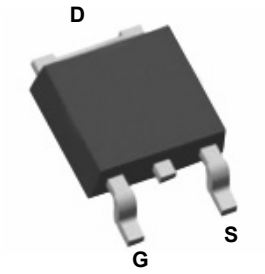
GOOD-ARK
SEMICONDUCTOR

SSFD20N24

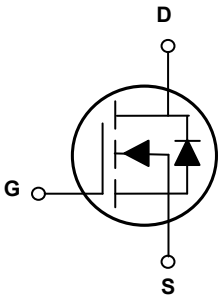
200V N-Channel MOSFET

Main Product Characteristics

V_{DS}	200V
$R_{DS(ON)}$	80mΩ (Max.) @V_{GS}=10V
I_D	24A



TO-252 (DPAK)



Schematic Diagram

Features and Benefits

- Advanced MOSFET process technology
- Ideal for high efficiency switched mode power supplies
- Low on-resistance with low gate charge
- Fast switching and reverse body recovery

Description

The SSFD20N24 utilizes the latest techniques to achieve high cell density and low on-resistance. These features make this device extremely efficient and reliable for use in high efficiency switch mode power supply and a wide variety of other applications.

Absolute Maximum Ratings (T_C=25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	200	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	24	A
Drain Current-Continuous (Tc=100°C)	$I_{D\ (100°C)}$	17	A
Pulsed Drain Current	I_{DM}	100	A
Maximum Power Dissipation	P_D	150	W
Single Pulse Avalanche Energy [4]	E_{AS}	250	mJ
Operating Junction Temperature Range	T_J	-55 to +175	°C
Storage Temperature Range	T_{STG}	-55 to +175	°C
Thermal Resistance, Junction-to-Case [1]	$R_{\theta JC}$	1	°C /W

Electrical Characteristics (T_C=25°C unless otherwise specified)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	200	220	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=200V, V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
On Characteristics [2]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1.0	1.5	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=15A	-	62	80	mΩ
Forward Transconductance	g_{FS}	V_{DS}=10V, I_D=15A	30	-	-	S
Dynamic Characteristics [3]						
Input Capacitance	C_{lss}	V_{DS}=25V, V_{GS}=0V, F=1.0MHz	-	4200	-	PF
Output Capacitance	C_{oss}		-	163	-	PF
Reverse Transfer Capacitance	C_{rss}		-	75	-	PF
Switching Characteristics [3]						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=100V, I_D=15A, V_{GS}=10V, R_{GEN}=2.5Ω	-	10	-	nS
Turn-on Rise Time	t_r		-	18	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	22	-	nS
Turn-Off Fall Time	t_f		-	5	-	nS
Total Gate Charge	Q_g	V_{DS}=100V, I_D=15A, V_{GS}=10V	-	60	-	nC
Gate-Source Charge	Q_{gs}		-	19	-	nC
Gate-Drain Charge	Q_{gd}		-	17	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage [2]	V_{SD}	V_{GS}=0V, I_S=15A	-	-	1.2	V
Diode Forward Current [1]	I_S		-	-	24	A
Reverse Recovery Time	t_{rr}	T_J = 25°C, I_F = 15A di/dt = 100A/μS [2]	-	90	-	nS
Reverse Recovery Charge	Q_{rr}		-	300	-	nC

Notes:

1. Surface Mounted on FR4 Board, t ≤ 10 sec.
2. Pulse Test: Pulse Width ≤ 300μS, Duty Cycle ≤ 2%.
3. Essentially independent of operating temperature.
4. E_{AS} Condition: T_J=25°C, V_{DD}=50V, V_G=10V, L=0.5mH, R_g=25Ω

Test Circuits

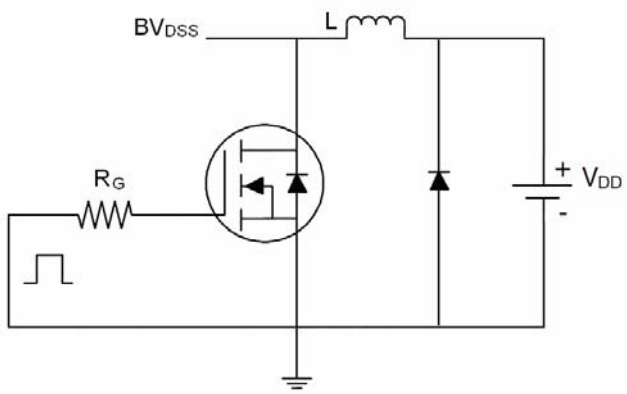


Fig.1 E_{AS} Test Circuit

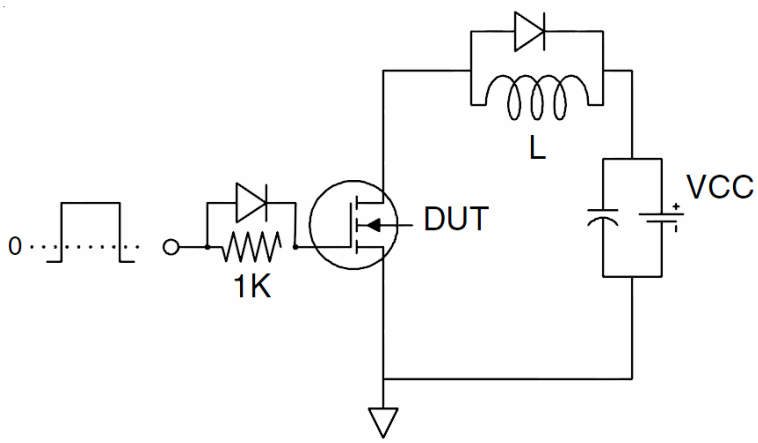


Fig.2 Gate Charge Test Circuit

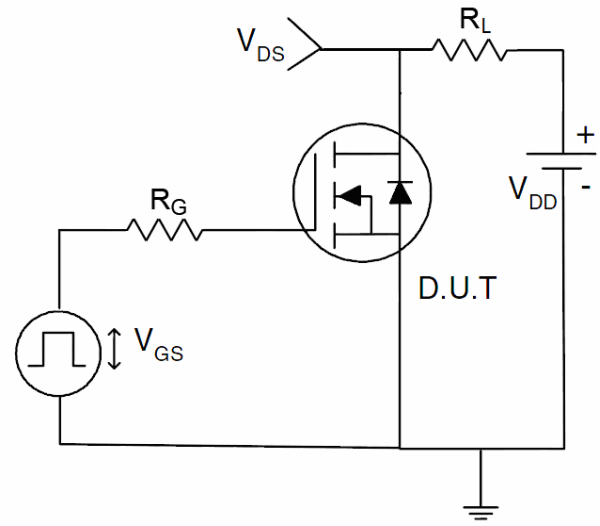


Fig.3 Switch Time Test Circuit

Typical Electrical and Thermal Characteristic Curves

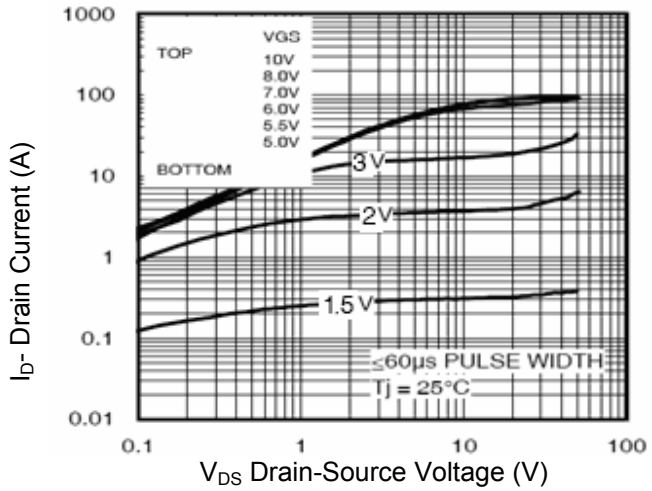


Fig.4 Output Characteristics

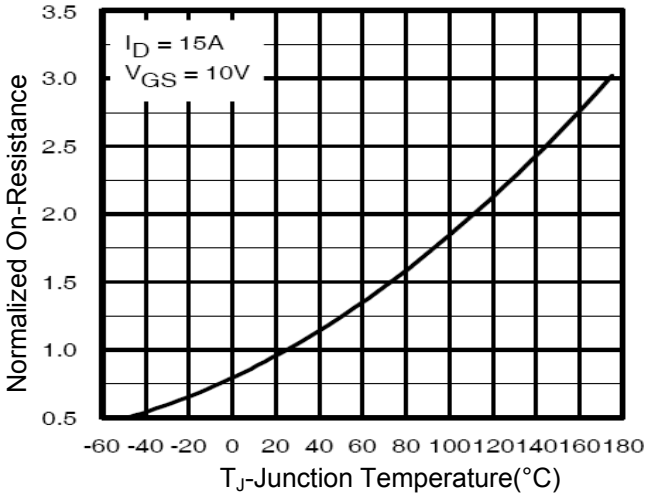


Fig.5 $R_{DS(ON)}$-Junction Temperature

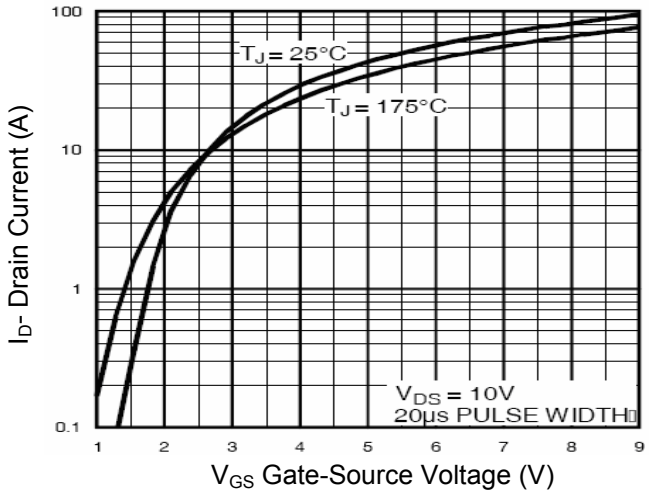


Fig.6 Transfer Characteristics

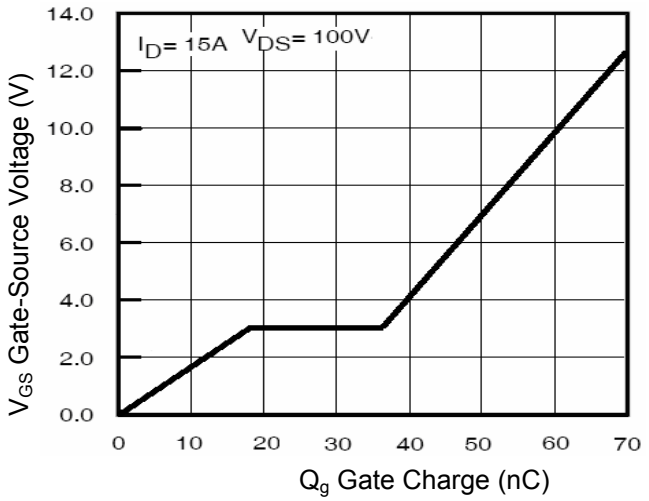


Fig.7 Gate Charge

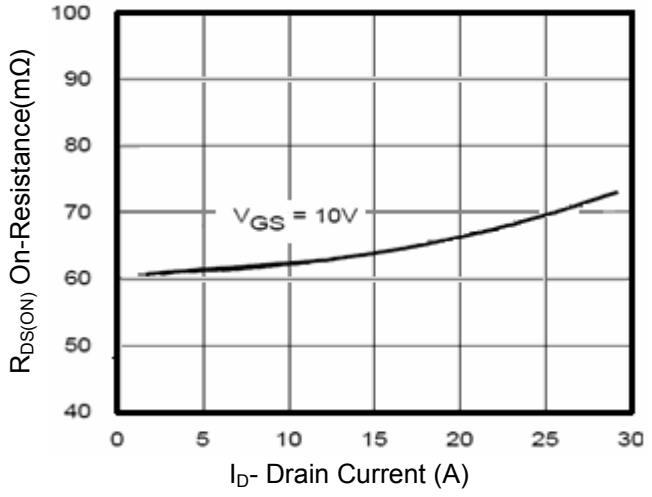


Fig.8 $R_{DS(ON)}$- Drain Current

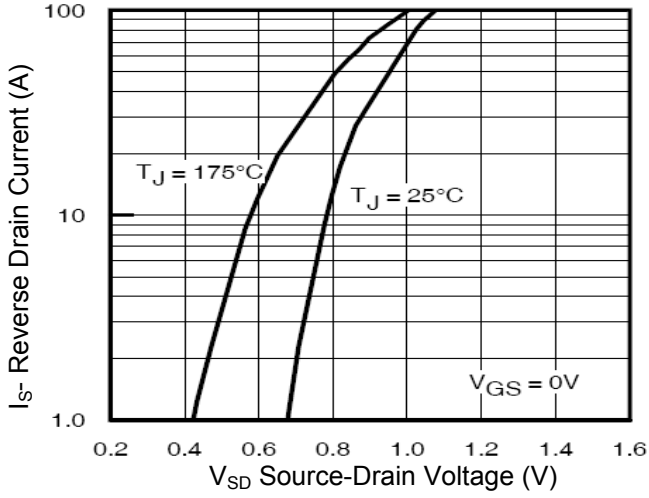


Fig.9 Source- Drain Diode Forward

Typical Electrical and Thermal Characteristic Curves

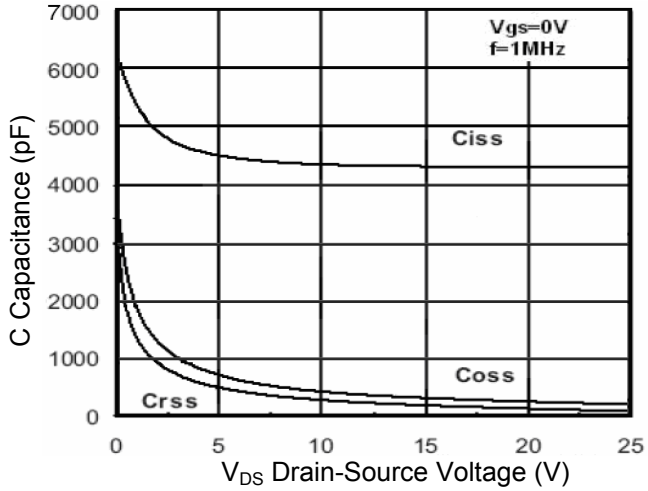


Fig.10 Capacitance vs V_{DS}

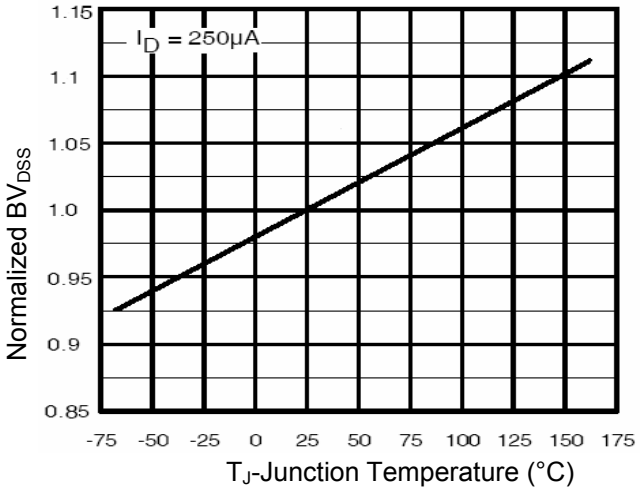


Fig.11 BV_{DSS} vs Junction Temperature

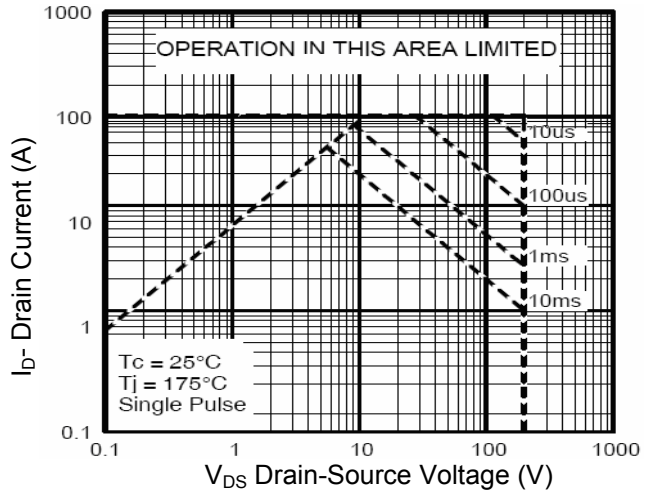


Fig.12 Safe Operation Area

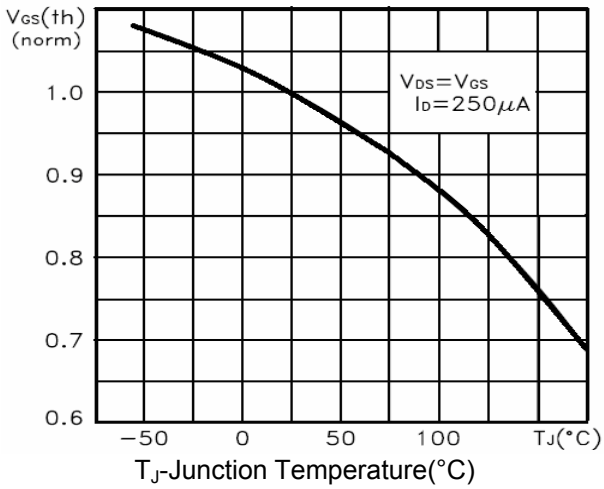


Fig.13 $V_{GS(th)}$ vs Junction Temperature

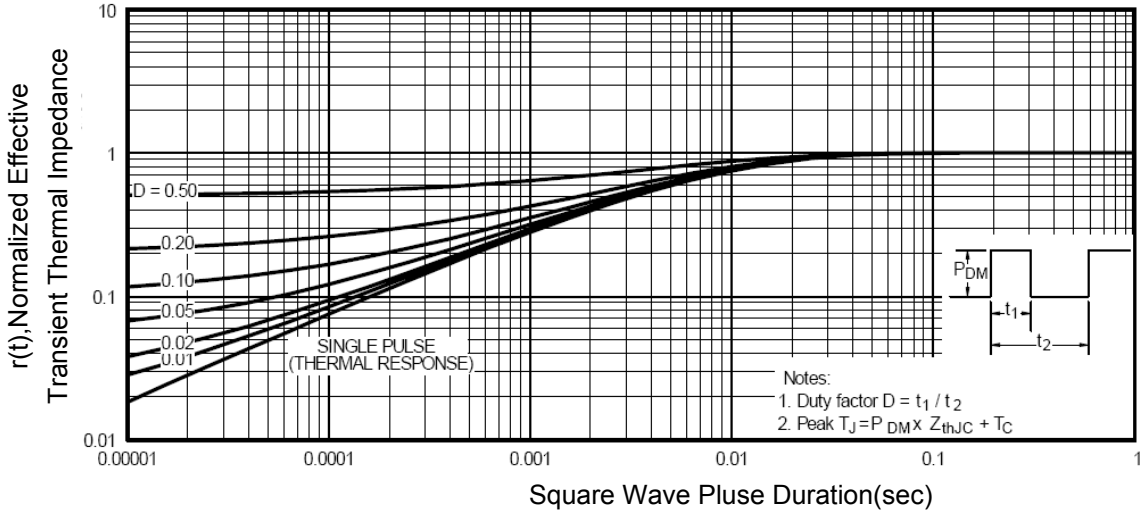
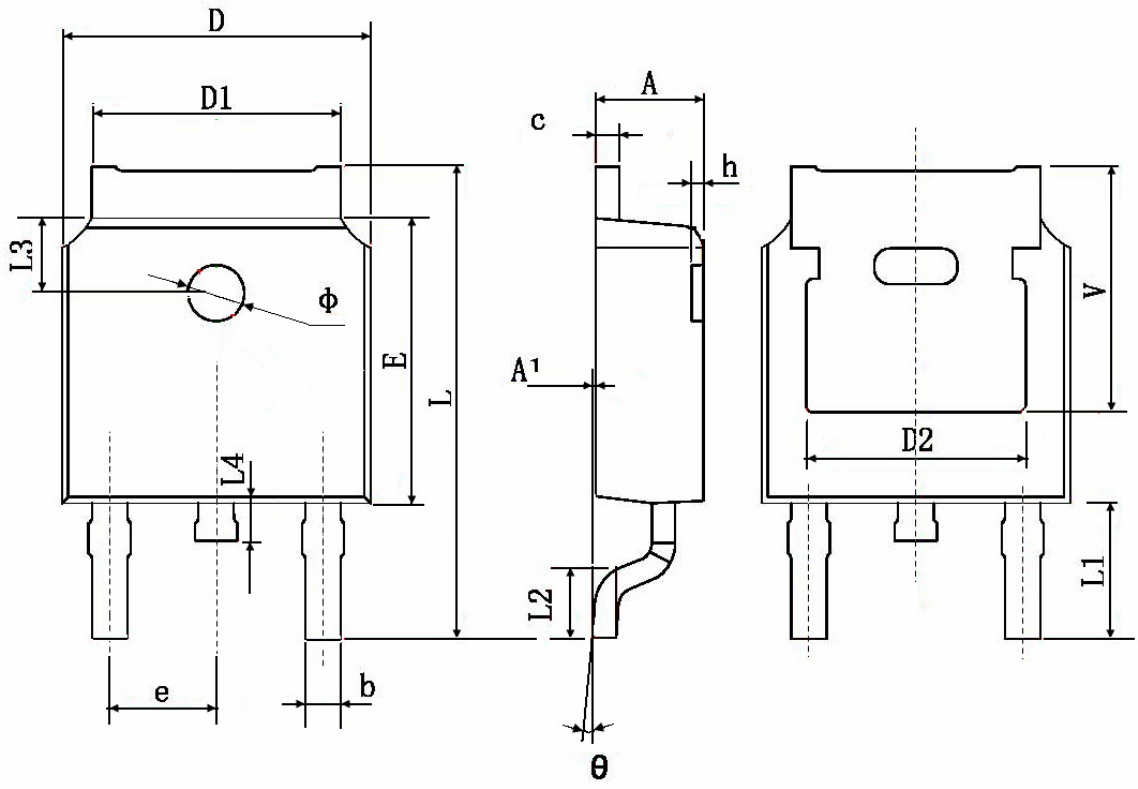


Fig.14 Normalized Maximum Transient Thermal Impedance

Package Outline Dimensions

TO-252(DPAK)



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	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	