

## General Description

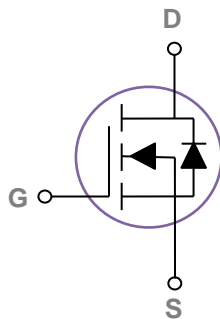
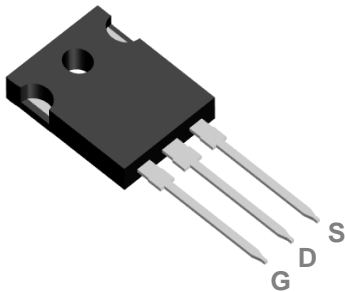
These N-Channel enhancement mode power field effect transistors are using silicon carbide technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BVDSS	R <sub>DS(ON)(typ)</sub>	ID
1200V	20mΩ	80A

## Features

- 1200V,80A, R<sub>DS(ON)(typ)</sub> =20mΩ@V<sub>GS</sub> = 20V
- Improved dv/dt capability
- Fast switching
- Green Device Available

## TO247 Pin Configuration



## Applications

- SMPS
- Solar Inverters
- Renewable energy
- EV battery chargers

## Absolute Maximum Ratings T<sub>c</sub>=25°C unless otherwise noted

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	1200	V
V <sub>GS(max)</sub>	Gate-Source Voltage , max. static voltage	+25/-10	V
V <sub>GS(op)</sub>	Recommended Drive Voltage	+18/-5	V
I <sub>D</sub>	Drain Current – Continuous (T <sub>c</sub> =25°C)	80	A
	Drain Current – Continuous (T <sub>c</sub> =100°C)	56	A
I <sub>DM</sub>	Drain Current – Pulsed <sup>1</sup>	200	A
P <sub>D</sub>	Power Dissipation (T <sub>c</sub> =25°C)	428	W
	Power Dissipation – Derate above 25°C	2.86	W/°C
T <sub>STG</sub>	Storage Temperature Range	-55 to 175	°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 175	°C

## Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJC</sub>	Thermal Resistance Junction to Case	0.35	---	°C/W

**Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**
**Off Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V , I <sub>D</sub> =100μA	1200	---	---	V
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =1200V , V <sub>GS</sub> =0V , T <sub>J</sub> =25°C	---	---	10	μA
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =22V , V <sub>DS</sub> =0V	---	---	100	nA

**On Characteristics**

R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =18V , I <sub>D</sub> =50A	---	20	26	mΩ
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =15V , I <sub>D</sub> =50A	---	25	---	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =20mA	2.0	2.8	4.0	V

**Dynamic and switching Characteristics**

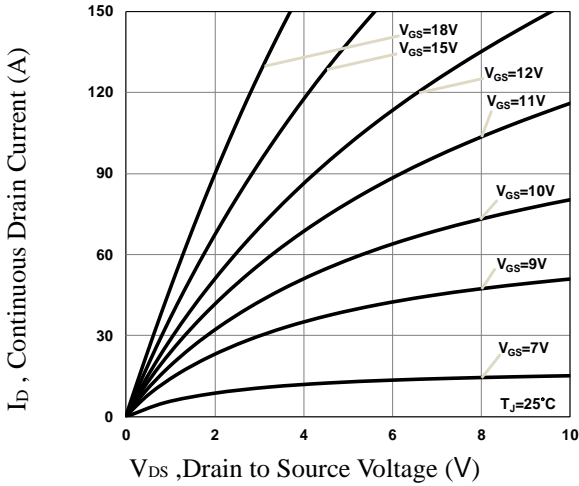
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =800V , V <sub>GS</sub> =-5/18V , I <sub>DS</sub> =50A	---	200	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	35	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	52	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =800V , V <sub>GS</sub> =-5/18V , R <sub>G</sub> =6Ω , I <sub>DS</sub> =50A	---	20	---	ns
T <sub>r</sub>	Rise Time		---	30	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	35	---	
T <sub>f</sub>	Fall Time		---	10	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =1000V , V <sub>GS</sub> =0V , F=500kHz , V <sub>AC</sub> =25mV	---	4000	---	pF
C <sub>oss</sub>	Output Capacitance		---	230	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	12	---	
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> =0V , V <sub>DS</sub> =0V , F=1MHz	---	0.6	---	Ω

**Drain-Source Diode Characteristics and Maximum Ratings**

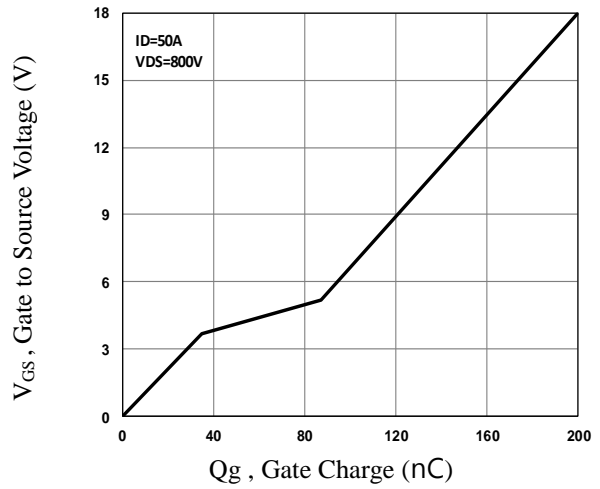
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current	V <sub>G</sub> =V <sub>D</sub> =0V , Force Current	---	---	80	A
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> =-5V , I <sub>S</sub> =33A , T <sub>J</sub> =25°C	---	4.1	---	V
t <sub>rr</sub>	Reverse Recovery Time	V <sub>R</sub> =400V , I <sub>S</sub> =50A	---	65	---	ns
Q <sub>rr</sub>	Reverse Recovery Charge	di/dt=300A/μs , T <sub>J</sub> =25°C	---	200	---	nC

Note :

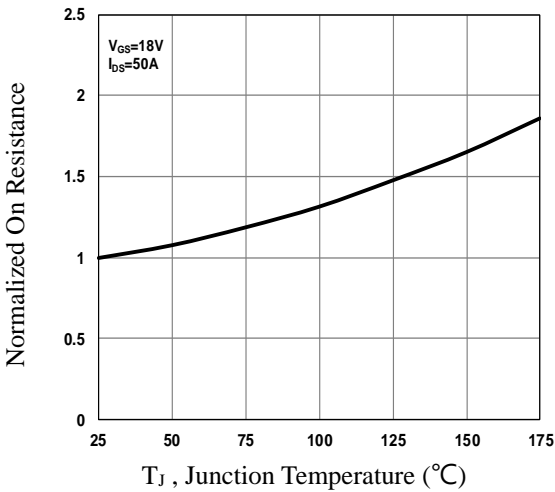
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≤ 300μs , duty cycle ≤ 2%.



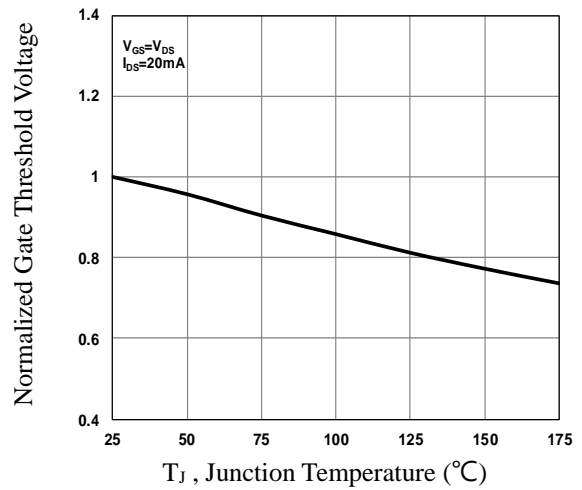
**Fig.1 Typical Output Characteristics**



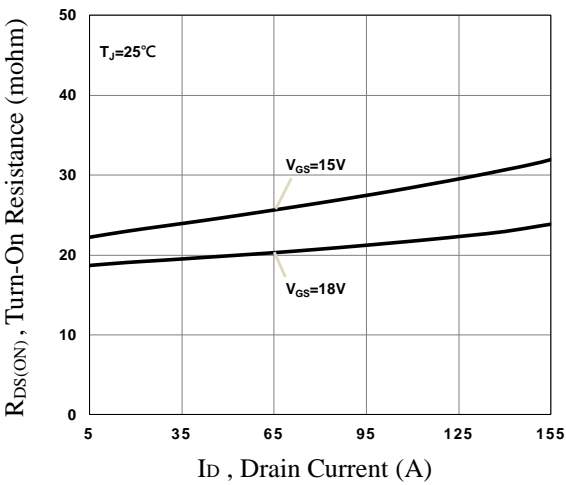
**Fig.2 Gate Charge Characteristics**



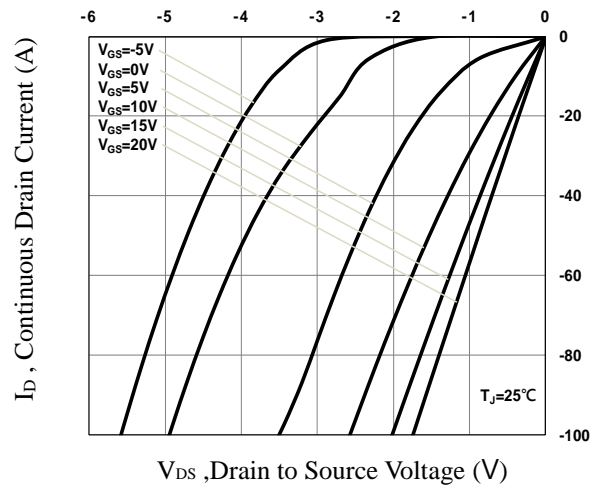
**Fig.3 Normalized RDS(on) vs. TJ**



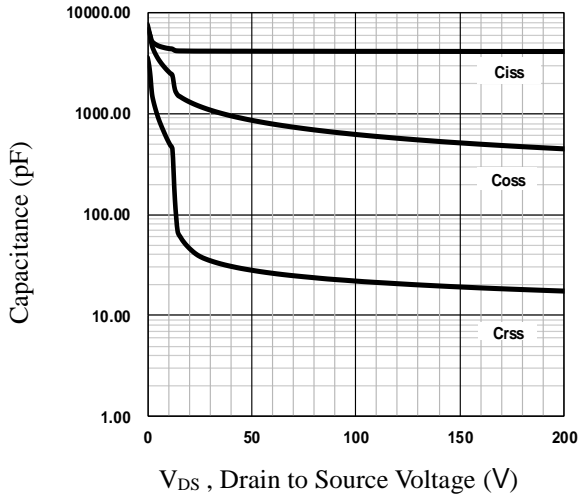
**Fig.4 Normalized V<sub>th</sub> vs. TJ**



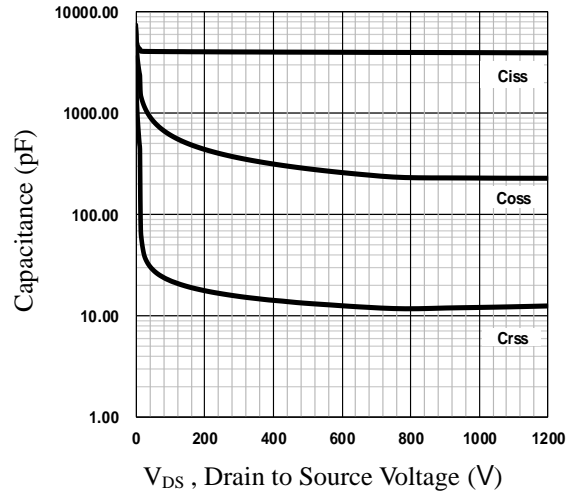
**Fig.5 Turn-On Resistance vs. ID**



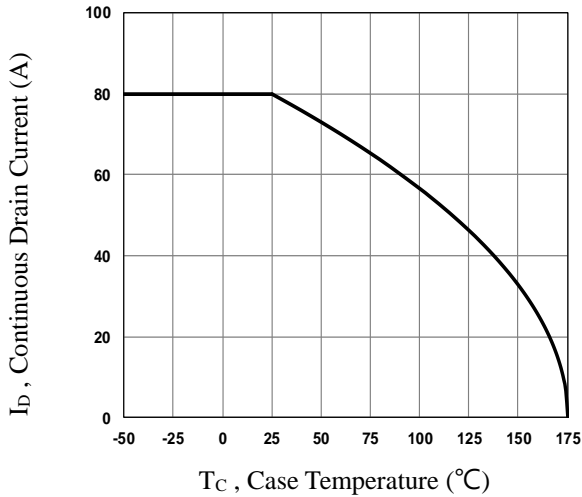
**Fig.6 3rd Quadrant Characteristic**



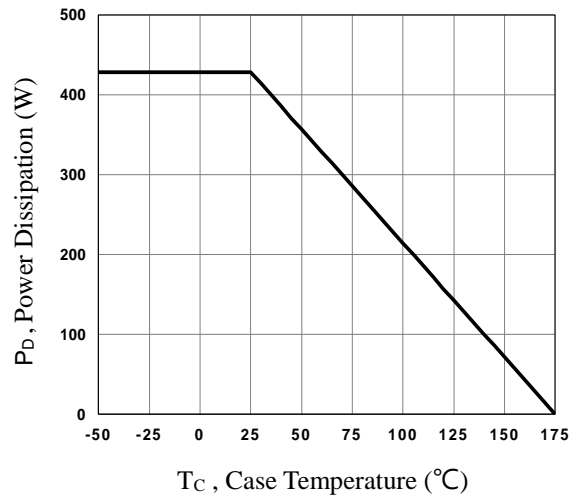
**Fig.7 Capacitance Characteristics**



**Fig.8 Capacitance Characteristics**

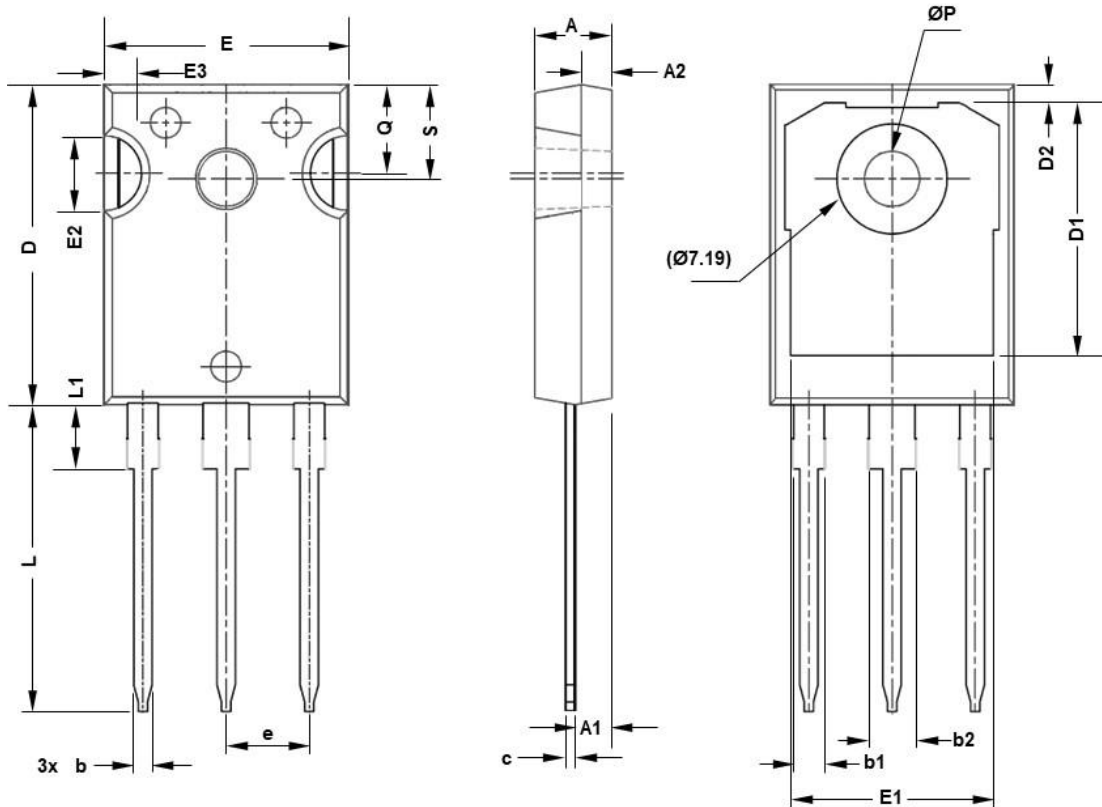


**Fig.9 Continuous Drain Current vs.  $T_c$**



**Fig.10 Power Dissipation Derating vs.  $T_c$**

**TO247 PACKAGE INFORMATION**



SYMBOL	mm		SYMBOL	mm	
	MIN	MAX		MIN	MAX
A	4.83	5.21	E2	4.32	5.49
A1	2.29	2.55	E3	2.15	2.80
A2	1.50	2.49	e	5.44BSC	
b	1.12	1.33	L	19.81	20.32
b1	1.91	2.39	L1	4.10	4.40
b2	2.87	3.22	ΦP	3.56	3.65
C	0.55	0.69	Q	5.39	6.20
D	20.80	21.10	S	6.04	6.30
D1	16.25	17.65			
D2	0.51	1.35			
E	15.75	16.13			
E1	13.46	14.16			