N-Channel 30-V (D-S) MOSFET

● FEATURES

$R_{DS(ON)}$@10V=14mΩ（typ）

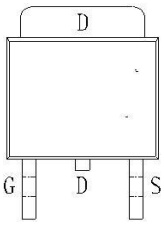
high density cell design for extremely low $R_{DS(ON)}$

Exceptional on-resistance and maximum DC current capability

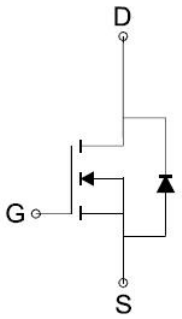
● GENERAL DESCRIPTION

The FS20N03 combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is ideal for load switch and battery protection applications.

● PIN CONFIGURATION



TO252



N-Channel MOSFET

● Absolute Maximum Ratings (T_A=25℃ Unless Otherwise Noted)

Parameter	Symbol	Limit	Units
Drain-Source Voltage	VDS	30	V
Gate-Source Voltage	VGS	±20	V
Drain Current-Continuous	ID	20	A
Drain Current-Pulsed [A]	IDM	50	A
Maximum Power Dissipation	PD	30	W
Operating and Store Temperature Range	TJ,Tstg	-55 to 150	℃

Thermal Characteristics

Parameter	Symbol	Limit	Units
Thermal Resistance, Junction-to-Ambient [B]	RqJA	3.5	℃/W

Electrical Characteristics (T_A=25°C unless otherwise noted)

Symbol	Parameter	Limit	Min	Typ	Max	Unit
STATIC						
BVDSS	Drain-Source Breakdown Voltage	VGS=0V, ID=250μA	30			V
VGS(th)	Gate Threshold Voltage [C]	VDS=VGS, ID=250μA	1	1.45	2.0	V
IGSS	Gate Leakage Current	VDS=0V, VGS=±20V			±100	nA
IDSS	Zero Gate Voltage Drain Current	VDS=28V, VGS=0V			500	nA
RDS(ON)	Drain-Source On-State Resistance [C]	VGS=4.5V, ID= 10A		18	26	mΩ
		VGS=10V, ID= 15A		14	18	
VSD	Diode Forward Voltage	IS=20A, VGS=0V			1.2	V
gFS	Forward Transconductance	VDS=5V,ID=10A		10		S
DYNAMIC [D]						
Qg	Total Gate Charge	VDS=20V,ID=5A VGS=10V		11		nC
Qgs	Gate-Source Charge			2.2		
Qgd	Gate-Drain Charge			4.2		
Ciss	Input capacitance	VDS=25V, VGS=0V, f=1.0MHz		1165		pF
Coss	Output Capacitance			142		
Crss	Reverse Transfer Capacitance			99		
SwitchingTimes [D]						
td(on)	Turn-on Delay Time	VDD=20V,ID=1.0A,VGS=10V,RG=6.0Ω		11.7		nS
tr	Turn-on Rise Time			5.2		nS
td(off)	Turn-Off Delay Time			18		nS
tf	Turn-Off Fall Time			6.0		nS

Notes Notes:

A.Repetitive Rating: Pulse width limited by maximum junction temperature.

B.Surface Mounted on FR4 Board, t≤10 sec.

C.Pulse Test: Pulse Width≤300 μs, Duty Cycle≤2%.

D.Guaranteed by design, not subject to production

- **Typical Performance Characteristics** (T =25℃)

Typical Electrical and Thermal Characteristics (Curves)

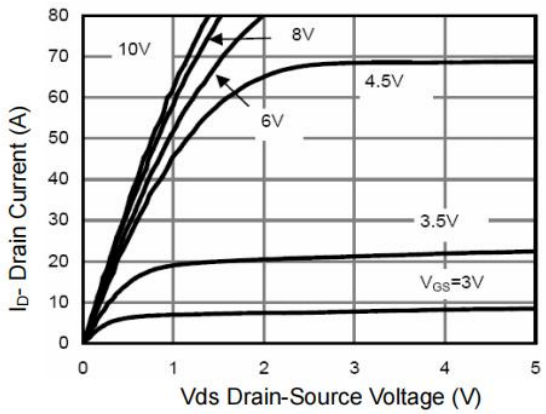


Figure 1 Output Characteristics

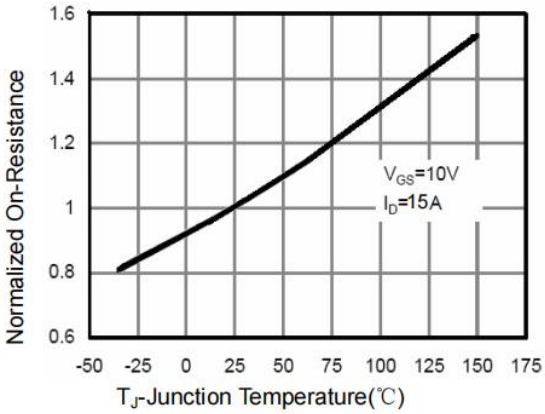


Figure 4 Rdson-Junction Temperature

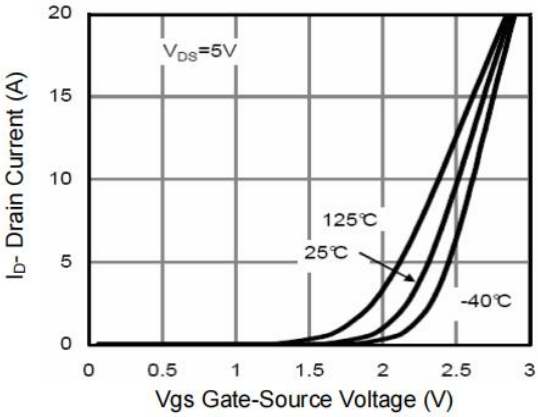


Figure 2 Transfer Characteristics

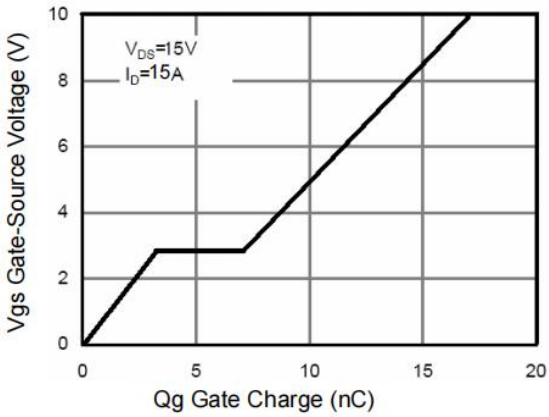


Figure 5 Gate Charge

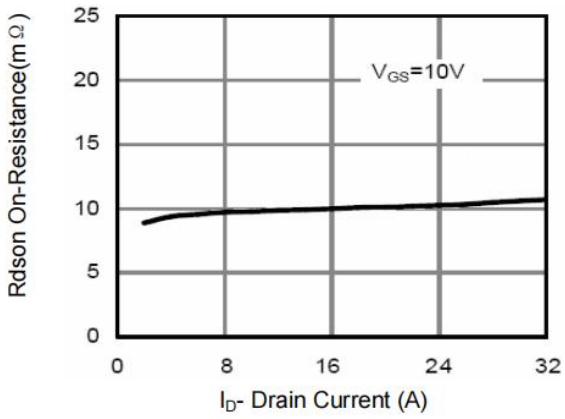


Figure 3 Rdson- Drain Current

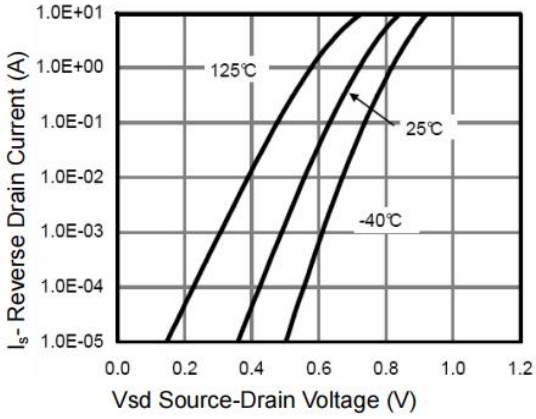


Figure 6 Source- Drain Diode Forward

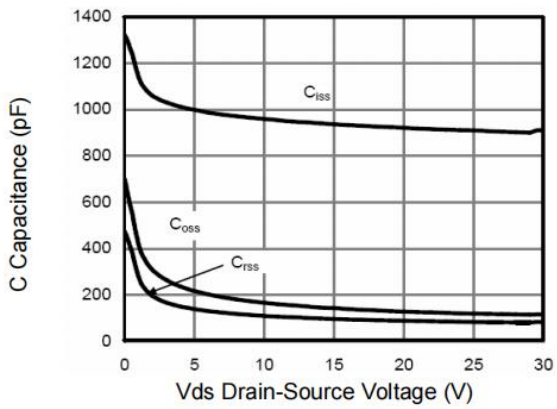


Figure 7 Capacitance vs Vds

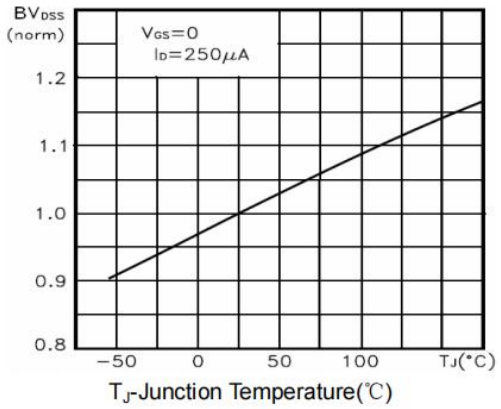


Figure 9 BV_{DSS} vs Junction Temperature

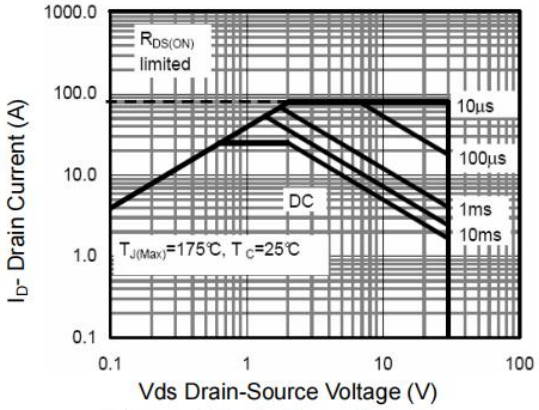


Figure 8 Safe Operation Area

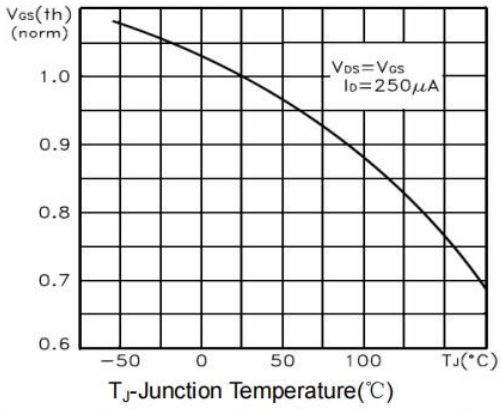


Figure 10 $V_{GS(th)}$ vs Junction Temperature

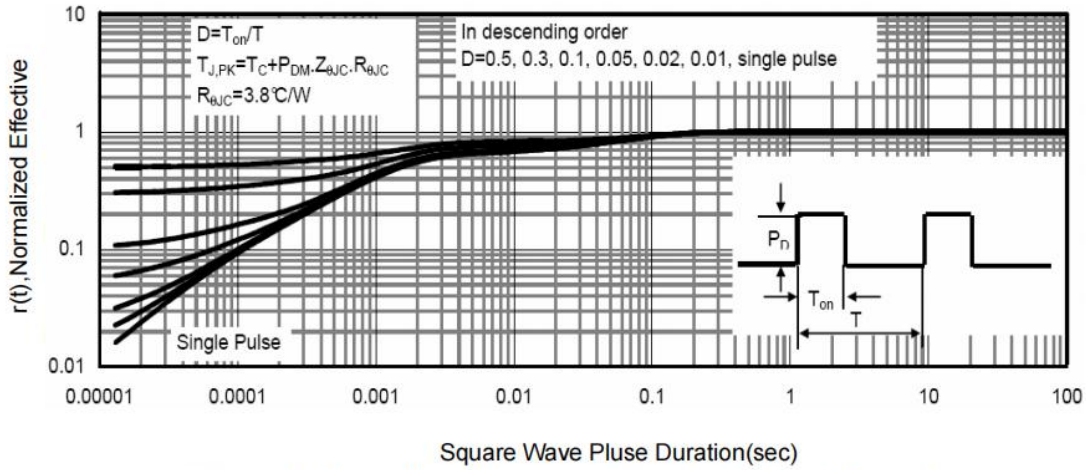
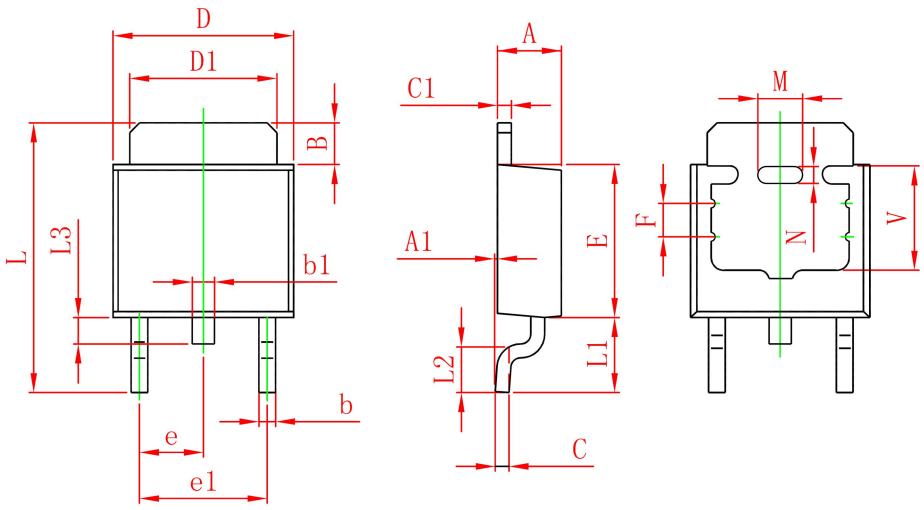


Figure 11 Normalized Maximum Transient Thermal Impedance

● PACKAGE

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	