40V N-Channel MOSFETs

General Description

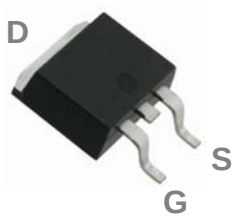
These N- Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on- state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

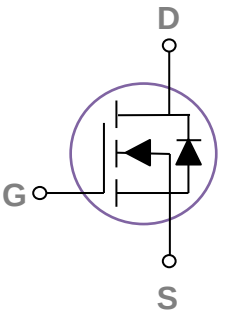
BVDSS	RDSON	ID
40V	2.5mΩ	130A

Features

- 40V,130A, RDS(ON) =2.5mΩ@VGS = 10V
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

TO252 Pin Configuration





Applications

- Networking
- Load Switch
- LED applications
- Quick Charger

Absolute Maximum Ratings T_C=25℃ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain- Source Voltage	40	V
V_{GS}	Gate- Source Voltage	+20/- 12	V
I_D	Drain Current – Continuous (T_C=25℃)	130	A
	Drain Current – Continuous (T_C=100℃)	82	A
I_{DM}	Drain Current – Pulsed[1]	520	A
EAS	Single Pulse Avalanche Energy[2]	320	mJ
IAS	Single Pulse Avalanche Current[2]	80	A
P_D	Power Dissipation (T_C=25℃)	96	W
	Power Dissipation – Derate above 25℃	0.77	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	- - -	1.3	℃/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	40	- - -	- - -	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=40V , V_{GS}=0V , T_J=25℃	- - -	- - -	1	uA
		V_{DS}=32V , V_{GS}=0V , T_J=85℃	- - -	- - -	10	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=20V , V_{DS}=0V	- - -	- - -	100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=20A	- - -	2	2.5	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	2	2.8	4	V
gfs	Forward Transconductance	V_{DS}=10V , I_D=20A	- - -	35	- - -	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge[3,4]	V_{DS}=20V , V_{GS}=10V , I_D=70A	- - -	58.4	88	nC
Q_{gs}	Gate-Source Charge[3,4]		- - -	14.3	21.5	
Q_{gd}	Gate-Drain Charge[3,4]		- - -	12	20	
$T_{d(on)}$	Turn-On Delay Time[3,4]	V_{DD}=20V , V_{GS}=10V , R_G=6Ω I_D=1A	- - -	14.6	30	ns
T_r	Rise Time[3,4]		- - -	21.5	42	
$T_{d(off)}$	Turn-Off Delay Time[3,4]		- - -	52	108	
T_f	Fall Time[3,4]		- - -	83.5	167	
C_{iss}	Input Capacitance	V_{DS}=20V , V_{GS}=0V , F=1MHz	- - -	3310	4965	pF
C_{oss}	Output Capacitance		- - -	1090	1650	
C_{rss}	Reverse Transfer Capacitance		- - -	100	150	

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	- - -	- - -	130	A
I_{SM}	Pulsed Source Current		- - -	- - -	260	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=1A , T_J=25℃	- - -	- - -	1	V
T_{rr}	Reverse Recovery Time	VR=30V, IS=10A , di/dt=100A/μs , TJ=25℃	- - -	38	- - -	ns
Q_{rr}	Reverse Recovery Charge		- - -	90	- - -	nC

Note :
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=80A.,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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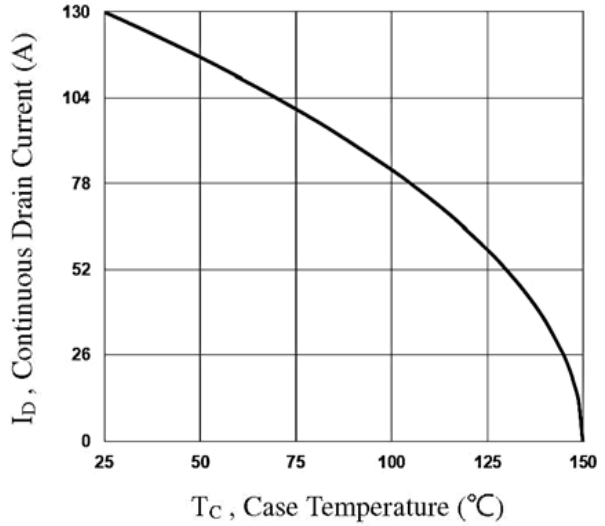

Fig.1 Continuous Drain Current vs. T_C

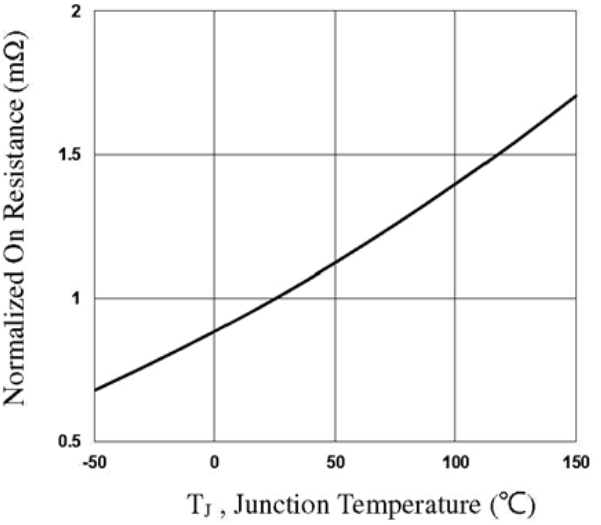

Fig.2 Normalized RDSON vs. T_J

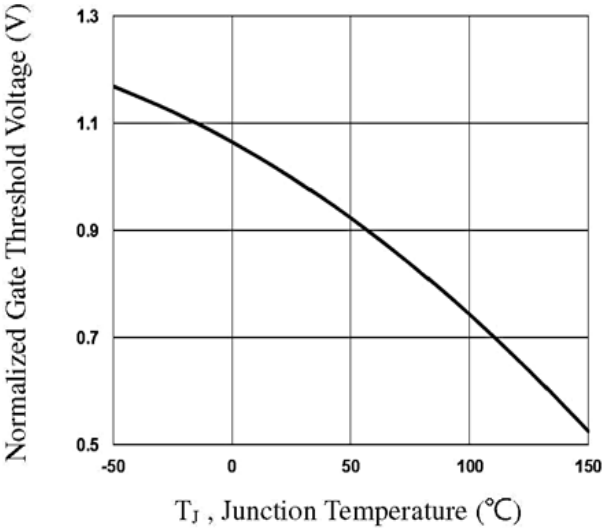

Fig.3 Normalized Vth vs. T_J

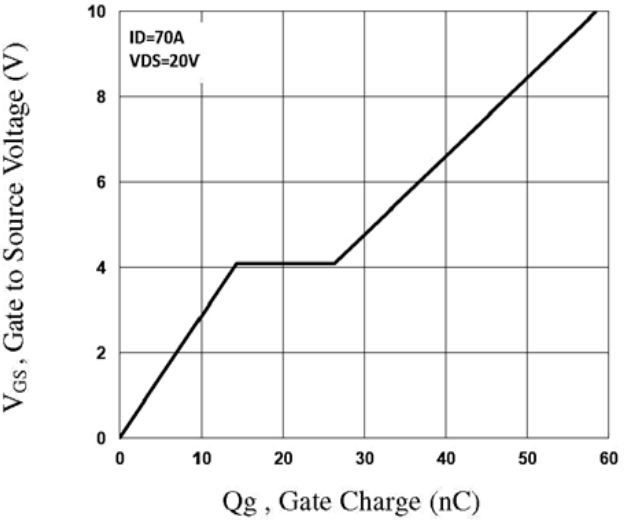

Fig.4 Gate Charge Characteristics

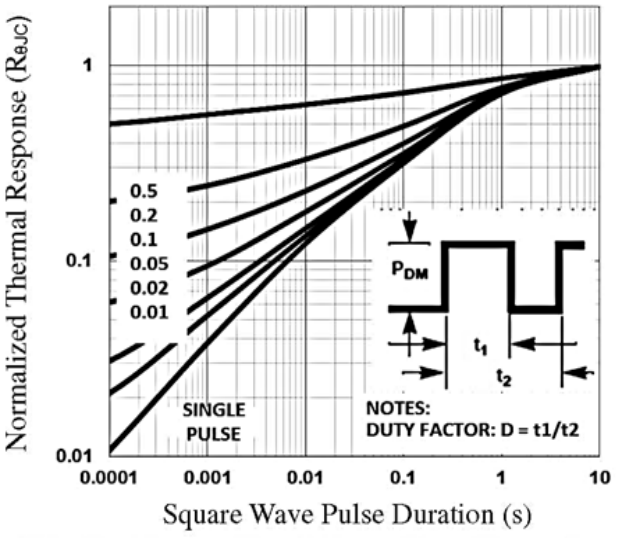

Fig.5 Normalized Transient Impedance

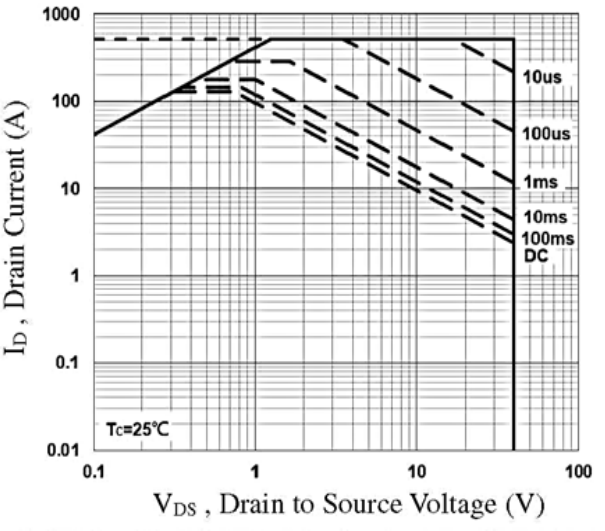

Fig.6 Maximum Safe Operation Area

40V N-Channel MOSFETs

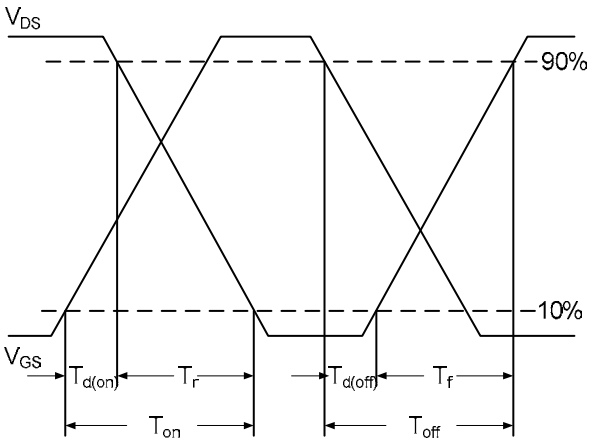

Fig.7 Switching Time Waveform

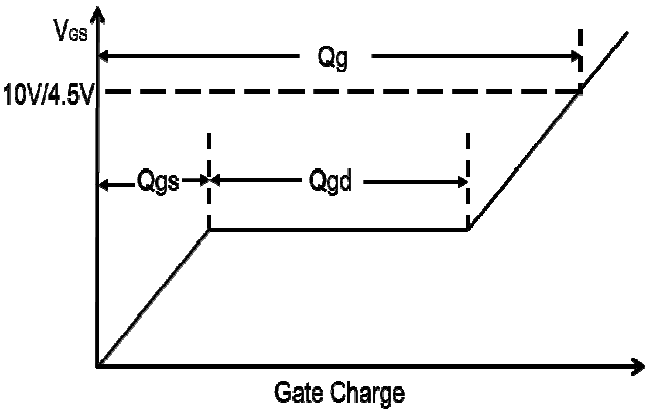

Fig.8 Gate Charge Waveform

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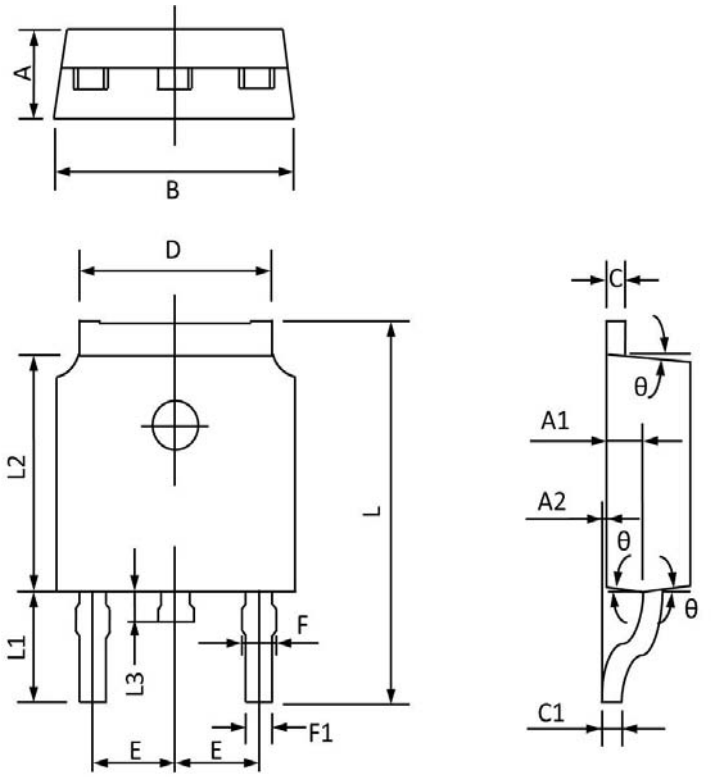
TO252 PACKAGE INFORMATION



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°