

FH12P10D

-100V P-Channel MOSFET

Description

FH12P10D 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 (FH12P10D) are available for low-profile applications.

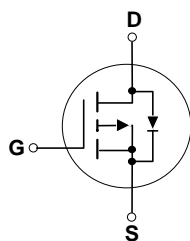
General Features

- ◆ $V_{DS} = -100V$, $I_D = -20A$
 $R_{DS(ON)} = 165\text{ m}\Omega$ (Typ) @ $V_{GS} = -10V$
- ◆ $R_{DS(ON)} = 175\text{ m}\Omega$ (Typ) @ $V_{GS} = -4.5V$
- ◆ Surface-mounted package
- ◆ Low gate charge

Applications

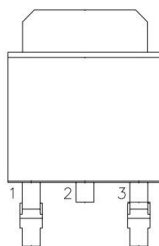
- ◆ Motor driver appliances
- ◆ Adapter appliances
- ◆ High power inverter system

P-Channel MOSFET

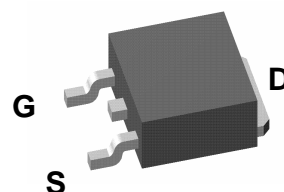


Schematic diagram

TO-252



Marking and pin assignment



TO-252 top view

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

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	$T_C = 25^\circ\text{C}$	-100	-	V
V_{GS}	Gate-Source Voltage	$T_C = 25^\circ\text{C}$	-	± 20	V
I_D	Drain Current (DC)	$T_C = 25^\circ\text{C}$, $V_{GS} = -10\text{ V}$	-	- 20	A
I_{DM}^*	Drain Current (Pulsed) *	$T_C = 25^\circ\text{C}$, $V_{GS} = -10\text{ V}$	-	- 44	A
P_{tot}	Drain power dissipation	$T_C = 25^\circ\text{C}$	-	35	W
T_{stg}	Storage Temperature		-55	150	$^\circ\text{C}$
T_J	Junction Temperature		-	150	$^\circ\text{C}$
I_S	Diode Forward Current	$T_C = 25^\circ\text{C}$	-	- 20	A
$R_{\theta JA}^{**}$	Thermal Resistance- Junction to Ambient		-	62.5	$^\circ\text{C}/\text{W}$
$R_{\theta JC}^{***}$	Thermal Resistance- Junction to Case		-	2.5	

Notes :

- * Pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$
- ** Mounted on PCB of 1 in^2 pad area
- *** Mounted on Large Heat Sink

6. Electrical Characteristics ($T_A=25\text{ }^\circ\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_{DS} = -250\text{ }\mu\text{A}$	-100	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_{DS} = -250\text{ }\mu\text{A}$	-1.0	-	-2.5	V
I_{DSS}	Drain Leakage Current	$V_{DS} = -80\text{ V}, V_{GS} = 0\text{ V}$	-	-	-1.0	μA
I_{GSS}	Gate Leakage Current	$V_{GS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$	-	-	± 100	nA
$R_{DS(ON)}^a$	On-State Resistance	$V_{GS} = -10\text{ V}, I_{DS} = -2\text{ A}$	-	165	180	m Ω
		$V_{GS} = -4.5\text{ V}, I_{DS} = -1\text{ A}$	-	175	190	
Diode Characteristics						
V_{SD}^a	Diode Forward Voltage	$I_{SD} = -2\text{ A}, V_{GS} = 0\text{ V}$	-	-	-1.3	V
t_{rr}	Reverse Recovery Time	$I_{SD} = -6\text{ A}, dI_{SD}/dt = 100\text{ A}/\mu\text{s}$	-	40	-	nS
Q_{rr}	Reverse Recovery Charge		-	28	-	nC
Dynamic Characteristics^b						
C_{iss}	Input Capacitance	$V_{GS} = 0\text{ V}, V_{DS} = -50\text{ V}$ Frequency = 1 MHz	-	1545	-	pF
C_{oss}	Output Capacitance		-	37	-	
C_{rss}	Reverse Transfer Capacitance		-	25	-	
$t_d(on)$	Turn-on Delay Time	$V_{DS} = -50\text{ V}, V_{GEN} = -10\text{ V},$ $R_G = 4.5\text{ }\Omega, R_L = 25\text{ }\Omega,$ $I_{DS} = -2\text{ A}$	-	10	-	nS
t_r	Turn-on Rise Time		-	27	-	
$t_d(off)$	Turn-off Delay Time		-	288	-	
t_f	Turn-off Fall Time		-	88	-	
Gate Charge Characteristics^b						
Q_g	Total Gate Charge	$V_{DS} = -50\text{ V}, V_{GS} = -10\text{ V},$ $I_{DS} = -2\text{ A}$	-	27	-	nC
Q_{gs}	Gate-Source Charge		-	5.3	-	
Q_{gd}	Gate-Drain Charge		-	3.2	-	

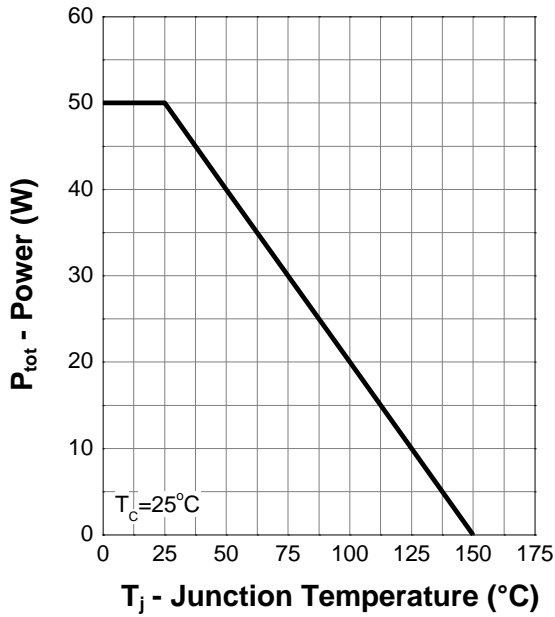
Notes :

a : Pulse test ; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$

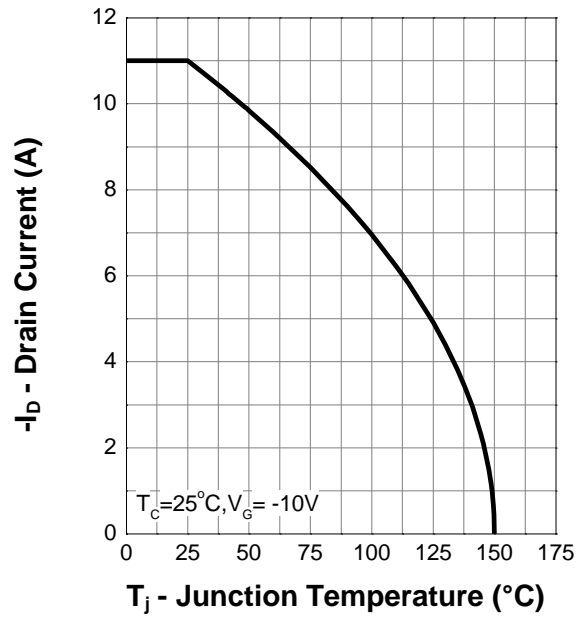
b : Guaranteed by design, not subject to production testing

7. Typical Characteristics (Cont.)

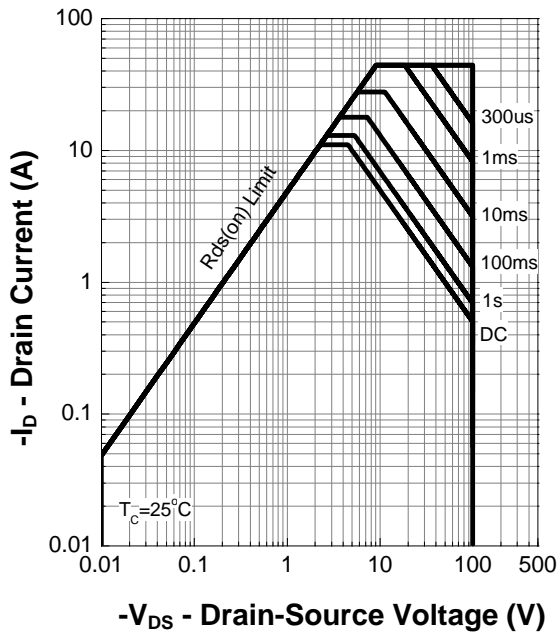
Power Capability



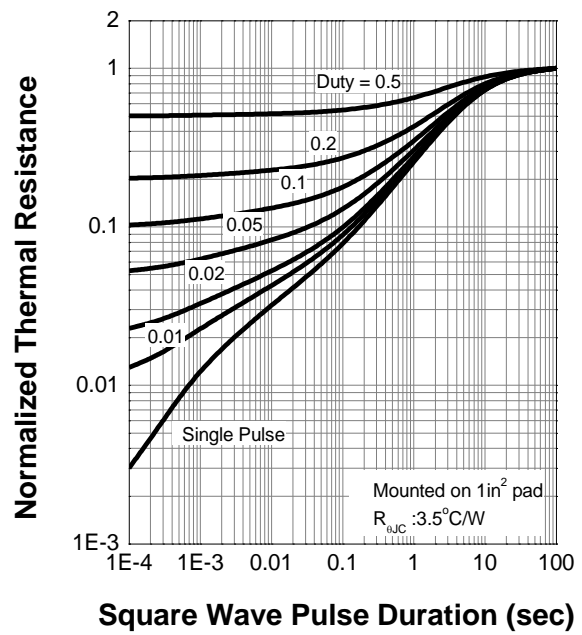
Current Capability



Safe Operation Area

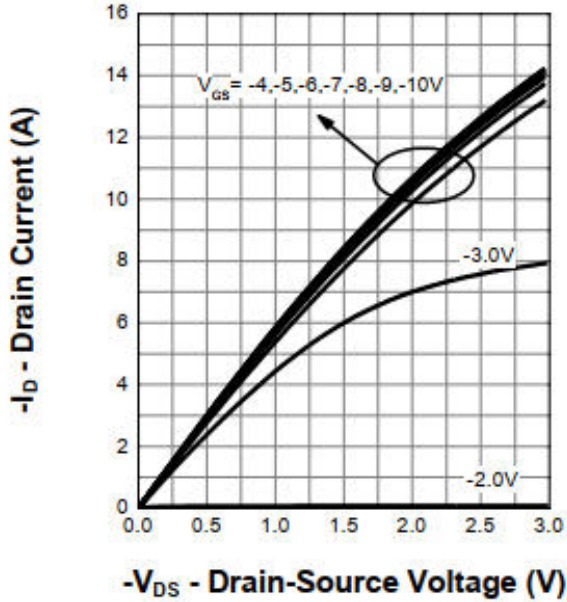


Transient Thermal Impedance

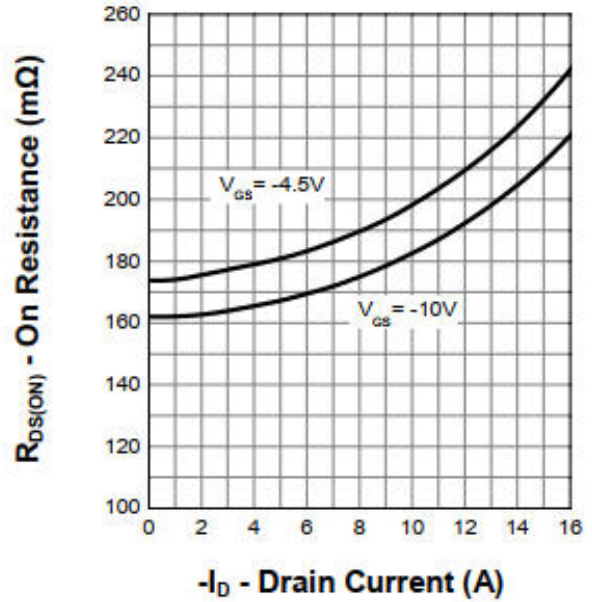


7. Typical Characteristics (Cont.)

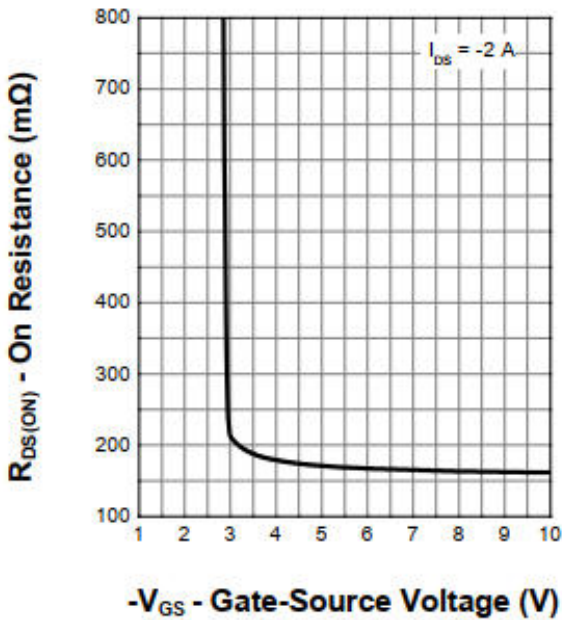
Output Characteristics



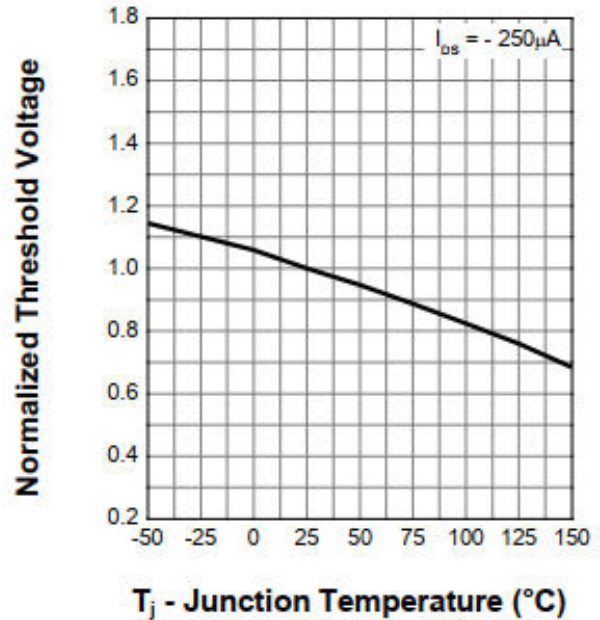
Drain-Source On Resistance



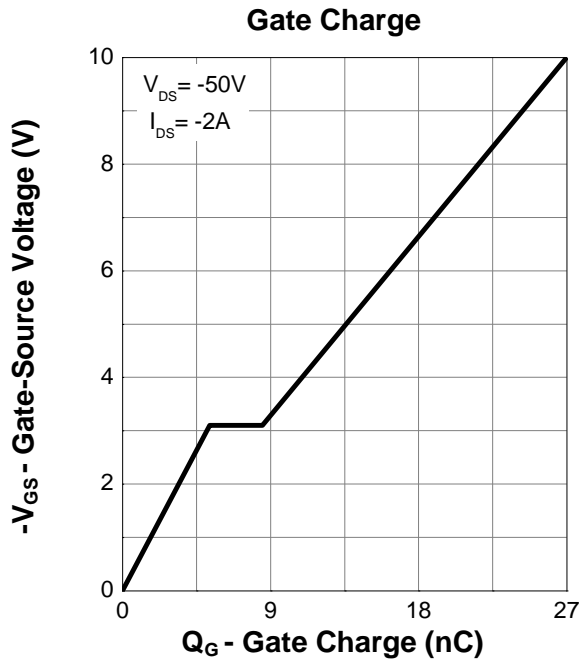
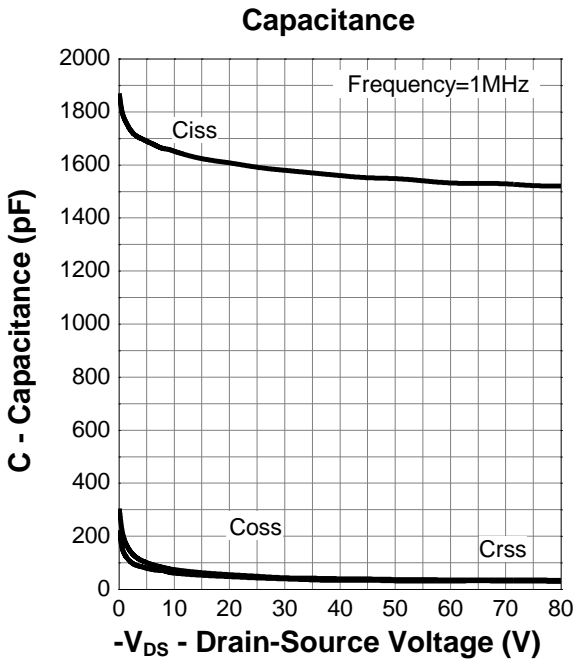
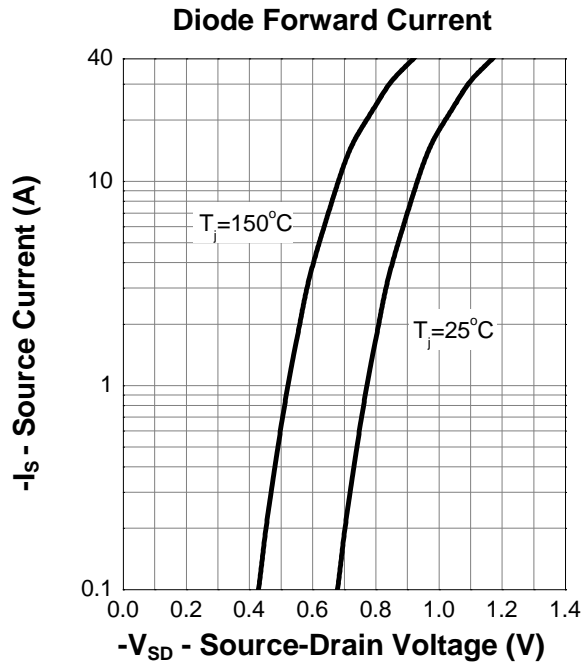
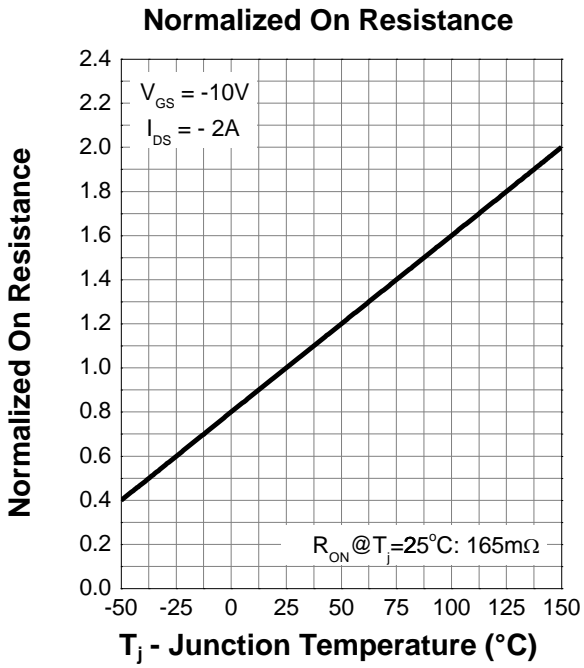
Transfer Characteristics



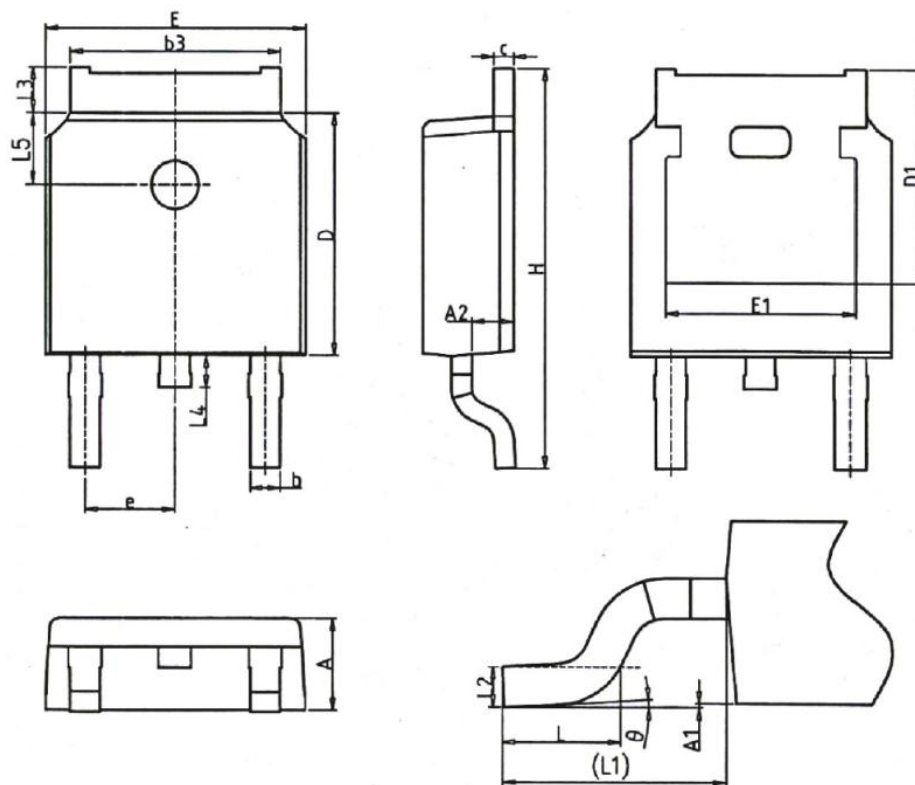
Normalized Threshold Voltage



7. Typical Characteristics (Cont.)



8. Package Information : TO-252



COMMON DIMENSIONS						
SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	2.20	2.30	2.38	0.087	0.091	0.094
A1	0.00		0.20	0.000		0.008
A2	0.97	1.07	1.17	0.038	0.042	0.046
b	0.68	0.78	0.90	0.027	0.031	0.035
b3	5.20	5.33	5.46	0.205	0.210	0.215
c	0.43	0.53	0.61	0.017	0.021	0.024
D	5.98	6.10	6.22	0.235	0.240	0.245
D1	5.30REF			0.209REF		
E	6.40	6.60	6.73	0.252	0.260	0.265
E1	4.63	-	-	0.182	-	-
e	2.286BSC			0.090BSC		
H	9.40	10.10	10.50	0.370	0.398	0.413
L	1.38	1.50	1.75	0.054	0.059	0.069
L1	2.90REF			0.114REF		
L2	0.51BSC			0.020BSC		
L3	0.88		1.28	0.035		0.050
L4	0.50		1.00	0.020		0.039
L5	1.65	1.80	1.95	0.065	0.071	0.077
θ	0°		8°	0°		8°