SEMICONDUCTOR
TECHNICAL DATA

FTK0976D

100V N-Channel MOSFETs

BVDSS	RDSON	ID
100V	9.2mΩ	60A

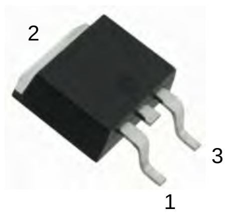
General Description

These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

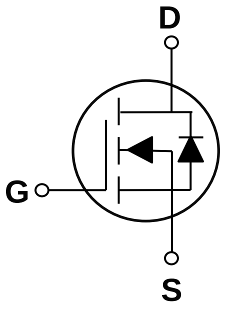
Features

- *100V,60A, RDS(ON) =9.2mΩ@VGS =10V*
- *Improved dv/dt capability*
- *Fast switching*
- *100% EAS Guaranteed*
- *AEC-Q101 qualified*

TO-252 Pin Configuration



1. Gate
2. Drain
3. Source



Applications

- *Networking*
- *Load Switch*
- *LED applications*
- *Quick Charger*

Absolute Maximum Ratings **(Tc=25℃ unless otherwise noted)**

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

Thermal Characteristics

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

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Electrical Characteristics **(T_J=25℃, unless otherwise noted)**

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	100	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.054	---	V/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=100V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=80V , V_{GS}=0V , T_J=125℃	---	---	10	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=+20V , V_{DS}=0V	---	---	100	nA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=15A	---	7.4	9.2	mΩ
		V_{GS}=4.5V , I_D=8A	---	10.6	14	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.0	1.6	2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-5.5	---	mV/℃
gfs	Forward Transconductance	V_{DS}=10V , I_D=3A	---	11	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge^{3,4}	V_{DS}=50V , V_{GS}=10V , I_D=8.5A	---	37.8	76	nC
Q_{gs}	Gate-Source Charge^{3,4}		---	7.8	16	
Q_{gd}	Gate-Drain Charge^{3,4}		---	8.4	17	
$T_{d(on)}$	Turn-On Delay Time^{3,4}	V_{DD}=50V , V_{GS}=10V , R_G=6Ω I_D=1A	---	14.6	30	ns
T_r	Rise Time^{3,4}		---	21.5	44	
$T_{d(off)}$	Turn-Off Delay Time^{3,4}		---	54	108	
T_f	Fall Time^{3,4}		---	84.3	168	
C_{iss}	Input Capacitance	V_{DS}=50V , V_{GS}=0V , F=1MHz	---	2250	4500	pF
C_{oss}	Output Capacitance		---	410	820	
C_{rss}	Reverse Transfer Capacitance		---	25	50	
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz	---	1.43	---	Ω

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	60	A
I_{SM}	Pulsed Source Current		---	---	120	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1	V
t_{rr}	Reverse Recovery Time	V_{GS}=0V,I_S=15A , di/dt=100A/µs T_J=25℃	---	42.4	---	nS
Q_{rr}	Reverse Recovery Charge		---	46.5	---	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=50V,V_{GS}=10V,L=0.1mH,I_{AS}=65A.,R_G=25Ω , Starting T_J=25℃.
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

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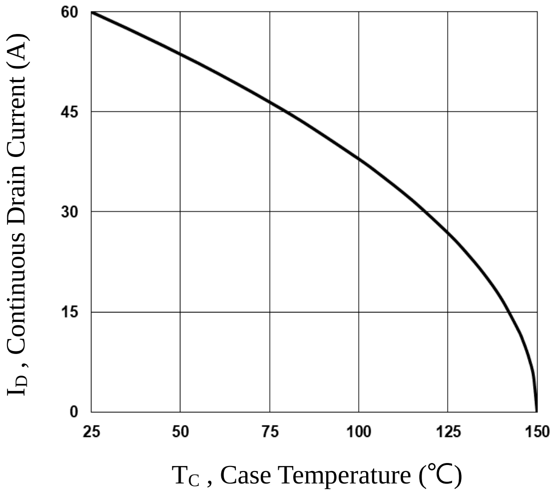

Fig.1 Continuous Drain Current vs. T_C

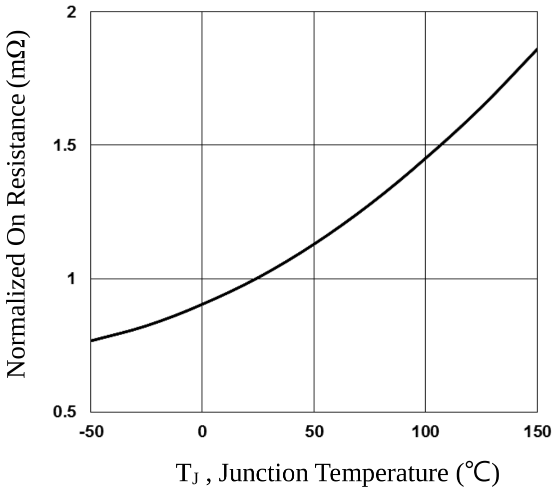

Fig.2 Normalized RDSON vs. T_J

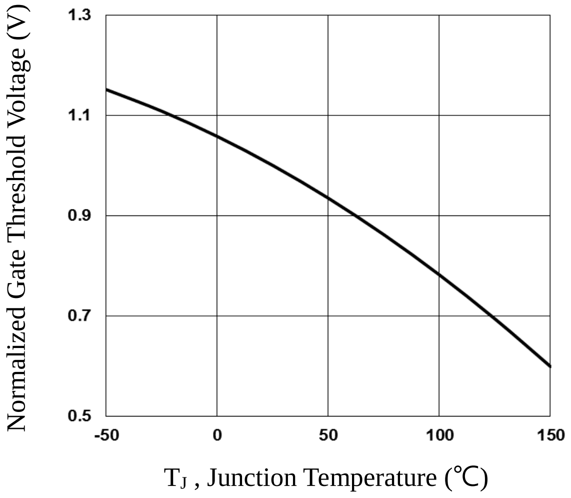

Fig.3 Normalized Vth vs. T_J

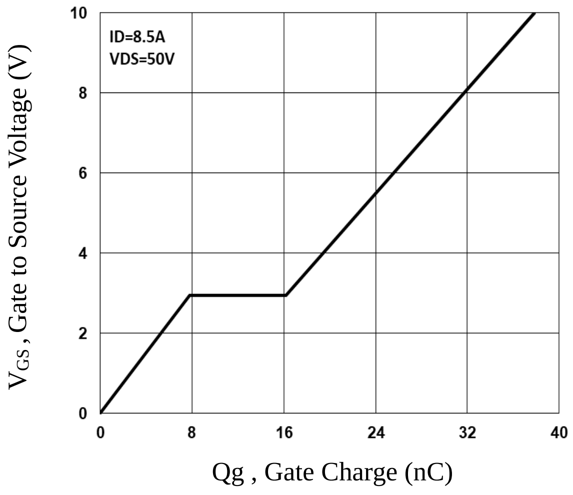

Fig.4 Gate Charge Characteristics

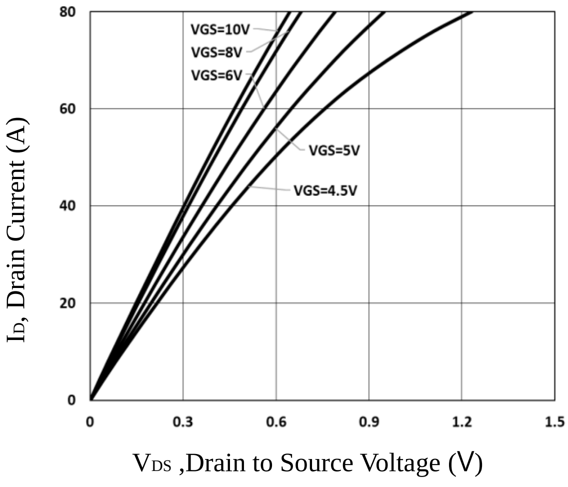

Fig.5 Typical Output Characteristics

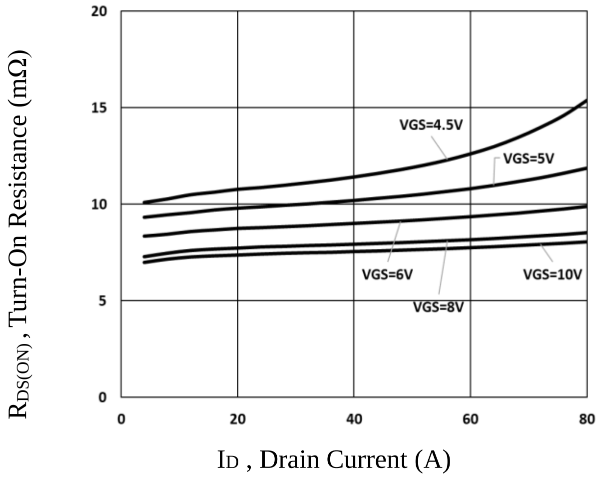

Fig.6 Turn-On Resistance vs. ID

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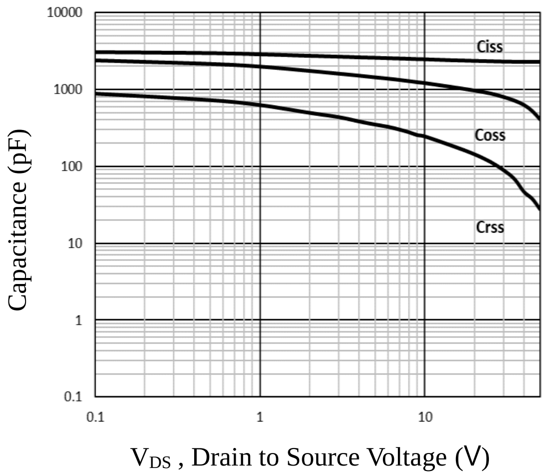

Fig.7 Capacitance Characteristics

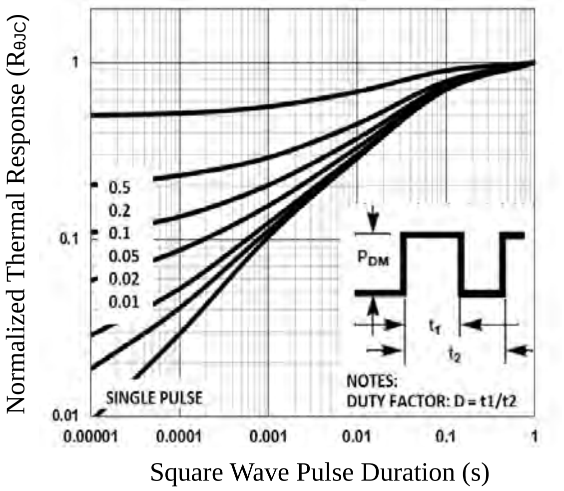

Fig.8 Normalized Transient Impedance

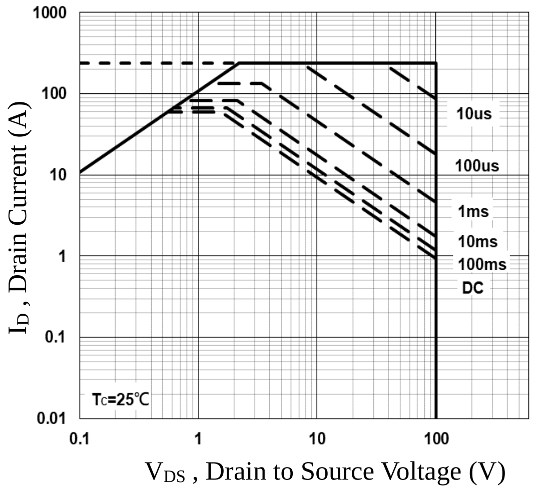

Fig.9 Maximum Safe Operation Area

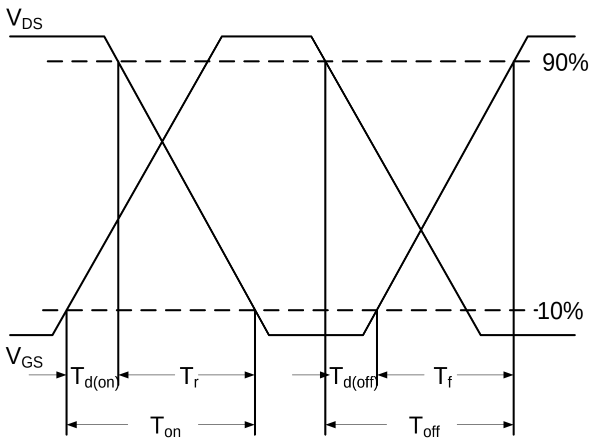

Fig.10 Switching Time Waveform

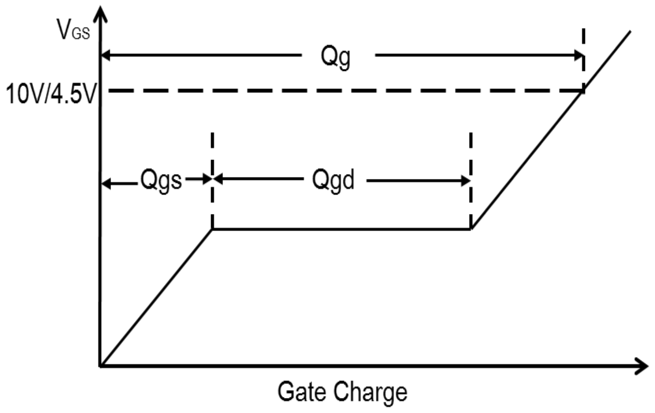

Fig.11 Gate Charge Waveform

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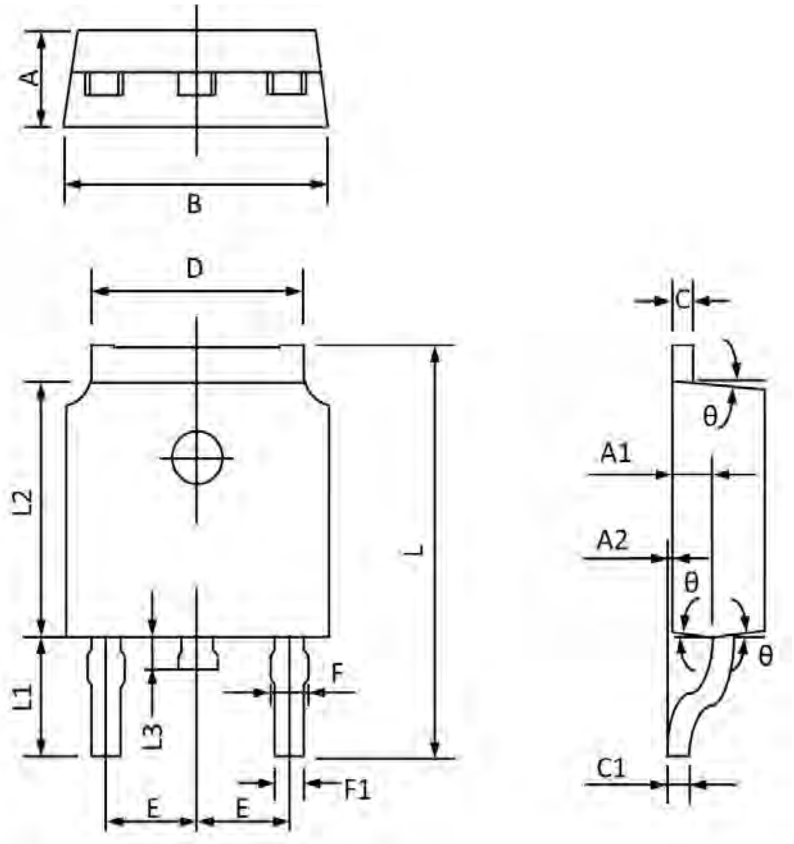
TO-252 PACKAGE INFORMATION



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°