

General Description

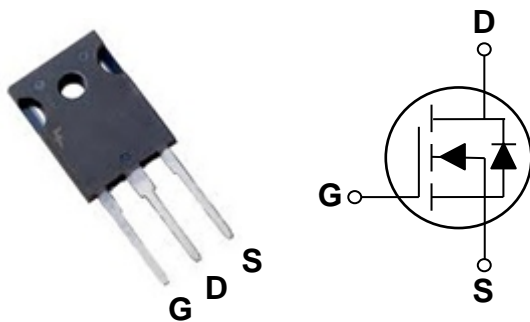
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BVDSS	RDSON	ID
40V	1.5mΩ	320A

Features

- 40V, 320A, $R_{DS(ON)} = 1.5m\Omega @ V_{GS} = 10V$
- Improved dv/dt capability
- Fast switching
- Green Device Available

TO247 Pin Configuration



Applications

- MB / VGA / Vcore
- POL Applications
- SMPS 2nd SR



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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Drain Current – Continuous ($T_C=25^\circ C$)	320	A
	Drain Current – Continuous ($T_C=100^\circ C$)	200	A
I_{DM}	Drain Current – Pulsed ¹	1280	A
EAS	Single Pulse Avalanche Energy ²	1377	mJ
IAS	Single Pulse Avalanche Current ²	166	A
P_D	Power Dissipation ($T_C=25^\circ C$)	415	W
	Power Dissipation – Derate above $25^\circ C$	3.33	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	---	0.30	$^\circ C/W$

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 =250uA	40	---	---	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} =40V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =32V, 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 =20A	---	1.2	1.5	mΩ
		V _{GS} =6V, I _D =15A	---	1.75	2.5	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.5	2.5	3.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	-5.6	---	mV/°C
g _{fs}	Forward Transconductance	V _{DS} =10V, I _D =2A	---	16	---	S

Dynamic Characteristics

Q _g	Total Gate Charge ^{3,4}	V _{DS} =32V, V _{GS} =10V, I _D =10A	---	295	450	nC
Q _{gs}	Gate-Source Charge ^{3,4}		---	72.9	110	
Q _{gd}	Gate-Drain Charge ^{3,4}		---	121	180	
T _{d(on)}	Turn-On Delay Time ^{3,4}	V _{DD} =32V, V _{GS} =10V, R _G =6Ω I _D =1A	---	74	148	ns
T _r	Rise Time ^{3,4}		---	190	380	
T _{d(off)}	Turn-Off Delay Time ^{3,4}		---	450	900	
T _f	Fall Time ^{3,4}		---	400	800	
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, F=1MHz	---	17760	26600	pF
C _{oss}	Output Capacitance		---	1990	3000	
C _{rss}	Reverse Transfer Capacitance		---	341	510	
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	---	2.07	3.1	Ω

Drain-Source Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current	V _G =V _D =0V, Force Current	---	---	320	A
I _{SM}	Pulsed Source Current ³		---	---	640	A
V _{SD}	Diode Forward Voltage ³	V _{GS} =0V, I _S =1A, T _J =25°C	---	---	1	V

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=166A., Starting T_J=25°C
3. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
4. Essentially independent of operating temperature.

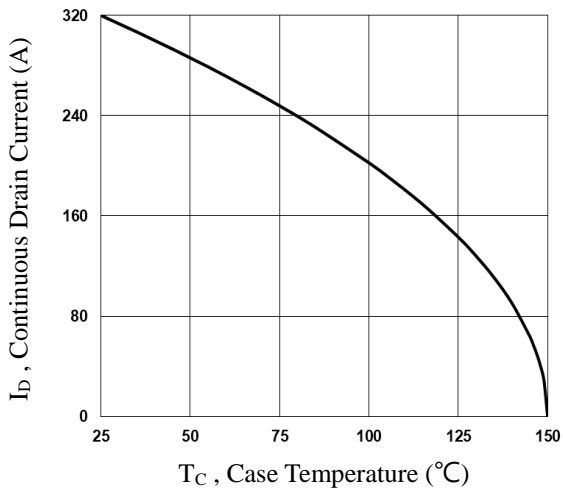


Fig.1 Continuous Drain Current vs. T_c

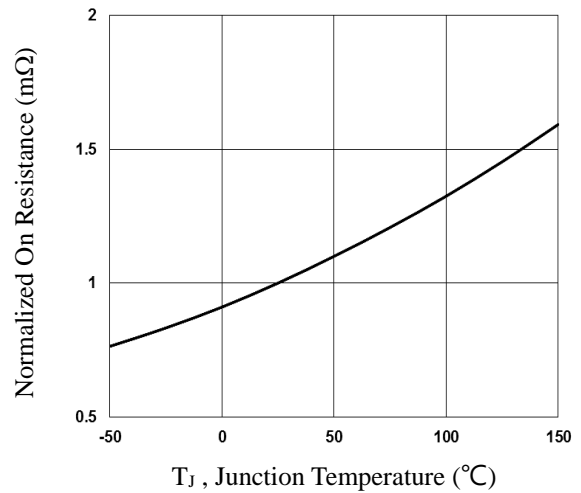


Fig.2 Normalized R_{DS(on)} vs. T_j

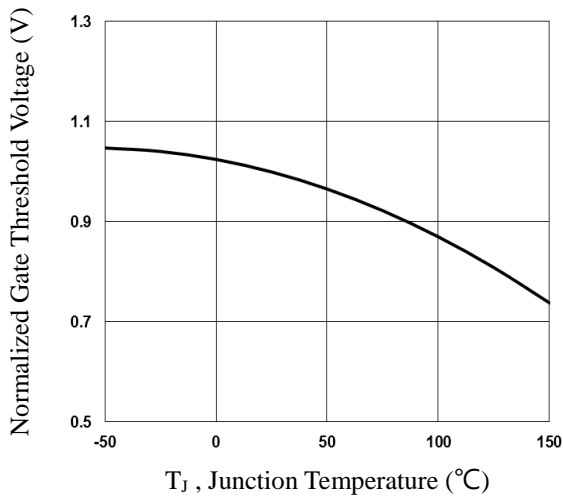


Fig.3 Normalized V_{th} vs. T_j

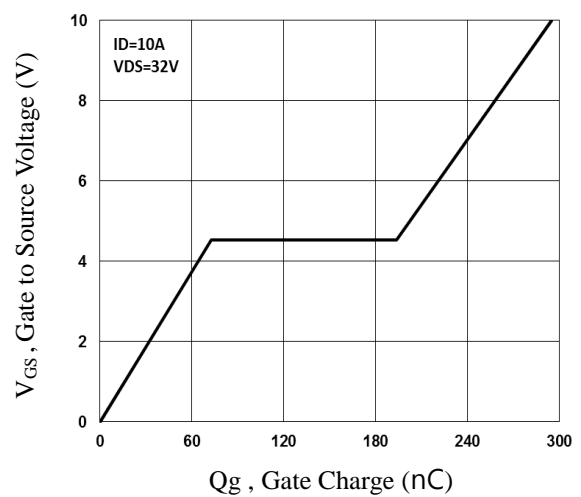


Fig.4 Gate Charge Waveform

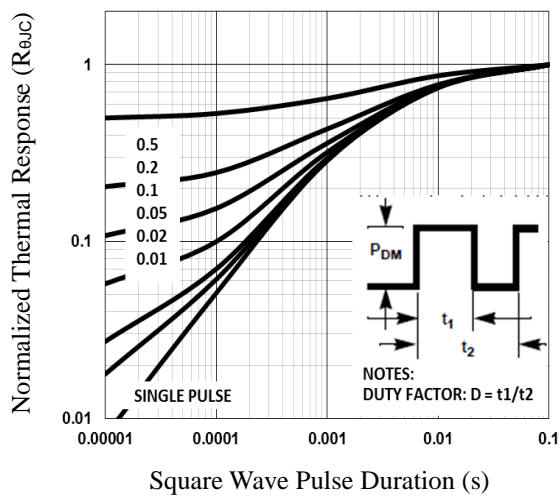


Fig.5 Normalized Transient Impedance

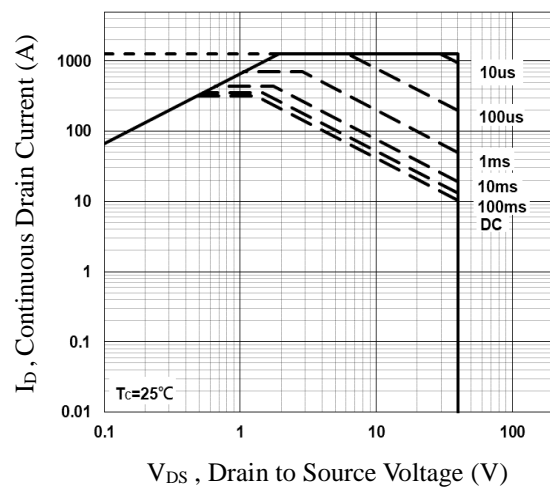


Fig.6 Maximum Safe Operation Area

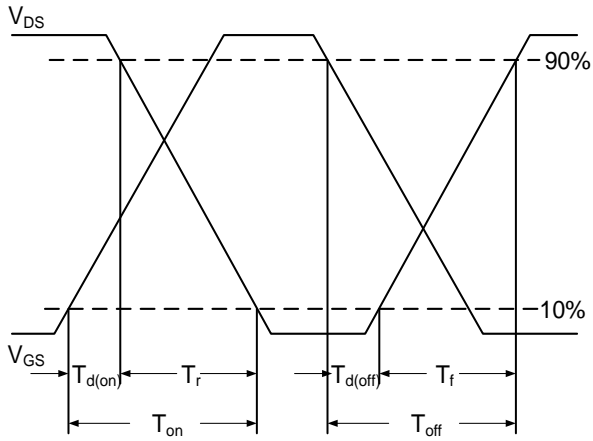


Fig.7 Switching Time Waveform

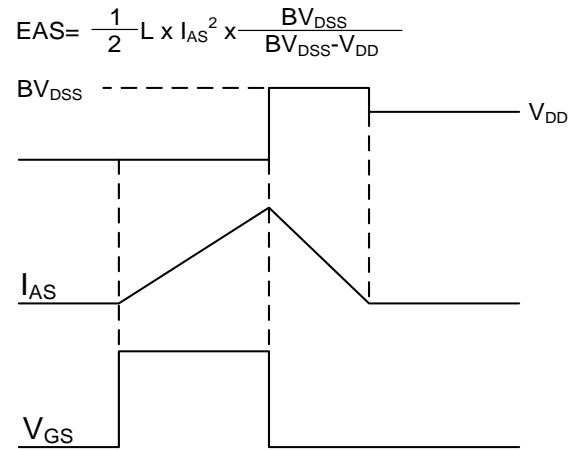
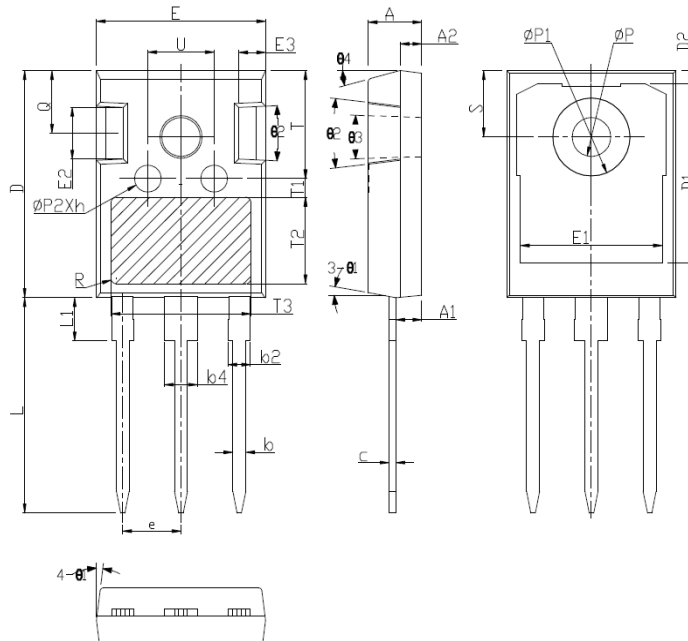


Fig.8 EAS Waveform



TO247 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters			Symbol	Dimensions In Millimeters		
	Min	Nom	Max		Min	Nom	Max
A	4.750	5.000	5.250	L	19.520	19.920	20.320
A1	2.160	2.410	2.660	L1	---	---	4.300
A2	1.850	2.000	2.150	ΦP	3.350	3.600	3.850
b	1.110	1.200	1.350	ΦP1	---	---	7.300
b2	1.900	2.010	2.250	ΦP2	2.250	2.500	2.750
b4	2.900	3.100	3.250	Q	5.500	5.800	6.100
c	0.510	0.610	0.750	S	6.15BSC		
D	20.600	21.000	21.400	R	0.50REF		
D1	16.150	16.550	16.950	T	9.700	---	10.300
D2	1.000	1.200	1.400	T1	1.65REF		
E	15.500	15.800	16.100	T2	8.00REF		
E1	13.000	13.300	13.600	T3	12.80REF		
E2	4.700	5.000	5.300	U	5.900	---	6.500
E3	2.250	2.500	2.750	θ1	3°	7°	10°
e	5.44BSC			θ2	2°	5°	8°
h	0.000	0.100	0.250	θ3	1°	---	2°
				θ4	10°	15°	20°