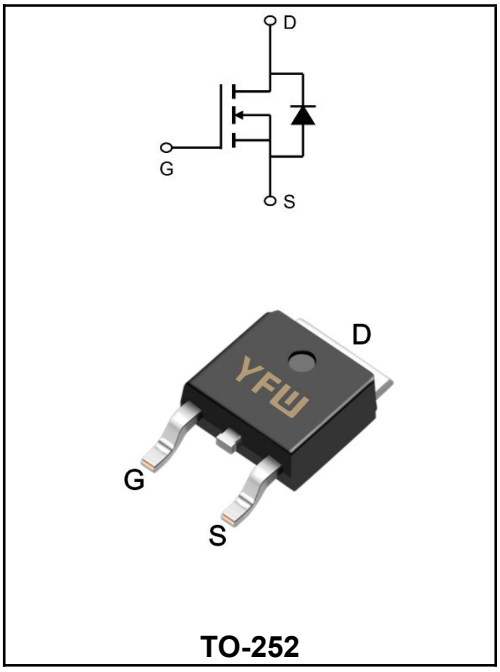
800V SiC N-Channel MOSFET

MAIN CHARACTERISTICS

I_D	15A
V_{DS}	800V
R_{DSON}-typ (@V_{GS}=18V T_C=25°C)	＜228mΩ(Typ:175mΩ)



FEATURES

- High Speed Switching
- Highblockigotagwit 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
Max Gate-Source Voltage	V_{GS}	-8/+22	V
Max Gate-Source Voltage, max. Transient Voltage（tp≤0.5μs, D<0.001）	V_{GS}	-8/+22	V
Recommended Operation Value	V_{GSop}	-4/+18	V
Continue Drain Current T_C=25℃	I_D	15	A
Continue Drain Current T_C=100℃		11	A
Pulsed Drain Current (Note1)	I_{DM}	30	A
Power Dissipation	P_D	48	W
Operating Temperature Range	T_J	-40 to +175	°C
Storage Temperature Range	T_{STG}	-40 to +150	°C
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.1	°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 T_C = 25℃	V_{DS}=V_{GS} , I_D=2.5mA	$V_{GS(th)}$	2	2.8	4	V
Gate-Source Threshold Voltage T_C = 175℃			-	2.0	-	V
Drain-Source On-State Resistance	V_{GS} = 15 V, I_D = 10 A	$R_{DS(on)}$	-	200	290	mΩ
	V_{GS} = 15 V, I_D =10 A,T_J = 175℃		-	208	-	
	V_{GS} = 18 V, I_D = 10 A		-	175	228	
	V_{GS} = 18 V, I_D =10 A,T_J = 175℃		-	188	-	
Input Capacitance	V_{GS} = 0 V V_{DS} = 600 V f = 1MHz	C_{iss}	-	308	-	pF
Output Capacitance		C_{oss}	-	32	-	
Reverse Transfer Capacitance		C_{rss}	-	4.2	-	
Coss Stored Energ		Eoss	-	5.3	-	μJ
Internal Gate Resistance	f=1MHz	RG(int)	-	3.9	-	Ω
Total Gate Charge(Note2)	I_D = 10A V_{DD} = 400 V V_{GS} =-4/18V	Q_G		14		nC
Gate to Source Charge(Note2)		Q_{GS}		2.8		
Gate to Drain Charge(Note2)		Q_{GD}		6.4		
Turn-on Delay Time(Note2)	V_{DS} = 400 V, I_D = 10A, V_{GS} = -4/18 V, R_G = 2.5Ω, L=200μH,	$t_{d(ON)}$	-	6	-	ns
Rise Time(Note2)		t_r	-	9	-	
Turn-Off Delay Time(Note2)		$t_{d(OFF)}$	-	8	-	
Fall Time(Note2)		t_f	-	11	-	
Turn-On Energy		Eon	-	27	-	μJ
Turn-Off Energy		Eoff	-	6	-	μJ
Maximun Body-Diode Continuous Current	V_{GS}=-4V Tc=25°C	I_S	-	15	-	A
Maximun Body-Diode Continuous Current	V_{GS}=-4V Tc=100°C		-	8	-	A
Maximun Body-Diode Pulsed Current(Note2)		I_{SM}	-	-	30	A
Drain-Source Diode Forward Voltage	V_{GS}=-4V, I_{SD}=5A T_J=25°C	V_{SD}	-	4	-	V
Drain-Source Diode Forward Voltage	V_{GS}=-4V, I_{SD}=5A T_J=175°C		-	3.7	-	V
Reverse Recovery Time(Note2)	V_{GS}=-4V, I_{SD}=5A, VR=400V, di/dt=1400A/μs, Tj=25°C	trr	-	12	-	ns
Reverse Recovery Charge(Note2)		Qrr	-	62	-	nC
Peak Reverse Recovery Current		Irrm	-	5	-	A

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

RATINGS AND CHARACTERISTIC CURVES

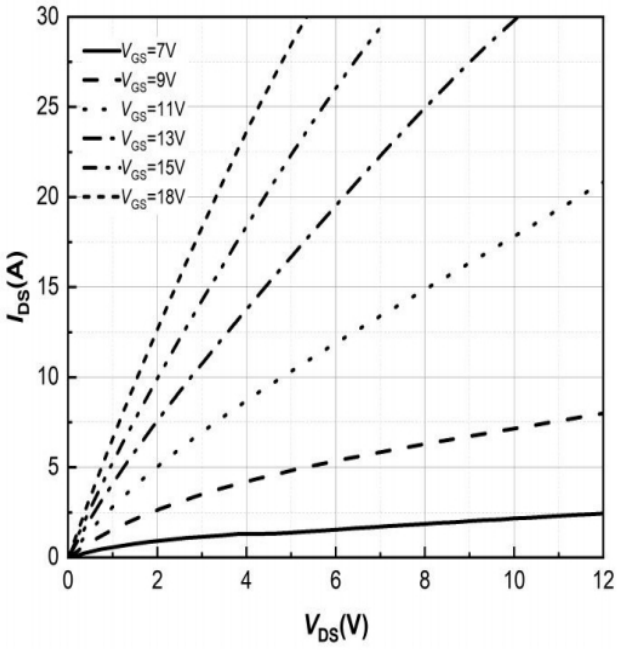


Figure 1. **Output Characteristics T_j=25°C**

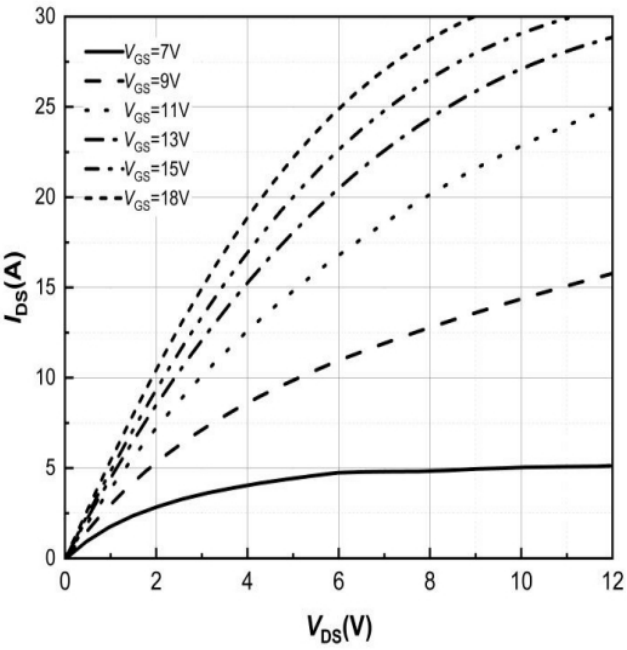


Figure 2. **Output Characteristics T_j=175°C**

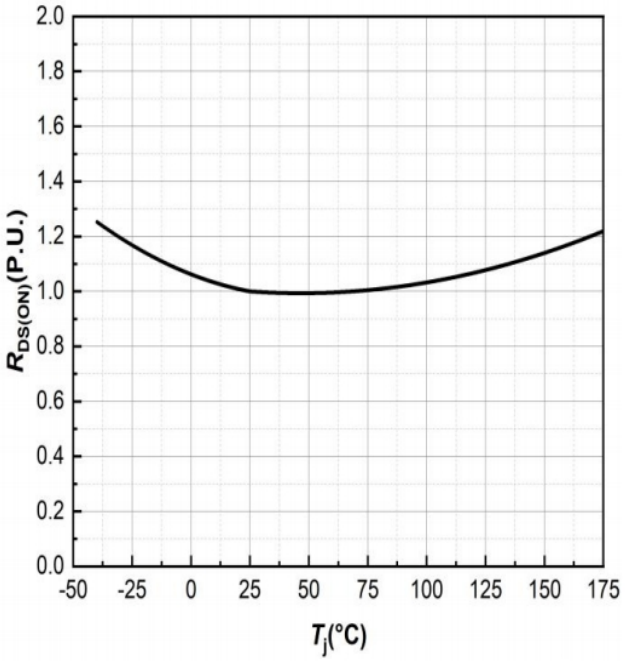


Figure 3. **Normalized On-Resistance vs. Temperature**

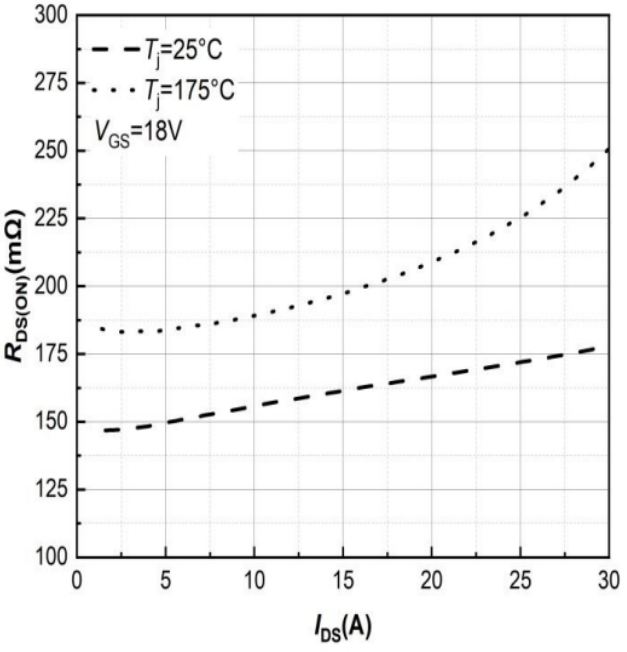


Figure 4. **On-Resistance vs. Drain Current For Various Temperatures**

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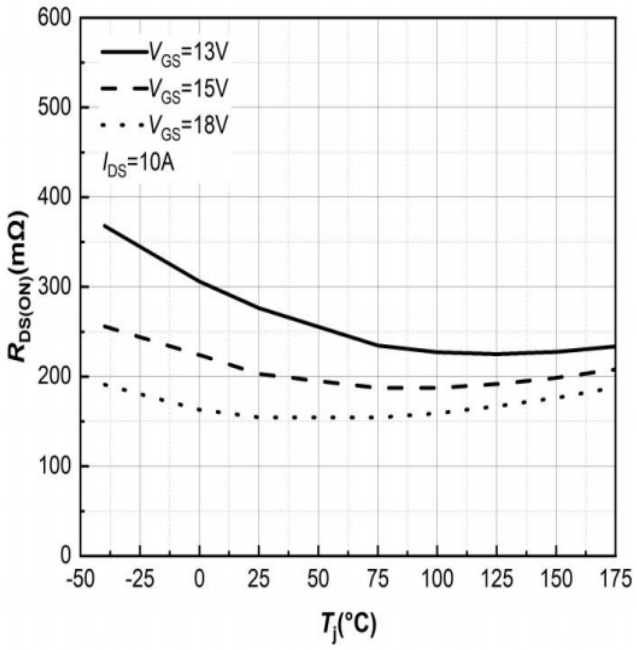

Figure 5. **On-Resistance vs. Temperature For Various Gate Voltage**

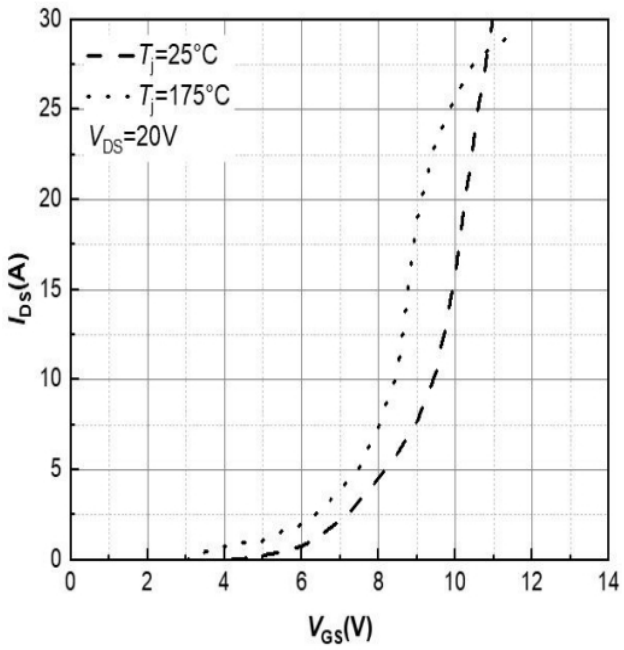

Figure 6. **Transfer Characteristic for Various Junction Temperatures**

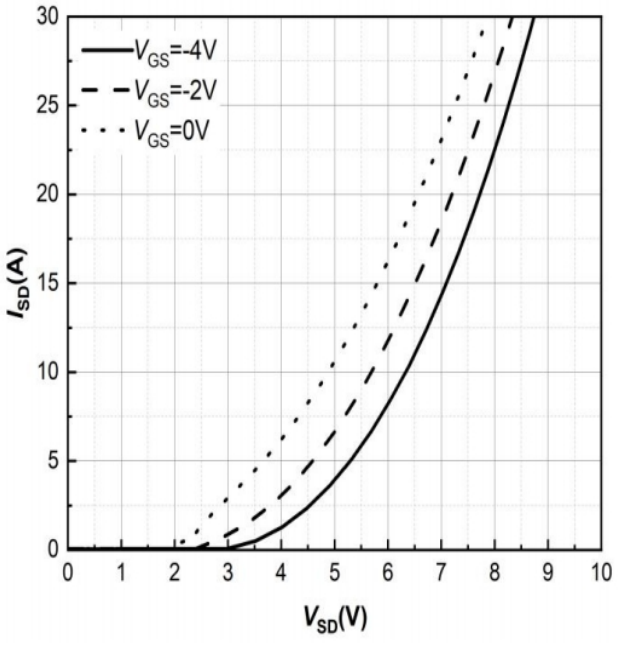

Figure 7. **Body Diode Characteristic T_j=25°C**

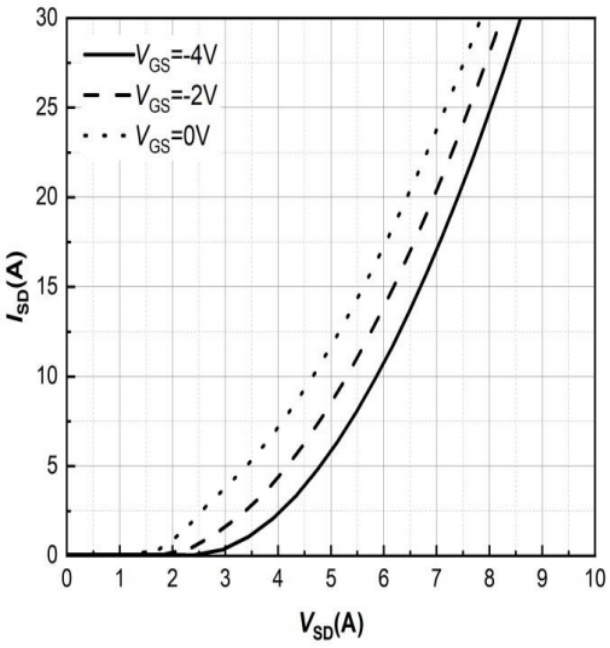

Figure 8. **Body Diode Characteristic T_j=175°C**

RATINGS AND CHARACTERISTIC CURVES

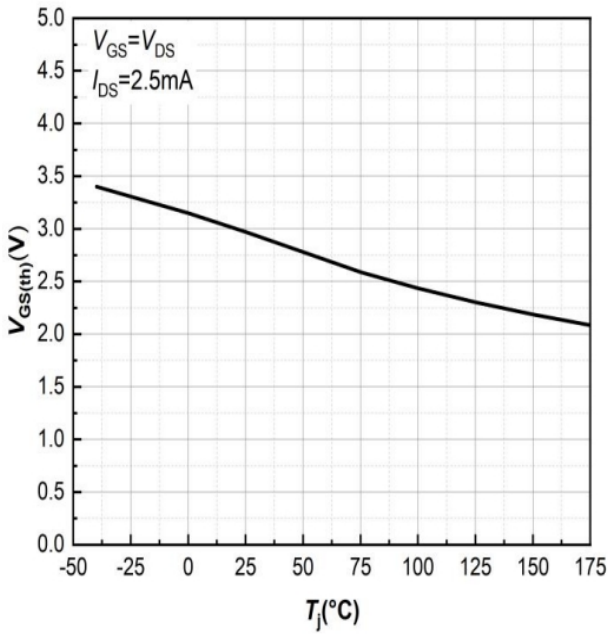

Figure 9. **Threshold Voltage vs. Temperature**

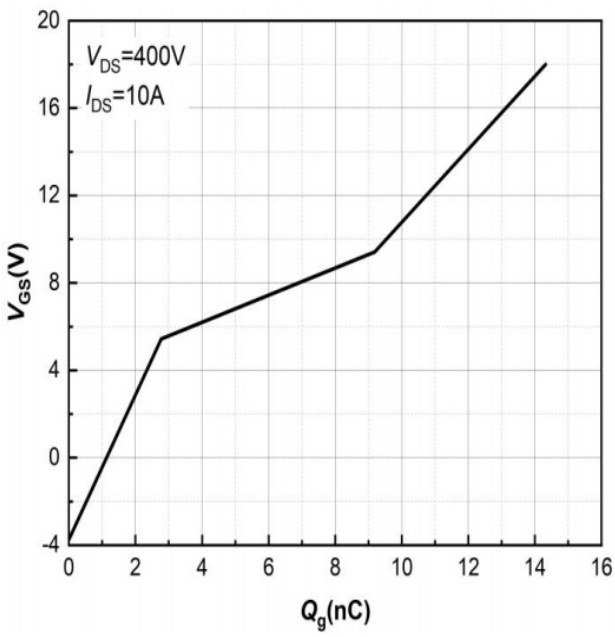

Figure 10. **Gate Charge Characteristics**

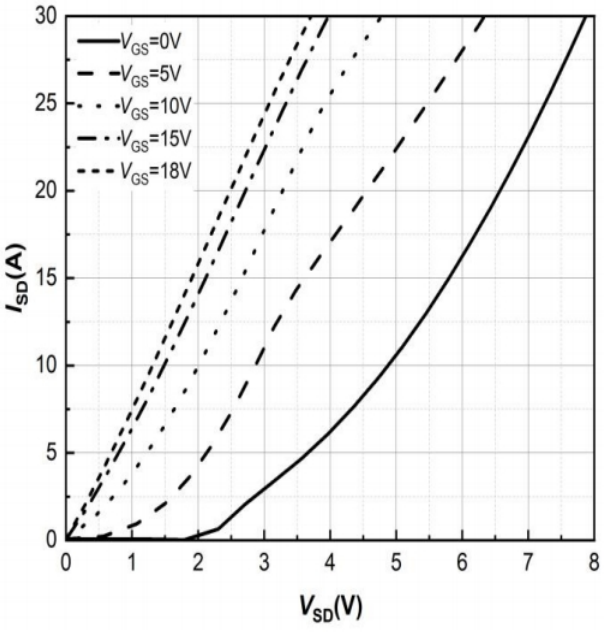

Figure 11. **3rd Quadrant Characteristic T_j=25°C**

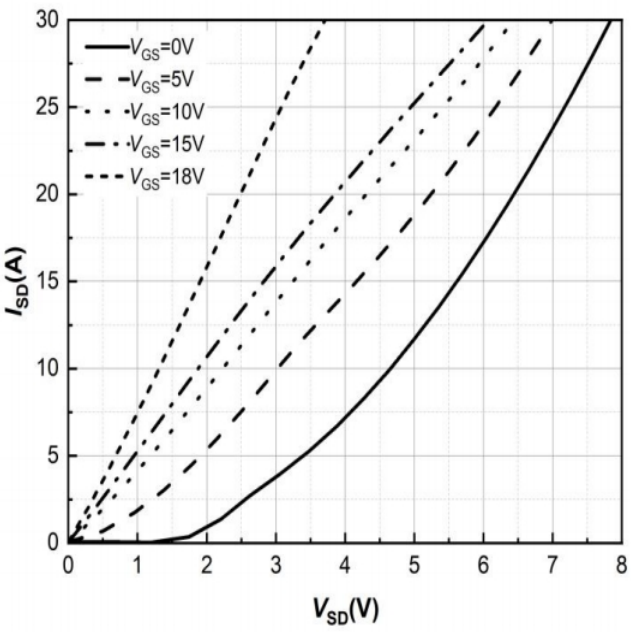

Figure 12. **3rd Quadrant Characteristic T_j=175°C**

RATINGS AND CHARACTERISTIC CURVES

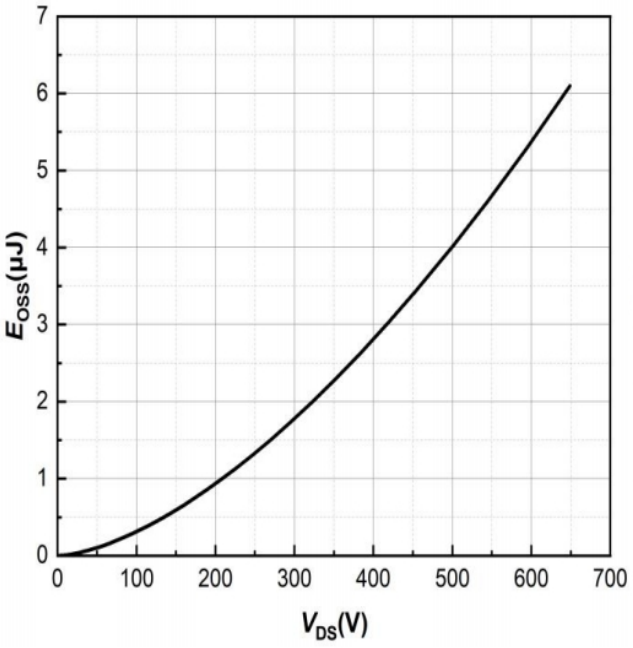

Figure 13. **Output Capacitor Stored Energy**

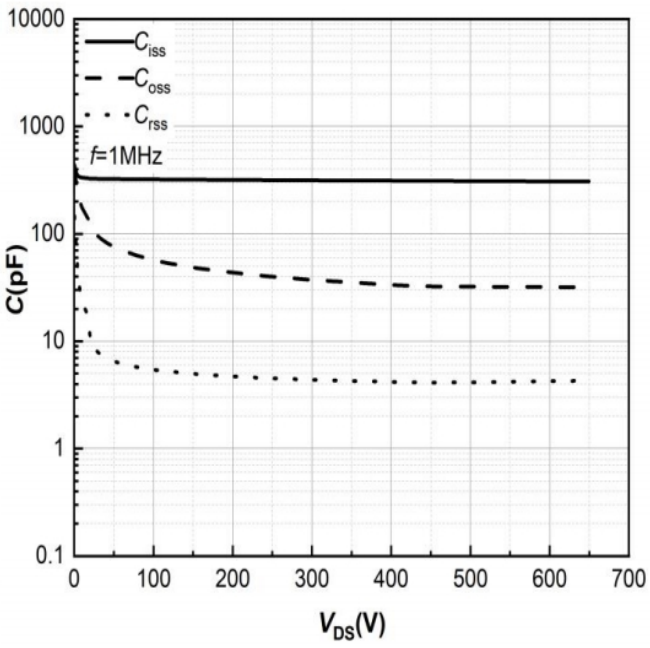

Figure 14. **Capacitances vs. Drain-Source**

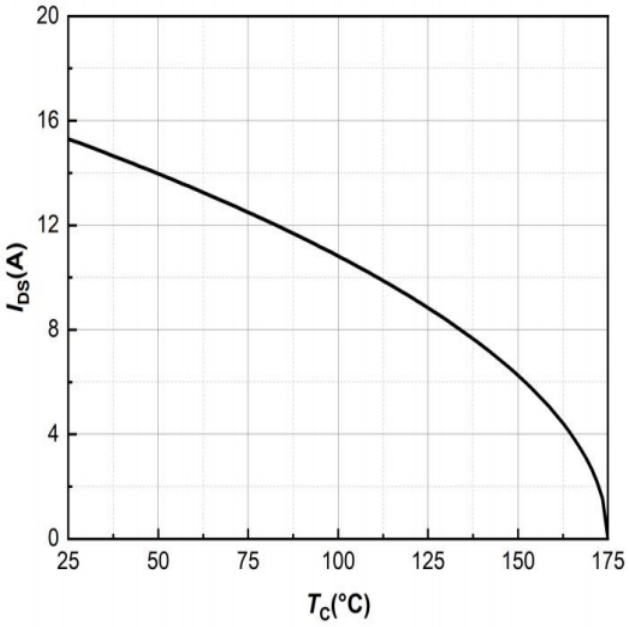

Figure 15. **Continuous Drain Current Derating vs. Case Temperature**

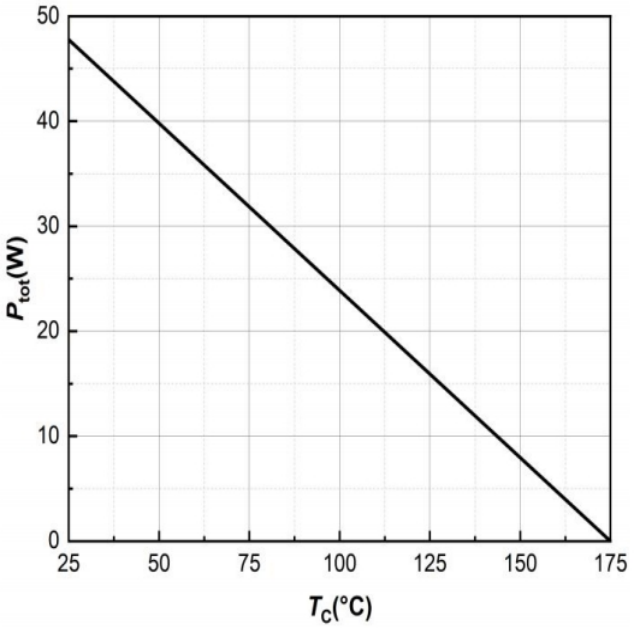

Figure 16. **Maximum Power Dissipation Derating vs. Case Temperature**

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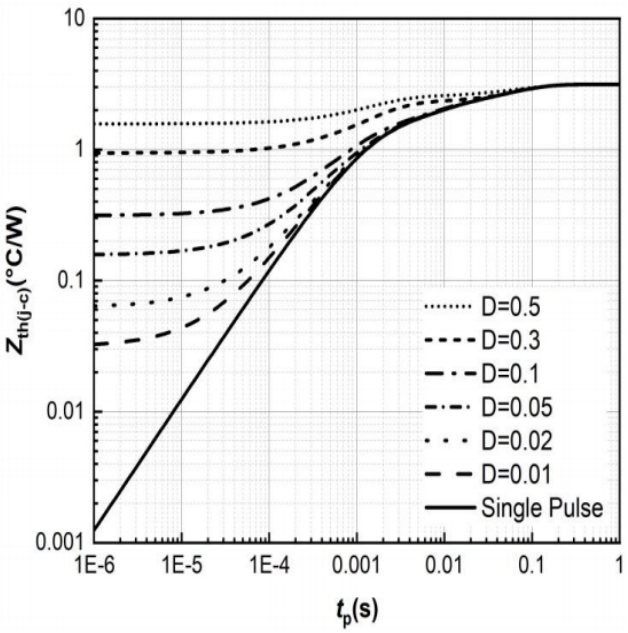


Figure 17. **Transient Thermal Impedance**

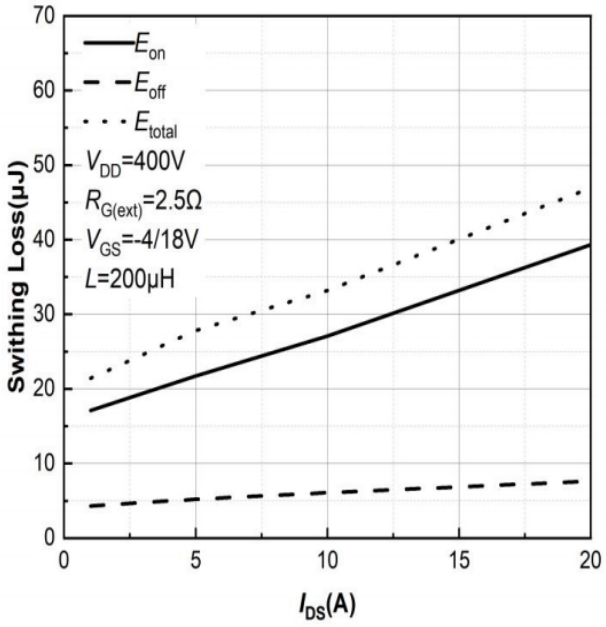


Figure 18. **Clamped Inductive Switching Energy vs. Drain Current**
T_j=25°C

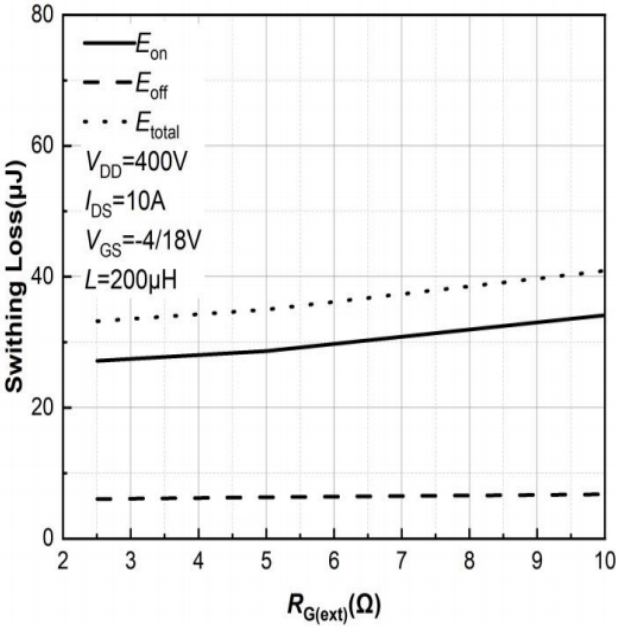


Figure 19. **Clamped Inductive Switching Energy vs. $R_{G(ext)}$**
T_j=25°C

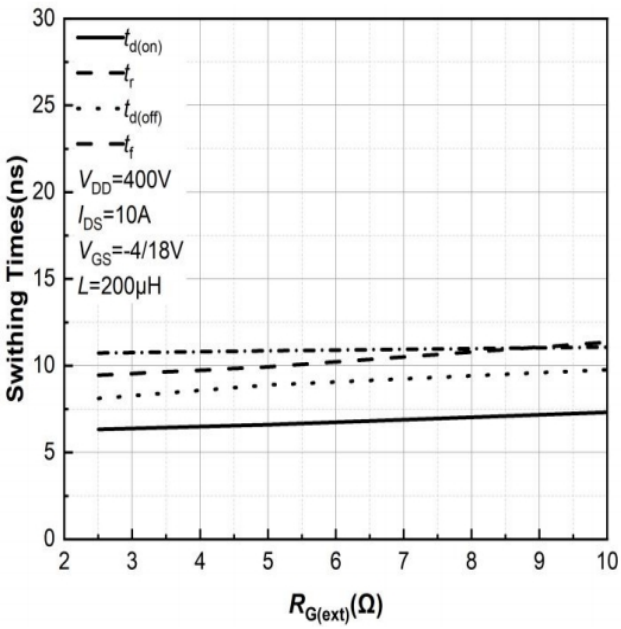


Figure 20. **Switching Times vs. $R_{G(ext)}$**
T_j=25°

RATINGS AND CHARACTERISTIC CURVES

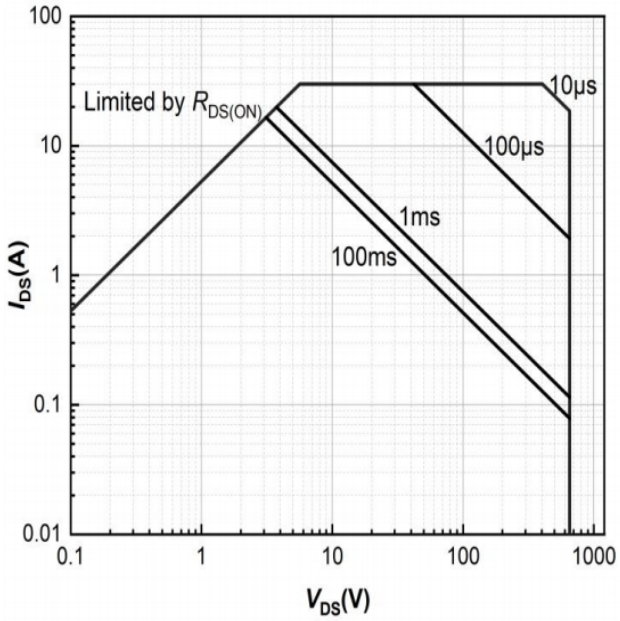
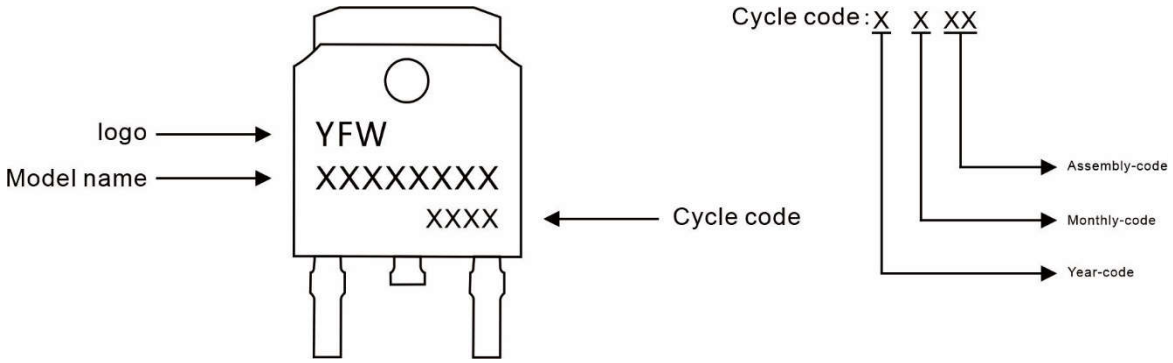


Figure 21. **Safe Operating Area**

Marking Diagram

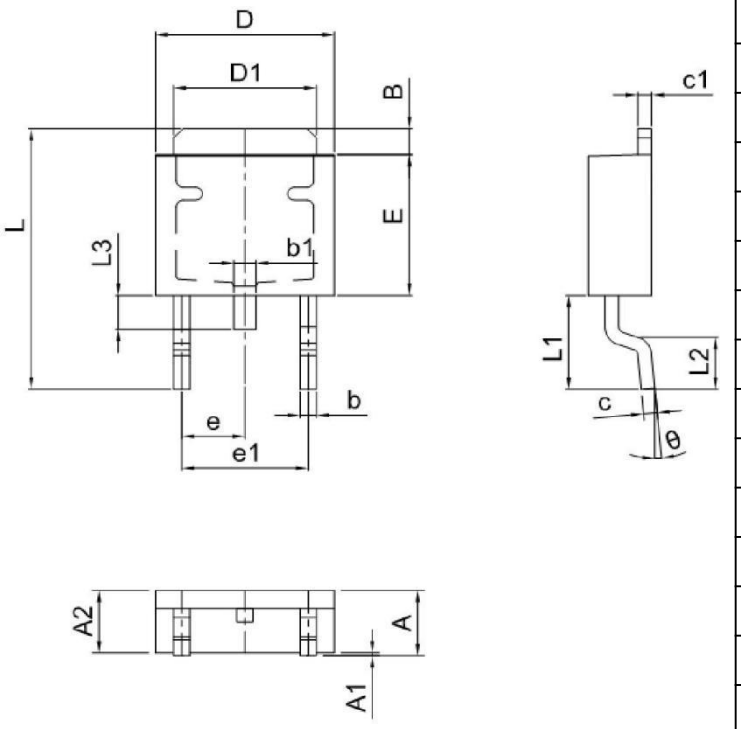


Ordering information

Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFWM317580ADG3	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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