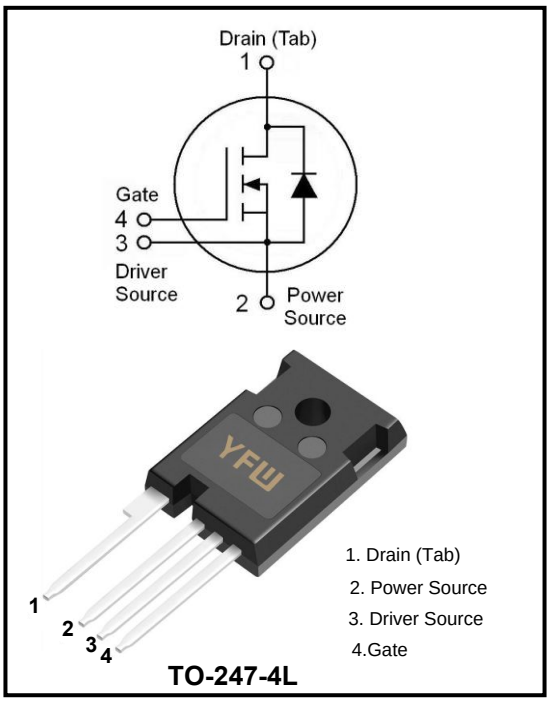
1200V SiC N-Channel MOSFET

MAIN CHARACTERISTICS

I_D	81A
V_{DS}	1200V
R_{DSON}-typ (@V_{GS}=18V T_j=25℃)	＜40mΩ(Typ:35mΩ)



FEATURES

- 3rd generation SiC MOSFET technology
- Optimized package with separate driver source pin
- 8mm of creepage distance between drain and source
- High blocking voltage with low on-resistance
- High-speed switching with low capacitances
- Fast intrinsic diode with low reverse recovery (Qrr)

APPLICATIONS

- Motor Drives
- EV Charging Station
- High Voltage DC/DC Converters

Absolute Maximum Ratings(T_C = 25 ℃, unless otherwise specified)

Parameter		Symbol	Value	Units
Drain-source voltage	V_{GS}=0V, I_D=100μA	V_{DS}	1200	V
Maximun Gate-source Voltage (dynamic)	AC (f >1Hz)	V_{GS}	-10 / +22	V
Gate source voltage (static)		V_{GSop}	-5 / +18	V
Continuous Drain Current	V_{GS}=20V, T_C=25℃ V_{GS}=20V, T_C=100℃	I_D	81 57	A
Pulsed Drain Curre	T_C=25℃	I_D pulse	230	A
Avalanche Capability	V_{DD}=100V,V_{GS}=0V,L=2mH	E_{AS}	784	mJ
Avalanche Capability	V_{DD}=100V,V_{GS}=0V,L=2mH	I_{AV}	28	A
Total power dissipation	T_C=25℃	P_D	357	W
Solder Temperature	1.6mm from case for 10s	T_L	260	℃
Mounting Torque	M3 or 6-32 screw	M_d	1 8.8	Nm Lbf-in
Junction Temperature		T_J	175	℃
Storage Temperature		T_{STG}	-55～175	℃
Thermal Resistance, Junction-case		$R_{\theta JC}$	0.37	°C/W
Thermal Resistance, Junction-Ambient		$R_{\theta JA}$	40	°C/W

Note:

1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.
Absolute maximum ratings are stress ratings only and functional device operation is not implied.
The values are based on the junction- to case thermal impedance which is measured with the device mounted to a large heat sink assuming maximum junction temperature of Tj(max) = 175 ℃

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	50	μA
Gate Leakage Current	V_{GS} = 22 V, V_{DS} = 0 V	I_{GSS}			200	nA
Gate Leakage Current	VDS = 0V, VGS= -10V				-200	nA
Gate-Source Threshold Voltage	V_{DS} = V_{GS} , I_D = 10 mA. T_J = 25℃	$V_{GS(th)}$	2.2	3.2	4.2	V
	V_{DS} = V_{GS} , I_D = 10 mA. T_J = 175℃			2.4		
Drain-Source On-State Resistance	V_{GS} = 18V, I_D = 33A，T_j = 25℃	$R_{DS(on)}$		35	40	mΩ
	V_{GS} = 18V, I_D = 33A，T_j = 175℃			48		
	V_{GS} = 15V, I_D = 33A，T_j = 25℃			38	45	
	V_{GS} = 15V, I_D = 33A，T_j = 175℃			52		
Forward transconductance	V_{DS} = 20V I_D = 33A，T_j = 25℃	g_{FS}		32		S
	V_{DS} = 20V I_D = 33A，T_j = 175℃			27		
Input Capacitance	V_{DS} = 800V,V_{GS} = 0V, V_{AC} = 25mV,T_j = 25℃ f = 1MHz	C_{iss}		2540		pF
Output Capacitance		C_{oss}		97		
Reverse Transfer Capacitance		C_{rss}		7		
Coss Stored Energy		E_{oss}		56		μJ
Internal Gate Resistance	f=1MHz V_{AC}=25mV	R_G		1.4		Ω
Turn-On Switching Energy	V_{DS} = 800V, I_D = 33A V_{GS} = -5V/18V, $R_{G(ext)}$ = 5.1Ω	E_{on}		155		μJ
Turn-Off Switching Energy		E_{off}		123		
Total Switching Energy		E_{tot}		278		
Turn-on Delay Time(Note2)	V_{DS} = 800V I_D = 33A V_{GS} = -5V/ 18V $R_{G(ext)}$ = 5.1Ω	$t_{d(ON)}$		51		ns
Rise Time(Note2)		t_r		19		
Turn-Off Delay Time(Note2)		$t_{d(OFF)}$		59		
Fall Time(Note2)		t_f		17		
Total gate charge	V_{DS} = 800V I_D = 50A V_{GS} = -5V/ 20V	Q_g		252		nC
Gate-source charge		Q_{gs}		24		
Gate-drain charge		Q_{gd}		121		
Diode forward current	V_{GS} = -5V,T_j = 25℃	I_{SD}			80	A
Diode forward current	V_{GS} = -5V,T_j = 100℃				55	
Drain-Source Diode Forward Voltage	V_{GS}=-5V, I_{SD}=20A T_j = 25℃	V_{SD}		3.4		V
	V_{GS}=-5V,I_{SD}=20A T_j = 175℃			3.1		V
Reverse Recovery Time	V_{GS}=-5V, I_{SD}=33A, V_R=800V, di/dt=1000A/μs	trr		18.8		ns
Reverse Recovery Charge		Qrr		104		nC
Peak Reverse Recovery Current		Irrm		10.5		A

Typical Characteristics

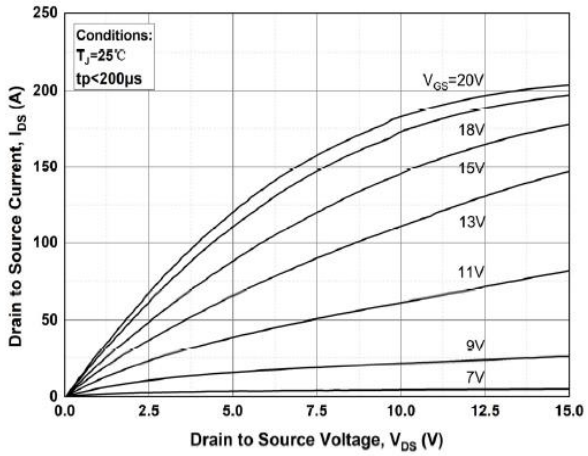


Figure 1. Output Characteristics T_j=25℃

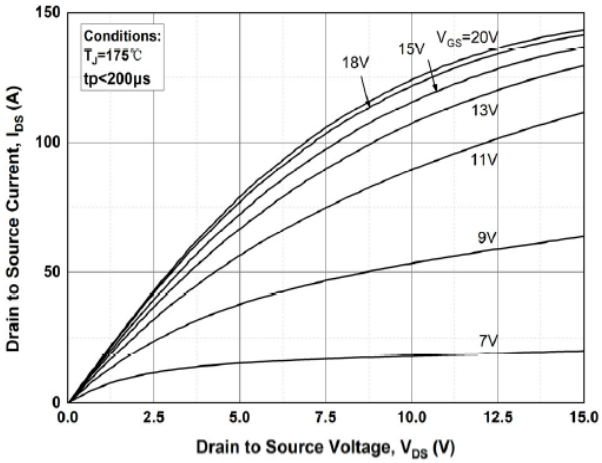


Figure 2. Output Characteristics T_j=175℃

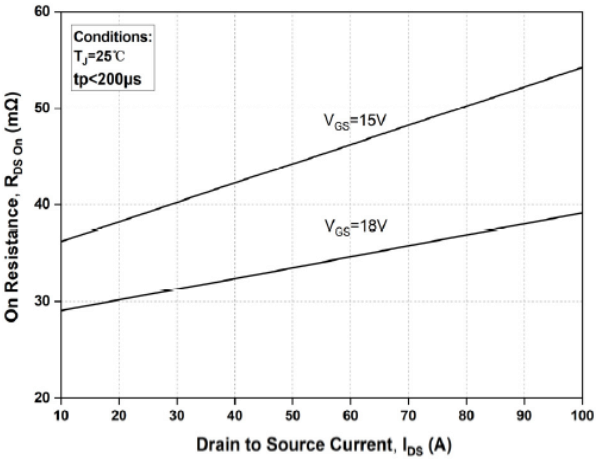


Figure 3. On-Resistance vs. Drain Source Current

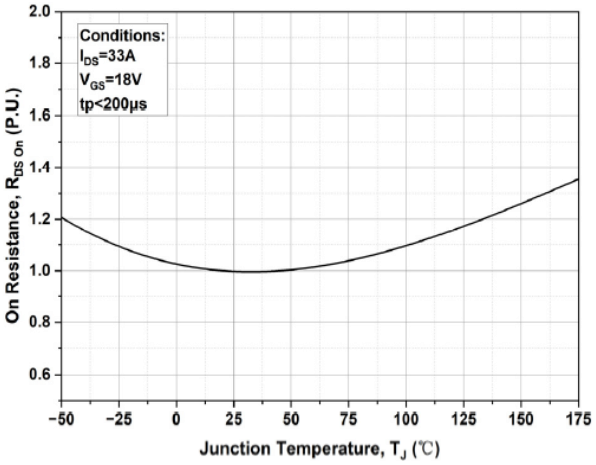


Figure 4. Normalized On-Resistance vs. Temperature

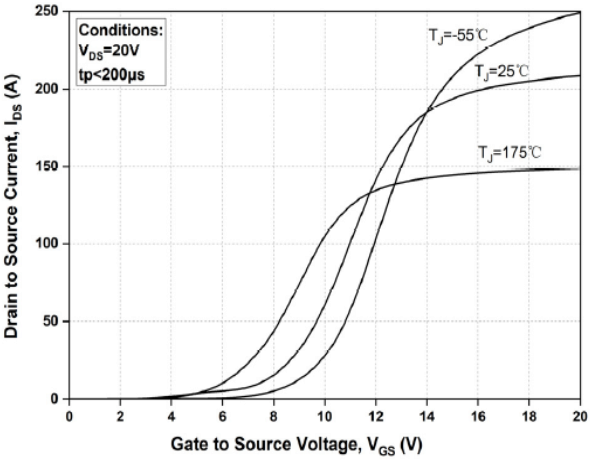


Figure 5. Transfer Characteristic for Various Junction Temperatures

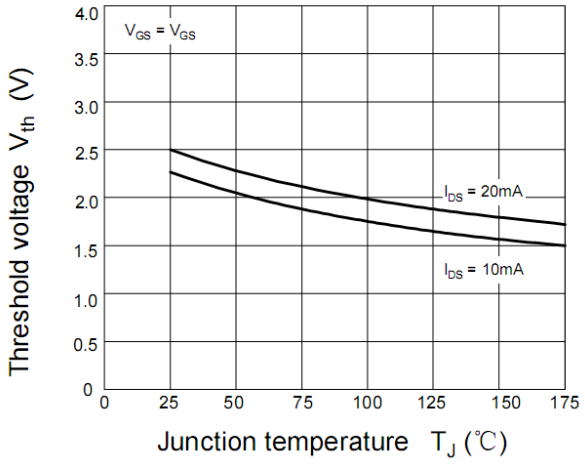


Figure 6. Threshold Voltage vs. Temperature

Typical Characteristics

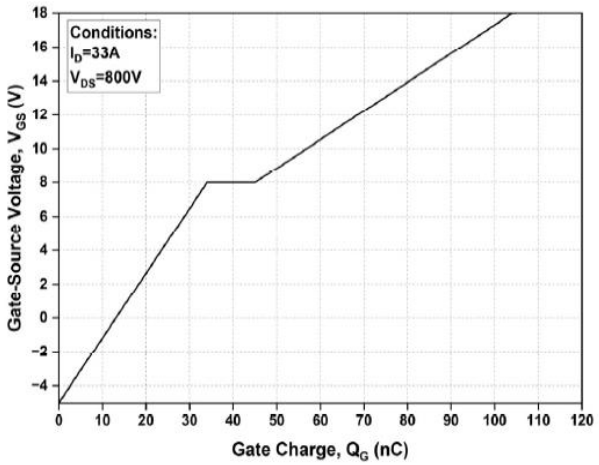


Figure 7. Gate Charge Characteristic

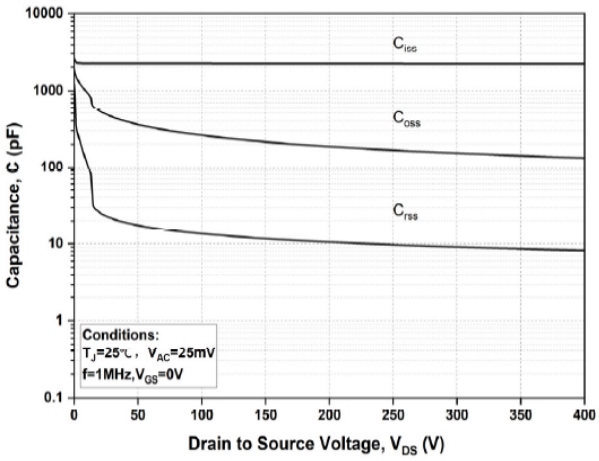


Figure 8. Capacitance vs Drain to Source Voltage (0-400V)

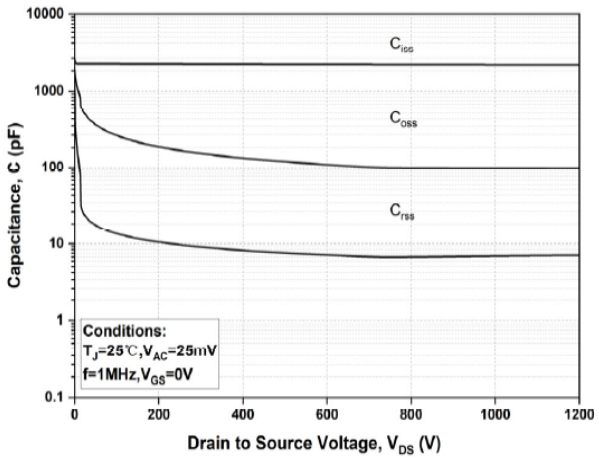


Figure 9. Capacitance vs Drain to Source Voltage (0-1200V)

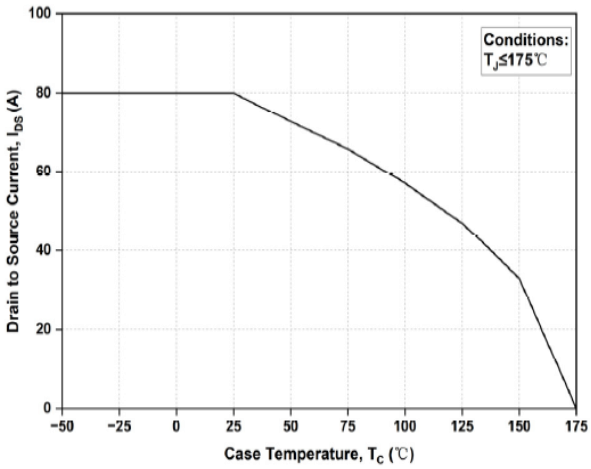


Figure 10. Continuous Drain Current Derating vs. Case Temperature

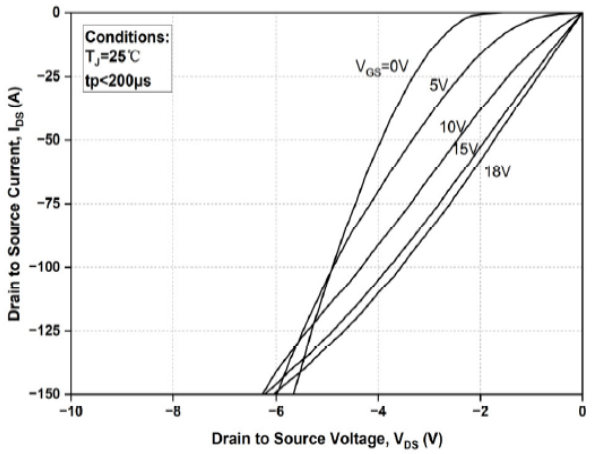


Figure 11. 3rd Quadrant Characteristic at 25℃

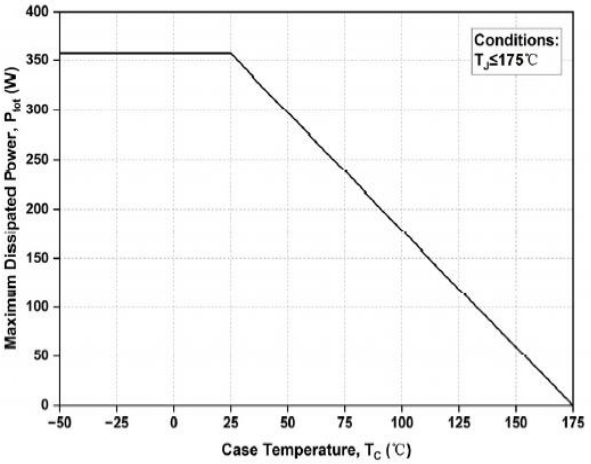


Figure 12. Power Derating

Typical Characteristics

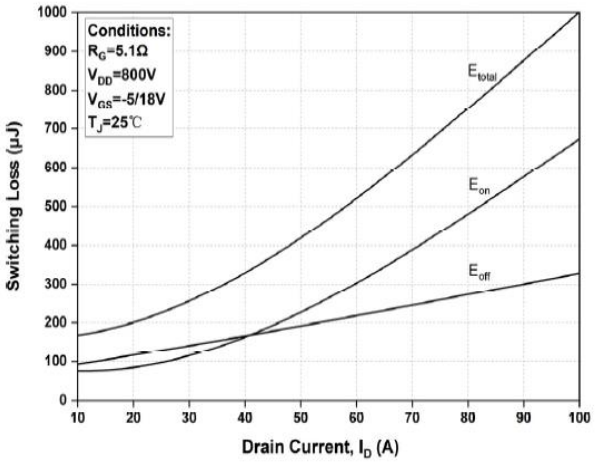


Figure 13. Switching Energy vs. Drain Current

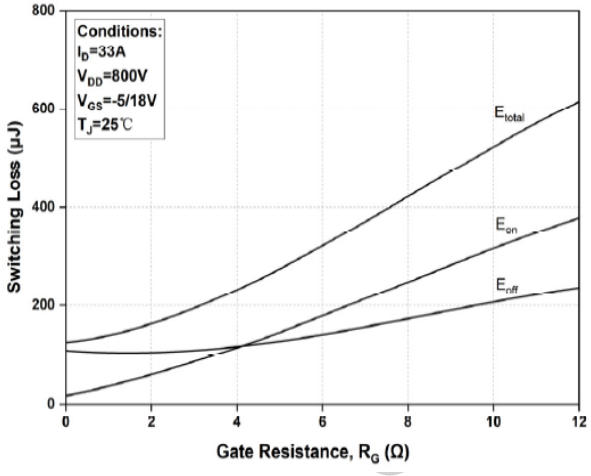


Figure 14. Switching Energy vs. RG(ext)

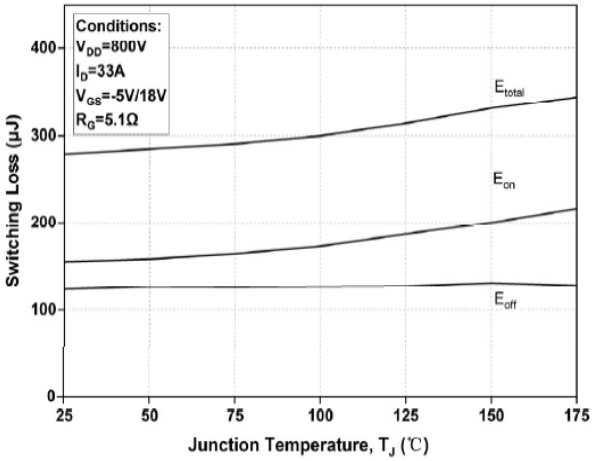


Figure 15. Switching Energy vs. Temperature

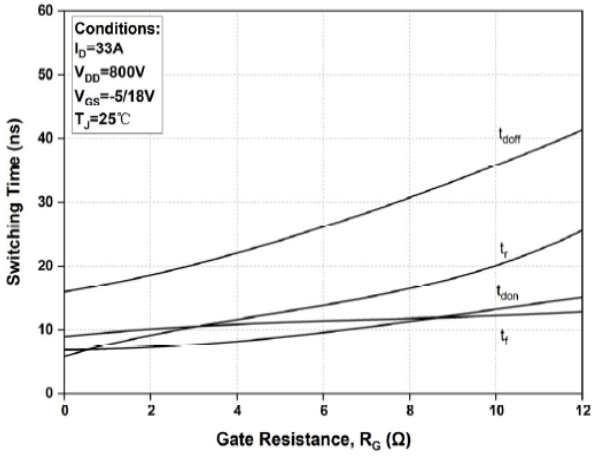


Figure 16. Switching Times vs. RG(ext)

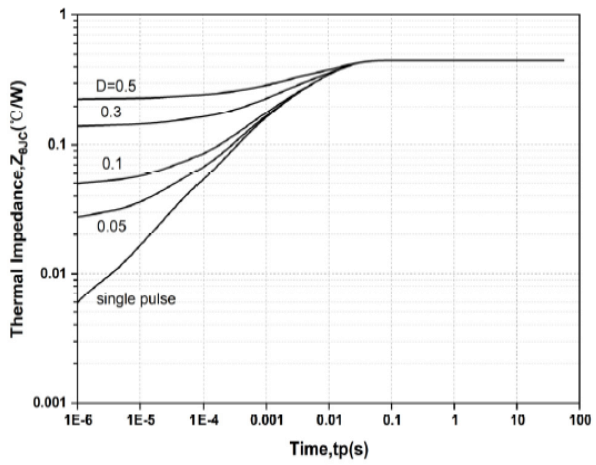


Figure 17. Transient Thermal Impedance

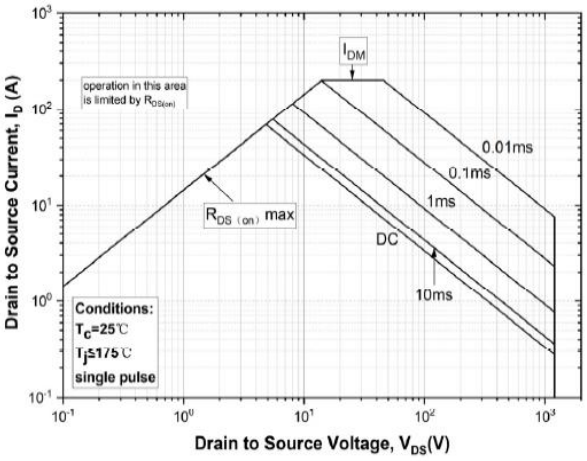
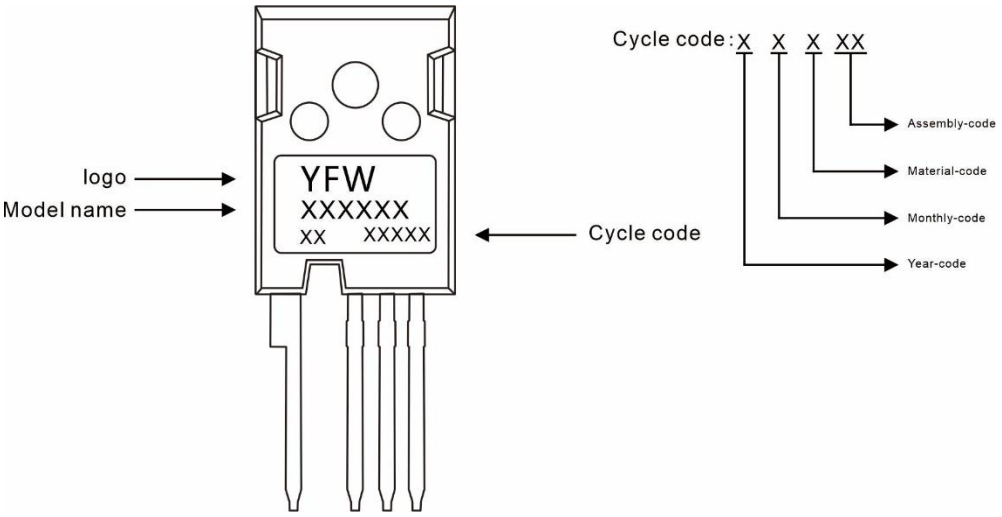


Figure 18. Safe Operating Area

Marking Diagram

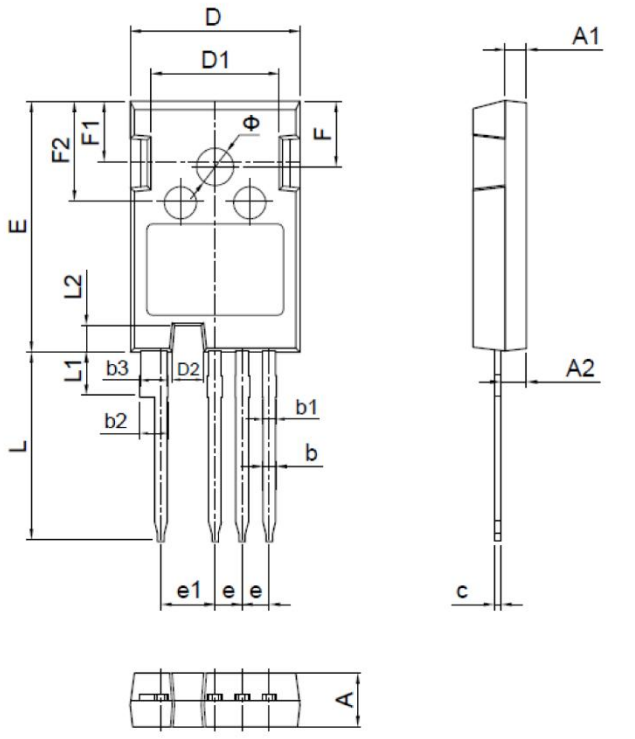


Ordering information

Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFWM3035120GPG3	TO-247-4L	0.242oz(6.85g)	30pcs/tube	600PCS/Box 2400PCS/Carton

Package Dimensions

TO-247-4L



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	1.07	1.33	0.042	0.052
b1	1.20	1.50	0.047	0.059
B2	2.40	2.80	0.094	0.110
B3	2.40	2.69	0.094	0.106
c	0.55	0.68	0.022	0.027
D	15.77	16.03	0.621	0.631
D1	11.60	12.00	0.457	0.472
D2	2.40	2.70	0.094	0.106
E	23.30	23.70	0.917	0.933
e	2.54(BSC)		0.100(BSC)	
e1	5.08(BSC)		0.200(BSC)	
F	6.05	6.25	0.238	0.246
F1	5.50	5.90	0.217	0.232
F2	9.30	9.70	0.366	0.382
L	17.20	17.60	0.677	0.693
L1	4.05	4.35	0.159	0.171
L2	2.35	2.65	0.093	0.104
Φ	3.50	3.70	0.138	0.146

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