

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

### ● FEATURES

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

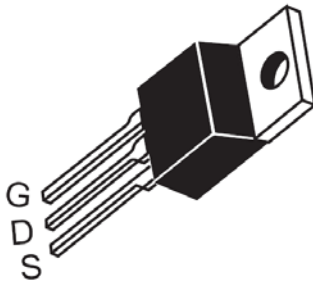
high density cell design for extremely low  $R_{DS(ON)}$

Exceptional on-resistance and maximum DC current capability

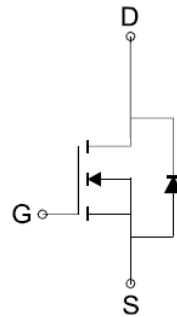
### ● GENERAL DESCRIPTION

The FS10N12 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



TO220



N-Channel MOSFET

### ● Absolute Maximum Ratings ( $T_A=25^\circ C$ Unless Otherwise Noted)

Parameter	Symbol	Limit	Units
Drain-Source Voltage	VDS	100	V
Gate-Source Voltage	VGS	$\pm 25$	V
Drain Current-Continuous	ID	118	A
Drain Current-Pulsed a	IDM	472	A
Maximum Power Dissipation @ $T_C = 25^\circ C$ -Derate above $25^\circ C$	PD	230	W
		1.54	W/ $^\circ C$
Single Pulsed Avalanche Energy <sup>d</sup>	EAS	960	mJ
Operating and Store Temperature Range	TJ, Tstg	-55 to 175	C

### Thermal Characteristics

Parameter	Symbol	Limit	Units
Thermal Resistance, Junction-to-Case	RqJC	1.9	$^\circ C/W$
Thermal Resistance, Junction-to-Ambient	RqJA	62.5	$^\circ C/W$

# FS10N12

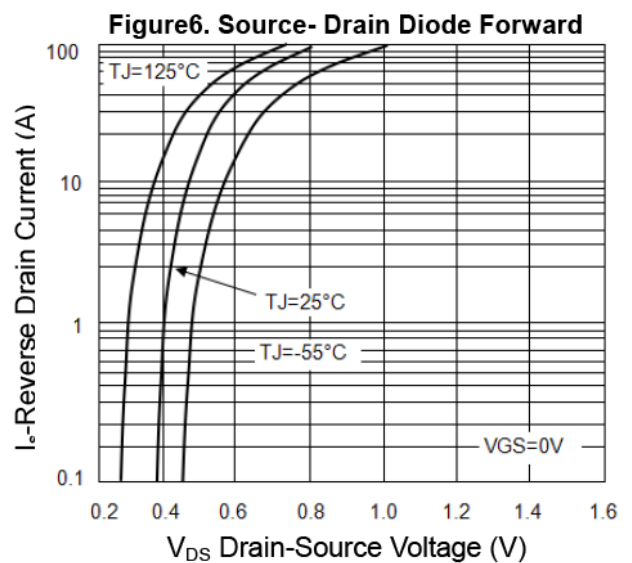
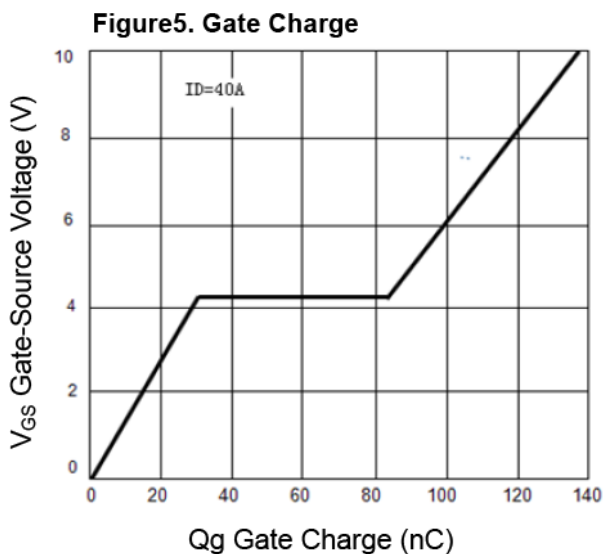
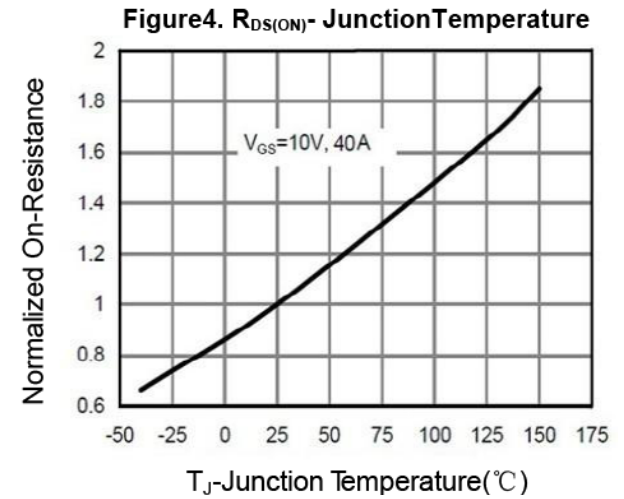
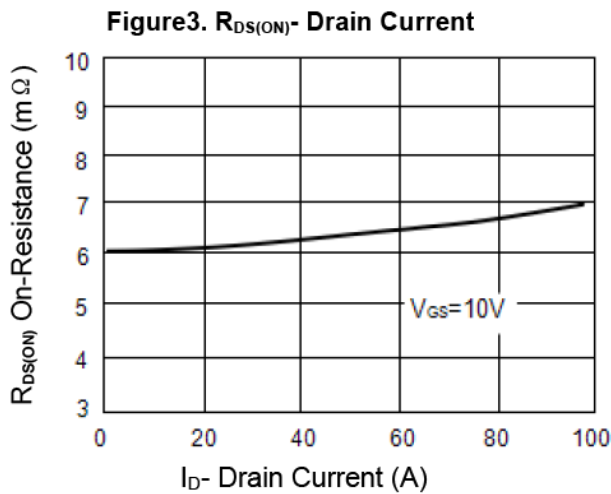
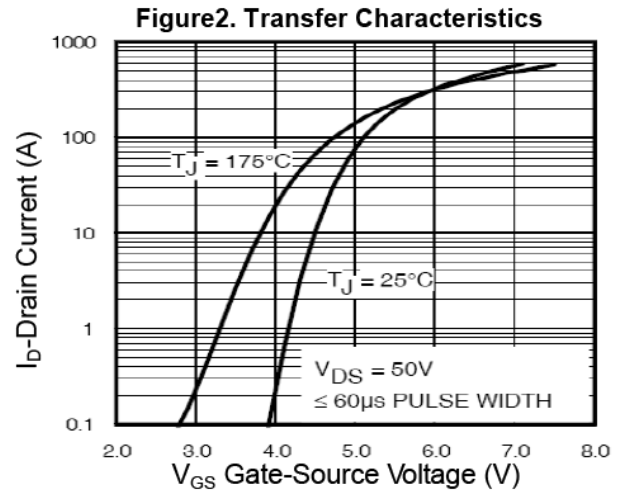
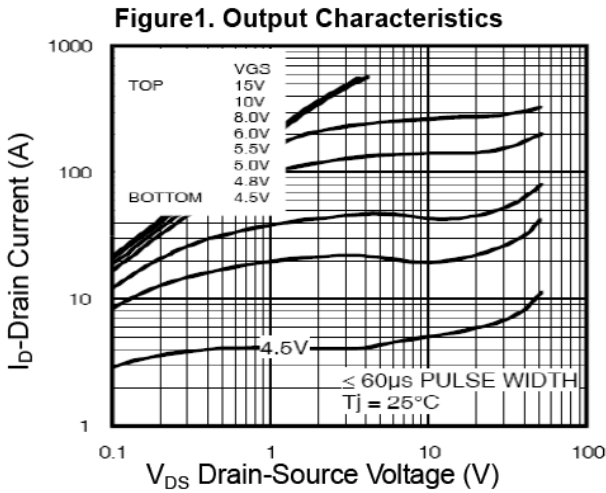
## ● Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

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	2		4	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= 50A		6.2	7.5	mΩ
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		139		nC
Qgs	Gate-Source Charge			30		
Qgd	Gate-Drain Charge			52		
Ciss	Input capacitance	VDS=25V, VGS=0V, f=1.0MHz		6700		pF
Coss	Output Capacitance			550		
Crss	Reverse Transfer Capacitance			98		
<b>SwitchingTimes</b>						
td(on)	Turn-on Delay Time	VDD=65V, ID=40A, RL=15Ω VGS=10V, RG=2.5Ω		25		nS
tr	Turn-on Rise Time			29		nS
td(off)	Turn-Off Delay Time			53		nS
tf	Turn-Off Fall Time			63		nS
<b>Source-DrainDiodeCharacteristics</b>						
ISD	Source-Drain Current(Body Diode)			118		A
ISDM	Pulsed Source-Drain Current(Body Diode)			472		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		95		nS
Qrr	Reverse Recovery Charge(Note 1)			189		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>

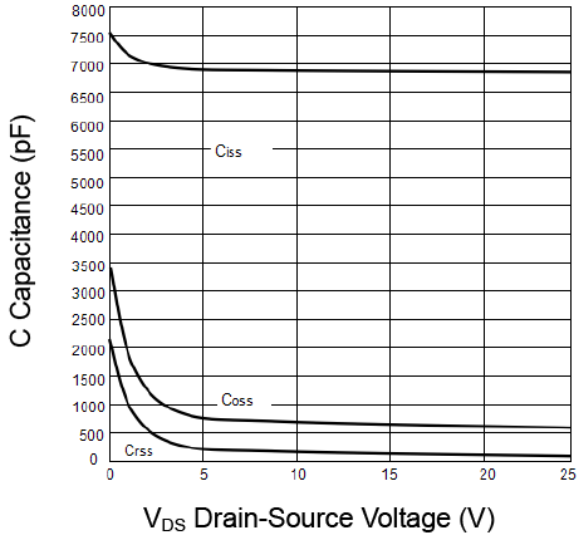


Figure8. Safe Operation Area

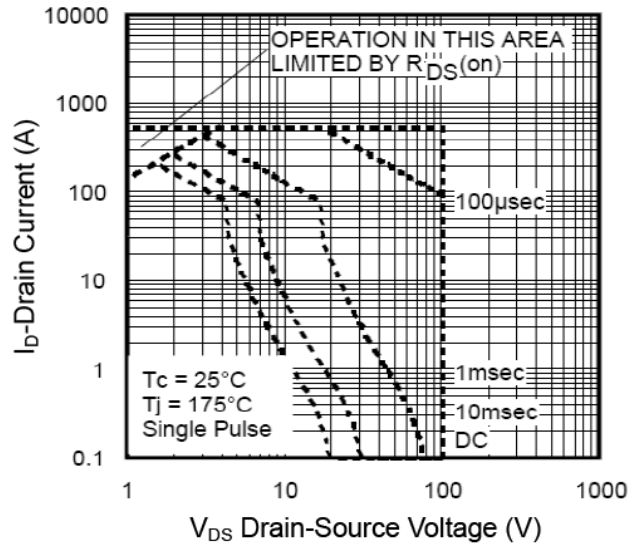


Figure9. BV<sub>DSS</sub> vs Junction Temperature

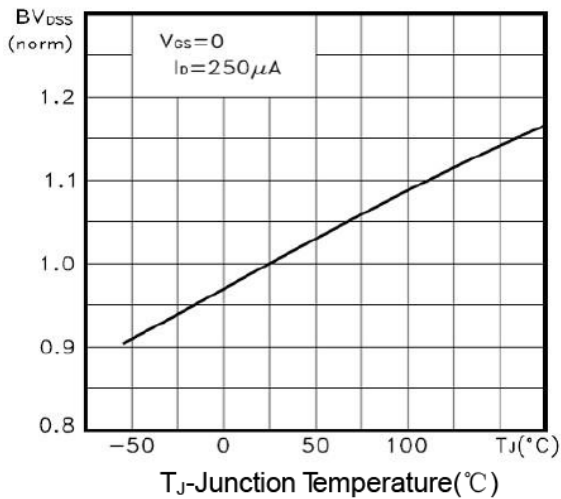


Figure10. V<sub>GS(th)</sub> vs Junction Temperature

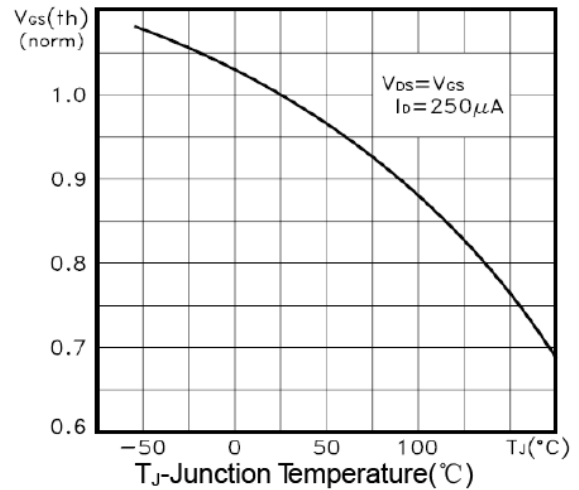
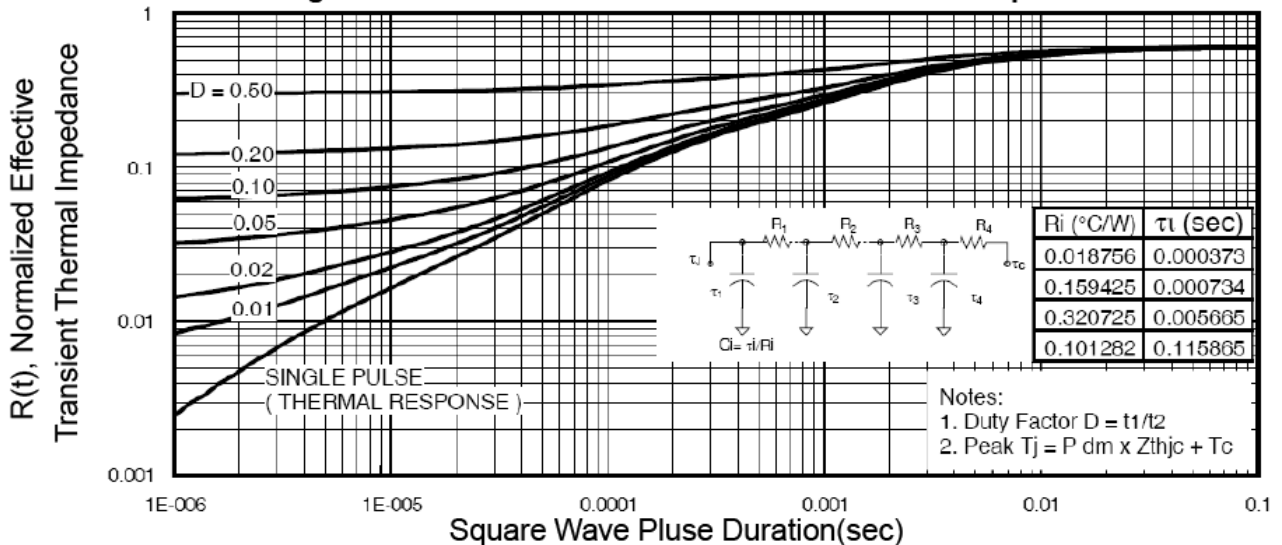


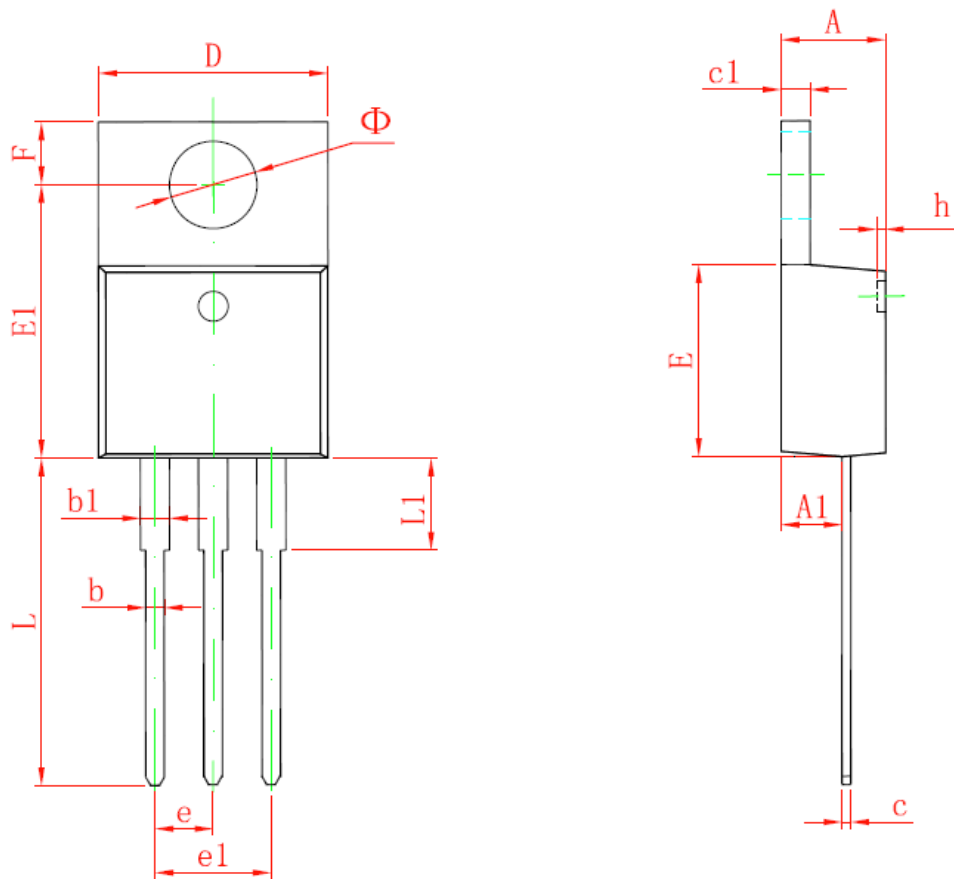
Figure11. Normalized Maximum Transient Thermal Impedance



# FS10N12

- PACKAGE

TO220



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
E1	12.060	12.460	0.475	0.491
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
h	0.000	0.300	0.000	0.012
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
Φ	3.735	3.935	0.147	0.155