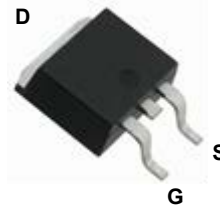
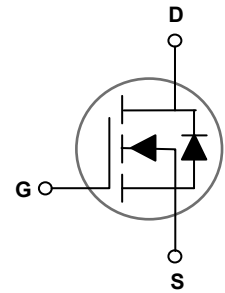


Main Product Characteristics

$V_{(BR)DSS}$	100V
$R_{DS(ON)}$	9.2mΩ
I_D	60A



TO-252



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 SSFD0976 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 ($T_C=25^{\circ}C$ unless otherwise specified)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	+20 / -12	V
Drain Current – Continuous ($T_C=25^{\circ}C$)	I_D	60	A
Drain Current – Continuous ($T_C=100^{\circ}C$)		38	A
Drain Current – Pulsed ¹	I_{DM}	240	A
Single Pulse Avalanche Energy ²	E_{AS}	211	mJ
Single Pulse Avalanche Current ²	I_{AS}	65	A
Power Dissipation ($T_C=25^{\circ}C$)	P_D	94	W
Power Dissipation – Derate above 25°C		0.75	W/°C
Storage Temperature Range	T_{STG}	-50 to +150	°C
Operating Junction Temperature Range	T_J	-50 to +150	°C

Thermal Characteristics

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	---	62	°C/W
Thermal Resistance Junction to Case	$R_{\theta JC}$	---	1.33	°C/W

Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	100	---	---	V
BV_{DSS} Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^\circ\text{C}, I_D=1\text{mA}$	---	0.054	---	$V/^\circ\text{C}$
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=100V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=80V, V_{GS}=0V, T_J=125^\circ\text{C}$	---	---	10	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=+20V, V_{DS}=0V$	---	---	100	nA
On Characteristics						
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=15A$	---	7.4	9.2	m Ω
		$V_{GS}=4.5V, I_D=8A$	---	10.6	14	m Ω
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1	1.6	2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		---	-5.5	---	$\text{mV}/^\circ\text{C}$
Forward Transconductance	g_{fs}	$V_{DS}=10V, I_D=3A$	---	11	---	S
Dynamic and Switching Characteristics						
Total Gate Charge ^{3, 4}	Q_g	$V_{DS}=50V, V_{GS}=10V, I_D=8.5A$	---	37.8	76	nC
Gate-Source Charge ^{3, 4}	Q_{gs}		---	7.8	16	
Gate-Drain Charge ^{3, 4}	Q_{gd}		---	8.4	17	
Turn-On Delay Time ^{3, 4}	$T_{d(on)}$	$V_{DD}=50V, V_{GS}=10V, R_G=6\Omega, I_D=1A$	---	14.6	30	nS
Rise Time ^{3, 4}	T_r		---	21.5	44	
Turn-Off Delay Time ^{3, 4}	$T_{d(off)}$		---	54	108	
Fall Time ^{3, 4}	T_f		---	84.3	168	
Input Capacitance	C_{iss}	$V_{DS}=50V, V_{GS}=0V, F=1\text{MHz}$	---	2250	4500	pF
Output Capacitance	C_{oss}		---	410	820	
Reverse Transfer Capacitance	C_{rss}		---	25	50	
Gate Resistance	R_g	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	---	1.43	---	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_S	$V_G=V_D=0V, \text{Force Current}$	---	---	60	A
Pulsed Source Current	I_{SM}		---	---	120	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	1	V
Reverse Recovery Time	t_{rr}	$V_{GS}=0V, I_S=15A, di/dt=100A/\mu s, T_J=25^\circ\text{C}$	---	42.4	---	nS
Reverse Recovery Charge	Q_{rr}		---	46.5	---	nC

Note:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. $V_{DD}=50V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=65A, R_G=25\Omega, \text{Starting } T_J=25^\circ\text{C}$.
3. The data tested by pulsed, pulse width $\leq 300\ \mu s$, duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

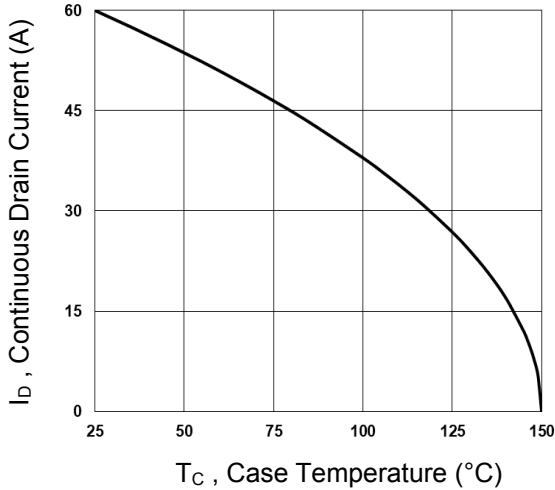


Fig.1 Continuous Drain Current vs. T_C

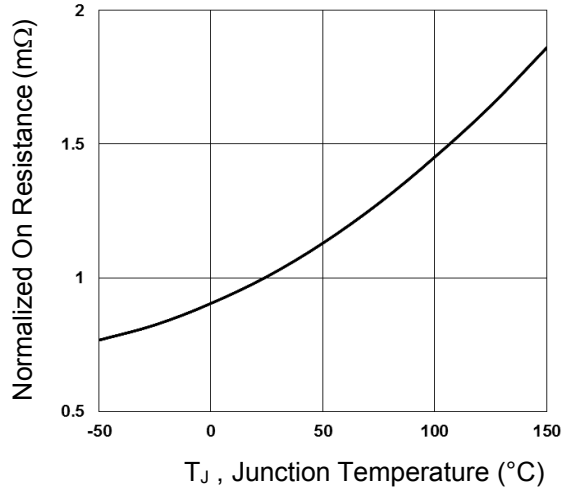


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

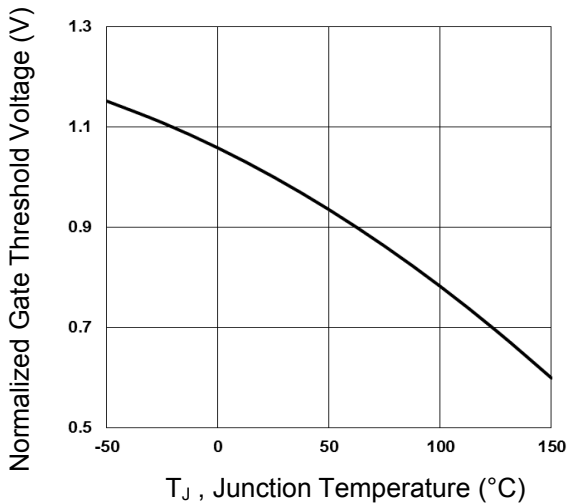


Fig.3 Normalized V_{th} vs. T_J

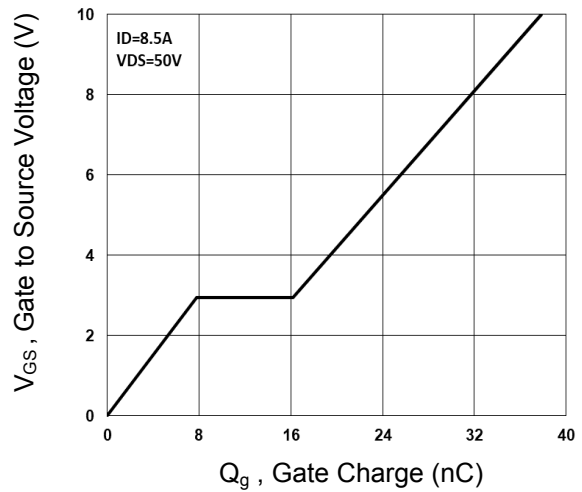


Fig.4 Gate Charge Characteristics

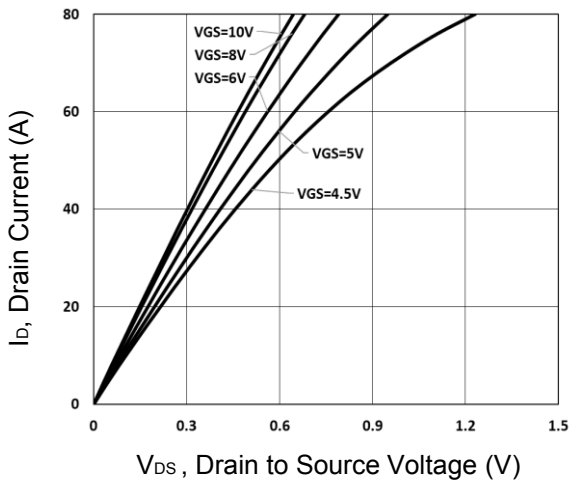


Fig.5 Typical Output Characteristics

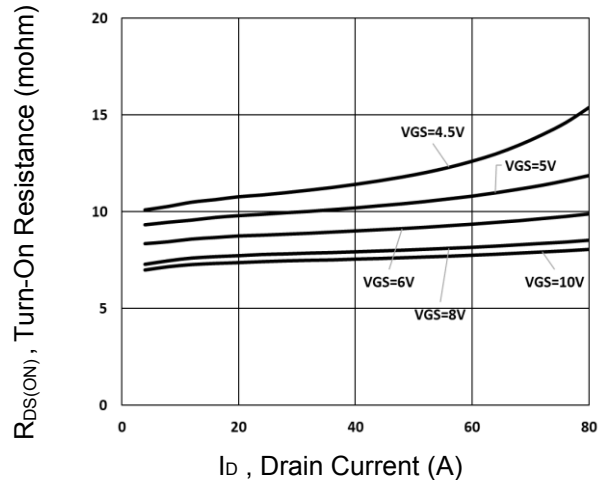
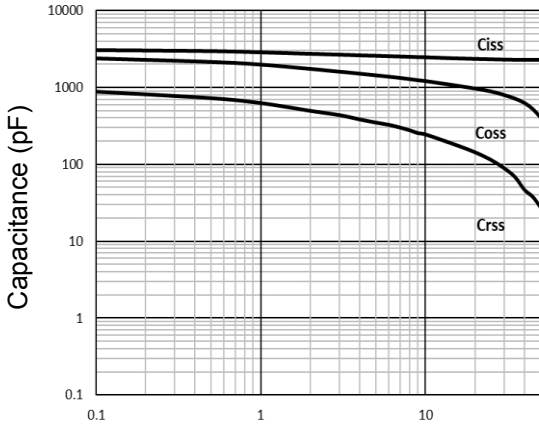


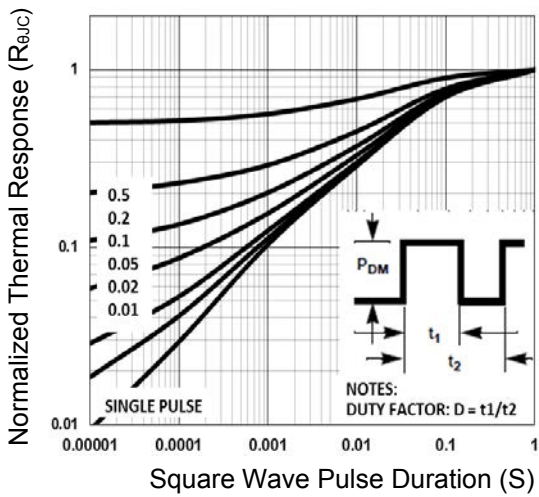
Fig.6 Turn-On Resistance vs. I_D

Typical Electrical and Thermal Characteristic Curves



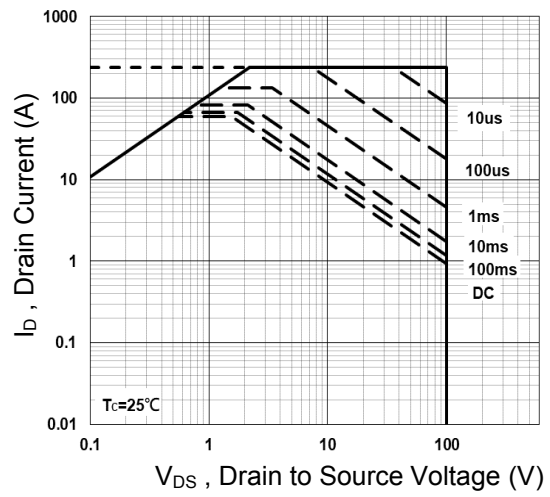
V_{DS} , Drain to Source Voltage (V)

Fig.7 Capacitance Characteristics



Square Wave Pulse Duration (S)

Fig.8 Normalized Transient Impedance



V_{DS} , Drain to Source Voltage (V)

Fig.9 Maximum Safe Operation Area

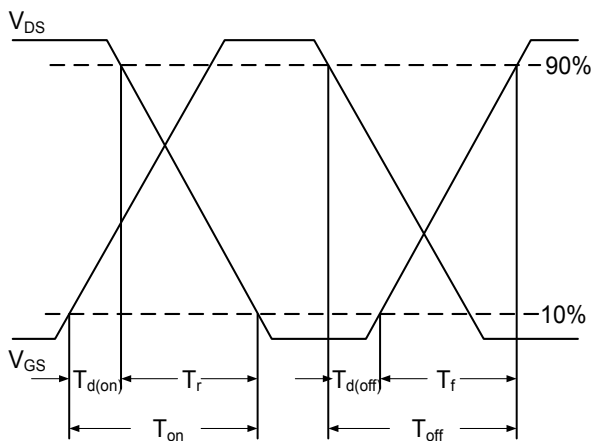


Fig.10 Switching Time Waveform

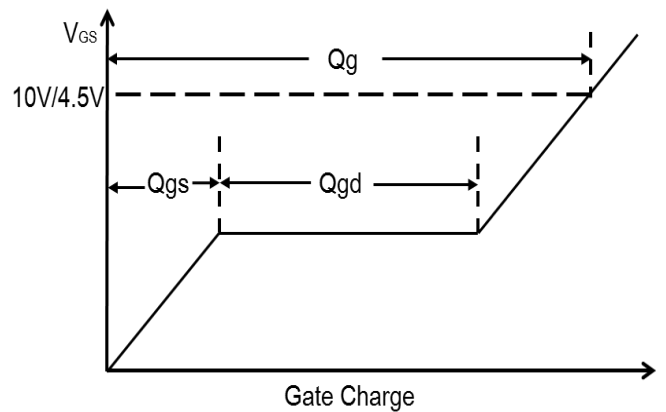
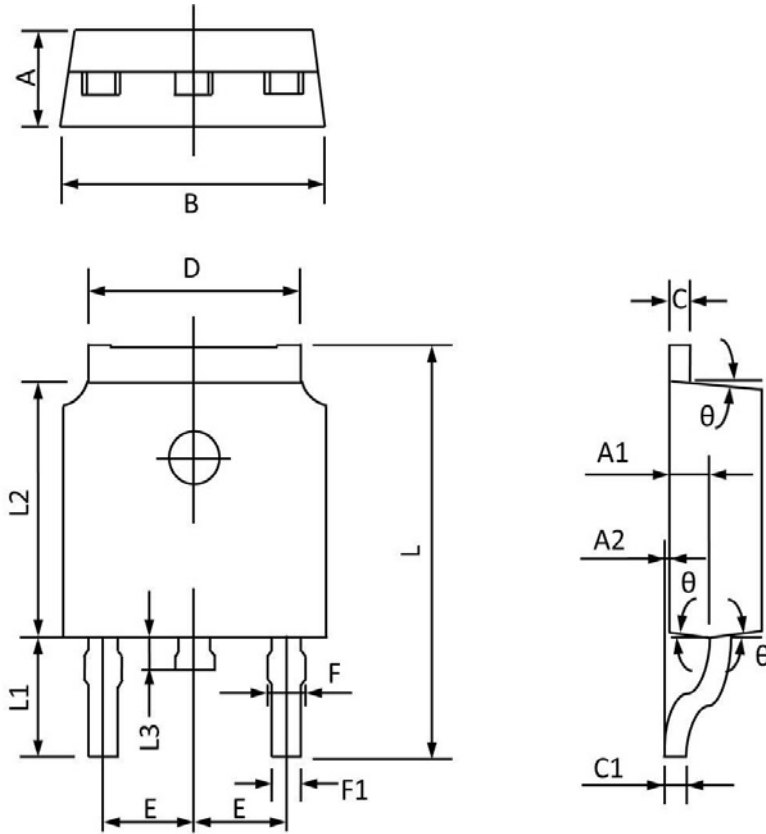


Fig.11 Gate Charge Waveform

Package Outline Dimensions

TO-252 (DPAK)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	2.400	2.200	0.094	0.087
A1	1.110	0.910	0.044	0.036
A2	0.150	0.000	0.006	0.000
B	6.800	6.400	0.268	0.252
C	0.580	0.450	0.023	0.018
C1	0.580	0.460	0.023	0.018
D	5.500	5.100	0.217	0.201
E	2.386	2.186	0.094	0.086
F	0.940	0.600	0.037	0.024
F1	0.860	0.500	0.034	0.020
L	10.400	9.400	0.409	0.370
L1	3.000	2.400	0.118	0.094
L2	6.200	5.400	0.244	0.213
L3	1.200	0.600	0.047	0.024
θ	9°	3°	9°	3°