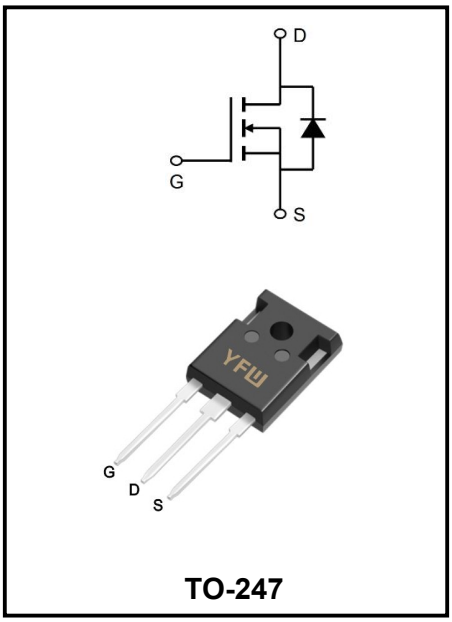
1200V SiC N-Channel MOSFET

MAIN CHARACTERISTICS

I_D	74A
V_{DS}	1200V
R_{DSON}-typ (@V_{GS}=18V T_C=25°C)	＜50mΩ(Typ:33mΩ)



TO-247

FEATURES

- High Speed Switching with Low Capacitances
- High Blocking Voltage with Low RDS(on)
- Easy to Parallel
- Simple to Drive
- RoHS Compliant

BENEFITS

- Increased Power Density
- Faster Operating Frequency
- Reduction of Heat Sink Requirements
- Higher Efficiency
- Reduced EMI

APPLICATIONS

- Power Factor Correction Modules
- Switch Mode Power Supplies
- DC-AC Inverters
- High Voltage DC/DC Converters

Maximum Ratings at Tc=25°C unless otherwise specified

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	1200	V
Gate-Source Voltage	V_{GS}	-8/+22	V
Recommended Operation Value	V_{GSop}	-4/+18	V
Continue Drain Current Tc=25℃	I_D	74	A
Continue Drain Current Tc=100℃		52	
Pulsed Drain Current	I_{DM}	150	A
Power Dissipation Tc=25℃	P_D	312	W
Power Dissipation Tc=100℃		156	W
Operating Temperature Range	T_J	-40 to +175	°C
Storage Temperature Range	T_{STG}	-40 to +175	°C
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.48	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	26.8	°C/W

Note1:Pulse test: 300 μs pulse width, 2 % duty cycle

Electrical Characteristics at Tc=25°C unless otherwise specified

Parameter	Test Condition	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{GS} = 0 V,I_D = 100μA	BV_{DSS}	1200	-	-	V
Drain-Source Leakage Current	V_{DS} = 1200 V, V_{GS} = 0 V	I_{DSS}	-	1	5	μA
Gate Leakage Current	V_{GS} = 18 V, V_{DS} = 0 V	I_{GSS}	-	-	250	nA
Gate-Source Threshold Voltage	V_{DS} = V_{GS} , I_D = 10 mA	$V_{GS(th)}$	2	2.6	4	V
	V_{DS} = V_{GS} , I_D = 10 mA T_J = 175℃		-	2	-	V
Drain-Source On-State Resistance	V_{GS} = 18 V, I_D = 40 A	$R_{DS(ON)}$	-	33	50	mΩ
	V_{GS} = 18 V, I_D = 40 A,T_J = 175℃		-	47	-	mΩ
Internal Gate Resistance	f=1MHz	RG(int)	-	2.1	-	Ω
Input Capacitance	V_{DS}=1000V V_{GS}=0V f=100kHz	C_{iss}	-	2975	-	pF
Output Capacitance		C_{oss}	-	119	-	pF
Reverse Transfer Capacitance		C_{rss}	-	12	-	pF
Coss Stored Energy		E_{oss}	-	175	-	μJ
Total Gate Charge(Note2)	I_D =40A V_{DD} =800V V_{GS} =-4/+ 18 V	Q_g	-	117	-	nC
Gate to Source Charge(Note2)		Q_{gs}	-	38	-	nC
Gate to Drain Charge(Note2)		Q_{gd}	-	27	-	nC
Turn-on Switching Energy	V_{DS} = 800 V, I_D =40A V_{GS} = -4/+18 V RG(int) = 2.5 Ω L=200μH	E_{on}	-	485	-	μJ
Turn-off Switching Energy		E_{off}	-	75	-	μJ
Turn-on Delay Time(Note2)		$t_{d(on)}$	-	18	-	ns
Rise Time(Note2)		t_r	-	21	-	ns
Turn-Off Delay Time(Note2)		$t_{d(OFF)}$	-	31	-	ns
Fall Time(Note2)		t_f	-	9	-	ns
Maximun Body-Diode Continuous Current	V_{GS} = -4 V, Tc=25°C	I_S	-	45	-	A
	V_{GS} = -4 V, Tc=100°C		-	20	-	A
Maximun Body-Diode Pulsed Current(Note2)		I_{SM}	-	150	-	A
Drain-Source Diode Forward Voltage	V_{GS} = -4 V, I_{SD} = 20 A	V_{SD}	-	5	6.6	V
	V_{GS}= -4 V, I_{SD}=20A, Tj=175℃		-	4.4	-	V
Reverse Recovery Time(Note2)	V_{GS} = -4 V， I_{SD} = 20 A, V_R =800V, dIF/dt =3900A/μs	trr	-	19	-	ns
Reverse Recovery Charge(Note2)		Qrr	-	500	-	nC
Peak Reverse Recovery Current		Irrm	-	50	-	A

Note2:Pulse test: 300 μs pulse width, 2 % duty cycle

RATINGS AND CHARACTERISTIC CURVES

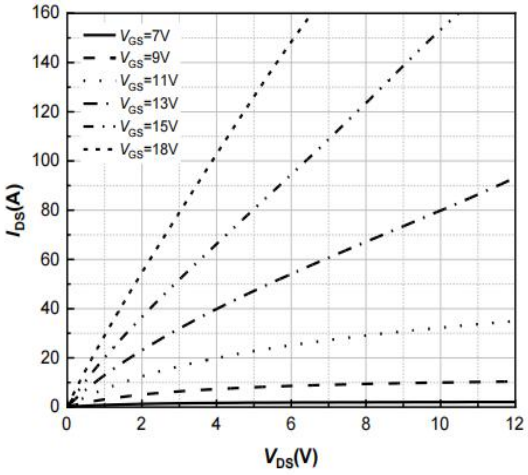


Figure 1. **Output Characteristics T_j=-40°C**

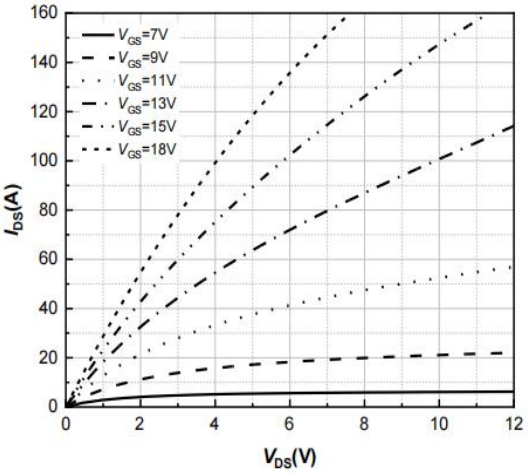


Figure 2. **Output Characteristics T_j=25°C**

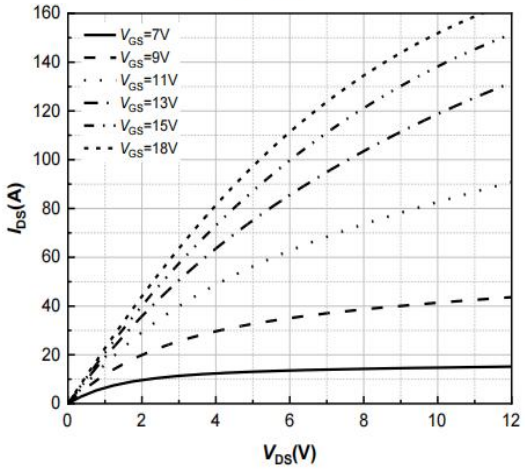


Figure 3. **Output Characteristics T_j=175°C**

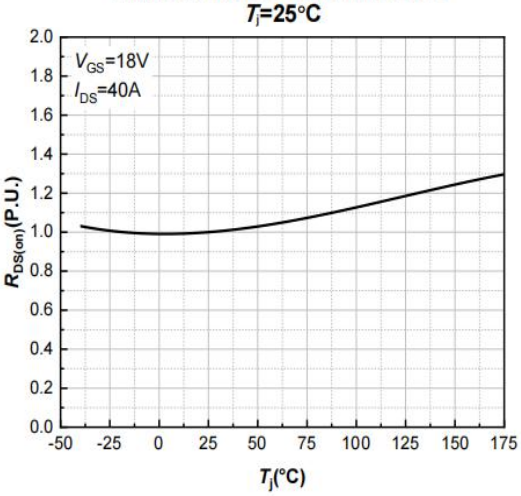


Figure 4. **Normalized On-Resistance vs. Temperature**

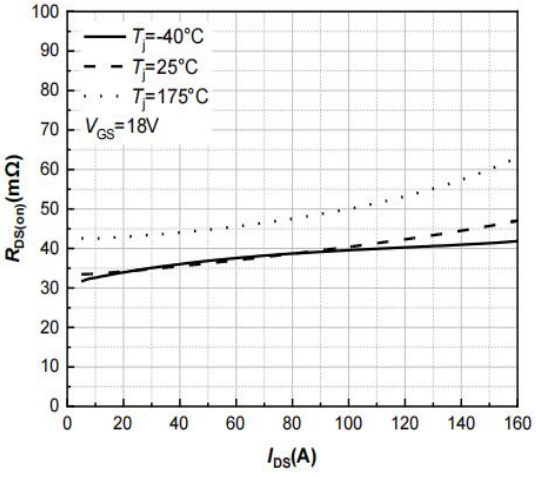


Figure 5. **On-Resistance vs. Drain Current For Various Temperatures**

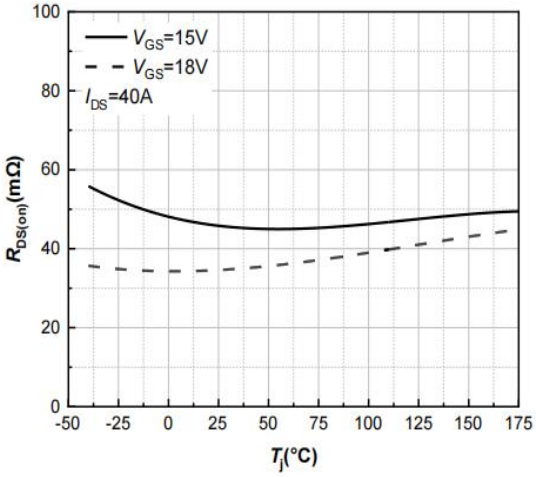


Figure 6. **On-Resistance vs. Temperature For Various Gate Voltage**

RATINGS AND CHARACTERISTIC CURVES

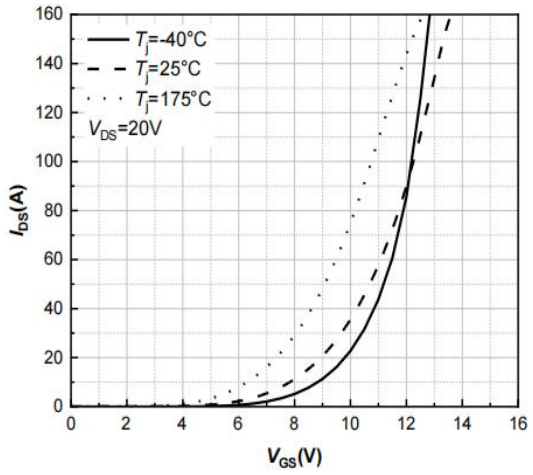


Figure 7. **Transfer Characteristic for Various Junction Temperatures**

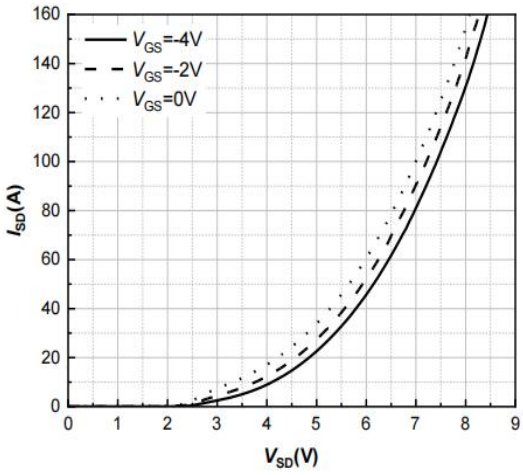


Figure 8. **Body Diode Characteristic T_j=-40°C**

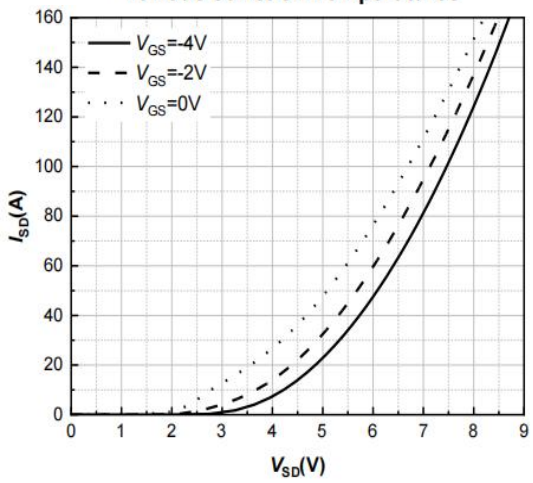


Figure 9. **Body Diode Characteristic T_j=25°C**

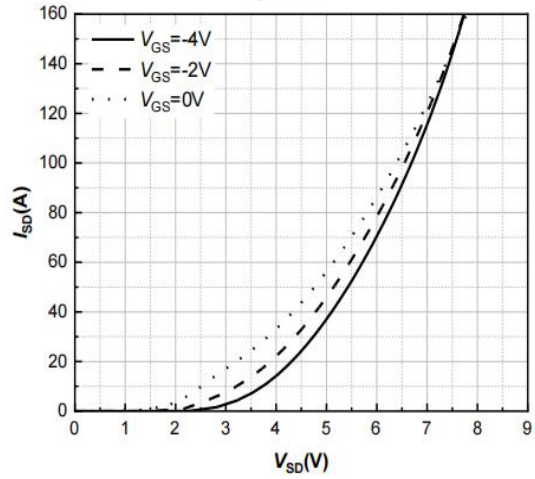


Figure 10. **Body Diode Characteristic T_j=175°C**

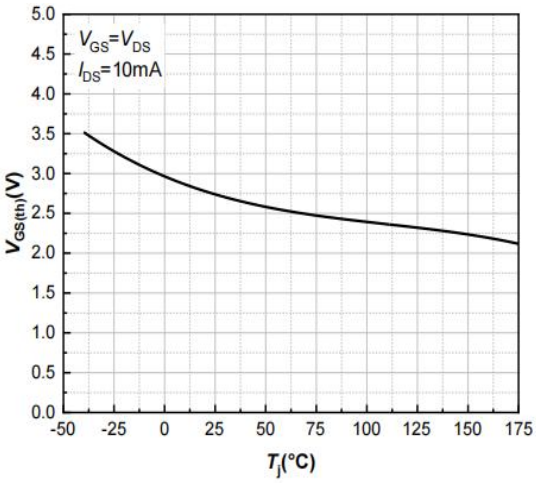


Figure 11. **Threshold Voltage vs. Temperature**

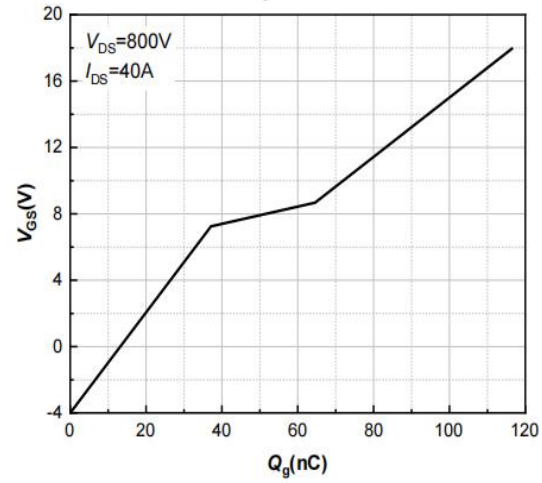


Figure 12. **Gate Charge Characteristics**

RATINGS AND CHARACTERISTIC CURVES

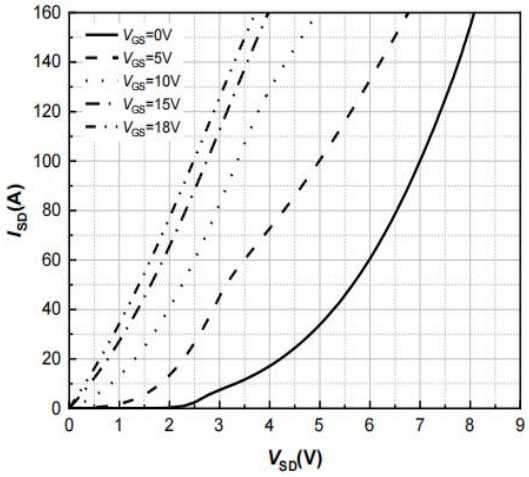


Figure 13. **3rd Quadrant Characteristic T_j=-40°C**

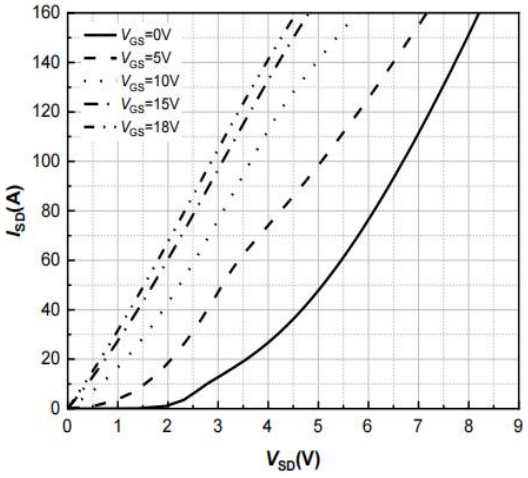


Figure 14. **3rd Quadrant Characteristic T_j=25°C**

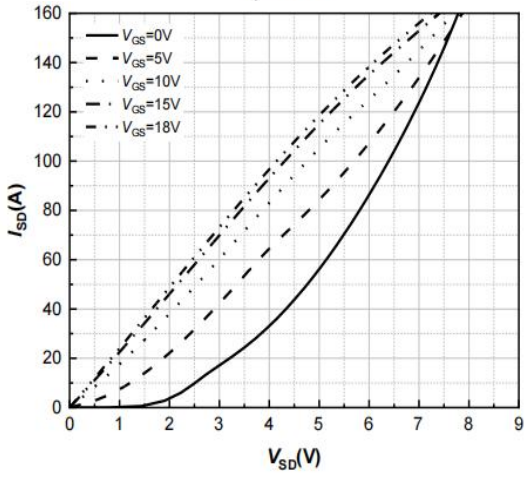


Figure 15. **3rd Quadrant Characteristic T_j=175°C**

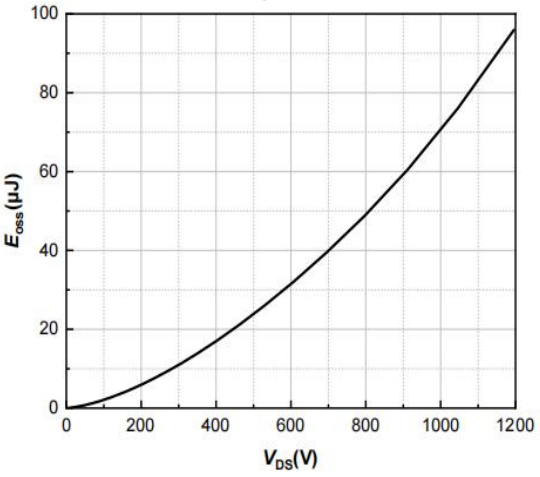


Figure 16. **Output Capacitor Stored Energy**

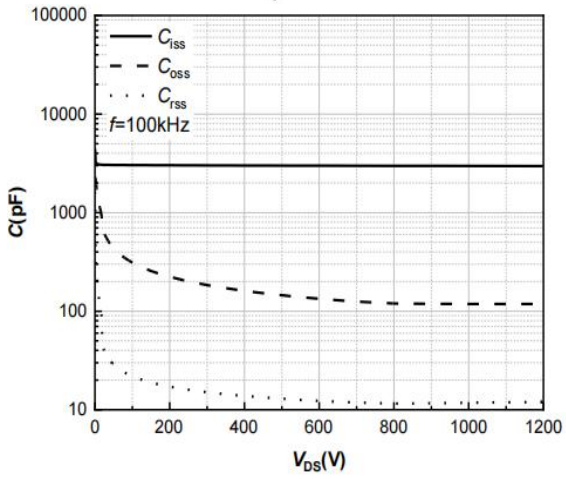


Figure 17. **Capacitances vs. Drain-Source**

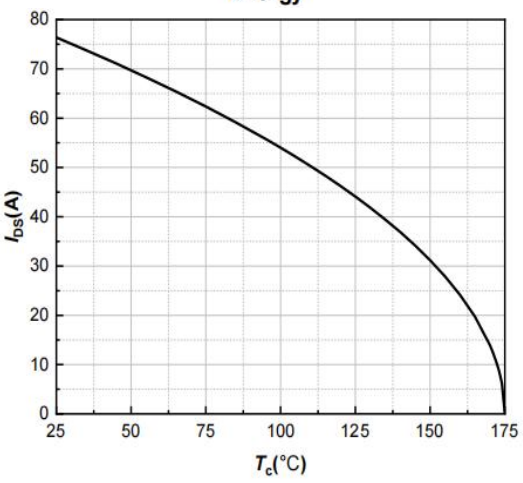


Figure 18. **Continuous Drain Current Derating vs. Case Temperature**

RATINGS AND CHARACTERISTIC CURVES

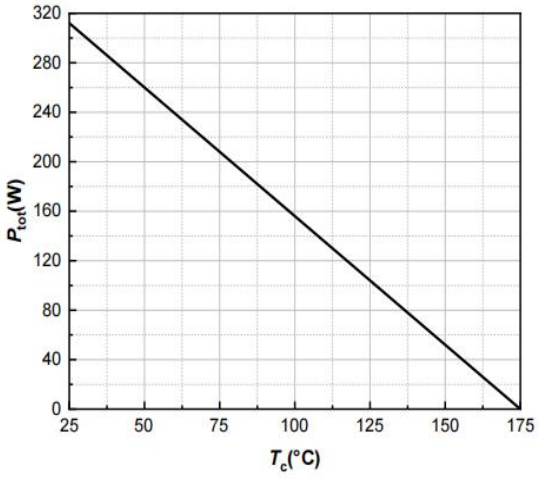


Figure 19. **Maximum Power Dissipation Derating vs. Case Temperature**

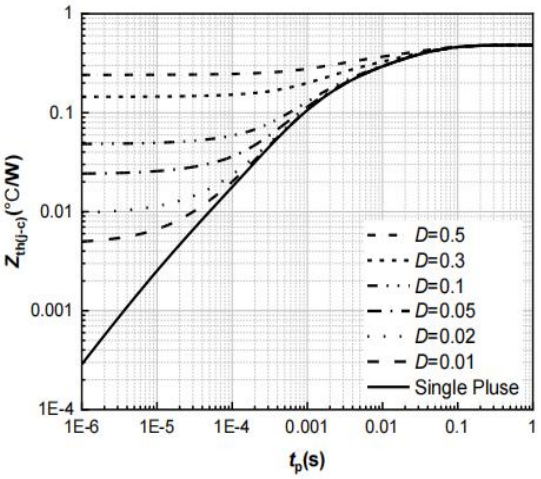


Figure 20. **Transient Thermal Impedance**

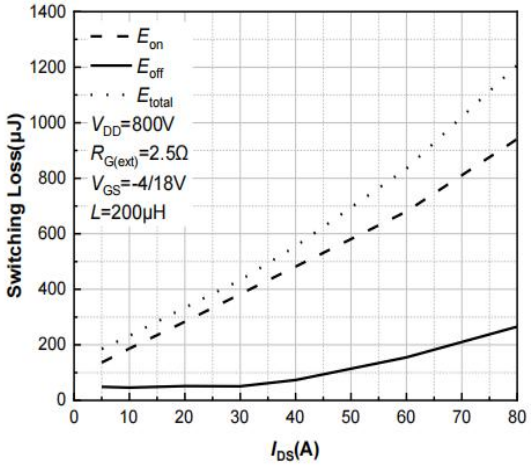


Figure 21. **Clamped Inductive Switching Energy vs. Drain Current**

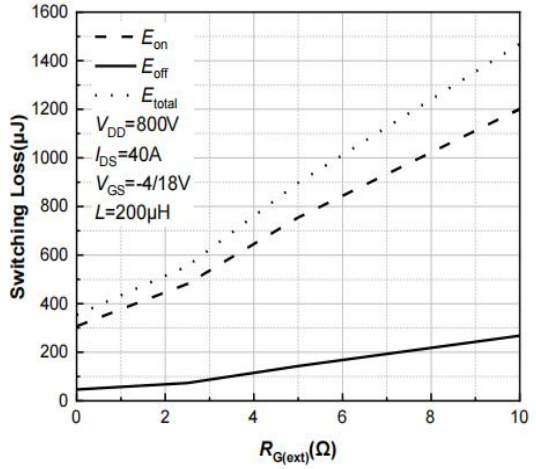


Figure 22. **Clamped Inductive Switching Energy vs. $R_{G(ext)}$**

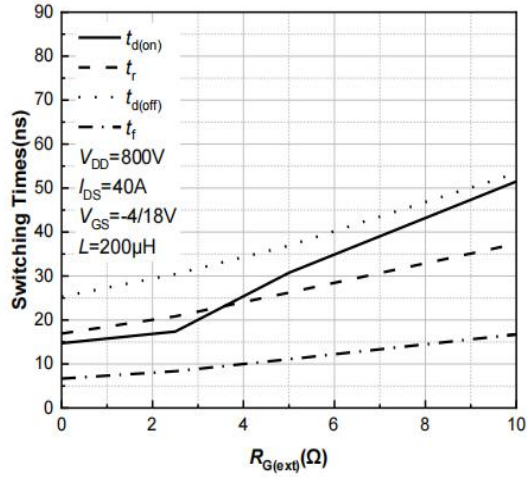


Figure 23. **Switching Times vs. $R_{G(ext)}$**

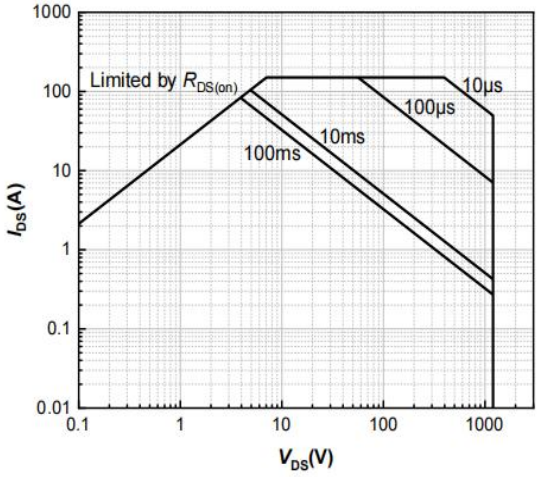
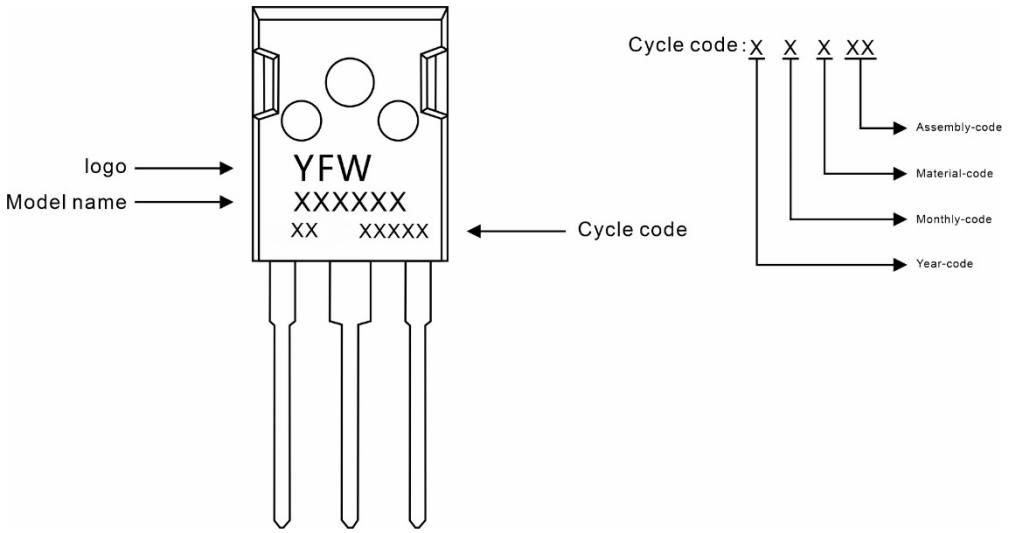


Figure 24. **Safe Operating Area**

Marking Diagram

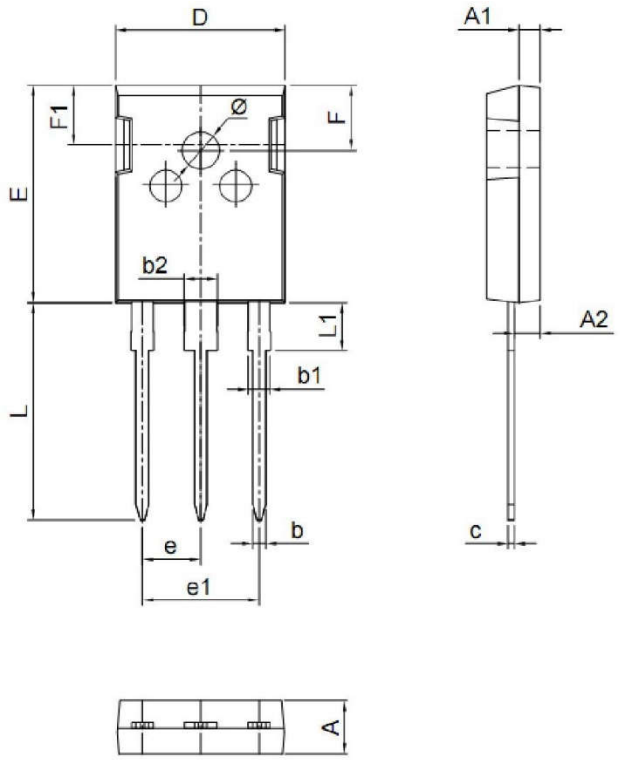


Ordering information

Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFWM3033120APG3	TO-247	0.209oz(5.93g)	30pcs/tube	600PCS/Box 2400PCS/Carton

Package Dimensions

TO-247



Symbol	Dimensions in mm		Dimensions in Inch	
	Min.	Max.	Min.	Max.
A	4.90	5.10	0.193	0.201
A1	1.90	2.10	0.075	0.083
A2	2.29	2.54	0.090	0.100
b	1.00	1.40	0.039	0.055
b1	2.00	2.20	0.079	0.087
b2	3.00	3.20	0.118	0.126
c	0.50	0.70	0.020	0.028
D	15.75	16.05	0.620	0.632
E	20.20	20.80	0.795	0.819
e	5.45 (BSC)		0.215 (BSC)	
e1	10.90 (BSC)		0.429 (BSC)	
F	6.05	6.25	0.238	0.246
F1	5.80	6.00	0.228	0.236
L	20.10	20.40	0.791	0.803
L1	4.05	4.35	0.159	0.171
Φ	3.50	3.70	0.138	0.146

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