

**General Description**

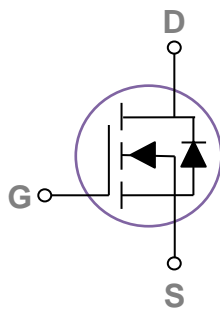
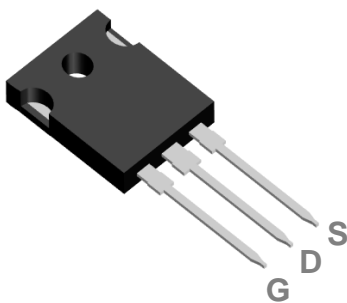
These N-Channel enhancement mode power field effect transistors are using super junction MOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.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

BVDSS	RDSON	ID
600V	115mΩ	30A

**Features**

- 600V,30A,  $R_{DS(ON)} = 115m\Omega @ V_{GS} = 10V$
- Improved dv/dt capability
- Fast switching
- Green Device Available

**TO247 Pin Configuration**



**Applications**

- PFC Power Supply Stages
- Motor Control
- DC-DC Converters
- Adapter

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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	600	V
$V_{GS}$	Gate-Source Voltage	$\pm 30$	V
$I_D$	Drain Current – Continuous ( $T_c=25^\circ C$ )	30	A
	Drain Current – Continuous ( $T_c=100^\circ C$ )	19	A
$I_{DM}$	Drain Current – Pulsed <sup>1</sup>	120	A
EAS	Single Pulse Avalanche Energy	700	mJ
$P_D$	Power Dissipation ( $T_c=25^\circ C$ )	210	W
	Power Dissipation – Derate above 25°C	1.68	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
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	62	°C/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	0.56	°C/W

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=1mA$	600	---	---	V
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=600V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	$\mu\text{A}$
		$V_{DS}=480V, V_{GS}=0V, T_J=125^\circ\text{C}$	---	---	10	$\mu\text{A}$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 30V, V_{DS}=0V$	---	---	$\pm 100$	nA

**On Characteristics**

$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=15A$	---	100	115	m $\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu\text{A}$	2	3	4	V

**Dynamic and switching Characteristics**

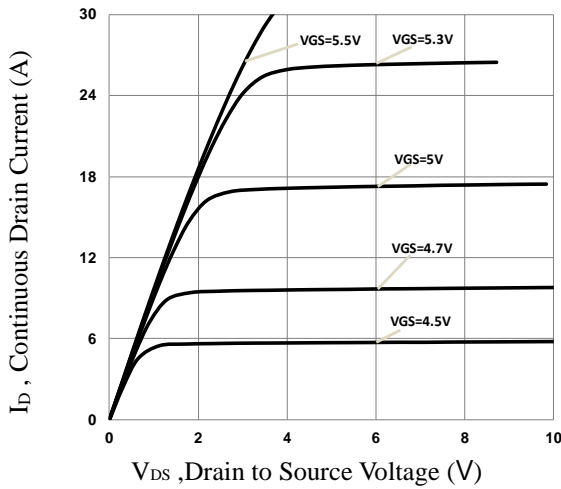
$Q_g$	Total Gate Charge <sup>2,3</sup>	$V_{DS}=480V, V_{GS}=10V, I_D=15A$	---	88	135	nC
$Q_{gs}$	Gate-Source Charge <sup>2,3</sup>		---	10	15	
$Q_{gd}$	Gate-Drain Charge <sup>2,3</sup>		---	37	60	
$T_{d(on)}$	Turn-On Delay Time <sup>2,3</sup>	$V_{DS}=480V, V_{GS}=10V, R_G=25\Omega, I_D=15A$	---	50	75	ns
$T_r$	Rise Time <sup>2,3</sup>		---	110	165	
$T_{d(off)}$	Turn-Off Delay Time <sup>2,3</sup>		---	250	375	
$T_f$	Fall Time <sup>2,3</sup>		---	90	135	
$C_{iss}$	Input Capacitance	$V_{DS}=100V, V_{GS}=0V, F=1\text{MHz}$	---	2580	3900	pF
$C_{oss}$	Output Capacitance		---	115	175	
$C_{rss}$	Reverse Transfer Capacitance		---	15	25	
$R_g$	Total Gate Charge <sup>2,3</sup>	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	---	3	---	$\Omega$

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

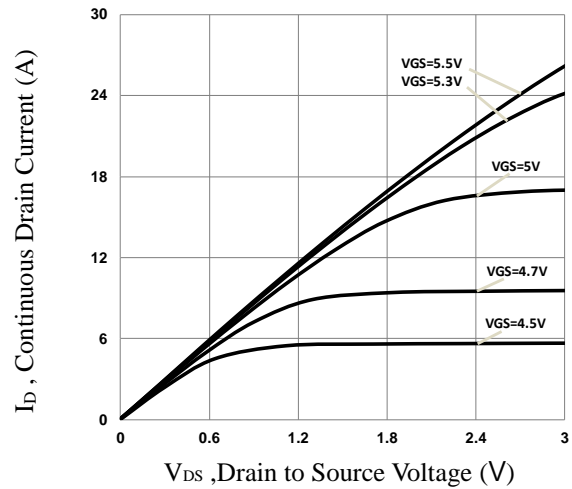
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current	$V_G=V_D=0V, \text{Force Current}$	---	---	30	A
$I_{SM}$	Pulsed Source Current		---	---	60	A
$V_{SD}$	Diode Forward Voltage	$V_{GS}=0V, I_S=15A, T_J=25^\circ\text{C}$	---	---	1.4	V
$t_{rr}$	Reverse Recovery Time	$V_R=400V, I_S=10A$	---	370	---	ns
$Q_{rr}$	Reverse Recovery Charge	$di/dt=100A/\mu\text{s}, T_J=25^\circ\text{C}$	---	5.2	---	$\mu\text{C}$

Note :

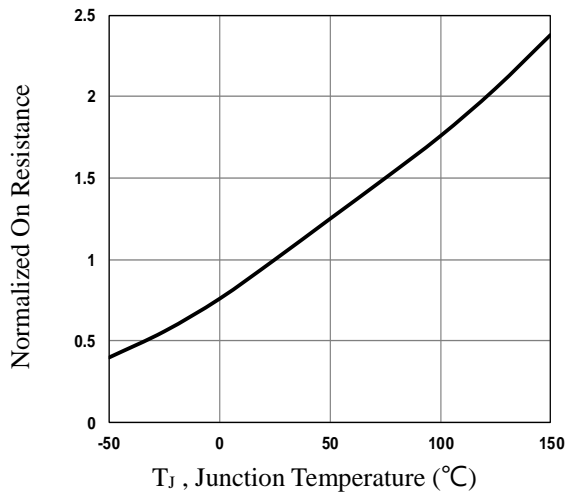
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width  $\leq 300\mu\text{s}$  , duty cycle  $\leq 2\%$ .
3. Essentially independent of operating temperature.



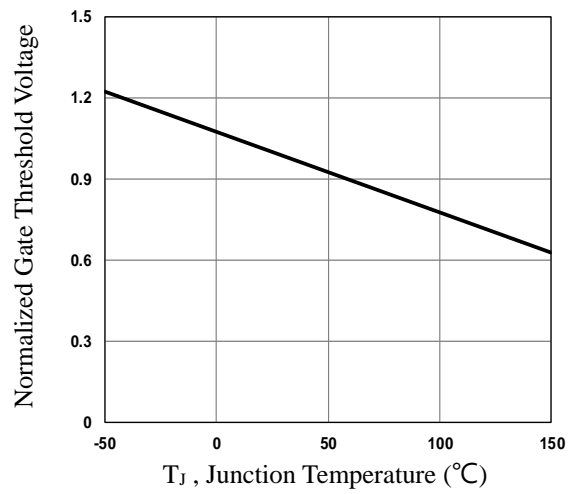
**Fig.1 Typical Output Characteristics**



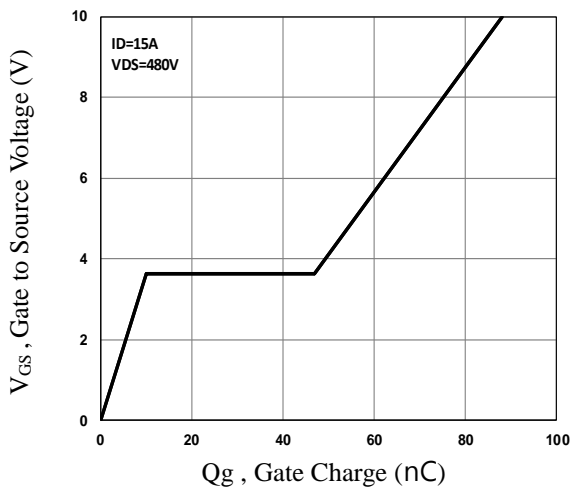
**Fig.2 Typical Output Characteristics**



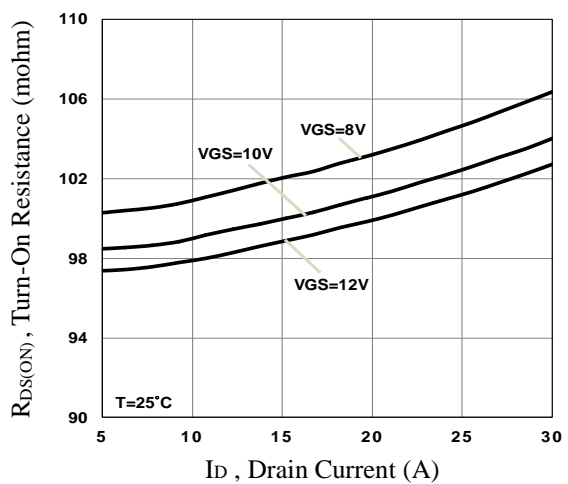
**Fig.3 Normalized  $R_{DS(on)}$  vs.  $T_J$**



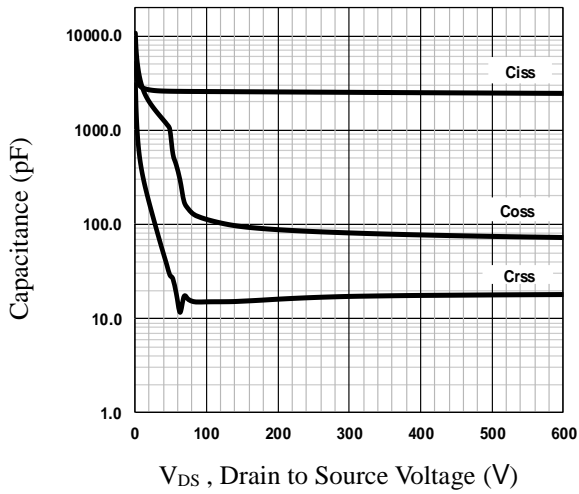
**Fig.4 Normalized  $V_{th}$  vs.  $T_J$**



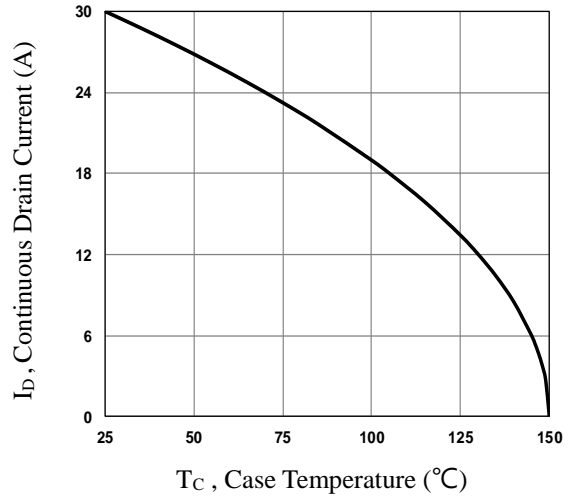
**Fig.5 Gate Charge Characteristics**



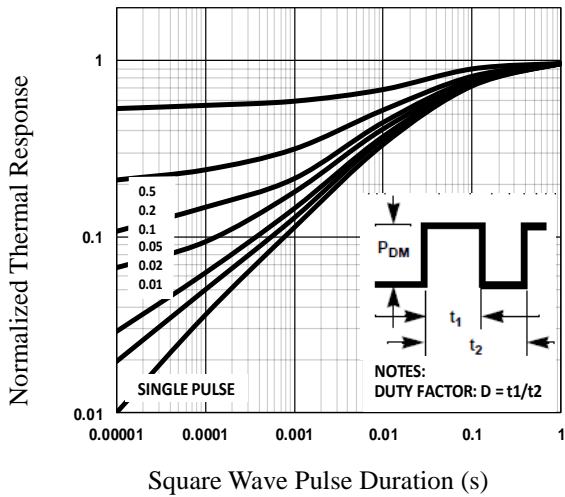
**Fig.6 Turn-On Resistance vs.  $I_D$**



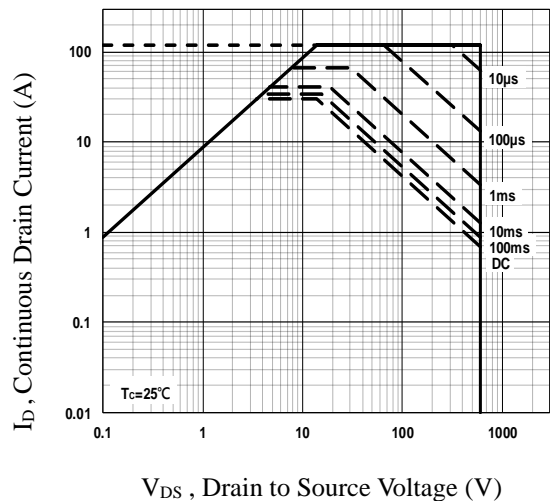
**Fig.7 Capacitance Characteristics**



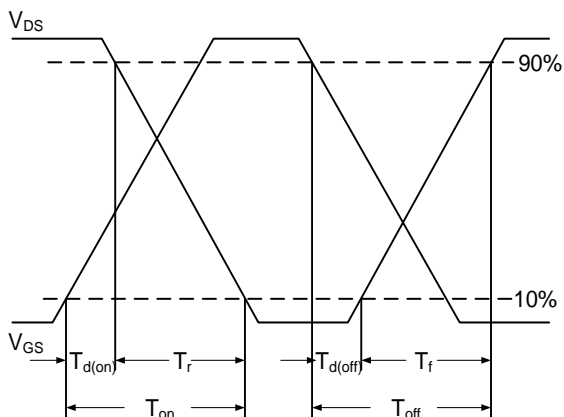
**Fig.8 Continuous Drain Current vs.  $T_c$**



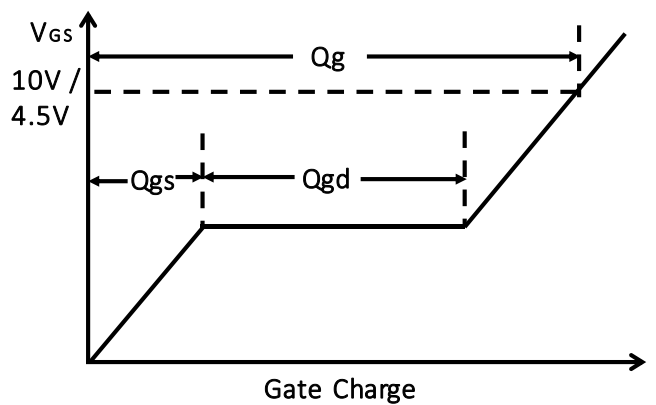
**Fig.9 Normalized Transient Impedance**



**Fig.10 Maximum Safe Operation Area**



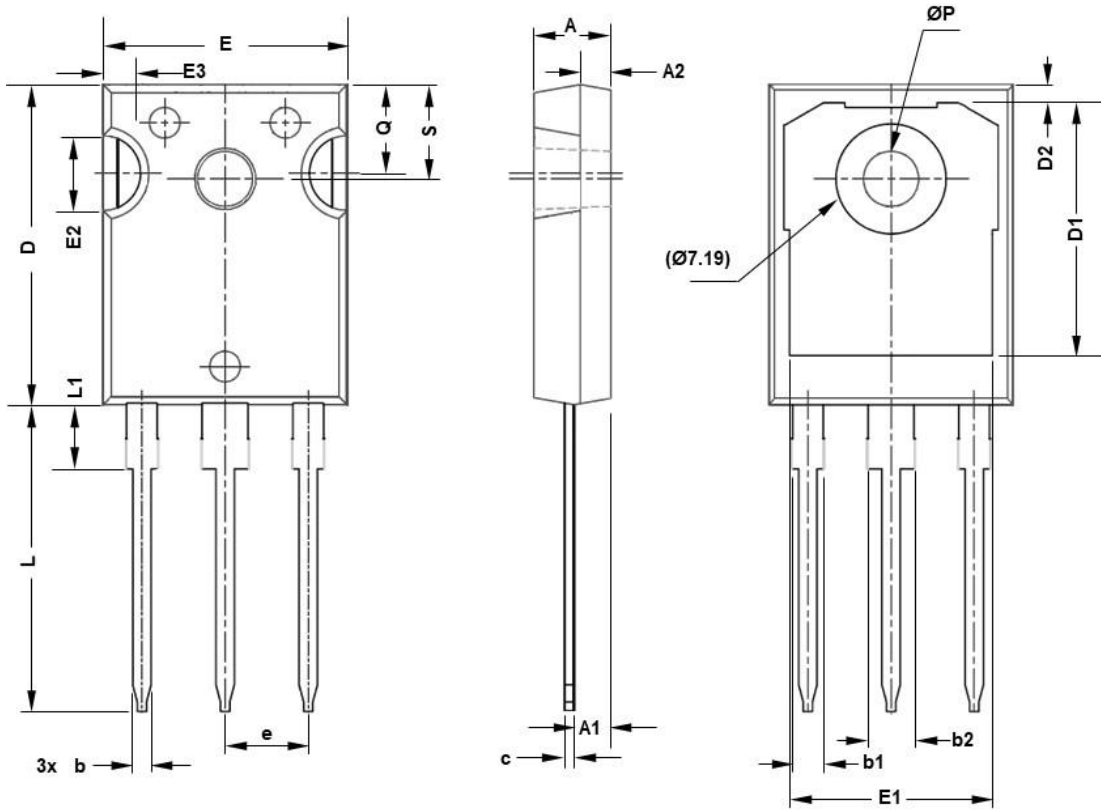
**Fig.11 Switching Time Waveform**



**Fig.12 Gate Charge Waveform**

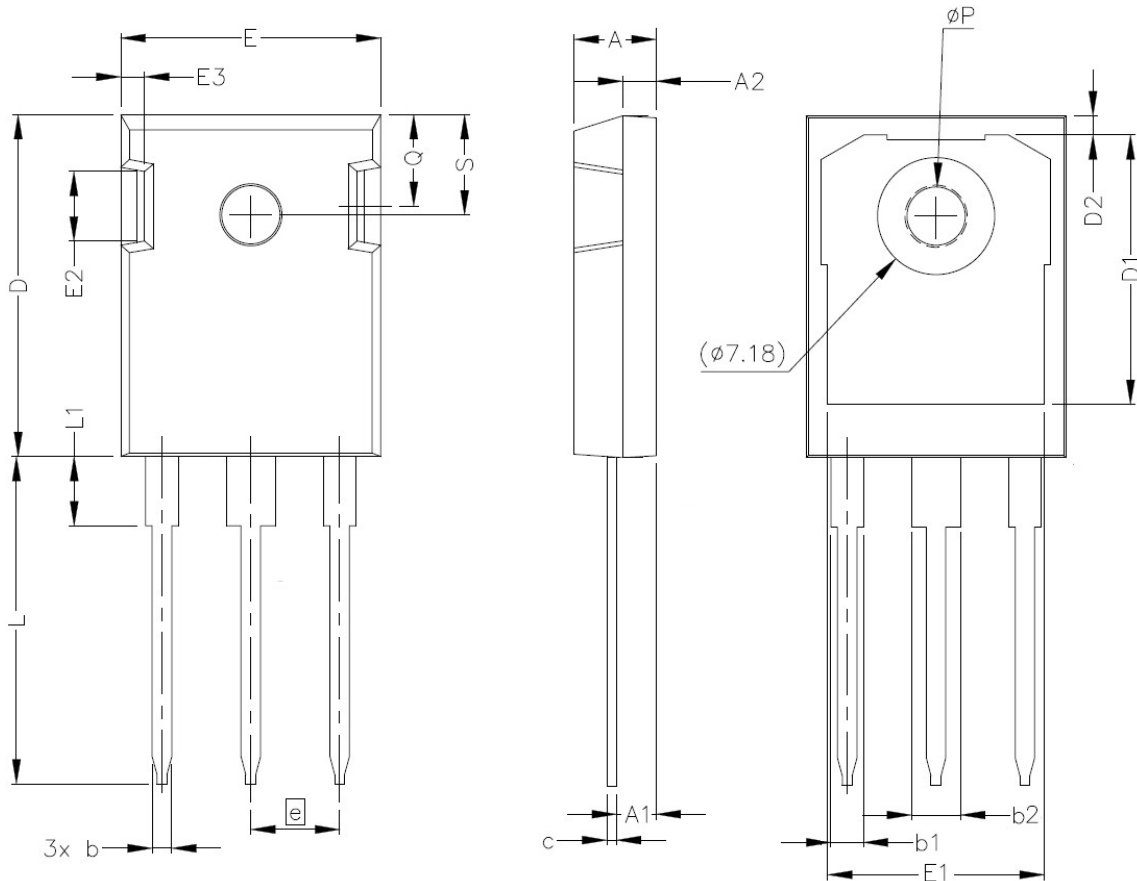
**TO247 PACKAGE INFORMATION**

**VERSION A**



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			

VERSION B



SYMBOL	mm		SYMBOL	mm	
	MIN	MAX		MIN	MAX
A	4.75	5.25	E2	3.70	5.30
A1	2.16	2.66	E3	1.00	2.75
A2	1.75	2.25	e	5.44BSC	
b	1.07	1.35	L	19.52	20.32
b1	1.90	2.41	L1	4.10	4.40
b2	2.87	3.38	ΦP	3.35	3.85
C	0.50	0.70	Q	5.40	6.20
D	20.60	21.40	S	6.15BSC	
D1	16.15	17.65			
D2	0.95	1.35			
E	15.50	16.10			
E1	12.40	13.60			