

General Description

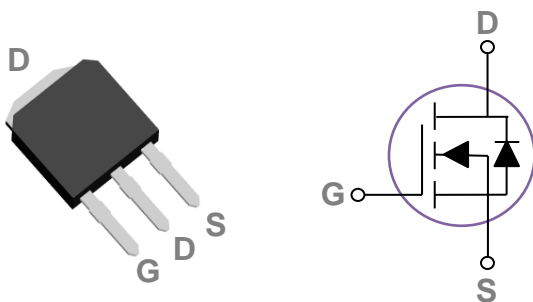
These N-Channel enhancement mode power field effect transistors are using super junction MOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.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

BVDSS	RDSON	ID
700V	1.6Ω	5A

Features

- 700V,5A, $R_{DS(ON)} = 1.6\Omega$ @ $V_{GS} = 10V$
- Improved dv/dt capability
- Fast switching
- Green Device Available

TO251 Pin Configuration



Applications

- PFC Power Supply Stages
- Motor Control
- DC-DC Converters
- Adapter

Absolute Maximum Ratings $T_c=25^\circ C$ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	700	V
V_{GS}	Gate-Source Voltage	± 30	V
I_D	Drain Current – Continuous ($T_c=25^\circ C$)	5	A
	Drain Current – Continuous ($T_c=100^\circ C$)	3.2	A
I_{DM}	Drain Current – Pulsed ¹	20	A
EAS	Single Pulse Avalanche Energy	159	mJ
P_D	Power Dissipation ($T_c=25^\circ C$)	33	W
	Power Dissipation – Derate above $25^\circ C$	0.26	W/ $^\circ C$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	3.8	$^\circ C/W$

Electrical Characteristics (T_J=25 °C, unless otherwise noted)
Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =1mA	700	---	---	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =700V, V _{GS} =0V, T _J =25°C	---	---	1	μA
		V _{DS} =560V, V _{GS} =0V, T _J =100°C	---	---	10	μA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±30V, V _{DS} =0V	---	---	±100	nA

On Characteristics

R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =1A	---	1.3	1.6	Ω
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250μA	2	3	4	V

Dynamic and switching Characteristics

Q _g	Total Gate Charge	V _{DS} =560V, V _{GS} =10V, I _D =5A	---	9	18	nC
Q _{gs}	Gate-Source Charge		---	0.8	3	
Q _{gd}	Gate-Drain Charge		---	5.5	11	
T _{d(on)}	Turn-On Delay Time	V _{DS} =350V, V _{GS} =10V, R _G =25Ω I _D =5A	---	10	20	ns
T _r	Rise Time		---	25	50	
T _{d(off)}	Turn-Off Delay Time		---	25	50	
T _f	Fall Time		---	30	60	
C _{iss}	Input Capacitance	V _{DS} =100V, V _{GS} =0V, F=1MHz	---	220	440	pF
C _{oss}	Output Capacitance		---	18	36	
C _{rss}	Reverse Transfer Capacitance		---	4	8	
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	---	18	---	Ω

Guaranteed Avalanche Energy

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
EAS	Single Pulse Avalanche Energy	V _{DD} =100V, L=79.9mH, I _{AS} =1A	40	---	---	mJ

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	---	---	5	A
I _{SM}	Pulsed Source Current		---	---	10	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =5A, T _J =25°C	---	---	1.4	V
t _{rr}	Reverse Recovery Time	V _R =400V, I _S =3A	---	230	---	ns
Q _{rr}	Reverse Recovery Charge	di/dt=100A/μs, T _J =25°C	---	1.6	---	μC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. Essentially independent of operating temperature.

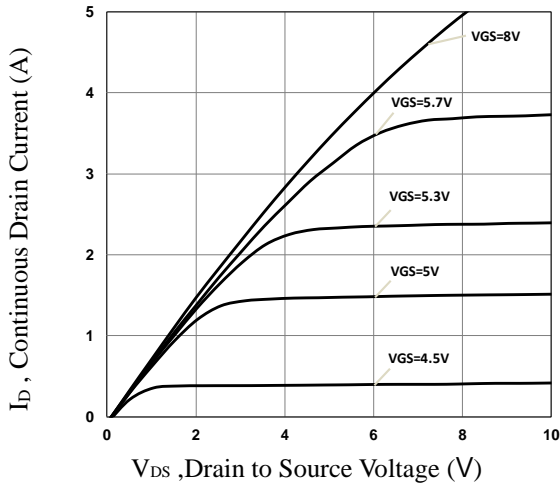


Fig.1 Typical Output Characteristics

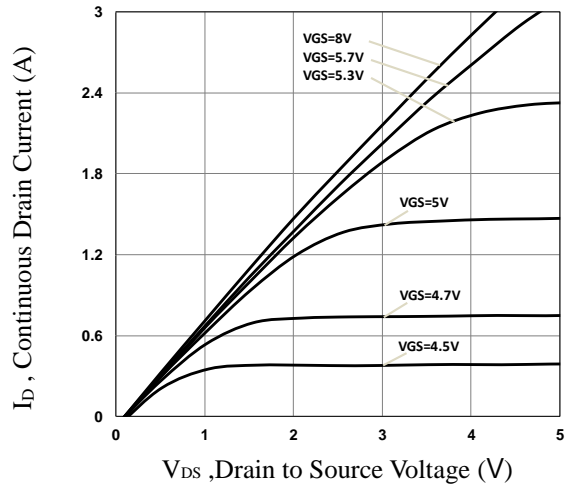


Fig.2 Typical Output Characteristics

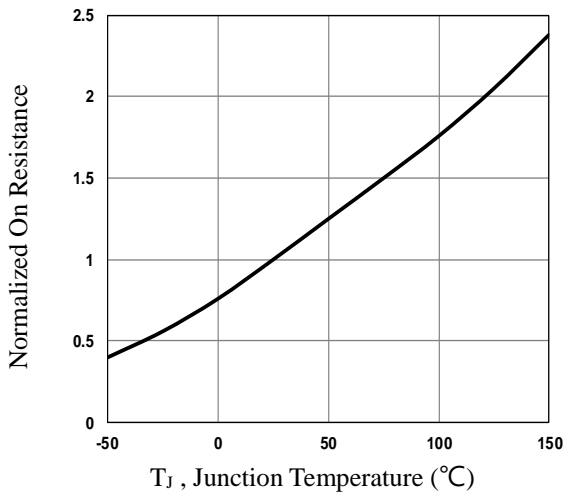


Fig.3 Normalized $R_{DS(on)}$ vs. T_J

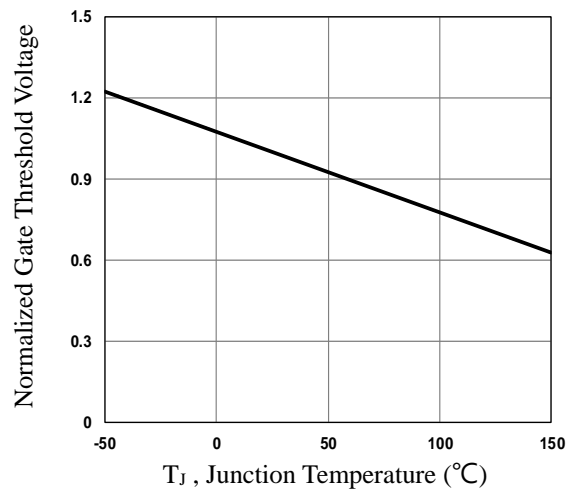


Fig.4 Normalized V_{th} vs. T_J

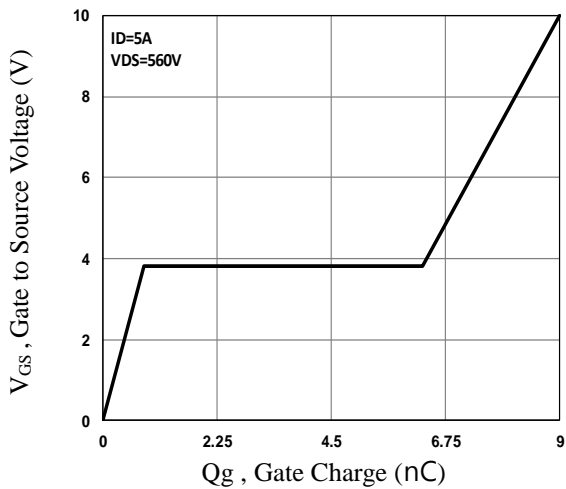


Fig.5 Gate Charge Characteristics

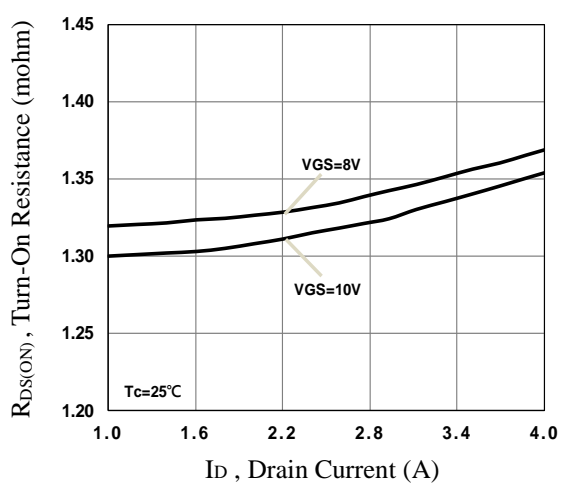


Fig.6 Turn-On Resistance vs. I_D

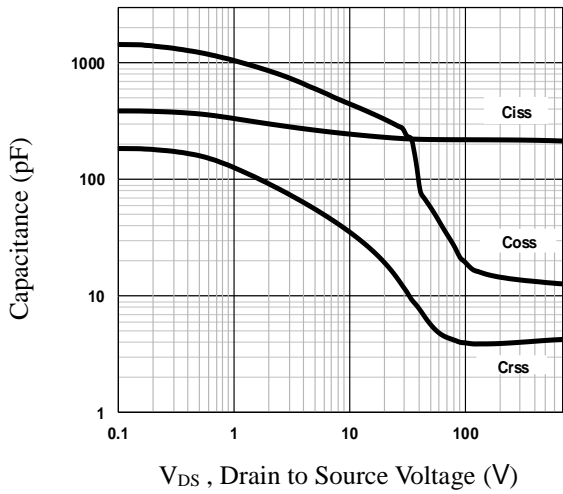


Fig.7 Capacitance Characteristics

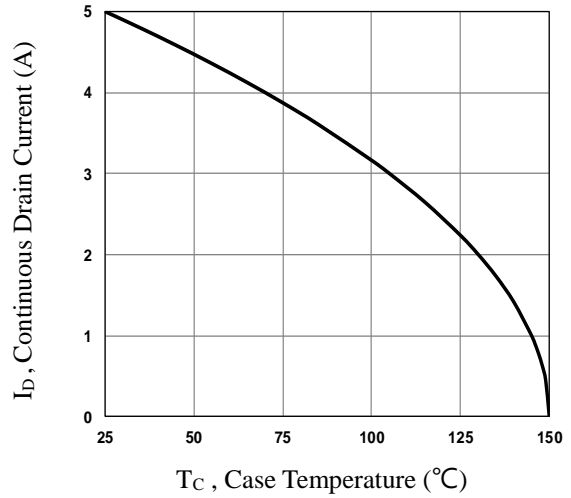


Fig.8 Continuous Drain Current vs. T_c

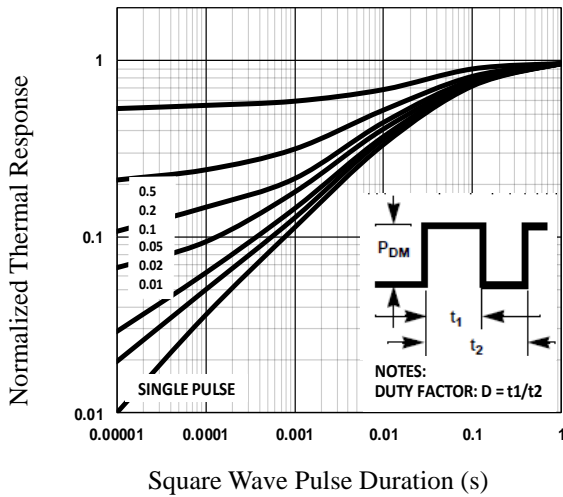


Fig.9 Normalized Transient Impedance

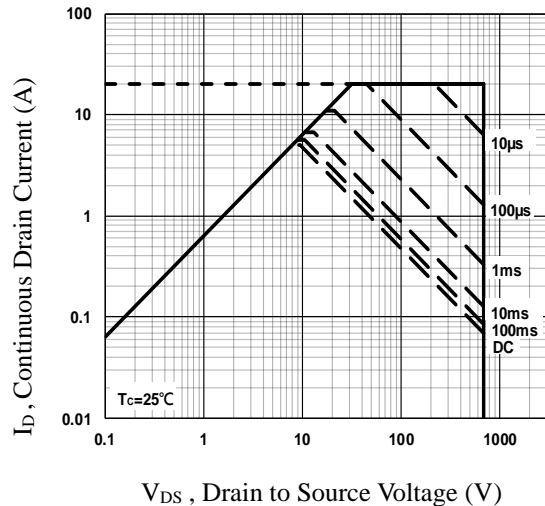


Fig.10 Maximum Safe Operation Area

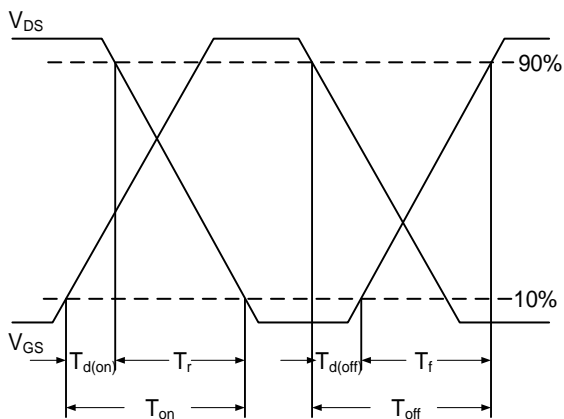


Fig.11 Switching Time Waveform

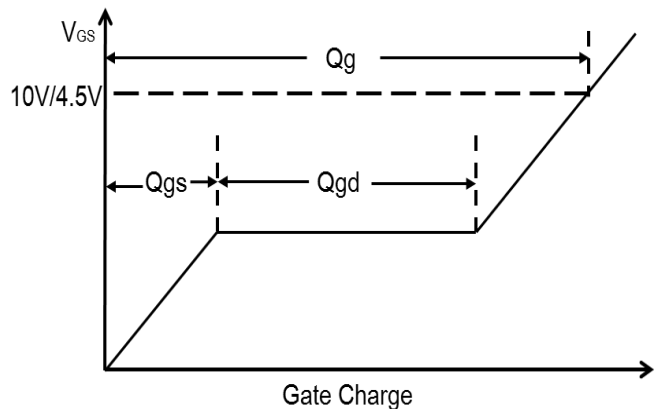
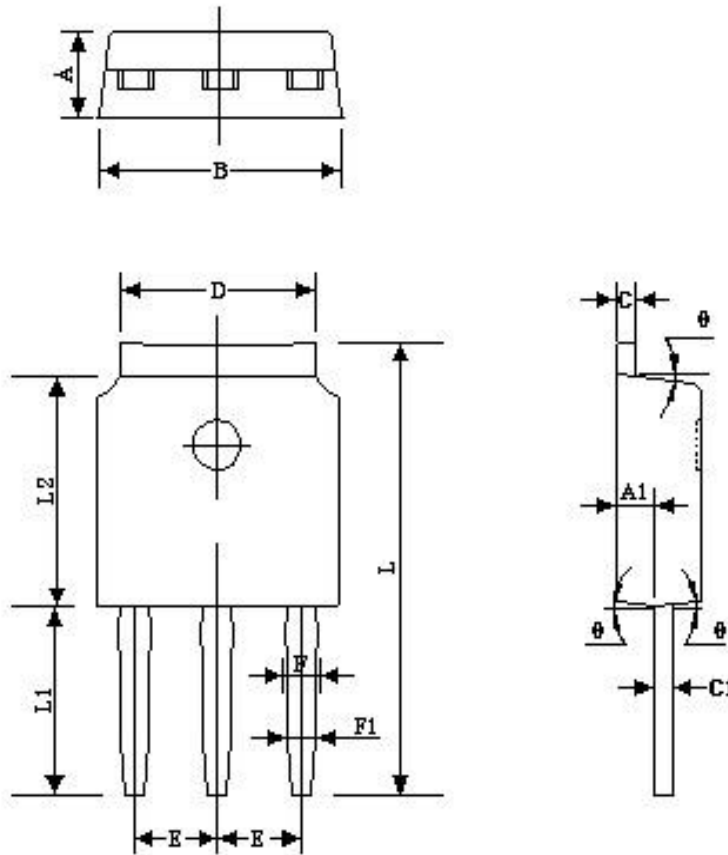


Fig.12 Gate Charge Waveform

TO251 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	2.500	2.100	0.098	0.083
A1	1.250	0.900	0.049	0.035
B	6.800	6.400	0.268	0.252
C	0.580	0.420	0.023	0.017
C1	0.580	0.420	0.023	0.017
D	5.500	5.000	0.217	0.197
E	2.400	2.000	0.094	0.079
F	1.050	0.750	0.041	0.030
F1	0.900	0.650	0.035	0.026
L	12.400	11.600	0.488	0.457
L1	5.300	4.700	0.209	0.185
L2	6.300	5.700	0.248	0.224
θ	9°	3°	9°	3°