

30V P-Channel MOSFET

Features

-30V70A ,

$R_{DS(ON)} < 7.8m\Omega @ V_{GS} = -10V$

$R_{DS(ON)} < 11m\Omega @ V_{GS} = -4.5V$

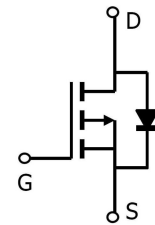
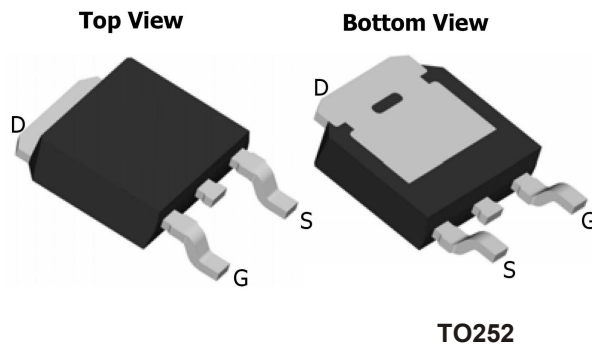
Lead Free Available (RoHS Compliant)

General Description

The FS70P03 is the high cell density trench P-ch MOSFETs, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications.

The FS70P03 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

Pin Configuration



Absolute Maximum Ratings $T_A=25^\circ C$ unless otherwise noted

Parameter		Symbol	Maximum	Units	
Drain-Source Voltage		V_{DS}	-30	V	
Gate-Source Voltage		V_{GS}	± 20		
Continuous Drain Current, $V_{GS} @ -10V^1$	$T_C=25^\circ C$	I_D	-70	A	
	$T_C=100^\circ C$		-40		
	$T_A=25^\circ C$		-11.3		
	$T_A=70^\circ C$		-9		
Pulsed Drain Current ²		I_{DM}	-180		
Avalanche Current		I_{AS}	-55.4		
Single Pulse Avalanche Energy ³		E_{AS}	153	mJ	
Total Power Dissipation ⁴	$T_A=25^\circ C$	P_D	2	W	
	$T_C=25^\circ C$		52.1		
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	$^\circ C$	
Thermal Characteristics					
Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ¹	$t \leq 10s$	$R_{\theta JA}$	---	25	$^\circ C/W$
	Maximum Junction-to-Ambient ¹		Steady-State	---	
Maximum Junction-to-Case ¹		$R_{\theta JC}$		---	

FS70P03

● Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV _{DSS}	Drain-Source Breakdown Voltage	I _D =-250μA, V _{GS} =0V	-30			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-24V, V _{GS} =0	T _J =25°C		-1	μA
			T _J =25°C		-5	
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} =±25V			±0.1	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} I _D =-250μA	-1		-2.5	V
R _{DS(on)}	Static Drain-Source On-Resistance ²	V _{GS} =-10V, I _D =-30A		6.8	7.8	mΩ
		V _{GS} =-4.5V, I _D =-15A		9.0	11	
g _{FS}	Forward Trans conductance	V _{DS} =-5V, I _D =-30A		26.4		S
V _{SD}	Diode Forward Voltage ²	I _S =-1A, V _{GS} =0V, T _J =25°C			-1.2	V
I _S	Continuous Source Current ^{1,5}	V _G =V _D =0V, Force Current			-70	A
I _{SM}	Pulsed Source Current ^{2,5}				-190	
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-15V, f=1MHz		3448		pF
C _{oss}	Output Capacitance			508		
C _{rss}	Reverse Transfer Capacitance			421		
SWITCHING PARAMETERS						
Q _g	Total Gate Charge(-4.5V)	V _{GS} =-4.5V, V _{DS} =-15V, I _D =-15A		33		nC
Q _{gs}	Gate Source Charge			10.7		
Q _{gd}	Gate Drain Charge			12.8		
t _{D(on)}	Turn-On Delay Time	V _{GS} =-10V, V _{DS} =-15V, I _D =-15A, R _G =3.3Ω		8		ns
t _r	Turn-On Rise Time			17.8		
t _{D(off)}	Turn-Off Delay Time			78.4		
t _f	Turn-Off Fall Time			43.6		
t _{rr}	Body Diode Reverse Recovery Time	I _F =-15A, dI/dt=100A/μs, T _J =25°C		29		
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =-15A, dI/dt=100A/μs, T _J =25°C		15		nC

Note:

A: Th1. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.

2. The data tested by pulsed, pulse width ≅ 300us, duty cycle ≅ 2%

3. The EAS data shows Max. rating. The test condition is VDD=-25V, VGS=-10V, L=0.1mH, IAS=-55.4A

4. The power dissipation is limited by 150°C junction temperature

5. The data is theoretically the same as ID and IDM, in real applications, should be limited by total power dissipation.

FS70P03

- TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

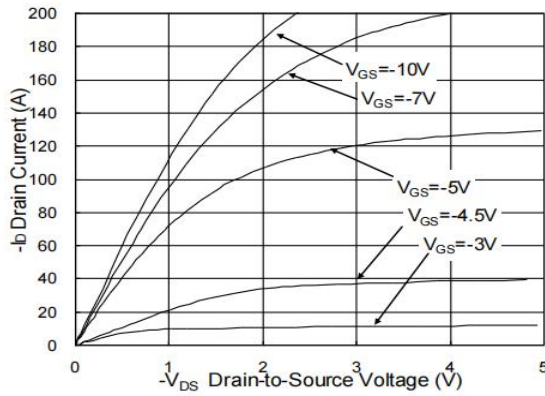


Fig.1 Typical Output Characteristics

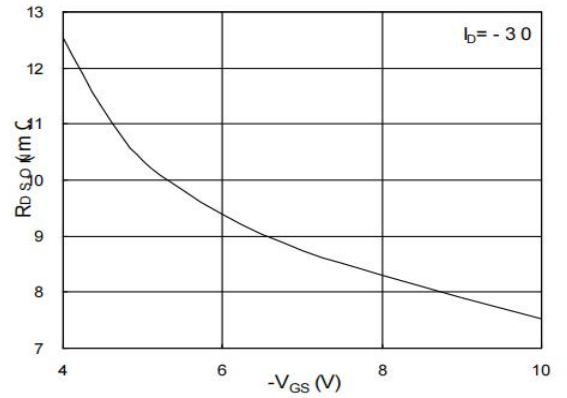


Fig.2 On-Resistance v.s Gate-Source

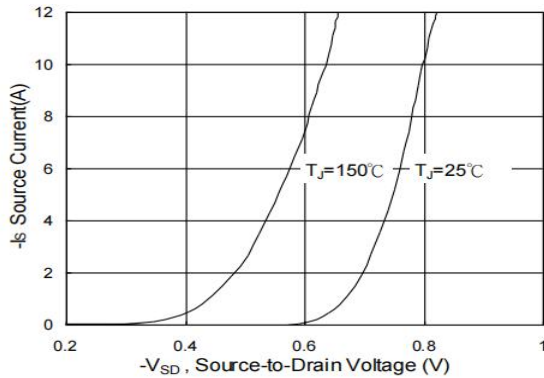


Fig.3 Forward Characteristics Of Reverse

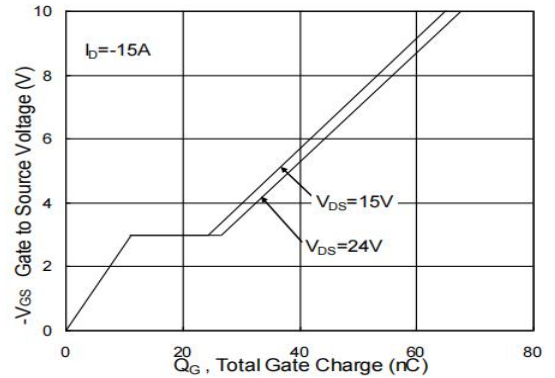


Fig.4 Gate-Charge Characteristics

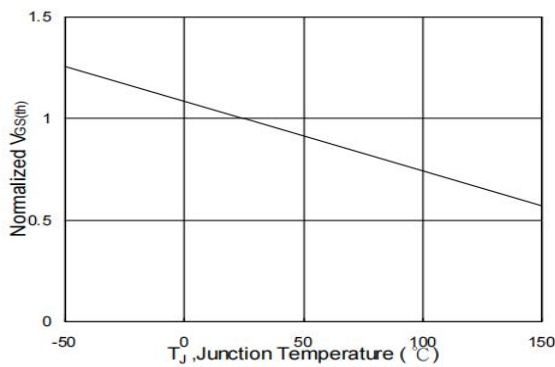


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

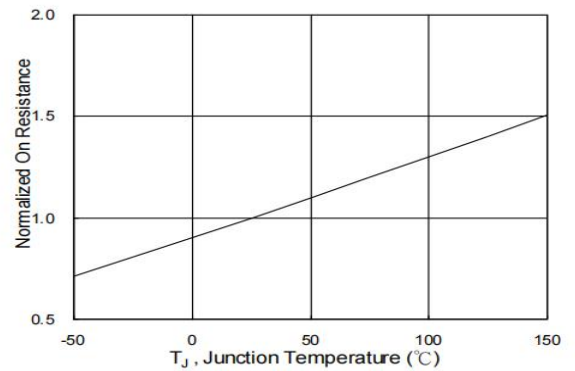


Fig.6 Normalized $R_{DS(on)}$ v.s T_J

FS70P03

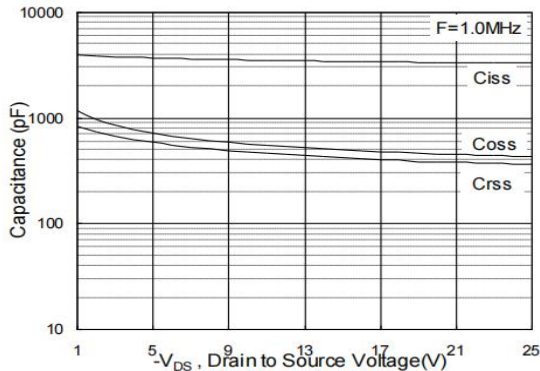


Fig. 7 Capacitance

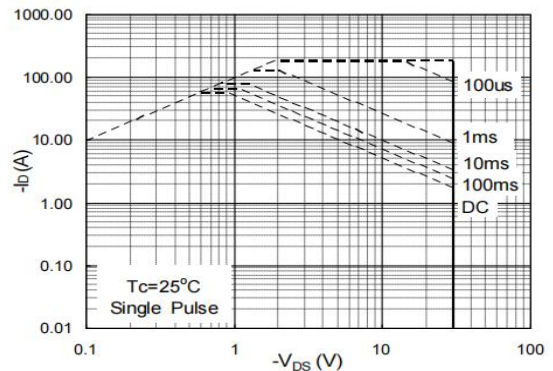


Fig. 8 Safe Operating Area

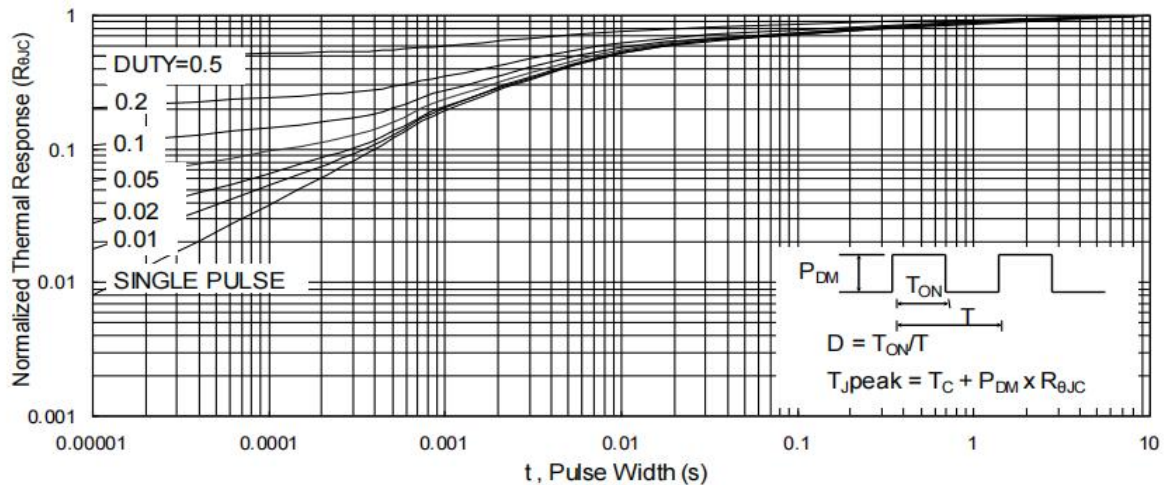


Fig. 9 Normalized Maximum Transient Thermal Impedance

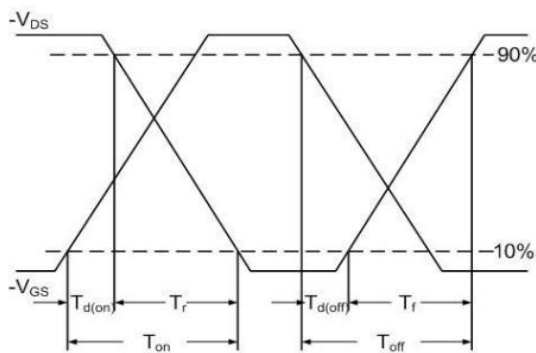


Fig. 10 Switching Time Waveform

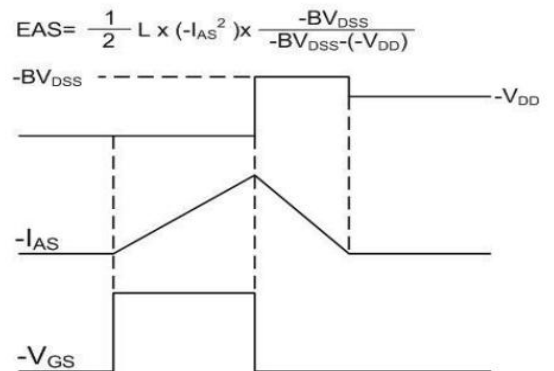
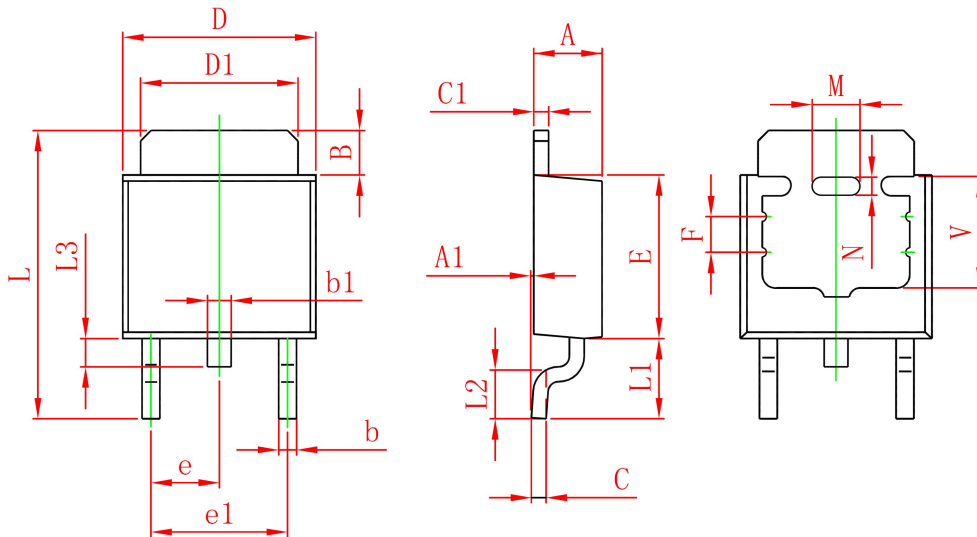


Fig. 11 Unclamped Inductive Switching Waveform

FS70P03

- Package Information

TO-252C-2L PACKAGE OUTLINE DIMENSIONS



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	1.350	1.650	0.053	0.065
b	0.500	0.700	0.020	0.028
b1	0.700	0.900	0.028	0.035
c	0.430	0.580	0.017	0.023
c1	0.430	0.580	0.017	0.023
D	6.350	6.650	0.250	0.262
D1	5.200	5.400	0.205	0.213
E	5.400	5.700	0.213	0.224
e	2.300 TYP.		0.091 TYP.	
e1	4.500	4.700	0.177	0.185
F	1.200REF.		0.047REF.	
M	1.600REF.		0.063REF.	
N	0.450REF.		0.018REF.	
L	9.500	9.900	0.374	0.390
L1	2.550	2.900	0.100	0.114
L2	1.400	1.780	0.055	0.070
L3	0.600	0.900	0.024	0.035
V	3.800 REF		0.150 REF	