

General Description

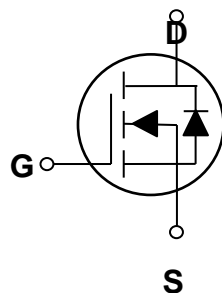
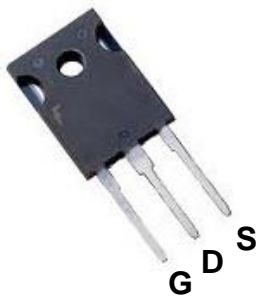
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BVDSS	RDSON	ID
60V	3.2mΩ	175A

Features

- 60V, 175A, $R_{DS(ON)} = 3.2m\Omega @ V_{GS} = 10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

TO247 Pin Configuration



Applications

- Networking
- Load Switch
- LED applications
- Quick Charger



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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	+20/-12	V
I_D	Drain Current – Continuous ($T_c=25^\circ\text{C}$)	175	A
	Drain Current – Continuous ($T_c=100^\circ\text{C}$)	110	A
I_{DM}	Drain Current – Pulsed ¹	700	A
EAS	Single Pulse Avalanche Energy ²	245	mJ
IAS	Single Pulse Avalanche Current ²	70	A
P_D	Power Dissipation ($T_c=25^\circ\text{C}$)	192	W
	Power Dissipation – Derate above 25°C	1.54	W/ $^\circ\text{C}$
T_{STG}	Storage Temperature Range	-50 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-50 to 150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	62	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	0.65	$^\circ\text{C}/\text{W}$

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	60	---	---	V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =1mA	---	0.05	---	V/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =60V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =48V, V _{GS} =0V, T _J =85°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	V _{GS} =10V, I _D =20A	---	2.6	3.2	mΩ
		V _{GS} =6V, I _D =10A	---	3.4	4.5	mΩ
		V _{GS} =4.5V, I _D =10A	---	4.8	7.0	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
g _{fs}	Forward Transconductance	V _{DS} =10V, I _D =5A	---	15	---	S

Dynamic and switching Characteristics

Q _g	Total Gate Charge ^{3, 4}	V _{DS} =48V, V _{GS} =10V, I _D =10A	---	59	120	nC
Q _{gs}	Gate-Source Charge ^{3, 4}		---	10.4	20	
Q _{gd}	Gate-Drain Charge ^{3, 4}		---	19.6	38	
T _{d(on)}	Turn-On Delay Time ^{3, 4}	V _{DD} =30V, V _{GS} =10V, R _G =6Ω I _D =1A	---	22	44	ns
T _r	Rise Time ^{3, 4}		---	14	28	
T _{d(off)}	Turn-Off Delay Time ^{3, 4}		---	40	80	
T _f	Fall Time ^{3, 4}		---	20	40	
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, F=1MHz	---	3620	7200	pF
C _{oss}	Output Capacitance		---	2395	4800	
C _{rss}	Reverse Transfer Capacitance		---	177	350	
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	---	1.8	3.6	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	---	---	175	A
I _{SM}	Pulsed Source Current		---	---	350	A
V _{SD}	Diode Forward Voltage	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}=70A., 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.

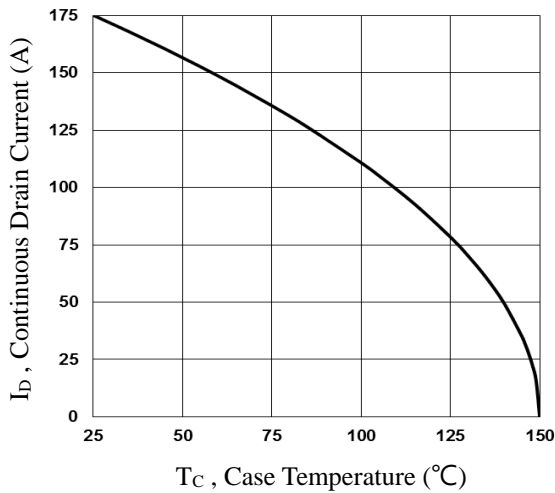


Fig.1 Continuous Drain Current vs. T_c

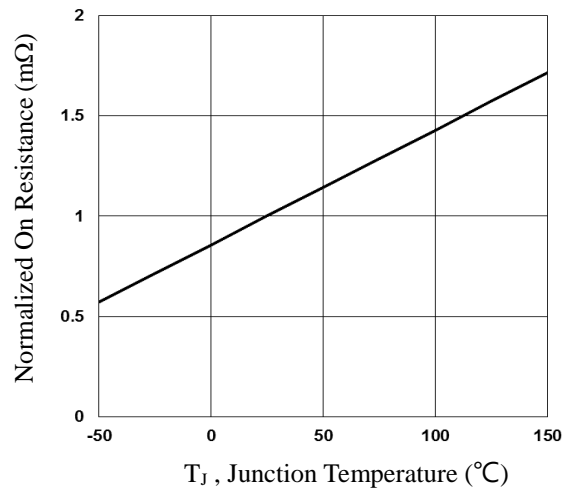


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

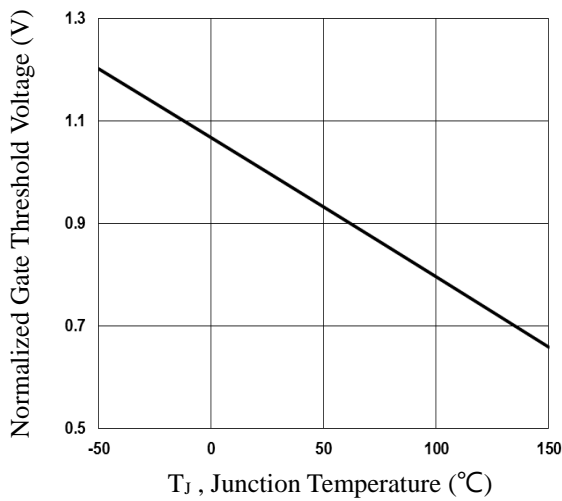


Fig.3 Normalized V_{th} vs. T_j

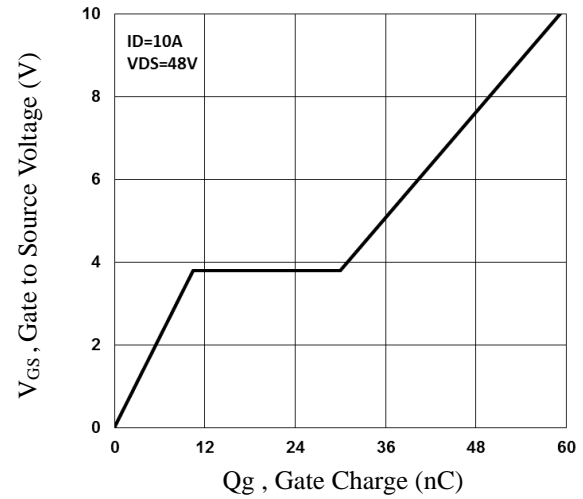


Fig.4 Gate Charge Characteristics

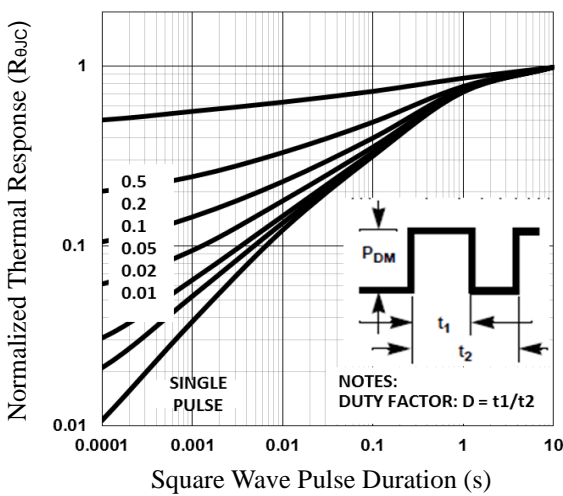


Fig.5 Normalized Transient Impedance

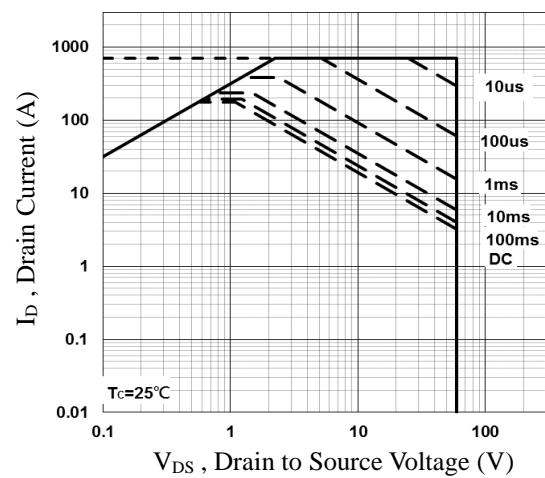


Fig.6 Maximum Safe Operation Area

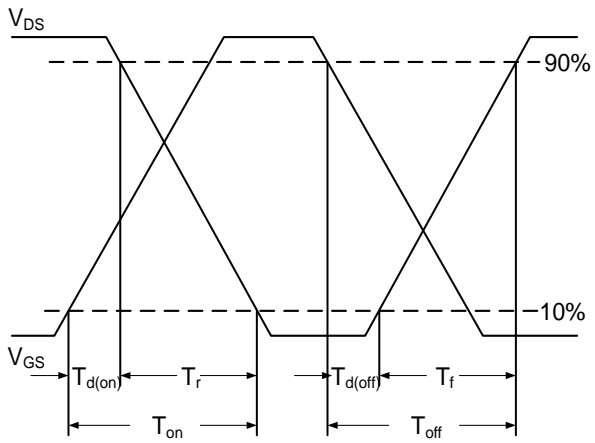


Fig.7 Switching Time Waveform

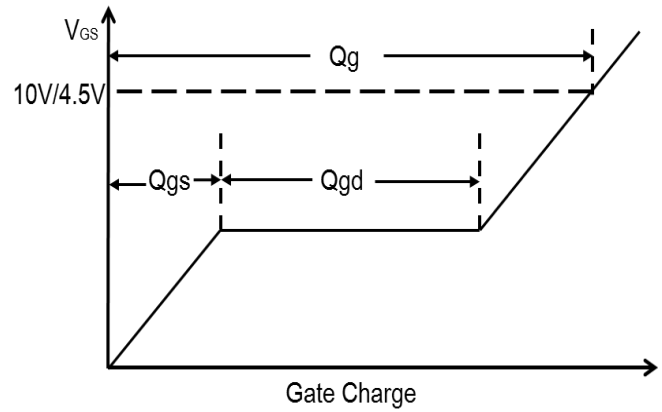
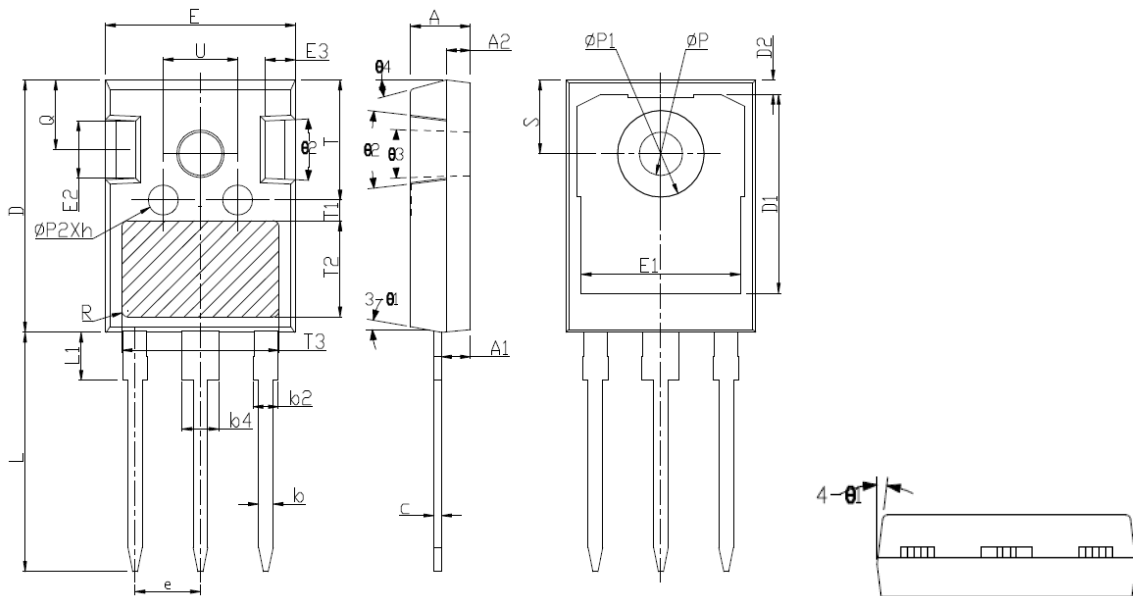


Fig.8 Gate Charge Waveform



TO247 PACKAGE INFORMATION



SYMBOL	mm			SYMBOL	mm		
	MIN	NOM	MAX		MIN	NOM	MAX
A	4.75	5.00	5.25	L	19.52	19.92	20.32
A1	2.16	2.41	2.66	L1	---	---	4.30
A2	1.85	2.00	2.15	ΦP	3.35	3.60	3.85
b	1.11	1.20	1.35	ΦP1	---	---	7.30
b2	1.90	2.01	2.25	ΦP2	2.25	2.50	2.75
b4	2.90	3.10	3.25	Q	5.50	5.80	6.10
c	0.51	0.61	0.75	S	6.15BSC		
D	20.60	21.00	21.40	R	0.50REF		
D1	16.15	16.55	16.95	T	9.70	---	10.30
D2	1.00	1.20	1.40	T1	1.65REF		
E	15.50	15.80	16.10	T2	8.00REF		
E1	13.00	13.30	13.60	T3	12.80REF		
E2	4.70	5.00	5.30	U	5.9	---	6.5
E3	2.25	2.50	2.75	θ1	4°	7°	10°
e	5.44BSC			θ2	2°	5°	8°
h	0.00	0.10	0.25	θ3	1°	---	2°
				θ4	10°	15°	20°