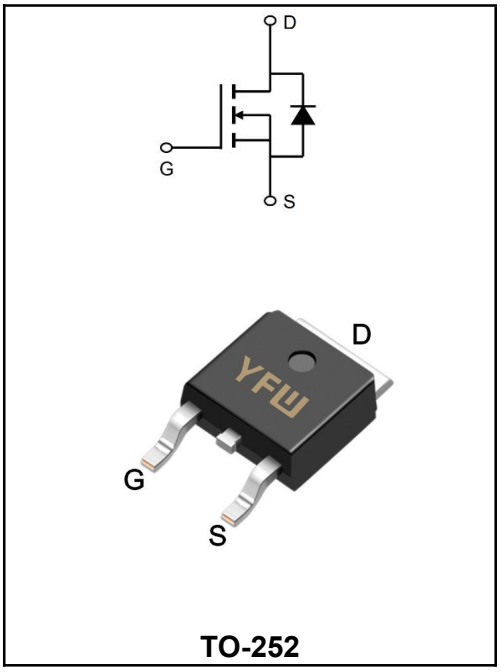
800V SiC N-Channel MOSFET

MAIN CHARACTERISTICS

I_D	13A
V_{DSS}	800V
R_{DSON}-typ (@V_{GS}=18V T_C=25°C)	＜320mΩ(Typ:240mΩ)



TO-252

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}	800	V
Gate-Source Voltage	V_{GS}	-5/+26	V
Recommended Operation Value	V_{GSop}	-4/+18	V
Continue Drain Current T_C=25℃	I_D	13	A
Continue Drain Current T_C=100℃		10	A
Pulsed Drain Current (Note1)	I_{DM}	24	A
Power Dissipation	P_D	28	W
Operating Temperature Range	T_J	-55 to +175	°C
Storage Temperature Range	T_{STG}	-55to +175	°C
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.63	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	30	°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}	800	-	-	V
Drain-Source Leakage Current	V_{DS} = 800 V, V_{GS} = 0 V	I_{DSS}	-	1	10	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 = 1.0 mA	$V_{GS(th)}$	2	3.1	4.2	V
Drain-Source On-State Resistance	V_{GS} = 15 V, I_D = 5A	$R_{DS(ON)}$	-	320	500	mΩ
	V_{GS} = 15 V, I_D =5 A,T_J = 175℃		-	400	-	
	V_{GS} = 18 V, I_D = 5 A		-	240	320	
	V_{GS} = 18 V, I_D =5A,T_J = 175℃		-	280	-	
Input Capacitance	V_{GS} = 0 V, V_{DS} = 500 V, f = 1MHz	C_{iss}	-	210	-	pF
Output Capacitance		C_{oss}	-	13	-	
Reverse Transfer Capacitance		C_{rss}	-	1	-	
Internal Gate Resistance	f=1MHz V_{AC}=25mV	$R_{G(int)}$	-	27	-	Ω
Total Gate Charge(Note2)	I_D = 5 A V_{DD} = 500 V V_{GS} =-4/18 V	Q_g	-	11	-	nC
Gate to Source Charge(Note2)		Q_{gs}	-	3	-	
Gate to Drain Charge(Note2)		Q_{gd}	-	7	-	
Turn-on Delay Time(Note2)	V_{DS} = 500 V I_D = 5 A V_{GS} = -4/18 V R_G = 2.2 Ω	$t_{d(on)}$	-	12	-	ns
Rise Time(Note2)		t_r	-	9	-	
Turn-Off Delay Time(Note2)		$t_{d(OFF)}$	-	20	-	
Fall Time(Note2)		t_f	-	9	-	
Turn-On Energy		E_{on}	-	36	-	μJ
Turn-Off Energy		E_{off}	-	5.9	-	μJ
Maximun Body-Diode Continuous Current	V_{GS}=-4V， Tc=25°C	I_S	-	8.6	-	A
Maximun Body-Diode Pulsed Current(Note2)		I_{SM}	-	-	24	A
Drain-Source Diode Forward Voltage	V_{GS}=-4V, I_{SD}=2.5A Tj=25°C	V_{SD}	-	4.3	-	V
	V_{GS}=-4V,I_{SD}=2.5A Tj=175°C		-	3.6	-	V
Reverse Recovery Time(Note2)	V_{GS}=-4V, I_{SD}=5A, V_R=500V,di/dt=950A/μs	trr	-	14	-	ns
Reverse Recovery Charge(Note2)		Qrr	-	26	-	nC
Peak Reverse Recovery Current		Irrm	-	2.9	-	A

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

RATINGS AND CHARACTERISTIC CURVES

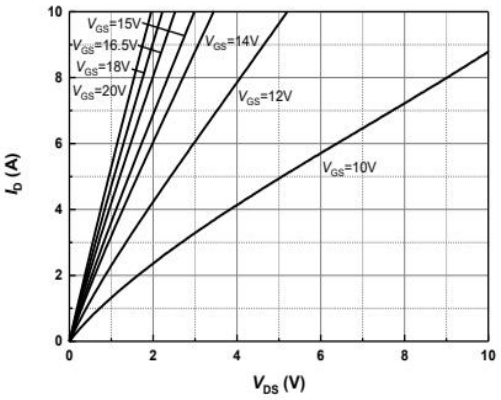


Figure 1 Typical Forward Output Characteristics at T_j=25°C

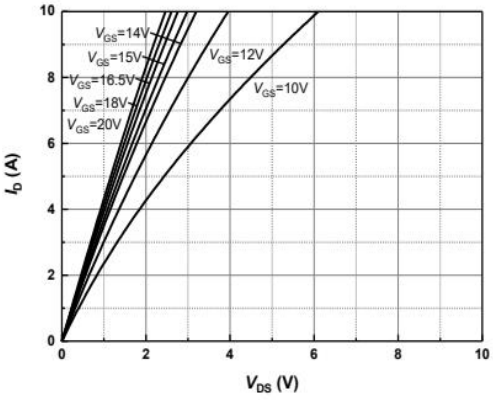


Figure 2 Typical Forward Output Characteristics at T_j=175°C

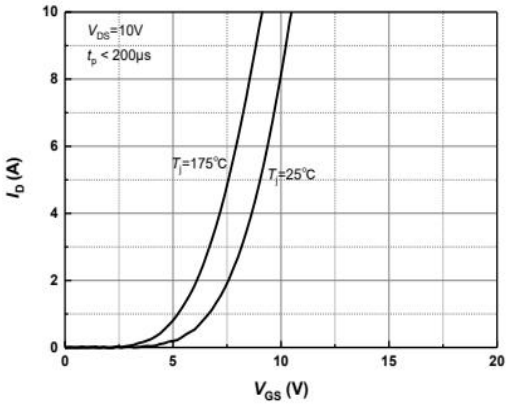


Figure 3 Transfer Characteristics for Various Temperatures

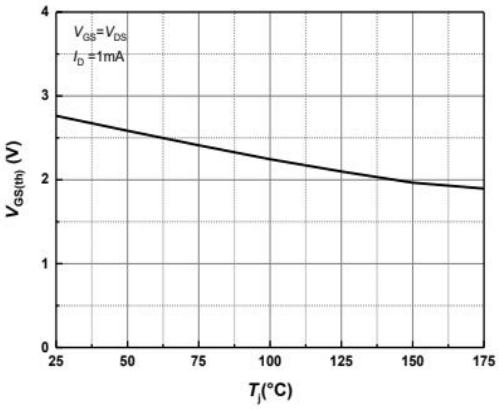


Figure 4 Threshold Voltage vs. Temperature

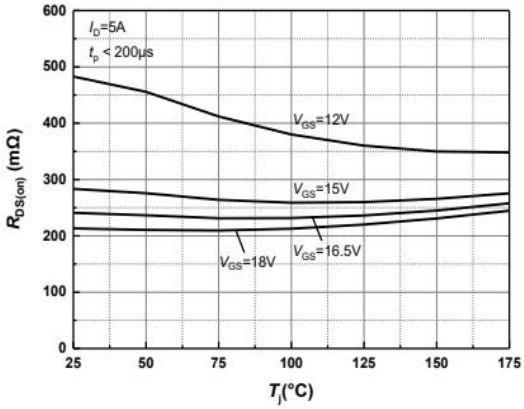


Figure 5 On-Resistance vs. Temperature for Various Gate-Source Voltages

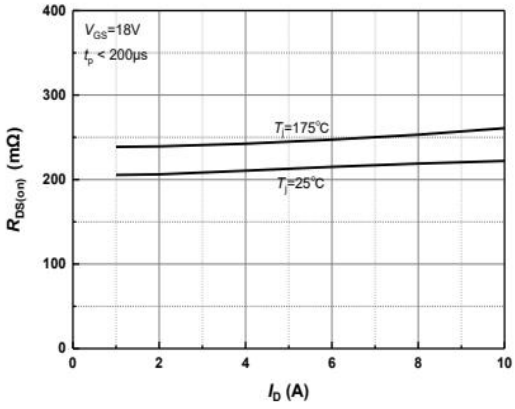


Figure 6 On-Resistance vs. Drain Current for Various Temperatures

RATINGS AND CHARACTERISTIC CURVES

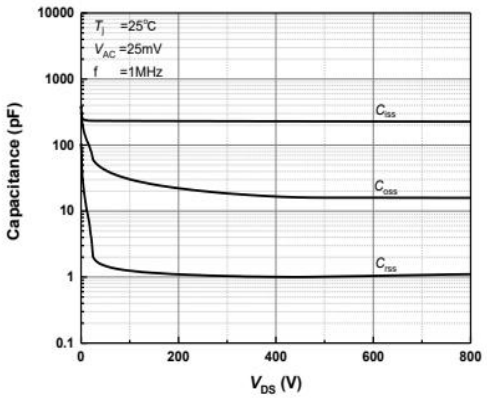


Figure 7 Capacitance vs. Drain-Source Voltage (0 - 800V)

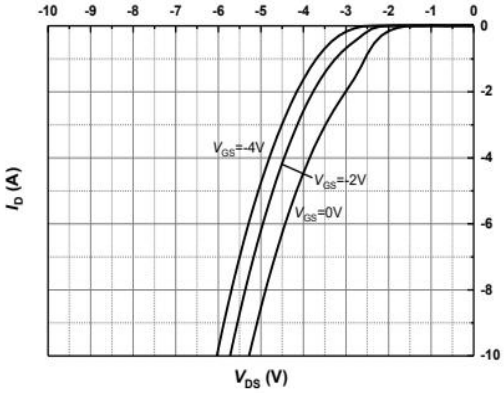


Figure 8 Body Diode Characteristics at T_j=25°C

Typical Performance

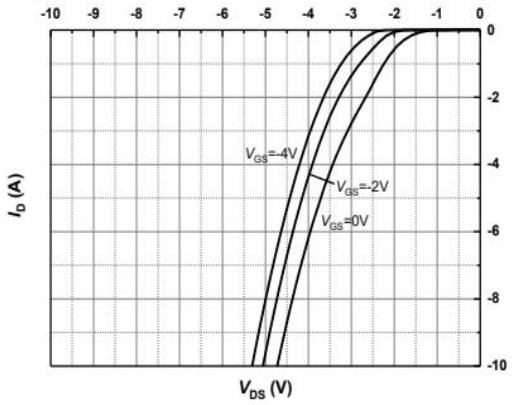


Figure 9 Body Diode Characteristics at T_j=175°C

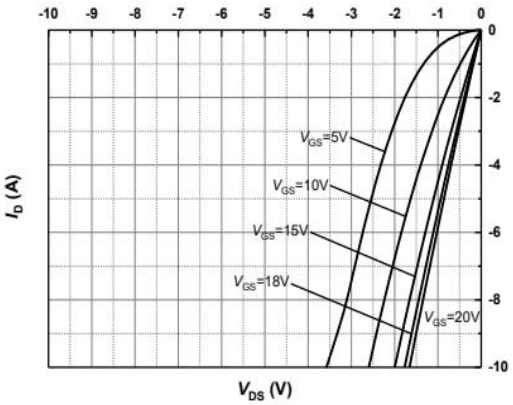


Figure 10 3rd Quadrant Characteristics at T_j=25°C

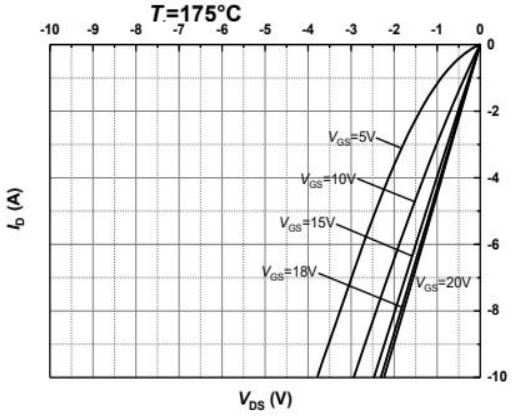


Figure 11 3rd Quadrant Characteristics at T_j=175°C

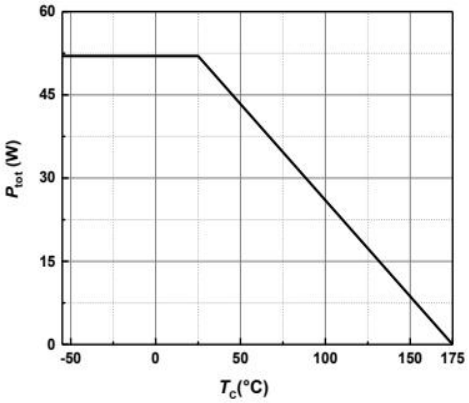


Figure 12 Maximum Power Dissipation Derating vs. Case Temperature

RATINGS AND CHARACTERISTIC CURVES

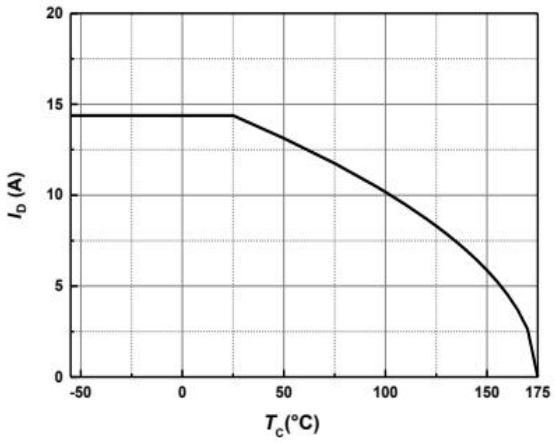


Figure 13 Continuous Drain Current Derating vs. Case Temperature

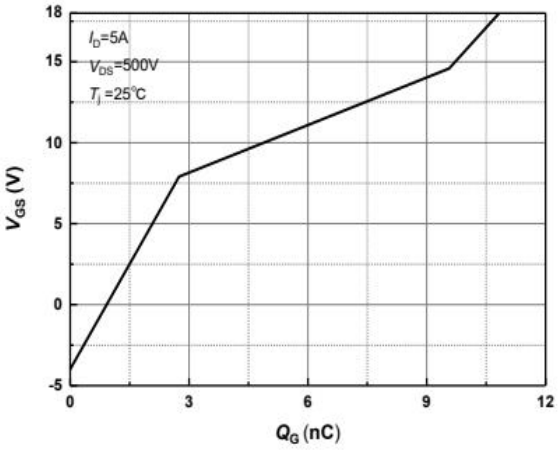
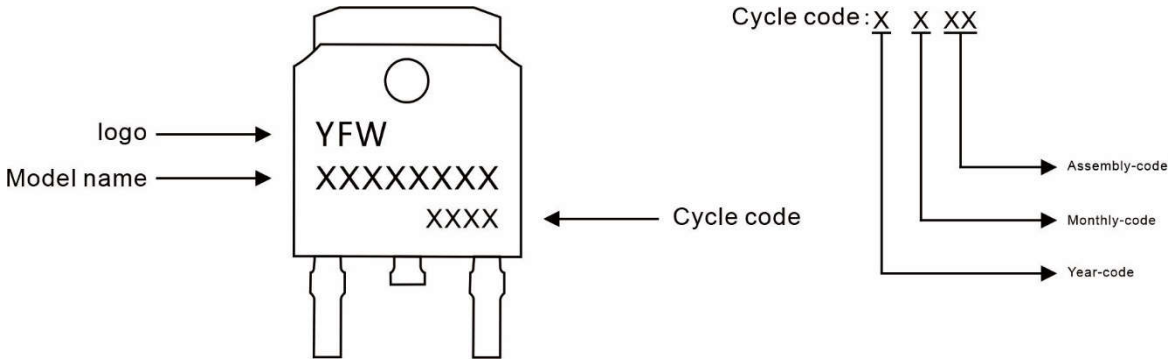


Figure 14 Gate Charge Characteristics

Marking Diagram

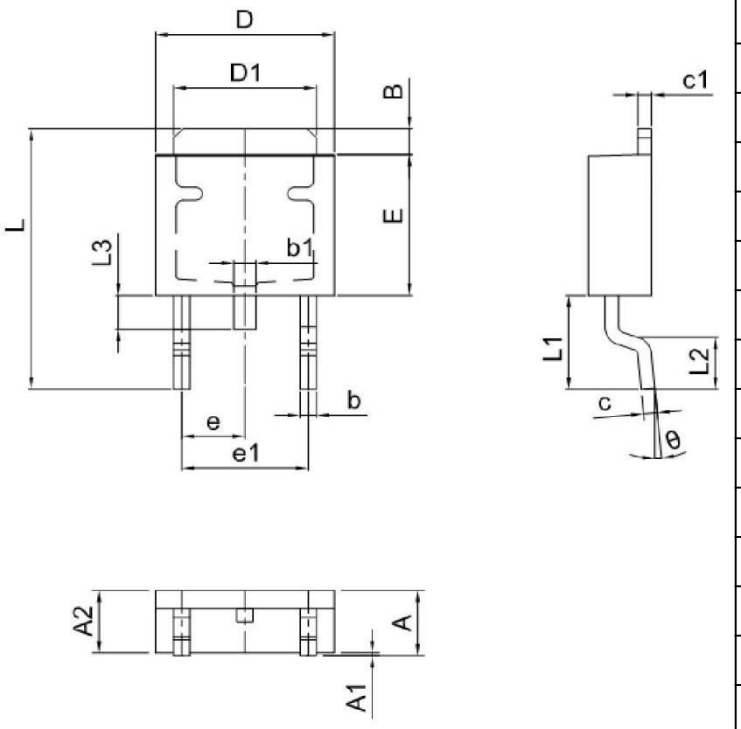


Ordering information

Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFWM332080ADG3	TO-252	0.011oz(0.32g)	2500pcs/reel	5000pcs/box 25000pcs/Carton

Package Dimensions

TO-252



Dim	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	2.20	2.50	0.087	0.098
A1	0.00	0.12	0.000	0.005
A2	2.20	2.40	0.087	0.094
B	0.95	1.55	0.037	0.061
b	0.50	0.80	0.020	0.031
b1	0.60	0.90	0.024	0.035
c	0.40	0.60	0.016	0.024
c1	0.40	0.60	0.016	0.024
D	6.35	6.65	0.250	0.262
D1	5.20	5.40	0.205	0.213
E	5.80	6.40	0.228	0.252
e	2.20	2.40	0.087	0.094
e1	4.40	4.80	0.173	0.189
L	10.00	11.00	0.393	0.433
L1	2.70	3.50	0.106	0.138
L2	1.40	1.80	0.055	0.071
L3	0.90	1.50	0.035	0.059

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