

General Description

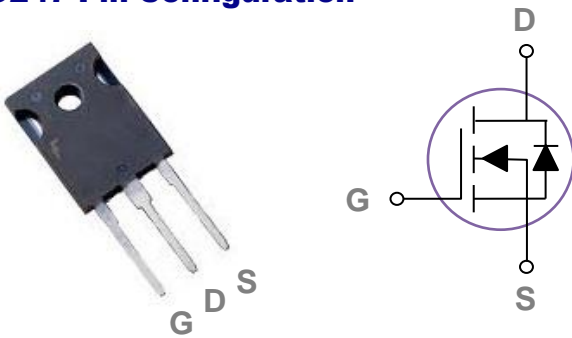
These N-Channel enhancement mode power field effect transistors are using Super Junction technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BVDSS	RDSON	ID
650V	0.14Ω	30A

Features

- 30A,650V, $R_{DS(ON)} = 0.14\Omega @ V_{GS} = 10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

TO247 Pin Configuration



- AI**
- High efficient switched mode power supplies
 - LED Lighting
 - Adapter/charger

Absolute Maximum Ratings (Tc=25°C unless otherwise noted)

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	650	V
V _{GS}	Gate-Source Voltage	±30	V
I _D	Drain Current – Continuous (T _C =25°C)	30	A
	Drain Current – Continuous (T _C =100°C)	19	A
I _{DM}	Drain Current – Pulsed ¹	120	A
EAS	Single Pulse Avalanche Energy ²	737	mJ
IAS	Single Pulse Avalanche Current ²	5.6	A
P _D	Power Dissipation (T _C =25°C)	312	W
	Power Dissipation – Derate above 25°C	2.5	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	---	62.5	°C/W
R _{θJC}	Thermal Resistance Junction to Case	---	0.4	°C/W

Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)
Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	650	---	---	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=650V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	50	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 30V, V_{DS}=0V$	---	---	± 100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=15A$	---	---	0.14	Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	2.5	---	4.5	V

Dynamic and switching Characteristics

Q_g	Total Gate Charge ^{2, 3}	$V_{DS}=50V, V_{GS}=10V, I_D=1.3A$	---	155	---	nC
Q_{gs}	Gate-Source Charge ^{2, 3}		---	38	---	
Q_{gd}	Gate-Drain Charge ^{2, 3}		---	48	---	
$T_{d(on)}$	Turn-On Delay Time ^{2, 3}	$V_{DD}=30V, V_{GS}=10V, R_G=25\Omega$ $I_D=0.5A$	---	95	---	ns
T_r	Rise Time ^{2, 3}		---	270	---	
$T_{d(off)}$	Turn-Off Delay Time ^{2, 3}		---	695	---	
T_f	Fall Time ^{2, 3}		---	400	---	
C_{iss}	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, F=1\text{MHz}$	---	2575	---	pF
C_{oss}	Output Capacitance		---	1435	---	
C_{rfs}	Reverse Transfer Capacitance		---	85	---	

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V, \text{Force Current}$	---	---	30	A
I_{SM}	Pulsed Source Current		---	---	60	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_S=30A, T_J=25^\circ\text{C}$	---	---	1.4	V
t_{rr}	Reverse Recovery Time ²	$V_{GS}=0V, I_S=30A, dI/dt=100A/\mu s,$	---	540	---	ns
Q_{rr}	Reverse Recovery Charge ²	$T_J=25^\circ\text{C}$	---	10.5	---	μC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD}=50V, V_{GS}=10V, L=47mH, I_{AS}=5.6A, R_G=25\Omega, \text{Starting } T_J=25^\circ\text{C}$.
3. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.

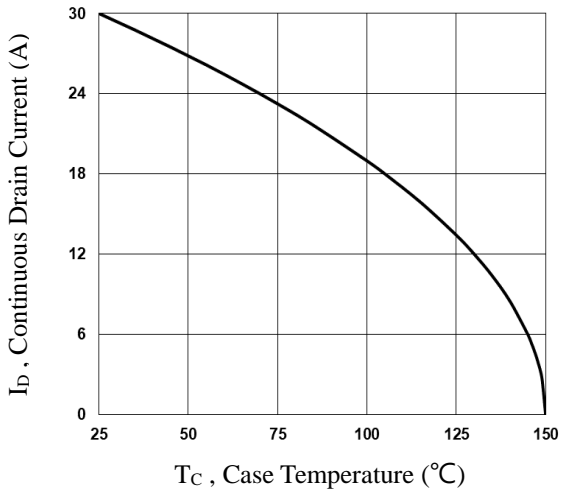


Fig.1 Continuous Drain Current vs. T_c

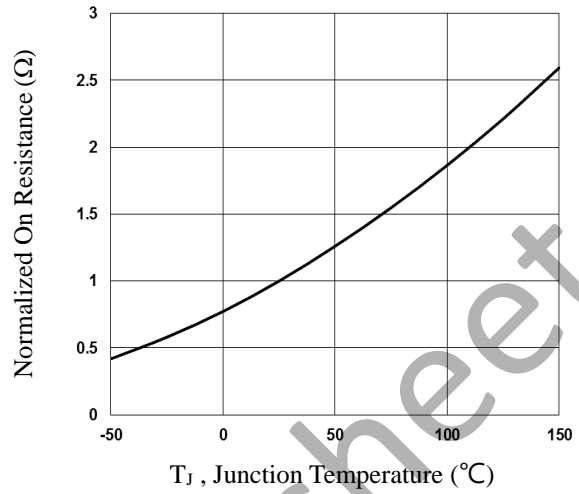


Fig.2 Normalized R_{DS(on)} vs. T_j

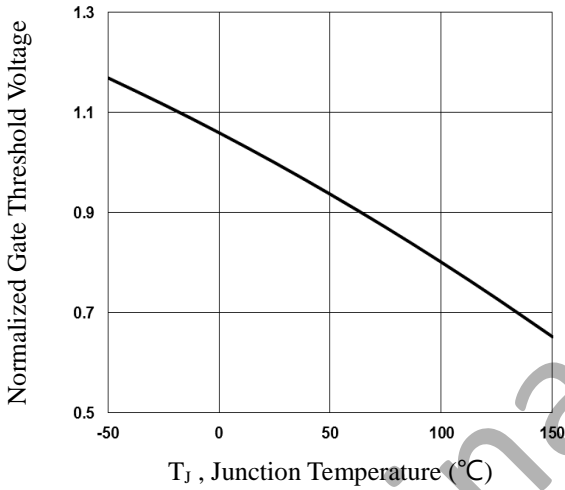


Fig.3 Normalized V_{th} vs. T_j

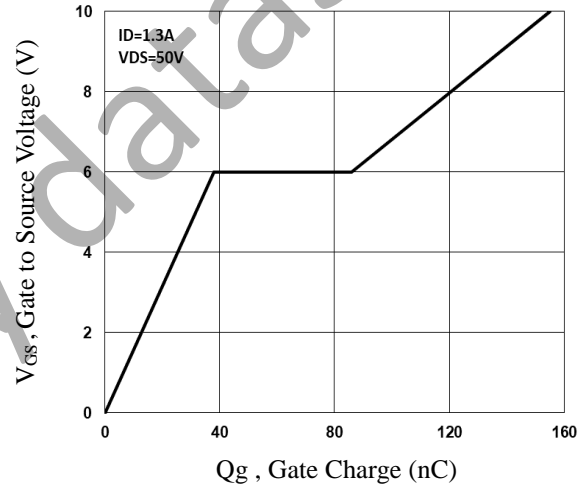


Fig.4 Gate Charge Waveform

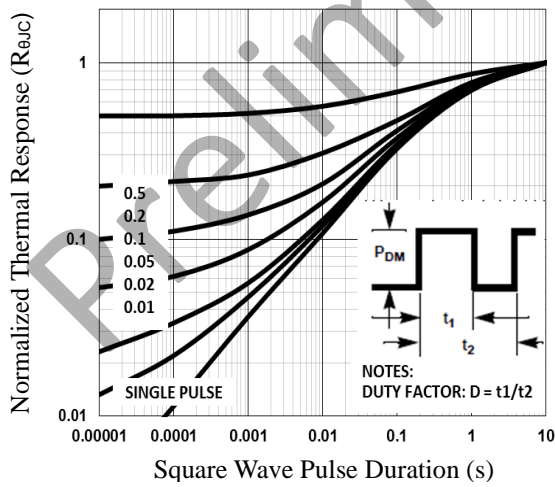


Fig.5 Normalized Transient Impedance

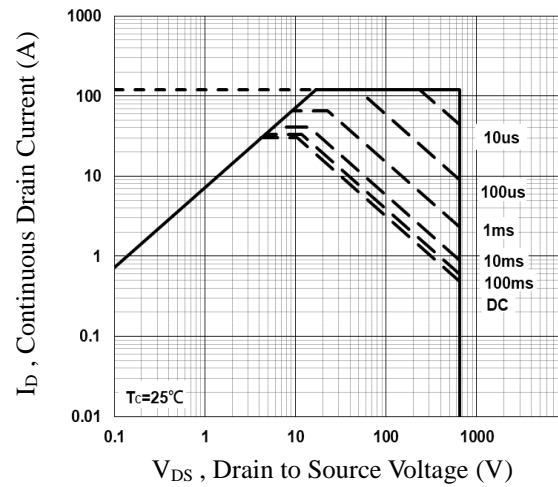


Fig.6 Maximum Safe Operation Area

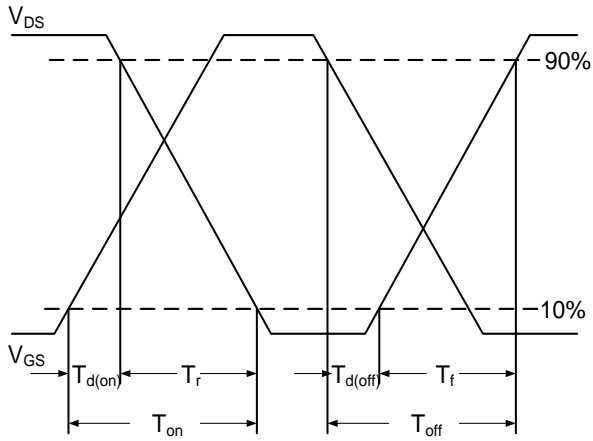


Fig.7 Switching Time Waveform

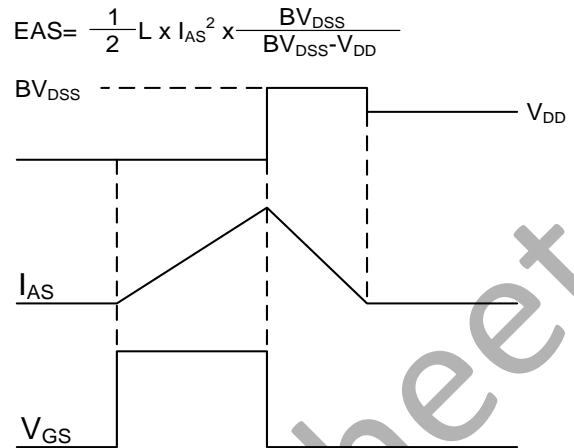
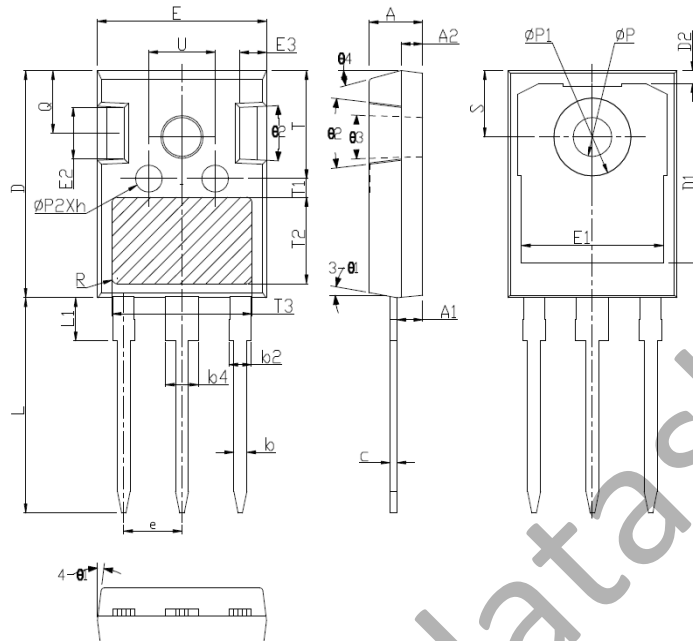


Fig.8 EAS Waveform

Preliminary datasheet

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°