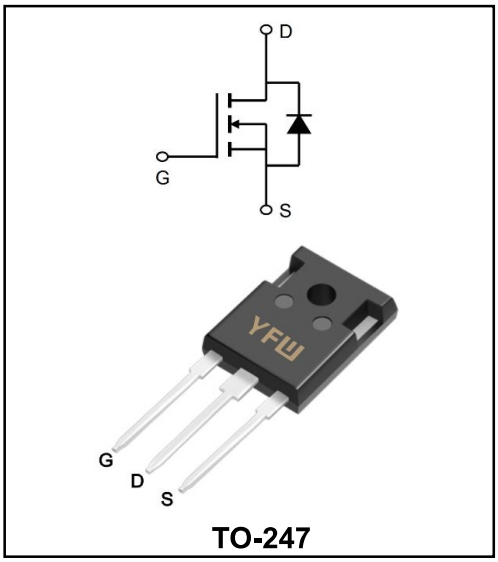
600V N-channel Super Junction MOSFET

MAIN CHARACTERISTICS

I_D	55A
V_{DSS}	600V
R_{DSON}-typ(@V_{GS}=10V)	＜68mΩ(Typ:57mΩ)



DESCRIPTION

The power MOSFET using super junction technology that can realize very low on-resistance and gate charge. It will provide much high efficiency by using optimized charge coupling technology. These user friendly devices give an advantage of Low EMI to designers as well as low switching loss.

FEATURES

- Fast switching capability
- Low On-Resistance
- 100% Avalanche tested
- 100% △V_{DS} tested

MECHANICAL DATA

- Case: TO-247/AP
- RoHS compliant
- Case Material: “Green” molding compound, UL flammability classification 94V-0,“Halogen-free”.

Maximum Ratings at Tc=25°C unless otherwise specified

Characteristics	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	600	V
Gate-Source Voltage	V_{GS}	±30	V
Continue Drain Current Tc=25°C	I_D	55	A
Pulsed Drain Current (Note2)	I_{DM}	160	A
Single Pulse Avalanche Energy (Note3)	E_{AS}	600	mJ
Power Dissipation (Tc = 25°C)	P_D	250	W
Operating Temperature Range	T_J	-55 to +150	°C
Storage Temperature Range	T_{STG}	-55 to +150	°C
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.5	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	60	°C/W

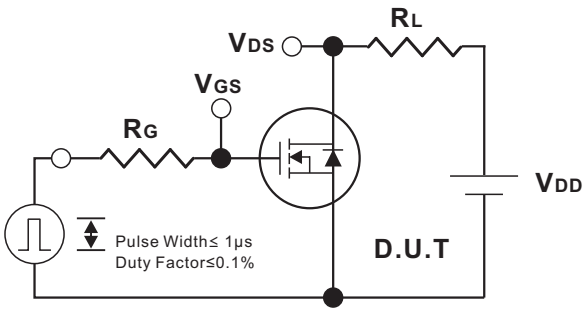
Notes:
1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. Repetitive Rating: Pulse width limited by maximum junction temperature.
3. L=10mH,V_{DD}=50V, R_G=25Ω,Starting TJ=25°C

Maximum Ratings at Ta =25°C unless otherwise specified

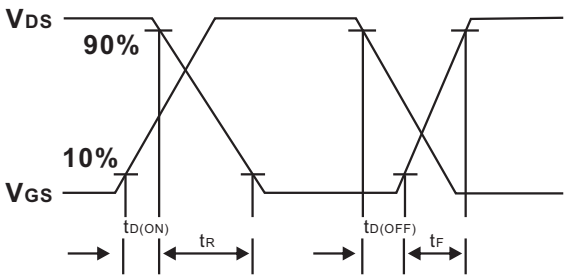
Characteristics	Test Condition	Symbo	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{GS} = 0 V,I_D = 250 μA	BV_{DSS}	600	-	-	V
Drain-Source Leakage Current	V_{DS} =600 V, V_{GS} = 0 V	I_{DSS}	-	-	10	μA
Gate Leakage Current	V_{GS} = ± 30 V, V_{DS} = 0 V	I_{GSS}	-	-	±100	nA
Gate-Source Threshold Voltage	V_{DS} = V_{GS} , I_D = 250 μA	$V_{GS(th)}$	3.0	-	5.0	V
Drain-Source On-State Resistance	V_{GS}=10V, I_D=27A	$R_{DS(ON)}$	-	57	68	mΩ
Transconductance	V_{DS}=10V,I_D=15A	g_{fs}	-	30	-	S
Input Capacitance	V_{DS}=50V V_{GS}=0V f=1.0MHz	C_{iss}	-	3836	-	pF
Output Capacitance		C_{oss}	-	155	-	pF
Reverse Transfer Capacitance		C_{rss}	-	5.1	-	pF
Gate resistance	V_{DS}=0V,FREQ=1.00MHz	R_G	-	6.0	-	Ω
Total Gate Charge(Note1)	V_{GS} = 480V V_{GS} = 10V I_D =25A (NOTE1,2)	Q_G	-	58	-	nC
Gate to Source Charge		Q_{GS}	-	22	-	nC
Gate to Drain Charge		Q_{GD}	-	15	-	nC
Turn-on Delay Time(Note1)	V_{DS}=380V,I_D=25A R_G=1.7Ω,V_{GS}=10V (NOTE1,2)	$t_{d(on)}$	-	32	-	ns
Rise Time		T_r	-	14	-	ns
Turn-Off Delay Time		$t_{d(OFF)}$	-	90	-	ns
Fall Time		t_f	-	9	-	ns
Maximum Continuous Drain -Source Diode Forward Current		I_S	-	-	55	A
Drain-Source Diode Forward Voltage (Note 1)	I_{SD}=55A,V_{GS}=0V	V_{SD}	-	-	1.2	V
Reverse recovery time (Note 1)	I_F=25A dI / dt = 100 A/μs	t_{rr}	-	140	-	ns
Reverse recovery charge		Q_{rr}	-	0.63	-	uC

Notes:
1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

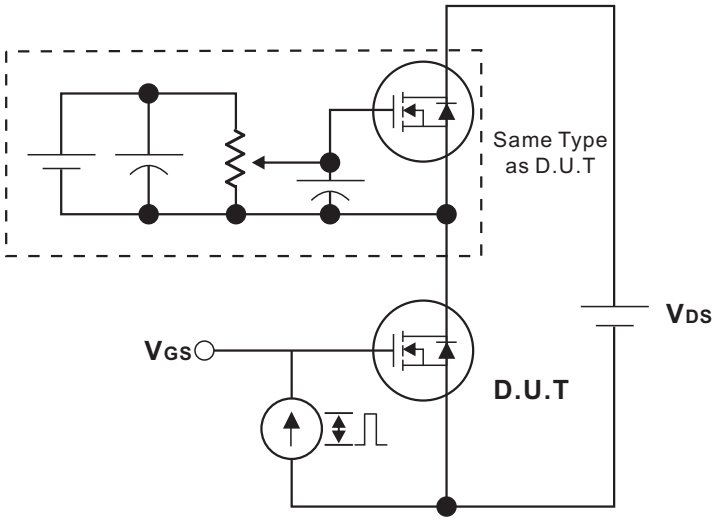
Test Circuits and waveforms



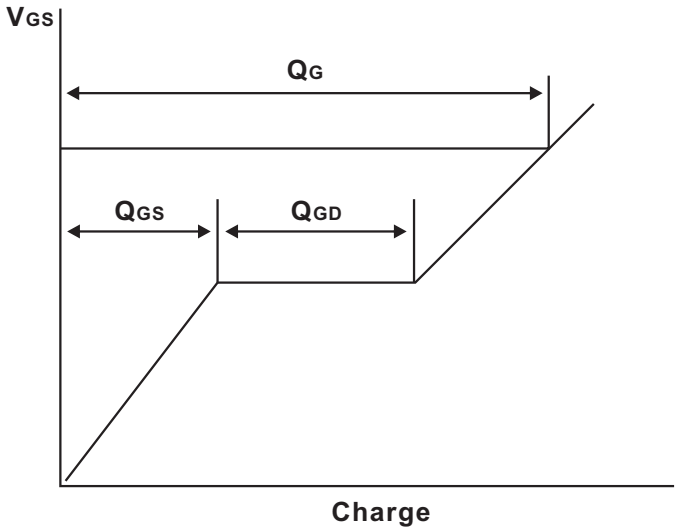
Switching Test Circuit



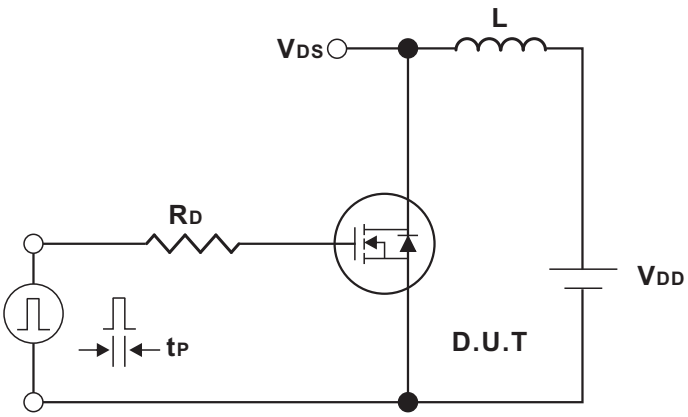
Switching Waveforms



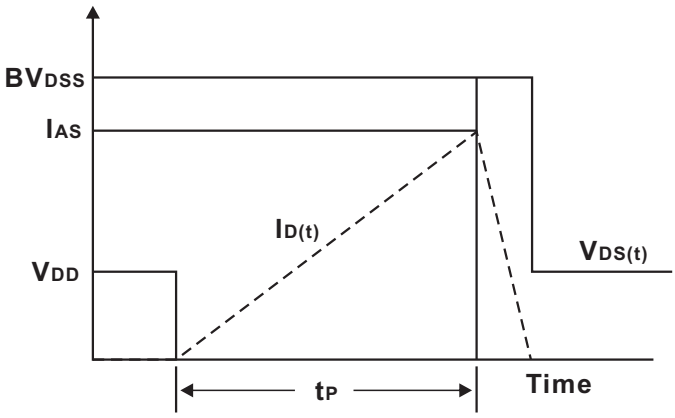
Gate Charge Test Circuit



Gate Charge Waveform

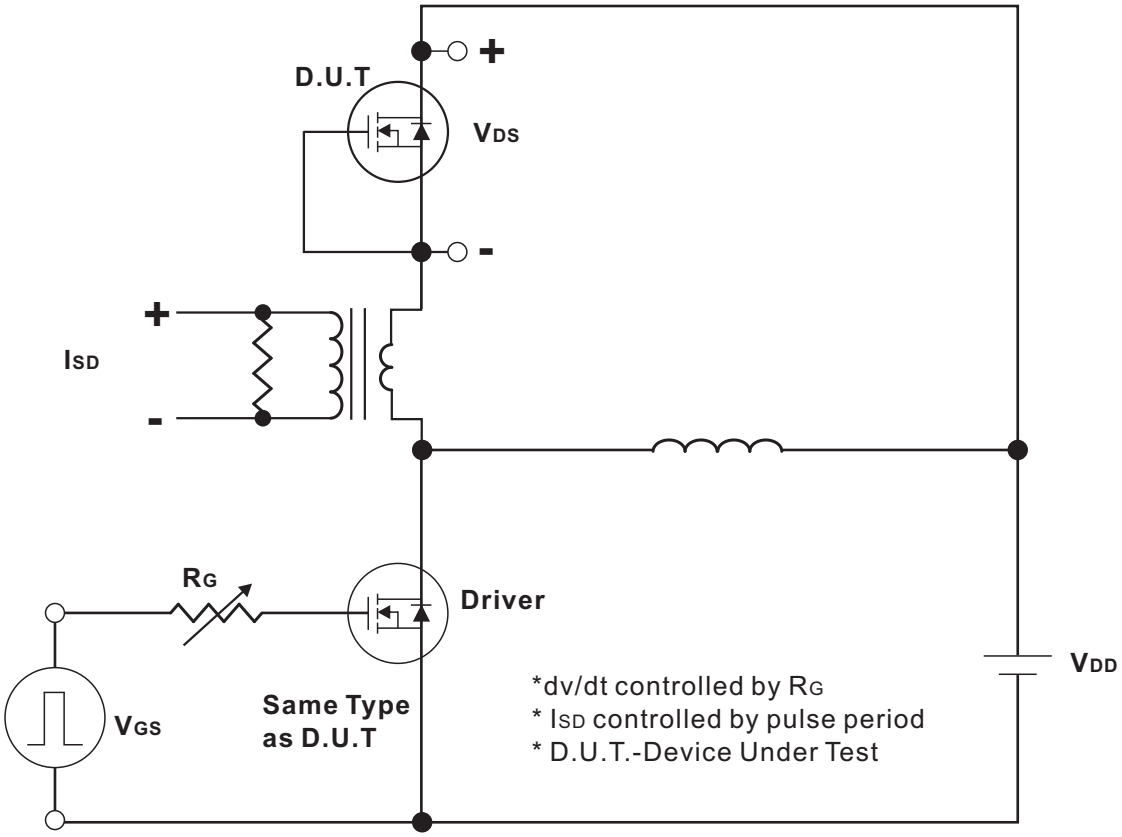


Unclamped Inductive Switching Test Circuit

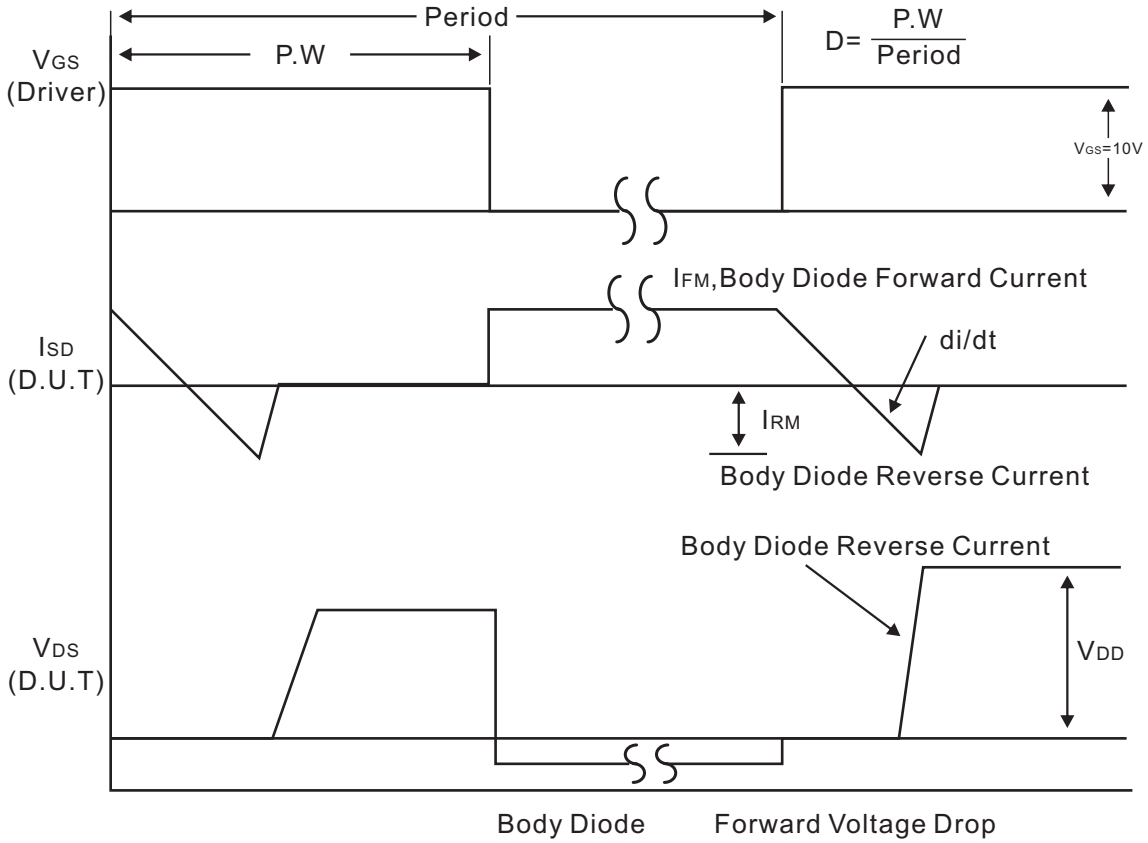


Unclamped Inductive Switching Waveforms

Test Circuits and waveforms



Peak Diode Recovery dv/dt Test Circuit



Peak Diode Recovery dv/dt Waveforms

Typical Characteristics

Fig.1 Output characteristics

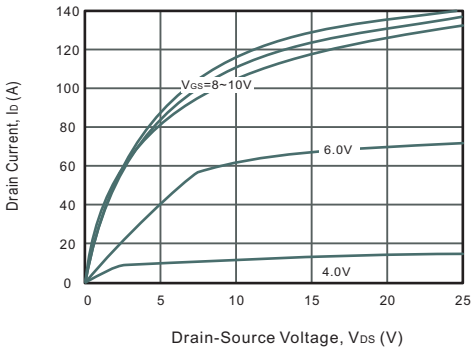


Fig.2 Power Dissipation

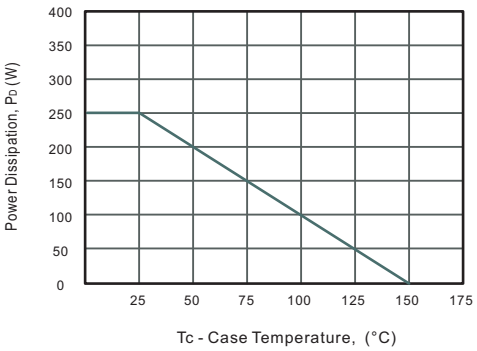


Fig.3 Drain Current Derating

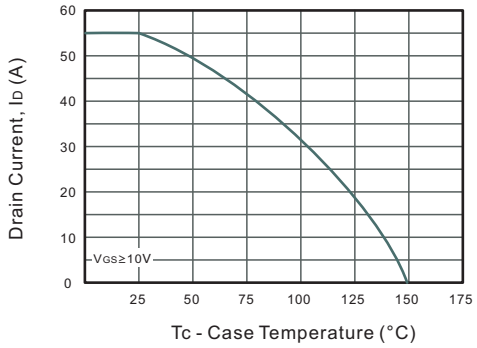


Fig.4 Drain-Source On-Resistance vs. Drain Current

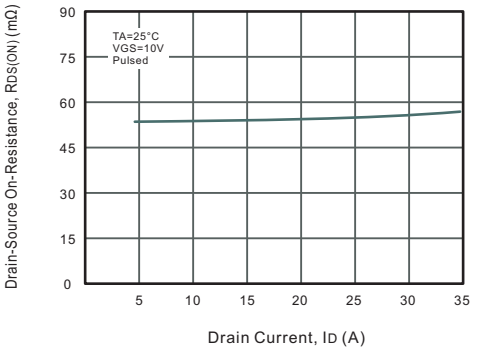


Fig.5 Gate Threshold Voltage vs. Junction Temperature

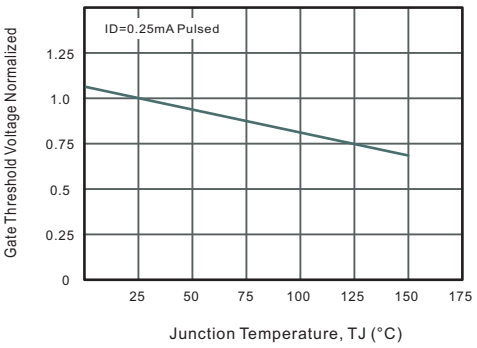


Fig.6 Body-diode Forward Characteristics

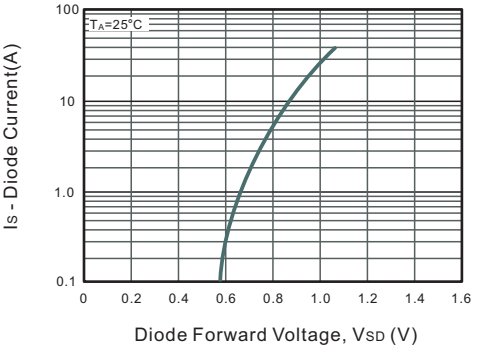


Fig.7 Drain-Source On-Resistance vs. Junction Temperature

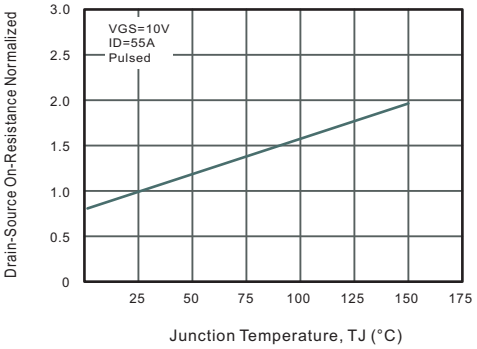
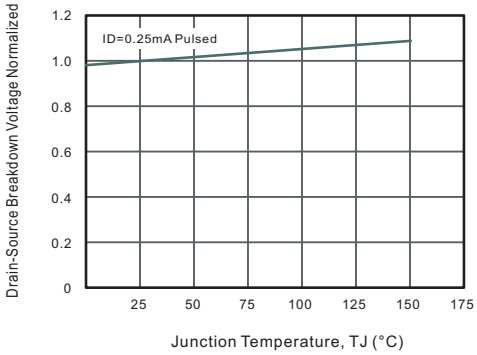


Fig.8 Breakdown Voltage vs. Junction Temperature



Typical Characteristics

Fig.9 Capacitance Characteristics

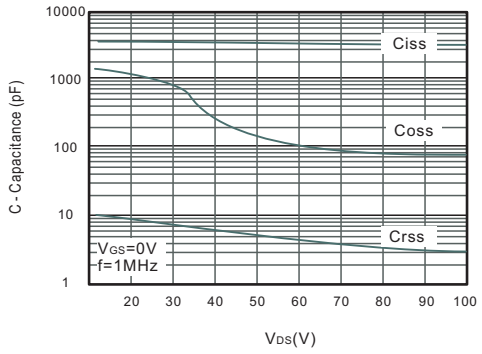


Fig.10 Gate Charge Characteristics

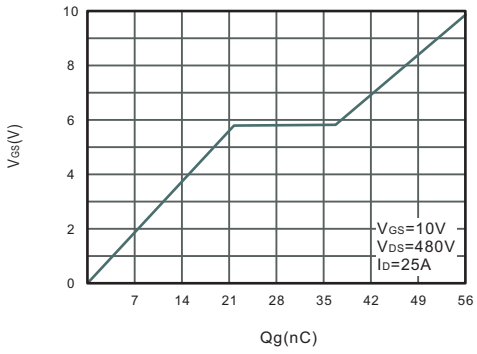


Fig.11 Safe Operating Area

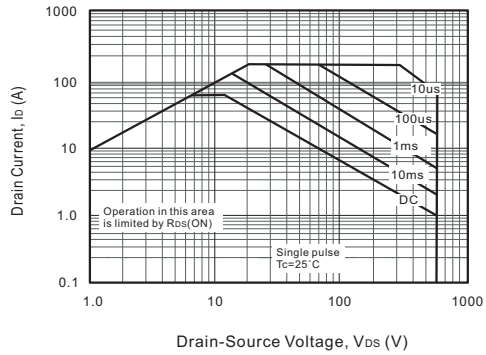
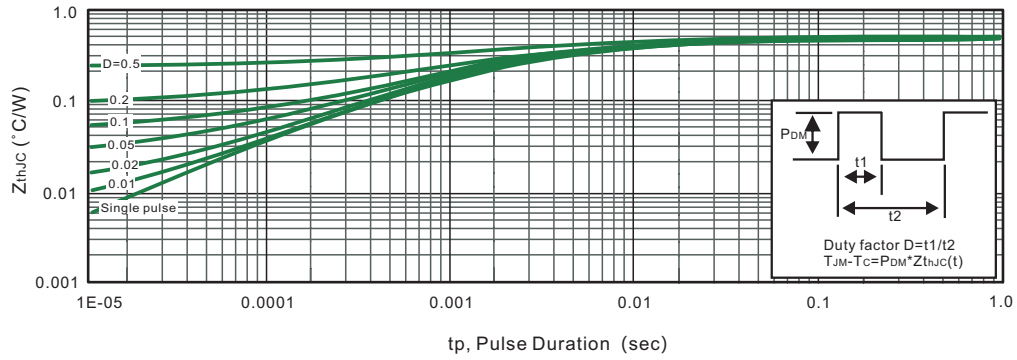
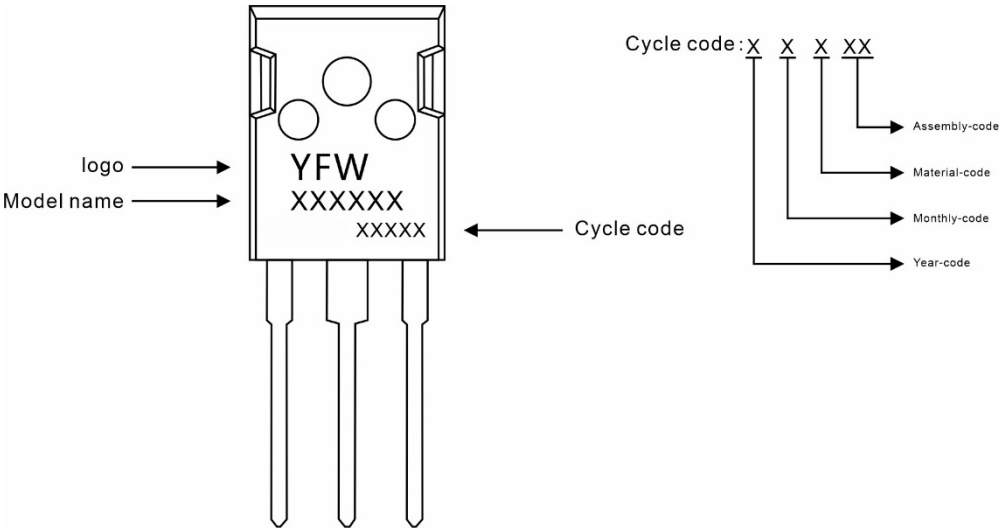


Fig.12 Max. Transient Thermal Impedance



Marking Diagram

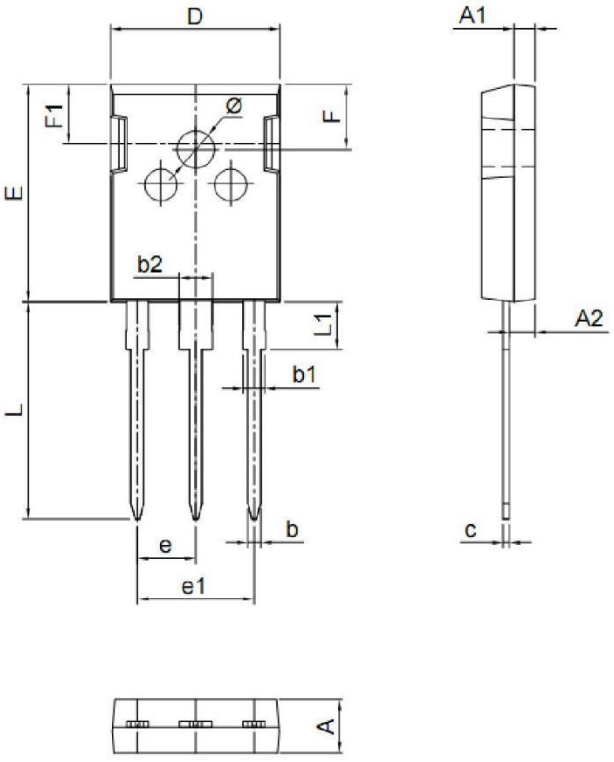


Ordering information

Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW60R068AP	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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