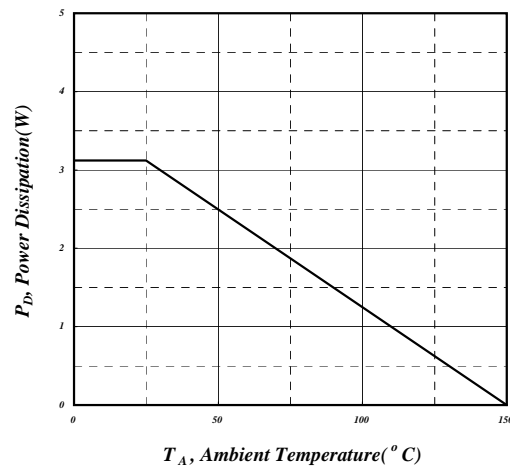
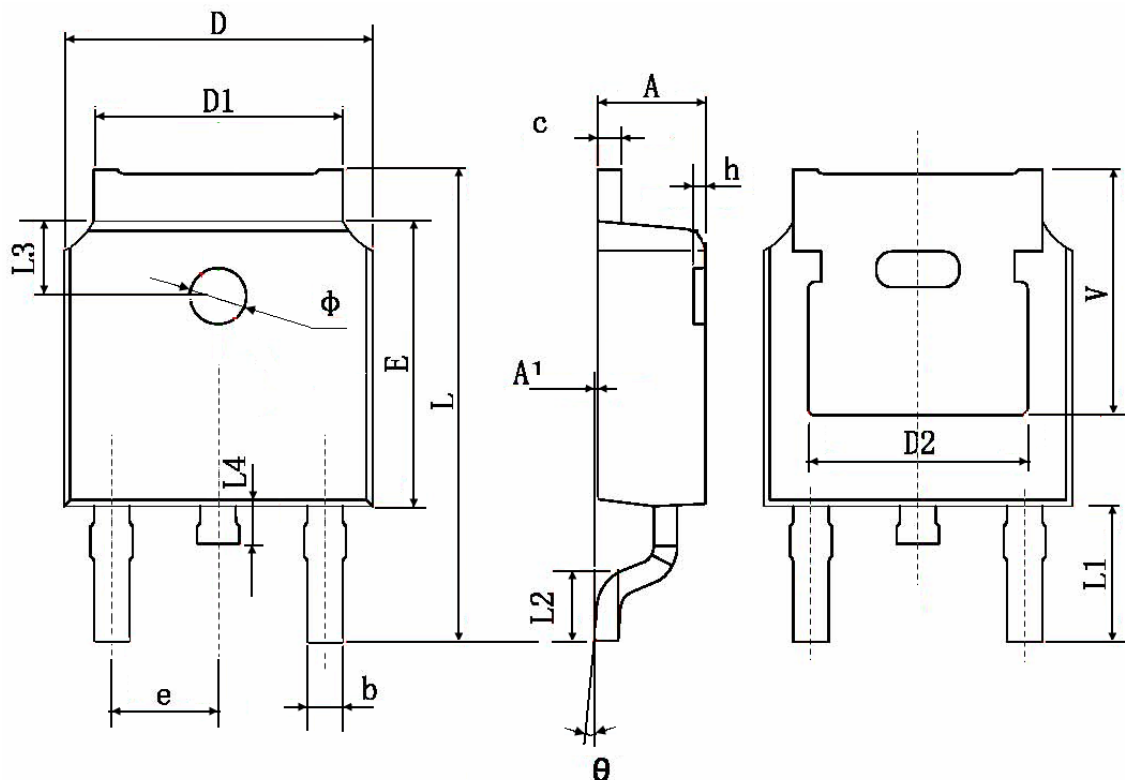


Fig 14. Total Power Dissipation

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	4.830 TYP.		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
phi	1.100	1.300	0.043	0.051
theta	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	