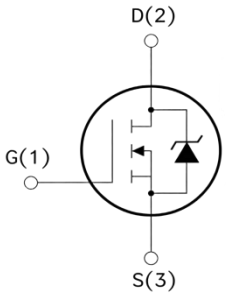
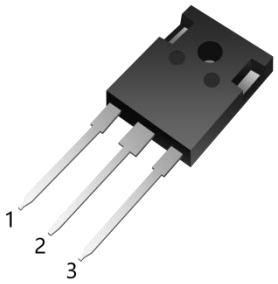
Silicon Carbide Power MOSFET

Parameter	Value	Unit
V_{DS}	1200	V
I_D	115	A
$R_{DS(ON)}$	16	mΩ
Q_G	238	nC





TO-247-3L

Features

- High Speed Switching with Low Capacitances
- High Blocking Voltage with Low $R_{DS(on)}$
- Low impedance package with driver source pin
- Easy to parallel and simple to drive

Applications

- Motor Driver
- Compressor Inverter
- Photovoltaic (PV) Inverter
- High Voltage DC/DC Converters
- Switched-Mode Power Supply(SMPS)

Absolute Maximum Ratings (at T_J=25℃ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-source Voltage	V_{DS}	1200	V
Gate-source Voltage	V_{GS}	-10/+22	V
Drain Current (continuous;Tc=25°C)	I_D	115	A
Drain Current (continuous;Tc=100°C)		85	
Drain Current (pulsed)	I_{DM}	250	A
Power Dissipation (Tc=25°C)	P_D	550	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +175	°C
Thermal Resistance from Junction to Case	$R_{\theta JC}$	0.27	°C/W
Thermal Resistance From Junction to Ambient	$R_{\theta JA}$	40	

Electrical Characteristics

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Static characteristics (at T_C=25°C unless otherwise specified)						
Drain-Source Breakdown Voltage	B_{VDS}	V_{GS}=0V; I_D=250uA	1200	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=1200V; V_{GS}=0V	-	5	100	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=-10/+20V; V_{DS}=0V	-	10	250	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}; I_{DS}=22mA	2	3	4	V
Recommended Turn-on Voltage	$V_{GS(on)}$	Static	-	18	-	V
Recommended Turn-off Voltage	$V_{GS(off)}$		-	-5	-	V
Static Drain-Source on Resistance	$R_{DS(on)}$	V_{GS}=18V; I_D=50A	-	16	22	mΩ
		V_{GS}=18V; I_D=50A; T_J=175°C	-	28	-	
Dynamic characteristics (at T_C=25°C unless otherwise specified)						
Input Capacitance	C_{iss}	V_{DS}=1000V; f=1MHz; V_{AC}=25mV	-	6878	-	pF
Output Capacitance	C_{oss}		-	288	-	
Reverse Transfer Capacitance	C_{rss}		-	13	-	
Transconductance	g_{fs}	V_{DS}=20V; I_D=50A	-	51	-	S
C_{OSS} Stored Energy	E_{OSS}	V_{DS}=1000V; f=1MHz	-	141	-	uJ
Turn-on Energy	E_{on}	V_{DS}=800V; V_{GS}=-5/+18V; I_D=50A; Load=68μH; T_J=175°C	-	2.57	-	mJ
Turn-off Energy	E_{off}		-	1.59	-	
Total Gate Charge	Q_G	V_{DS}=800V; V_{GS}=-5/+18V; I_D=50A	-	238	-	nC
Gate-Source Charge	Q_{GS}		-	76.7	-	
Gate-Drain Charge	Q_{GD}		-	78.3	-	
Internal Gate Resistor	R_{Gint}	f=1MHz; V_{AC}=25mV	-	2.2	-	Ω
Turn-on Delay Time	$t_{d(on)}$	V_{DS}=800V; V_{GS}=-5/+18V; I_D=50A; $R_{g(ext)}$=2.5Ω; Load=68μH	-	38	-	ns
Rise Time	t_r		-	52	-	
Turn-off Delay Time	$t_{d(off)}$		-	75	-	
Fall Time	t_f		-	42	-	

Reverse SiC Diode Characteristics(at T_J=25℃ unless otherwise specified)

Parameter	Symbol	Conditions	Values			Units
			Min.	Typ.	Max.	
Diode Forward Voltage	V_{FSD}	V_{GS}=0V; I_F=37.5A; T_J=25°C	-	3.5	6	V
		V_{GS}=0V; I_F=37.5A; T_J=175°C	-	3.0	6	
Continuous Diode Forward Current	I_S	V_{GS}=0V; T_C=25°C	-	110	-	A
Reverse Recovery Time	t_{RR}	V_R=800V; V_{GS}=-5V; I_F=50A; di/dt=900A/μs; T_J=175°C	-	56	-	ns
Reverse Recovery Charge	Q_{RR}		-	613	-	nC
Peak Reverse Recovery Current	I_{RRM}		-	18	-	A

Typical Characteristics

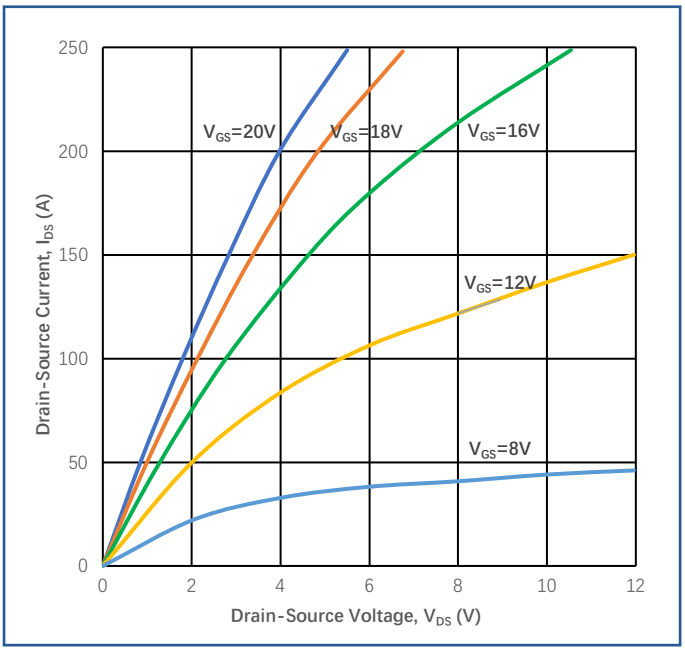


Fig 1

Output Characteristics (T_J=25 °C)

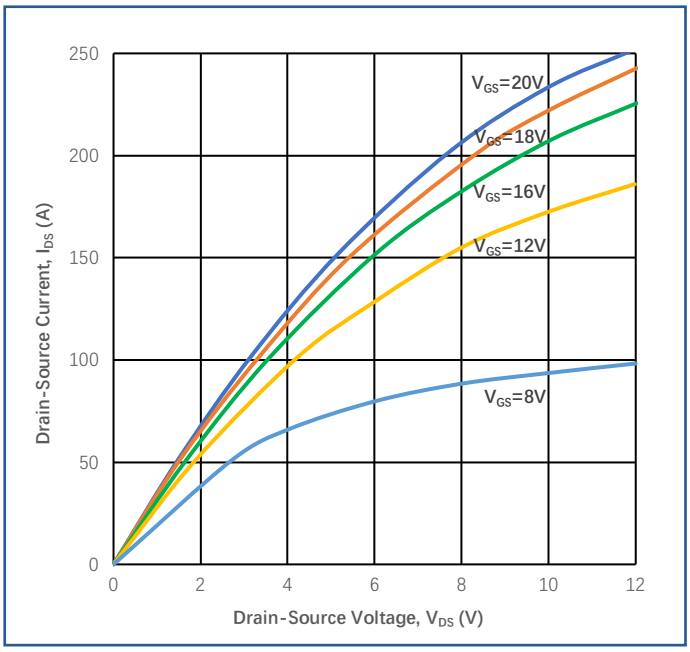


Fig 2

Output Characteristics (T_J=175°C)

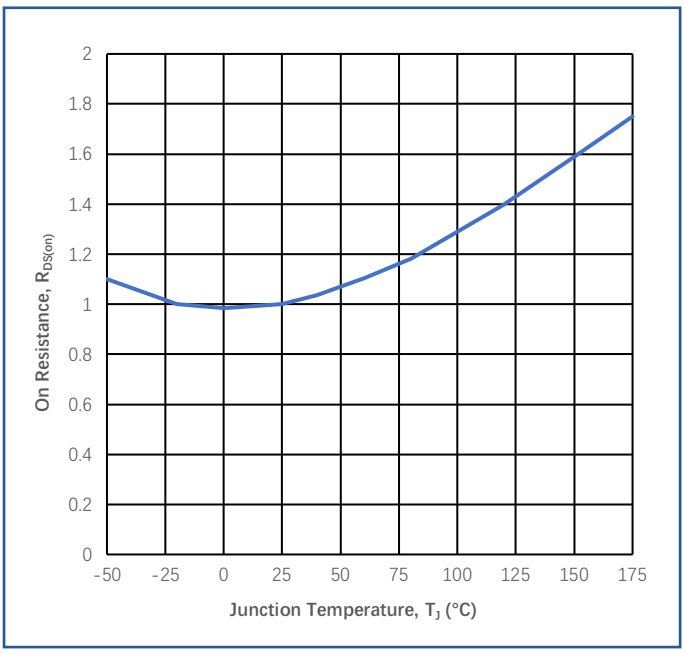


Fig 3

Normalized On-Resistance vs. Temperature

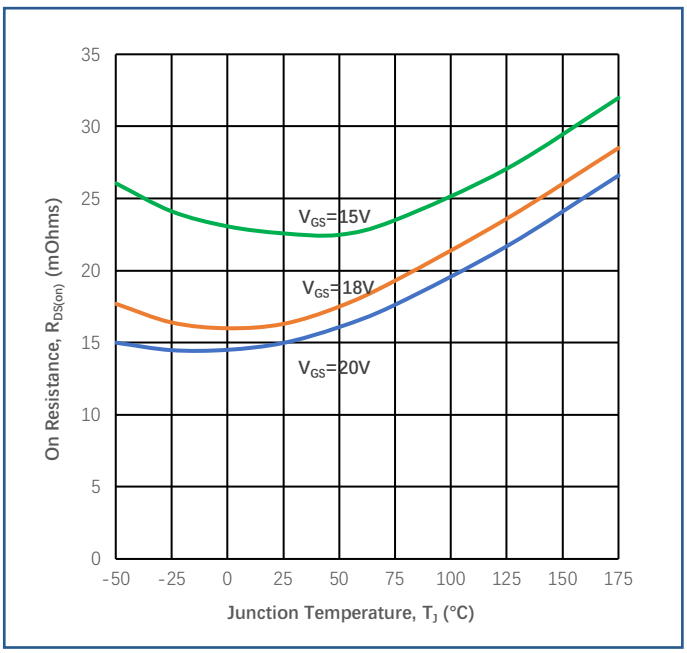


Fig 4

On-Resistance vs. Temperature

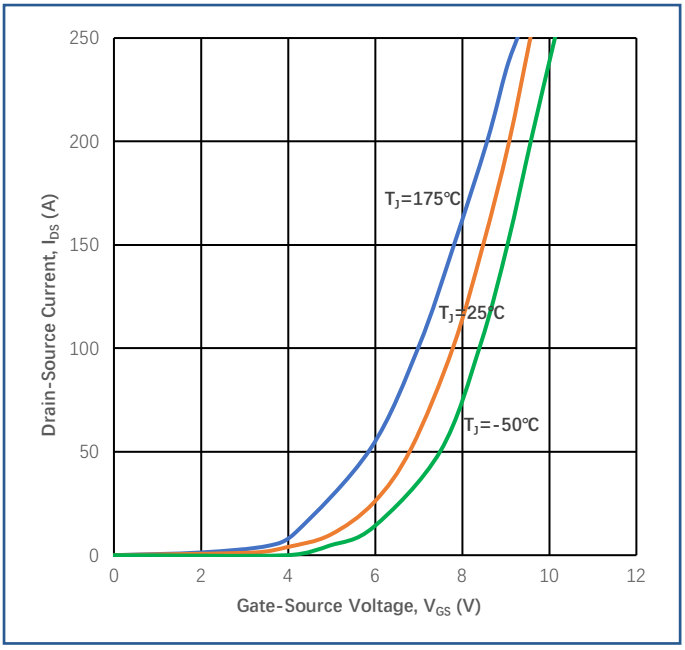


Fig 5
Transfer Characteristic

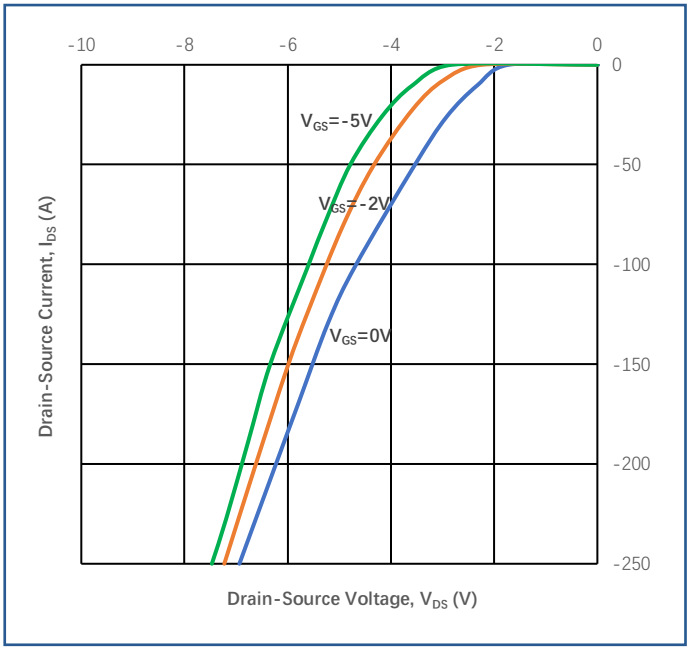


Fig 6
Body Diode Characteristic at 25°C

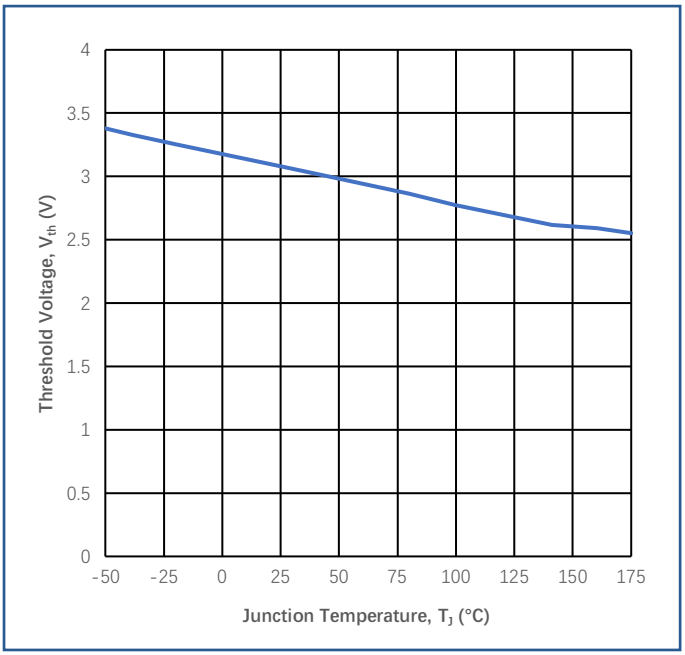


Fig 7
Threshold Voltage vs. Temperature

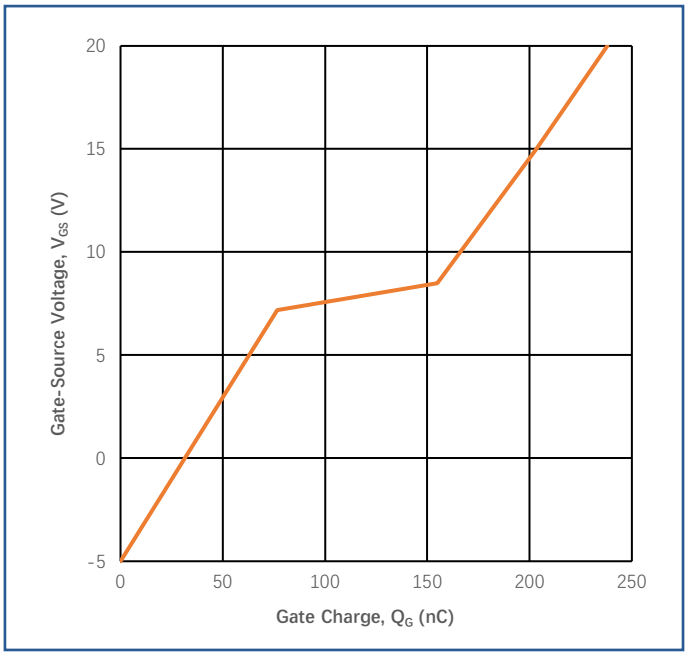


Fig 8
Gate Charge Characteristics

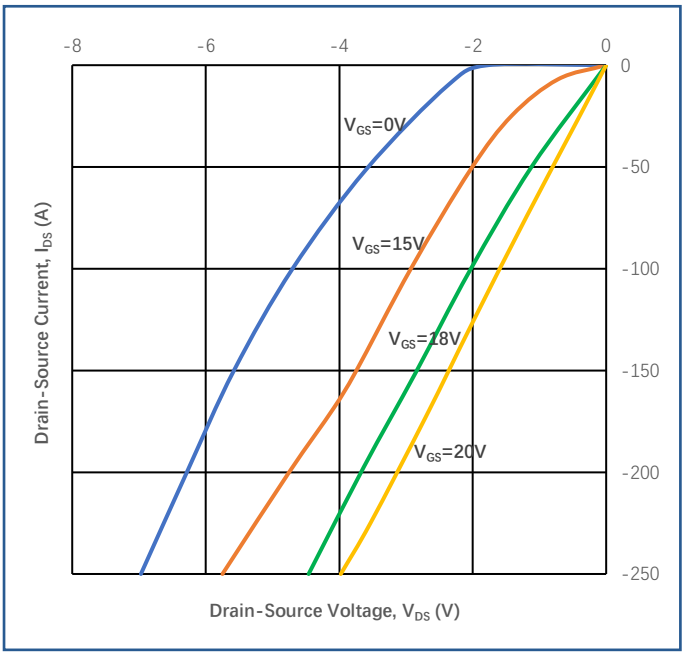


Fig 9

3rd Quadrant Characteristic at 25°C

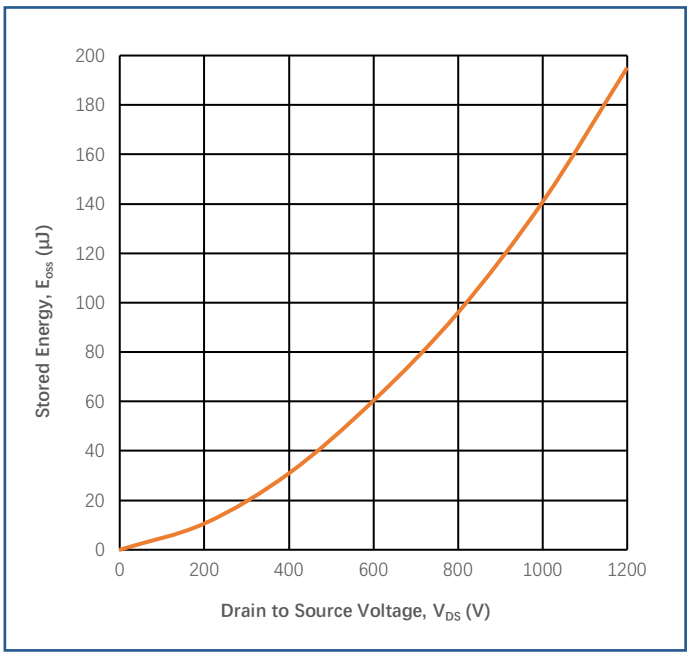


Fig 10

Output Capacitor Stored Energy

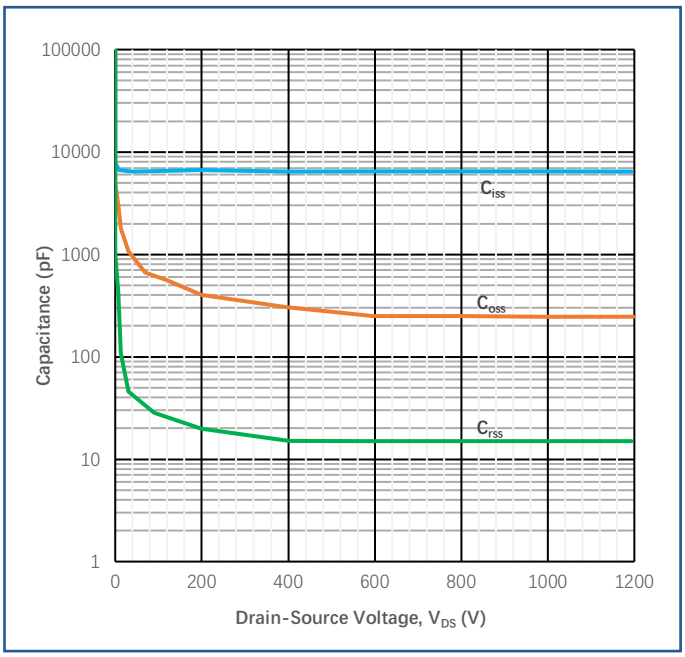


Fig 11

Capacitances vs. Drain-source

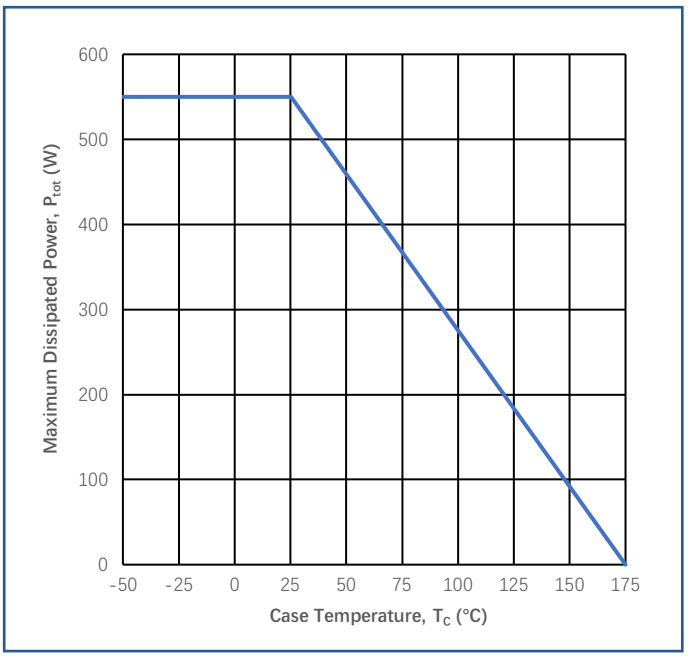
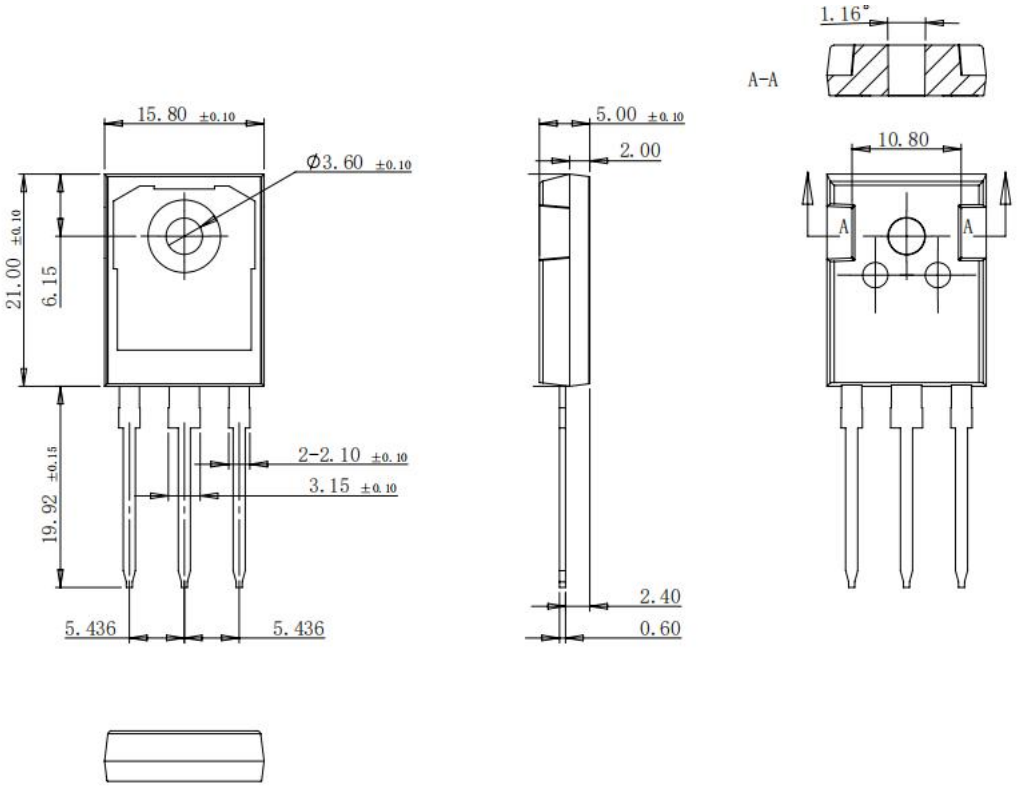


Fig 12

Max Power Dissipation Derating vs T_C

Package Outlines(Unit:mm)

TO-247-3L



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