

General Description

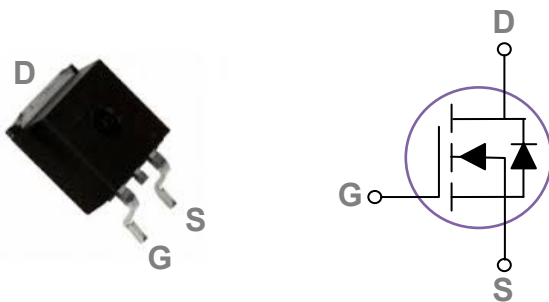
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BVDSS	R _{DS(ON)}	I _D
30V	3mΩ	176A

Features

- 30V, 176A, R_{DS(ON)} = 3mΩ@V_{GS} = 10V
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

TO263 Pin Configuration



Applications

- MB / VGA / V_{core}
- POL Applications
- SMPS 2nd SR

Absolute Maximum Ratings T_c=25°C unless otherwise noted

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	30	V
V _{GS}	Gate-Source Voltage	±20	V
I _D	Drain Current – Continuous (T _C =25°C)	176	A
	Drain Current – Continuous (T _C =100°C)	111	A
I _{DM}	Drain Current – Pulsed ¹	704	A
EAS	Single Pulse Avalanche Energy ²	180	mJ
IAS	Single Pulse Avalanche Current ²	60	A
P _D	Power Dissipation (T _C =25°C)	168	W
	Power Dissipation – Derate above 25°C	1.34	W/°C
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
R _{θJA}	Thermal Resistance Junction to ambient	---	62	°C/W
R _{θJC}	Thermal Resistance Junction to Case	---	0.74	°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 =250uA	30	---	---	V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =1mA	---	0.03	---	V/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =30V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =24V, V _{GS} =0V, T _J =125°C	---	---	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 ³	V _{GS} =10V, I _D =30A	---	2.4	3	mΩ
		V _{GS} =4.5V, I _D =15A	---	3.2	4	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	1.6	2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	-5	---	mV/°C
gfs	Forward Transconductance	V _{DS} =10V, I _D =2A	---	16	---	S

Dynamic Characteristics

Q _g	Total Gate Charge ^{3,4}	V _{DS} =15V, V _{GS} =4.5V, I _D =24A	---	40	75	nC
Q _{gs}	Gate-Source Charge ^{3,4}		---	6	12	
Q _{gd}	Gate-Drain Charge ^{3,4}		---	19	35	
T _{d(on)}	Turn-On Delay Time ^{3,4}	V _{DD} =15V, V _{GS} =10V, R _G =1Ω I _D =1A	---	20	40	ns
T _r	Rise Time ^{3,4}		---	32	60	
T _{d(off)}	Turn-Off Delay Time ^{3,4}		---	75	130	
T _f	Fall Time ^{3,4}		---	28	55	
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, F=1MHz	---	4800	8000	pF
C _{oss}	Output Capacitance		---	735	1300	
C _{rss}	Reverse Transfer Capacitance		---	420	800	
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	---	1.6	3.5	Ω

Drain-Source Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current	V _G =V _D =0V, Force Current	---	---	176	A
I _{SM}	Pulsed Source Current ³		---	---	352	A
V _{SD}	Diode Forward Voltage ³	V _{GS} =0V, I _S =1A, T _J =25°C	---	---	1	V
t _{rr}	Reverse Recovery Time	V _{DS} =30V, I _S =1A, di/dt=100A/μs	---	49	85	ns
Q _{rr}	Reverse Recovery Charge	T _J =25°C	---	18	35	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=60A., R_G=25Ω, Starting T_J=25°C.
3. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
4. Essentially independent of operating temperature.

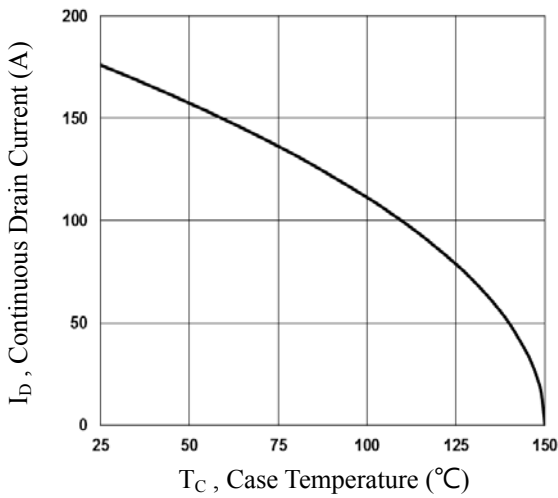


Fig.1 Continuous Drain Current vs. T_c

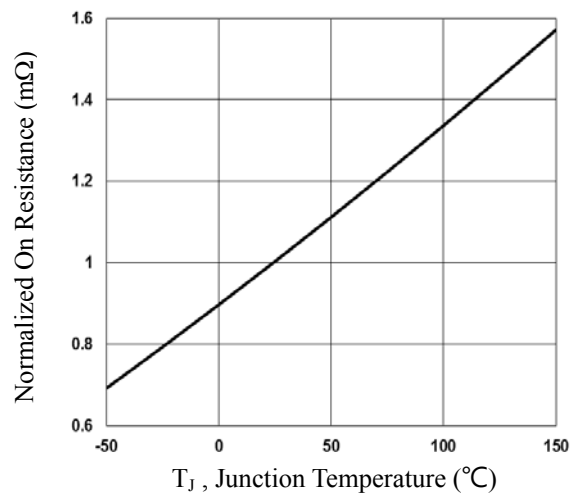


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

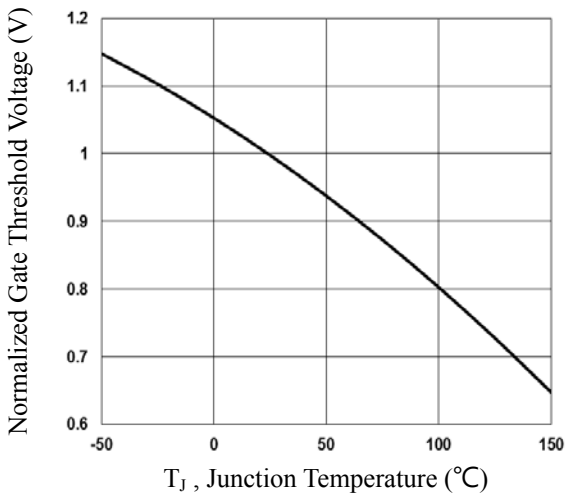


Fig.3 Normalized V_{th} vs. T_j

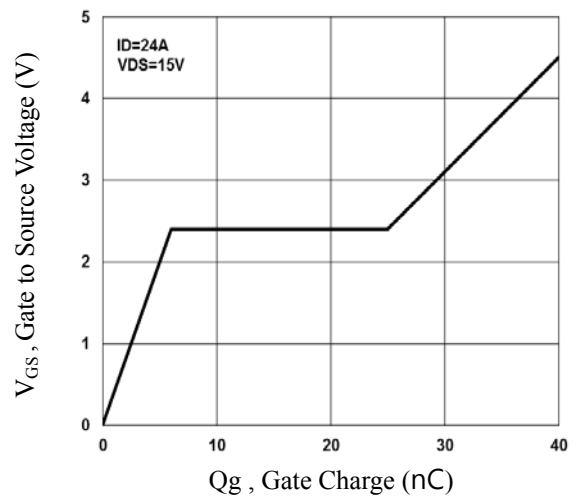


Fig.4 Gate Charge Waveform

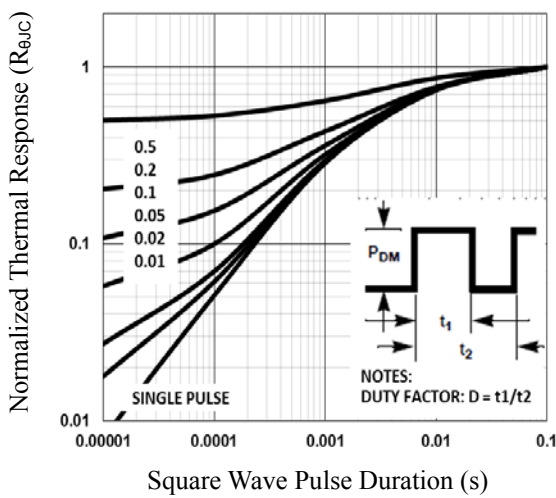


Fig.5 Normalized Transient Impedance

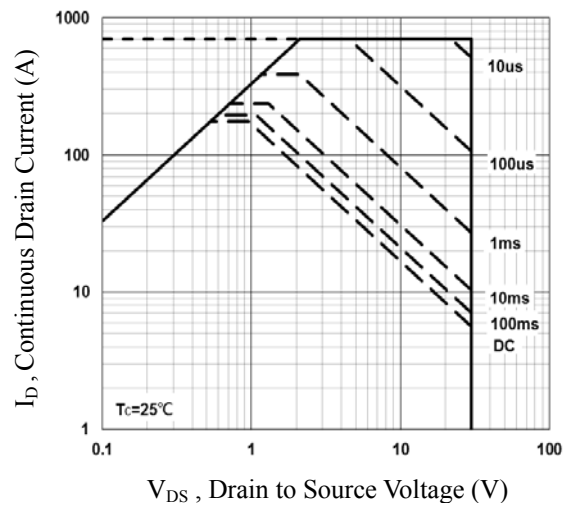


Fig.6 Maximum Safe Operation Area

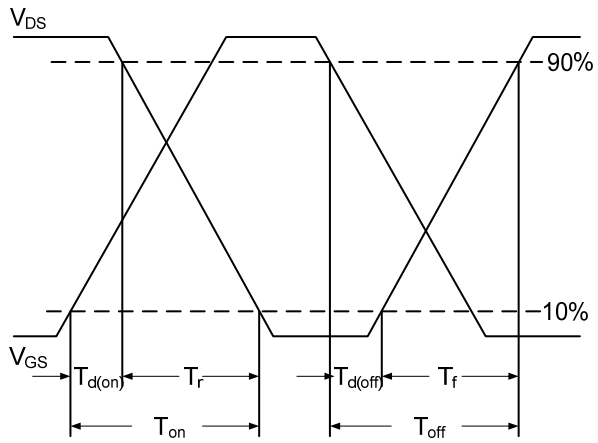


Fig.7 Switching Time Waveform

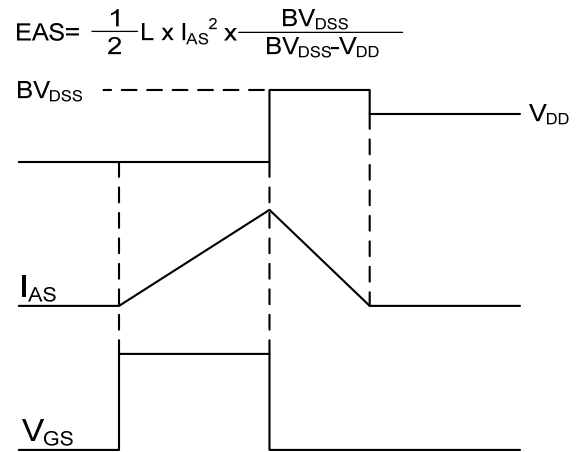


Fig.8 EAS Waveform