## 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
100V	90mΩ	15A

Features

- *100V,15A, RDS(ON) =90mΩ@VGS = 10V*
- *Improved dv/dt capability*
- *Fast switching*
- *100% EAS Guaranteed*
- *Green Device Available*

TO251 Pin Configuration
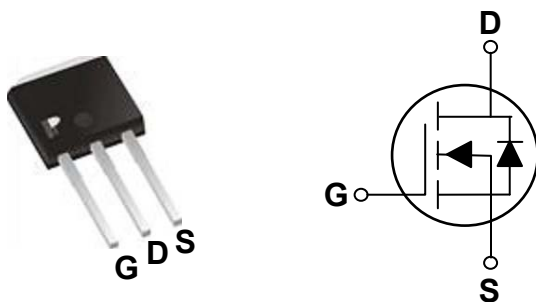
Applications

- *Networking*
- *Load Switch*
- *LED applications*

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	V
I_D	Drain Current – Continuous (T_C=25℃)	15	A
	Drain Current – Continuous (T_C=100℃)	9.5	A
I_{DM}	Drain Current – Pulsed[1]	60	A
P_D	Power Dissipation (T_C=25℃)	50	W
	Power Dissipation – Derate above 25℃	0.4	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	---	2.5	℃/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	---	0.05	---	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$_{GS}$=$\pm$20V , V$_{DS}$=0V	---	---	$\pm$100	nA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
R$_{DS(ON)}$	Static Drain-Source On-Resistance	V$_{GS}$=10V , I$_D$=5A	---	72	90	mΩ
		V$_{GS}$=4.5V , I$_D$=3A	---	75	100	mΩ
V$_{GS(th)}$	Gate Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$ =250uA	1.2	1.6	2.5	V
$\triangle$V$_{GS(th)}$	V$_{GS(th)}$ Temperature Coefficient		---	-5	---	mV/℃
gfs	Forward Transconductance	V$_{DS}$=10V , I$_D$=3A	---	8.7	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q$_g$	Total Gate Charge[2,3]	V$_{DS}$=48V , V$_{GS}$=10V , I$_D$=5A	---	9.3	13	nC
Q$_{gs}$	Gate-Source Charge[2,3]		---	2.1	4.2	
Q$_{gd}$	Gate-Drain Charge[2,3]		---	1.8	4	
T$_{d(on)}$	Turn-On Delay Time[2,3]	V$_{DD}$=30V , V$_{GS}$=10V , R$_G$=3.3Ω I$_D$=1A	---	2.9	6	ns
T$_r$	Rise Time[2,3]		---	9.5	18	
T$_{d(off)}$	Turn-Off Delay Time[2,3]		---	18.4	35	
T$_f$	Fall Time[2,3]		---	5.3	10	
C$_{iss}$	Input Capacitance	V$_{DS}$=50V , V$_{GS}$=0V , F=1MHz	---	1480	2150	pF
C$_{oss}$	Output Capacitance		---	480	700	
C$_{rss}$	Reverse Transfer Capacitance		---	35	55	
R$_g$	Gate resistance	V$_{GS}$=0V, V$_{DS}$=0V, F=1MHz	---	1.3	2.6	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	---	---	15	A
I$_{SM}$	Pulsed Source Current		---	---	60	A
V$_{SD}$	Diode Forward Voltage	V$_{GS}$=0V , I$_S$=1A , T$_J$=25℃	---	---	1	V
t$_{rr}$	Reverse Recovery Time[2]	V$_{GS}$=30V, I$_S$=1A , dI/dt=100A/μs	---	---	---	ns
Q$_{rr}$	Reverse Recovery Charge[2]	T$_J$=25℃	---	---	---	nC

Note :
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
3. Essentially independent of operating temperature.

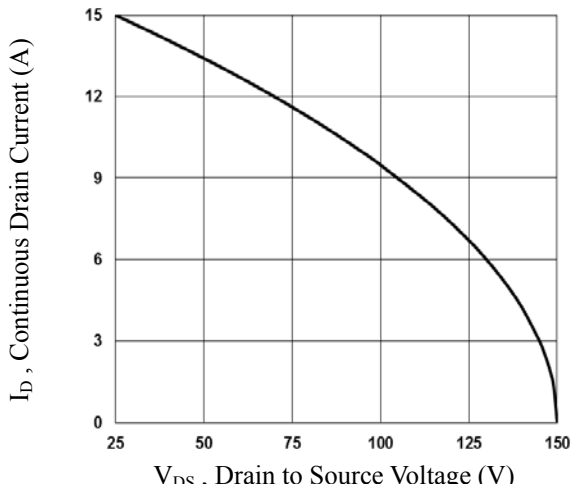**Fig.1   Output Characteristics**

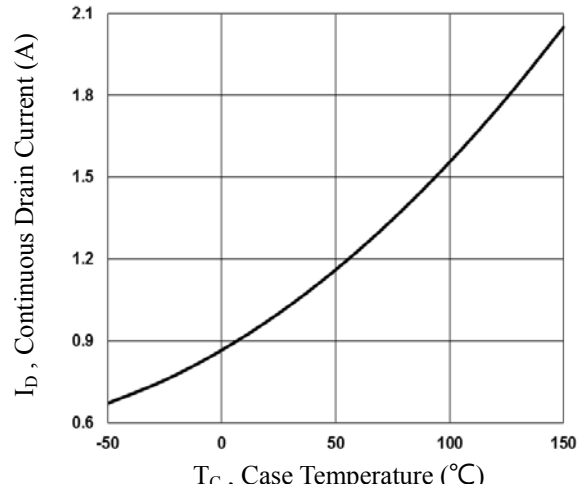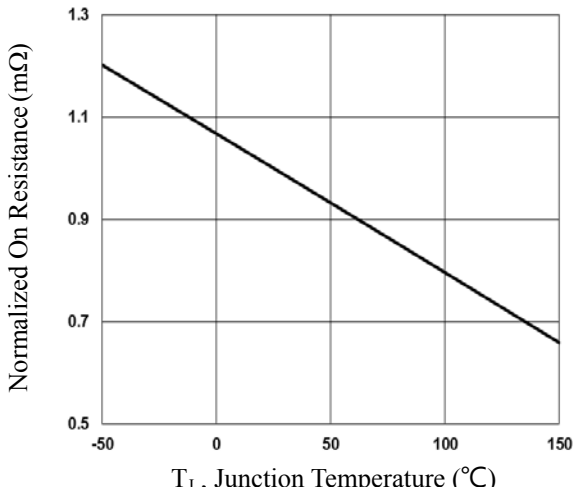**Fig.2   Continuous Drain Current vs. T$_c$**

Fig.3   Normalized RDSON vs. T$_J$
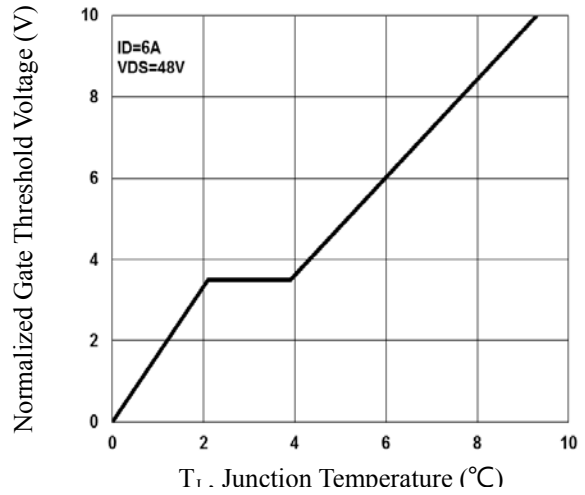

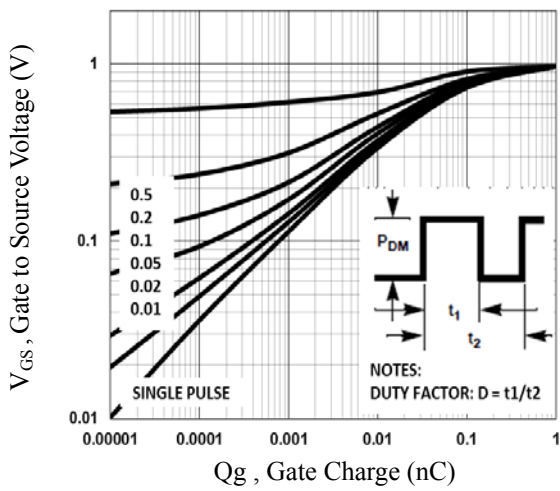**Fig.4   Normalized V$_{th}$ vs. T$_J$**
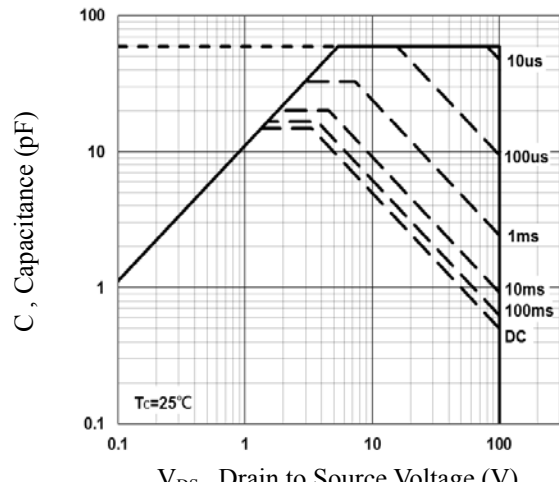

Fig.5   Gate Charge Waveform

Fig.6   Capacitance Characteristics
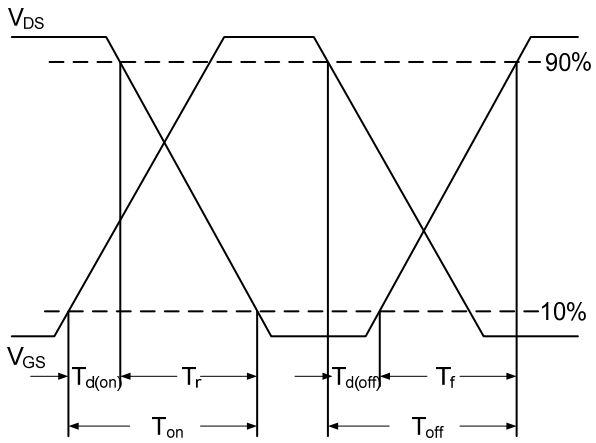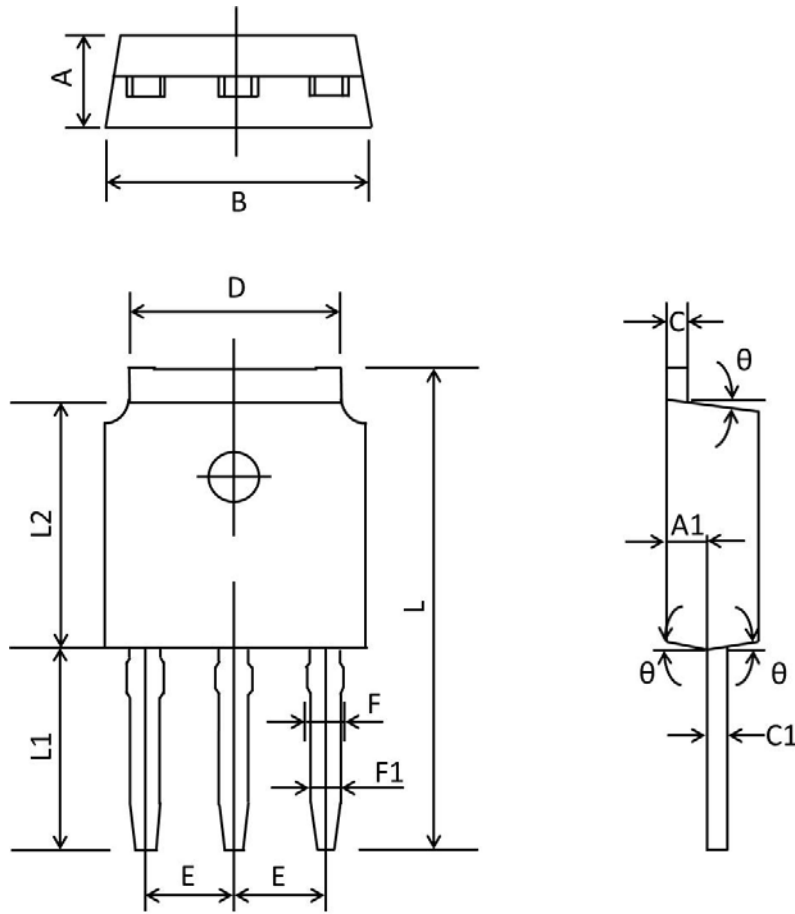
Fig.7   Switching Time Waveform
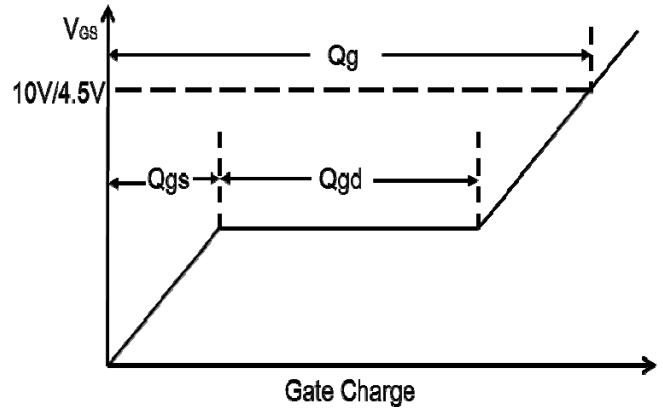
Fig.8   Gate Charge Waveform

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TO251 PACKAGE INFORMATION

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	**Max**	**Min**	**Max**
A	2.20	2.40	0.087	0.094
A1	0.91	1.11	0.036	0.044
B	6.50	6.70	0.256	0.264
C	0.46	0.580	0.018	0.230
C1	0.46	0.580	0.018	0.030
D	5.10	5.46	0.201	0.215
E	2.186	2.386	0.086	0.094
F	0.74	0.94	0.029	0.037
F1	0.660	0.860	0.026	0.034
L	11.70	12.30	0.461	0.484
L1	4.8	5.2	0.189	0205
L2	6.00	6.20	0.236	0.244
θ	3°	9°	3°	9°