

## N-Channel 100-V (D-S) MOSFET

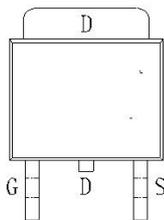
### ● FEATURES

RDS(ON) [7.2mΩ@VGS=4.5V](#) (TYP)  
RDS(ON) [9.5mΩ@VGS=10V](#) (TYP)  
high density cell design for extremely low RDS(ON)  
Exceptional on-resistance and maximum DC current capability

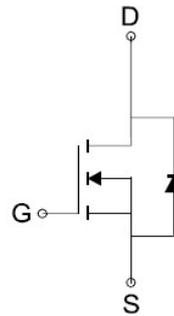
### ● GENERAL DESCRIPTION

The FS10N78 combines advanced trench MOSFET technology with a low resistance package to provide extremely low R<sub>DS(ON)</sub>. This device is ideal for load switch and battery protection applications.

### ● PIN CONFIGURATION



TO252



N-Channel MOSFET

### ● Absolute Maximum Ratings (T<sub>A</sub>=25°C Unless Otherwise Noted)

Parameter	Symbol	Limit	Units
Drain-Source Voltage	V <sub>DS</sub>	100	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Drain Current-Continuous	I <sub>D</sub>	78	A
Drain Current-Pulsed a	I <sub>DM</sub>	320	A
Maximum Power Dissipation @ T <sub>C</sub> = 25°C -Derate above 25°C	P <sub>D</sub>	125	W
		0.83	W/°C
Single Pulsed Avalanche Energy <sup>d</sup>	E <sub>AS</sub>	320	mJ
Operating and Store Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-55 to 175	°C

### Thermal Characteristics

Parameter	Symbol	Limit	Units
Thermal Resistance, Junction-to-Case	R <sub>qJC</sub>	1.2	°C/W
Thermal Resistance, Junction-to-Ambient	R <sub>qJA</sub>	65	°C/W

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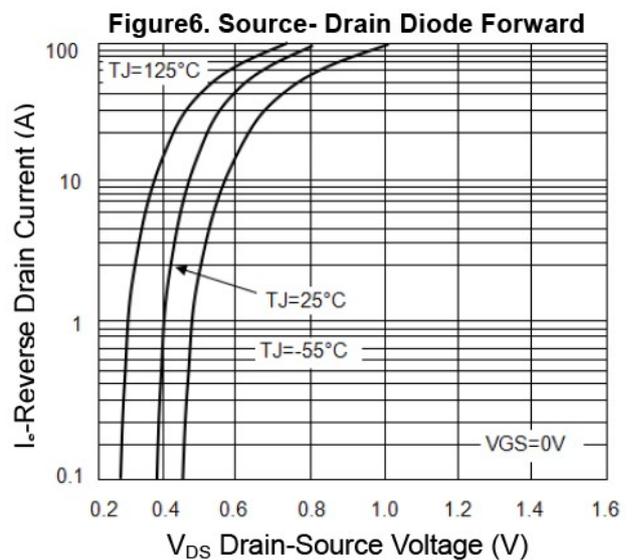
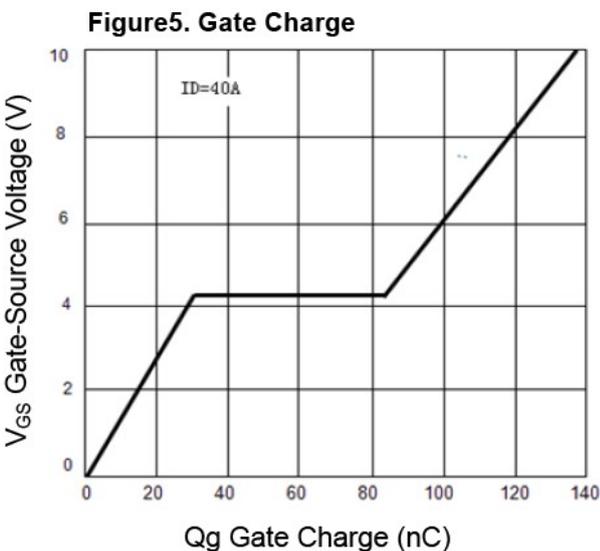
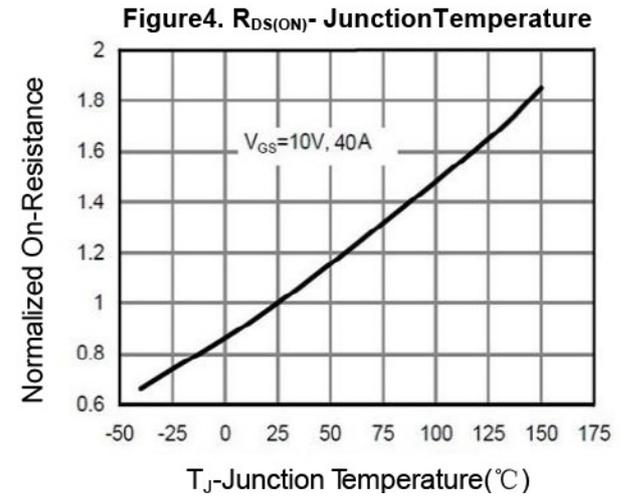
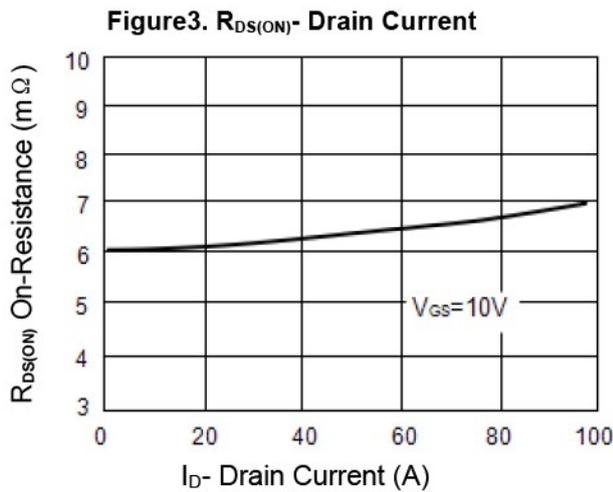
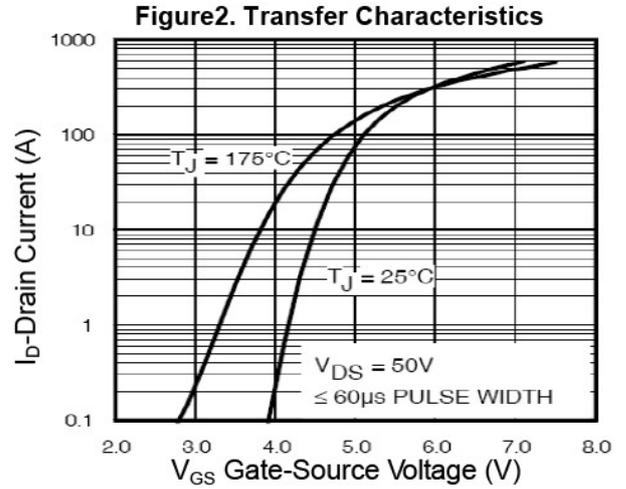
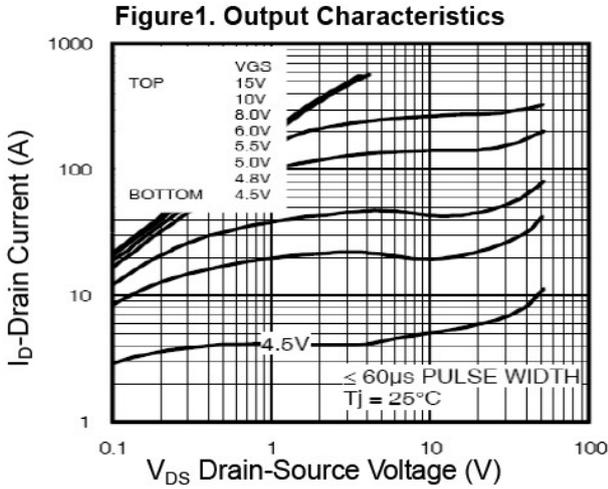
## ● Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

Symbol	Parameter	Limit	Min	Typ	Max	Unit
<b>STATIC</b>						
BVDSS	Drain-Source Breakdown Voltage	VGS=0V, ID=250μA	100			V
VGS(th)	Gate Threshold Voltage	VDS=VGS, ID=250μA	1.2	1.7	2.2	V
IGSS	Gate Leakage Current	VDS=0V, VGS=±20V			±100	nA
IDSS	Zero Gate Voltage Drain Current	VDS=100V, VGS=0V			1	μA
RDS(ON)	Drain-Source On-State Resistance	VGS=10V, ID= 39A		7.2	8.5	mΩ
		VGS=4.5V, ID= 39A		9.5	12	
VSD	Diode Forward Voltage	IS=2.7A, VGS=0V		0.72	1.1	V
<b>DYNAMIC<sup>c</sup></b>						
Qg	Total Gate Charge(10V)	VDS=50V, ID=40A VGS=10V		65		nC
Qgs	Gate-Source Charge			15		
Qgd	Gate-Drain Charge			9		
Ciss	Input capacitance	VDS=25V, VGS=0V, f=1.0MHz		5000		pF
Coss	Output Capacitance			430		
Crss	Reverse Transfer Capacitance			40		
<b>SwitchingTimes</b>						
td(on)	Turn-on Delay Tim	VDD=65V, ID=40A, RL=15Ω VGS=10V, RG=2.5Ω		15		nS
tr	Turn-on Rise Time			10		nS
td(off)	Turn-Off Delay Time			40		nS
tf	Turn-Off Fall Time			6		nS
<b>Source-DrainDiodeCharacteristics</b>						
ISD	Source-Drain Current(Body Diode)			78		A
ISDM	Pulsed Source-Drain Current(Body Diode)			320		A
VSD	Forward On Voltage(Note 1)	TJ=25°C, ISD=40A, VGS=0V		0.6	1	V
trr	Reverse Recovery Time(Note 1)	TJ=25°C, IF=40A di/dt=100A/μs		101		nS
Qrr	Reverse Recovery Charge(Note 1)			193		nC
ton	Forward Turn-on Time	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes 1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 1.5%, RG=25Ω, Starting TJ=25°C

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- Typical Performance Characteristics (T = 25°C)



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Figure7. Capacitance vs V<sub>DS</sub>

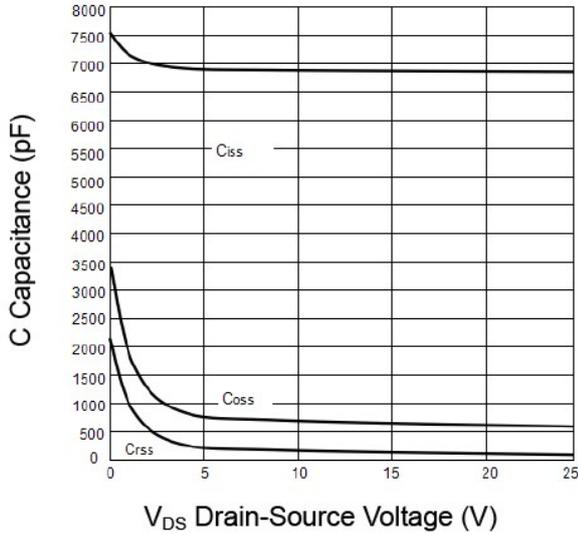


Figure8. Safe Operation Area

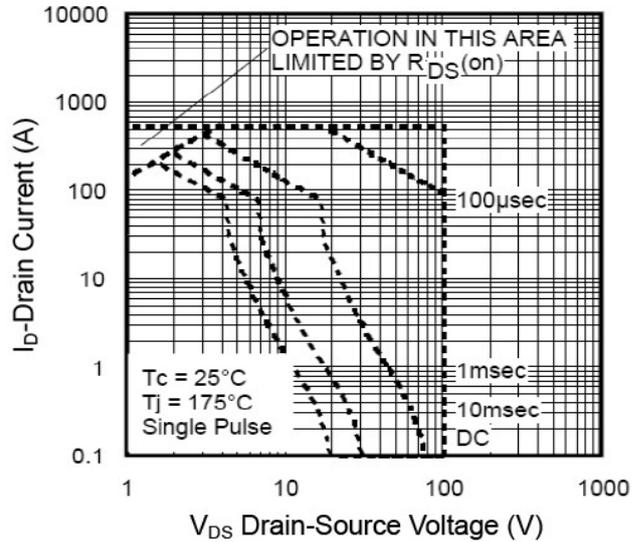


Figure9. BV<sub>DSS</sub> vs Junction Temperature

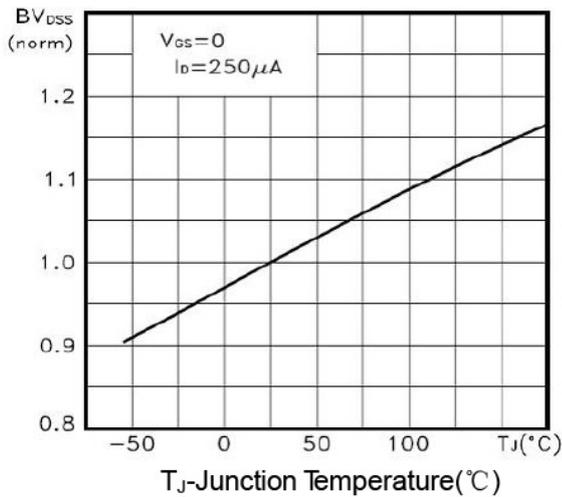


Figure10. V<sub>GS(th)</sub> vs Junction Temperature

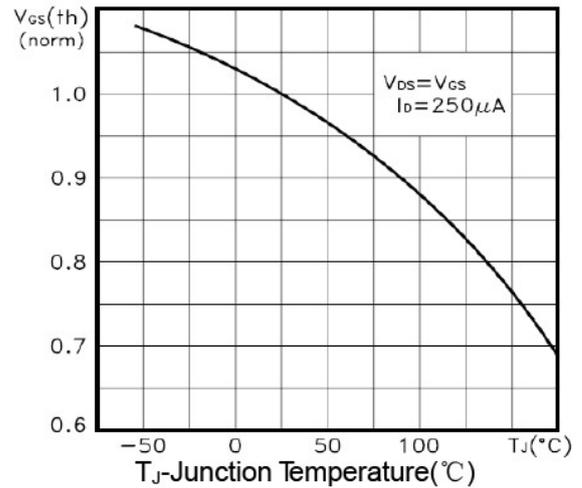
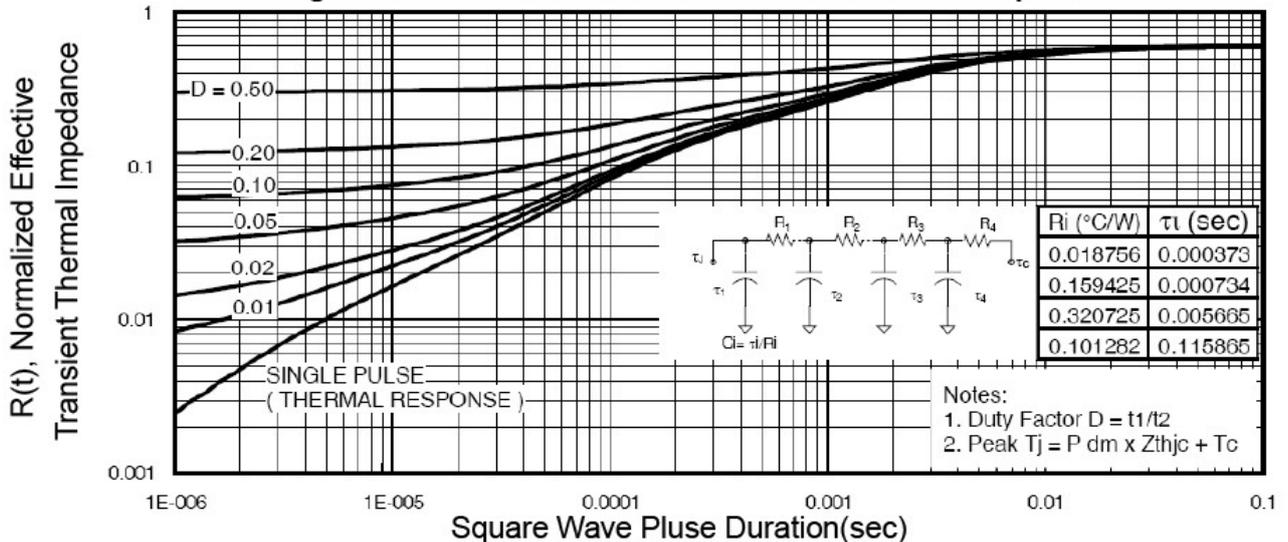


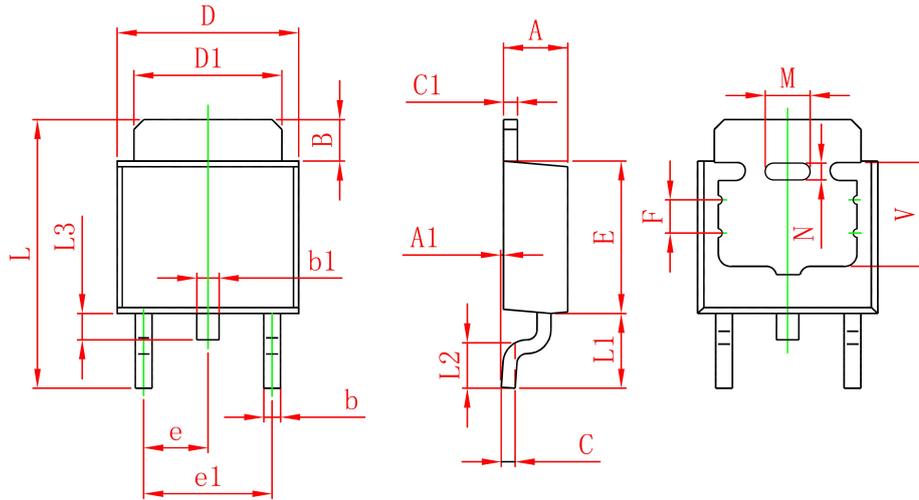
Figure11. Normalized Maximum Transient Thermal Impedance



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## ● 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	