

# FH17P03D

# -30V P-Channel MOSFET

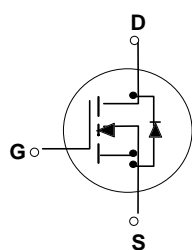
## Description

FH17P03D 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.

The TO-252 package is widely preferred for all commercial -industrial surface mount applications using infrared reflow technique and suited for high current application due to the low connection resistance. The through-hole version (FH17P03D) are available for low-profile applications.

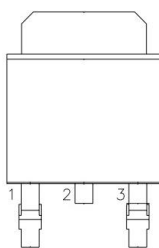
$BV_{DSS}$	-30V
$R_{DS(ON MAX)}$	9m $\Omega$
$I_D$	-70A

- Low On-resistance
- Simple Drive Requirement
- Fast Switching Characteristic
- RoHS Compliant & Halogen-Free



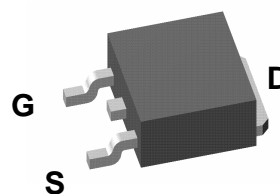
Schematic diagram

### TO-252



Marking and pin assignment

$$R_{DS(ON)} = 7.5m\Omega (MAX) @ V_{GS} = 10V$$



TO-252 top view

## Absolute Maximum Ratings @ $T_J = 25^\circ C$ (unless otherwise specified)

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	-30	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D @ T_C = 25^\circ C$	Drain Current, $V_{GS} @ 10V$	-70	A
$I_D @ T_C = 100^\circ C$	Drain Current, $V_{GS} @ 10V$	-40	A
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	-240	A
$P_D @ T_C = 25^\circ C$	Total Power Dissipation	54.3	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$

## Thermal Data

Symbol	Parameter	Value	Units
Rthj-c	Maximum Thermal Resistance Junction-case	2.3	$^\circ C/W$
Rthj-a	Maximum Thermal Resistance, Junction-ambient (PCB mount) <sup>3</sup>	62.5	$^\circ C/W$
Rthj-a	Maximum Thermal Resistance, Junction-ambient	110	$^\circ C/W$

## 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	$V_{GS}=0V, I_D=-250\mu A$	-30	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=-10V, I_D=-40A$	-	7.8	9	$m\Omega$
		$V_{GS}=-4.5V, I_D=-30A$	-	12	15	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1	-1.35	-3	V
$g_{fs}$	Forward Transconductance	$V_{DS}=-10V, I_D=-30A$	-	60	-	S
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=-24V, V_{GS}=0V$	-	-	-10	$\mu A$
$I_{GSS}$	Gate-Source Leakage	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
$Q_g$	Total Gate Charge <sup>2</sup>	$I_D=-30A$	-	44	70	nC
$Q_{gs}$	Gate-Source Charge	$V_{DS}=-24V$	-	6.5	-	nC
$Q_{gd}$	Gate-Drain ("Miller") Charge	$V_{GS}=-4.5V$	-	28.5	-	nC
$t_{d(on)}$	Turn-on Delay Time <sup>2</sup>	$V_{DS}=-15V$	-	11	-	ns
$t_r$	Rise Time	$I_D=-30A$	-	67	-	ns
$t_{d(off)}$	Turn-off Delay Time	$R_G=1\Omega$	-	37	-	ns
$t_f$	Fall Time	$V_{GS}=-10V$	-	22	-	ns
$C_{iss}$	Input Capacitance	$V_{GS}=0V$	-	3500	5600	pF
$C_{oss}$	Output Capacitance	$V_{DS}=-25V$	-	520	-	pF
$C_{rss}$	Reverse Transfer Capacitance	$f=1.0\text{MHz}$	-	495	-	pF
$R_g$	Gate Resistance	$f=1.0\text{MHz}$	-	2	-	$\Omega$

## Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{SD}$	Forward On Voltage <sup>2</sup>	$I_S=-30A, V_{GS}=0V$	-	-	-1.2	V
$t_{rr}$	Reverse Recovery Time	$I_S=-10A, V_{GS}=0V,$	-	34	-	ns
$Q_{rr}$	Reverse Recovery Charge	$dI/dt=100A/\mu s$	-	30	-	nC

### Notes:

1. Pulse width limited by Max. junction temperature.
2. Pulse test
3. Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board

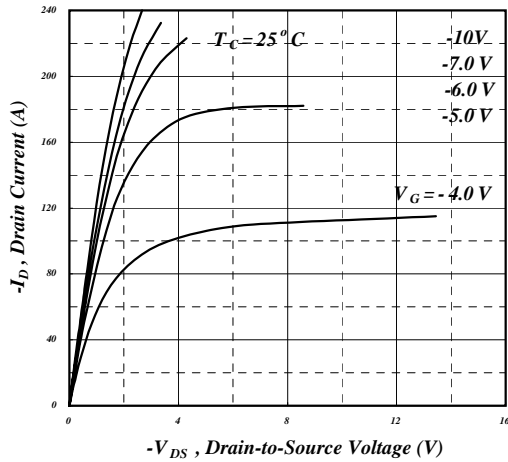


Fig 1. Typical Output Characteristics

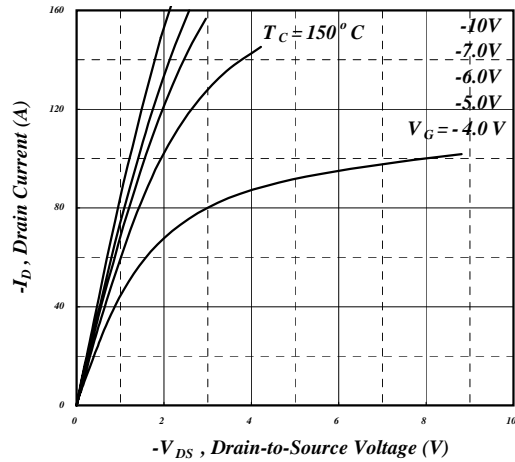


Fig 2. Typical Output Characteristics

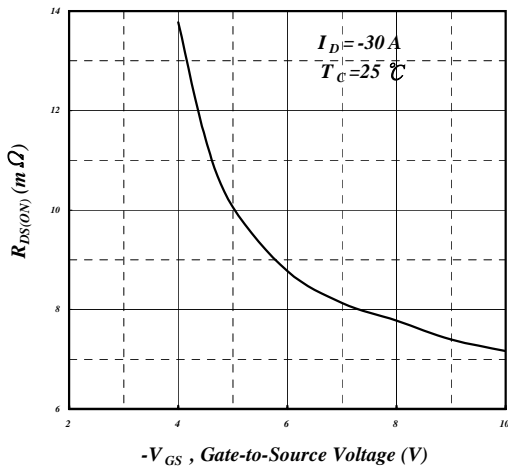


Fig 3. On-Resistance v.s. Gate Voltage

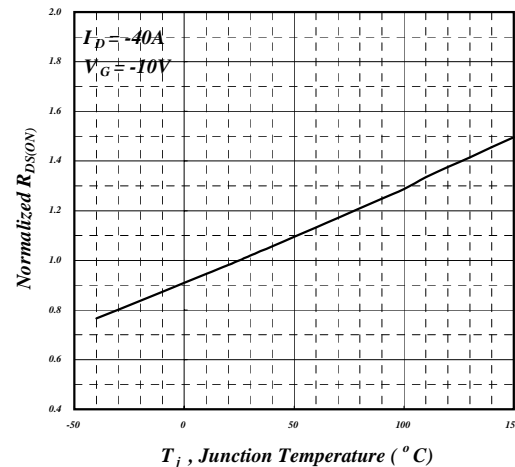


Fig 4. Normalized On-Resistance v.s. Junction Temperature

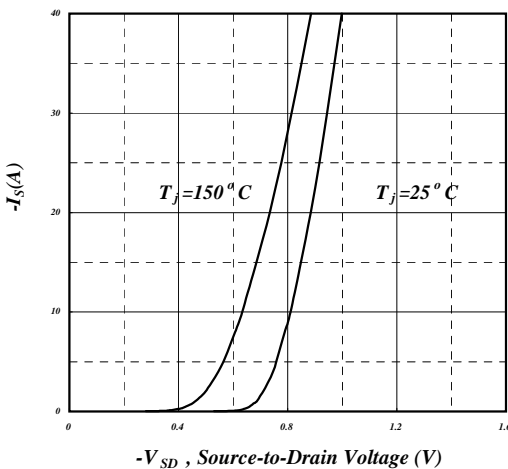


Fig 5. Forward Characteristic of Reverse Diode

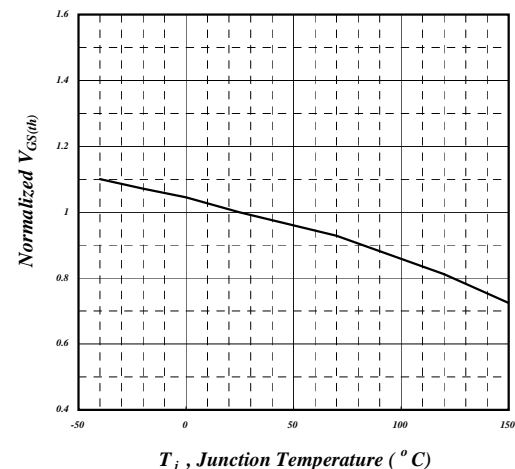


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

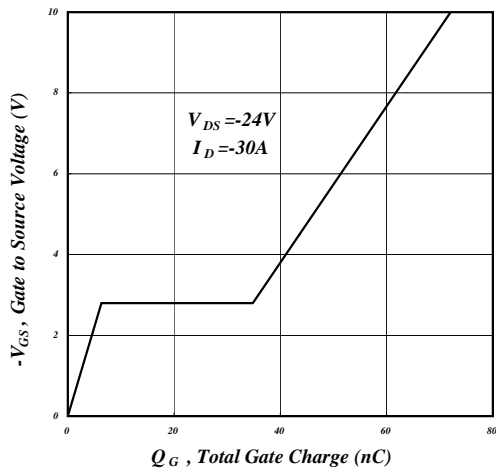


Fig 7. Gate Charge Characteristics

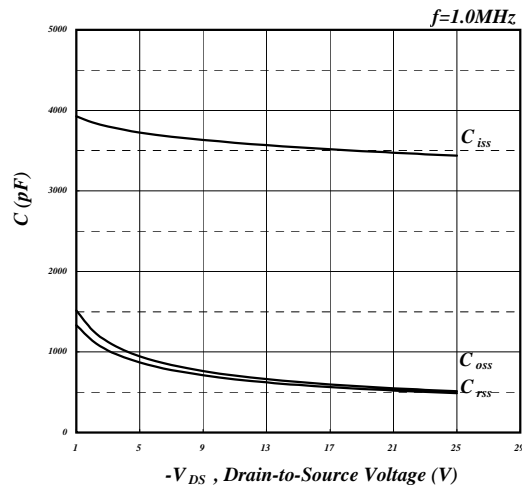


Fig 8. Typical Capacitance Characteristics

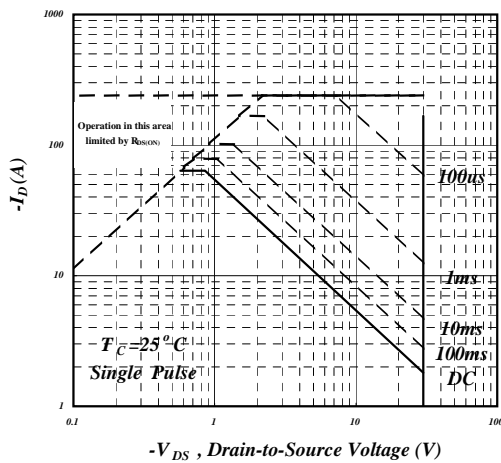


Fig 9. Maximum Safe Operating Area

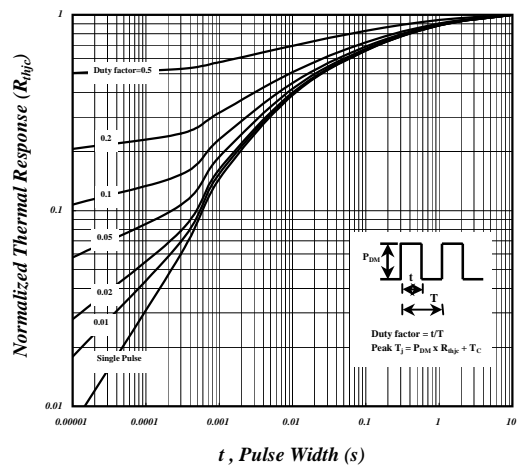


Fig 10. Effective Transient Thermal Impedance

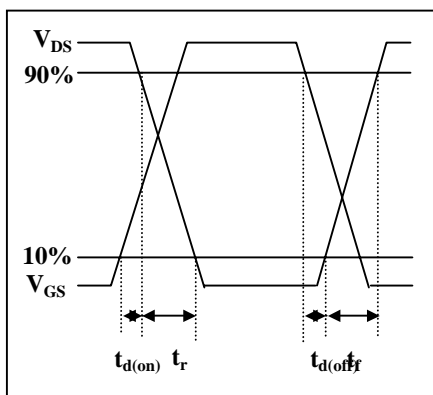


Fig 11. Switching Time Waveform

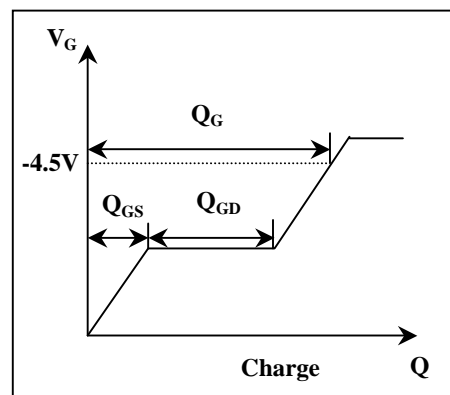
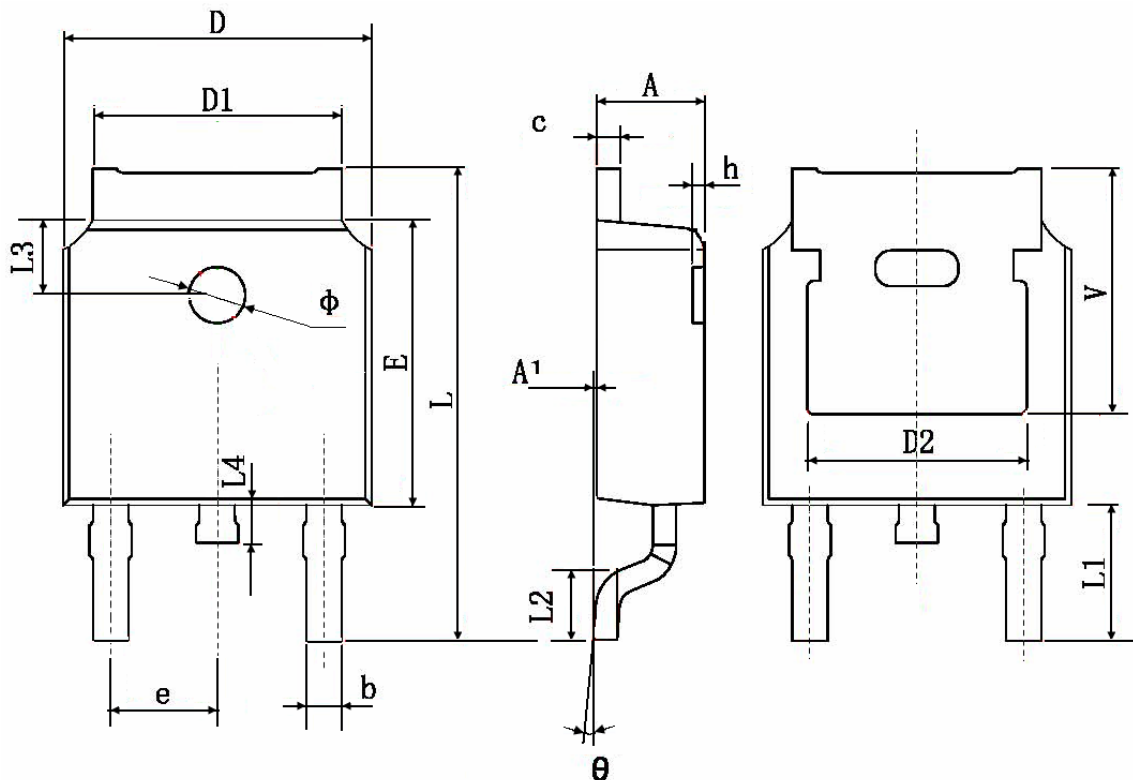


Fig 12. Gate Charge Waveform

## 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
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.	