N Channel MOSFET

Lead Free Package and Finish

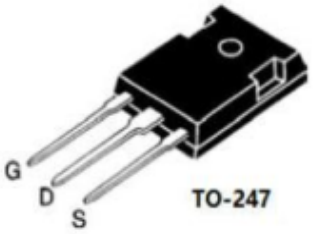
Applications:

•Adapter & Charger
•DC-AC inverter Power
•AC-DC Switching Power Supply
•LED driving power

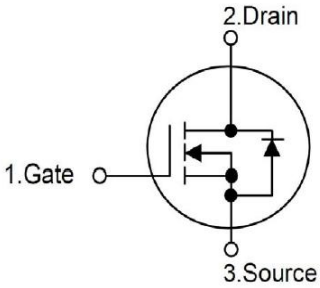
I_D	$R_{DS(ON)}$(Typ.)	V_{DSS}
18A	0.27Ω	500V

Features:

•Low On Resistance
•Low Gate Charge
•Peak Current vs Pulse Width Curve
•RoHS Compliant



Not to Scale



Ordering Information:

Part Number	Package	Marking
RS18N50W	TO-247	RS18N50W

Absolute Maximun Ratings Tc=25℃ unless otherwise specified

Symbol	Parameter	RS18N50W	Units
V_{DSS}	Drain-to-Source Voltage (Note*1)	500	V
I_D	Continuous Drain Current	18.0	A
I_D@ 100 ℃	Continuous Drain Current	9.0	
I_{DM}	Pulsed Drain Current (Note*2)	72.0	
P_D	Power Dissipation	98	W
V_{GS}	Gate-to-Source Voltage	±30	V
E_{AS}	Single Pulse Avalanche Engergy IAS=14A VDD=50V RG=25Ω Starting TJ=25℃	998	mJ
T_L	Maximum Temperature for Soldering Leads at 0.063in(1.6mm)from Case for 10 seconds	300	℃
T_{PKG}	Package Body for 10 seconds	260	
T_J and T_{STG}	Operating Junction and Storage Temperature Range	-55 to 150	

*Drain Current Limited by Maximum Junction Temperature

Caution:Stresses greater than those listed in the“Absolute Maximum Ratings”Table may cause permanent damage to the device.

Thermal Resistance

Symbol	Parameter	RS18N50W	Units	Test Conditions
RθJC	Junction-to-Case	0.43	℃/W	Drain lead soldered to water cooled heatsink,PD adjusted for a peak junction temperature of +150℃.
RθJA	Junction-to-Ambient	41		1 cubic foot chamber,free air.

OFF Characteristics TJ=25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-to-source Breakdown Voltage	500	--	--	V	V_{GS}=0V,I_D=250μA
I_{DSS}	Drain-to-Source Leakage Current	--	--	1.0	μA	V_{DS}=500V,V_{GS}=0V
I_{GSS}	Gate-to-Source Forward Leakage	--	--	100	μA	V_{GS}=+30V V_{DS}=0V
	Gate-to-Source Reverse Leakage	--	--	-100		V_{GS}=-30V V_{DS}=0V

ON Characteristics TJ=25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	--	0.27	0.32	Ω	V_{GS}=10V,I_D=9A
$V_{GS(TH)}$	Gate Threshold Voltage	3.0	--	4.0	V	V_{GS}=V_{DS},I_D=250μA

Resistive Switching Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$t_{d(ON)}$	Turn-on Delay Time	--	35	--	nS	V_{DS}=250V I_D=18A R_G=25Ω (Note:3,4)
t_{rise}	Rise Time	--	50	--		
$t_{d(OFF)}$	Turn-OFF Delay Time	--	180	--		
t_{fall}	Fall Time	--	65	--		

Dynamic Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
C_{iss}	Input Capacitance	--	2250	--	pF	V_{GS}=0V V_{DS}=25V f=1.0MHz
C_{oss}	Output Capacitance	--	231	--		
C_{rss}	Reverse Transfer Capacitance	--	36	--		
Q_g	Total Gate Charge	--	71	--	nC	V_{DS}=400V I_D=18A V_{GS}=10V (Note:3,4)
Q_{gs}	Gate-to-Source Charge	--	10.0	--		
Q_{gd}	Gate-to-Drain("Miller"）Charge	--	32	--		

Source-Drain Diode Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I_S	Continuous Source Current	--	--	18	A	Integral pn-diode in MOSFET
I_{SM}	Maximum Pulsed Current	--	--	72	A	
V_{SD}	Diode Forward Voltage	--	--	1.4	V	IS=18A,VGS=0V
t_{rr}	Reverse Recovery Time	--	570.3	--	nS	VGS=0V IS=18A,di/dt=100A/μs
Q_{rr}	Reverse Recovery Charge	--	7.35	--	μC	

Notes:

*1.TJ=±25℃ to +150℃.
*2.Repetitive rating;pulse width limited by maximum junction temperature.
*3.Pulse width≤300μs;duty cycle ≤1%.
*4.Basically not affected by temperature.

Typical Feature curve

Figure 1. Output Characteristics (T_J = 25°C)

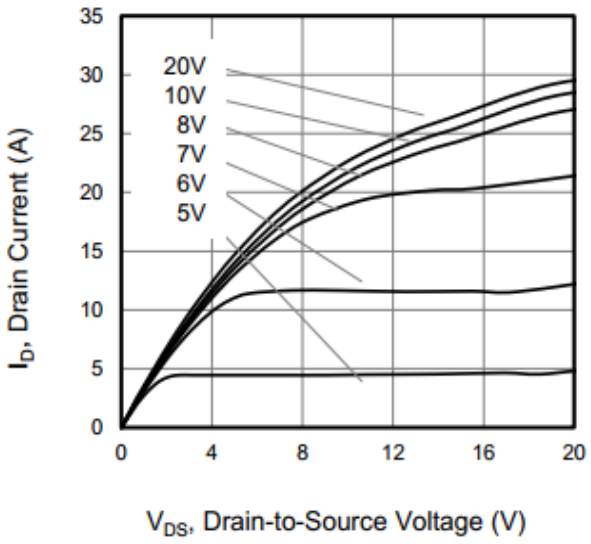


Figure 2. Body Diode Forward Voltage

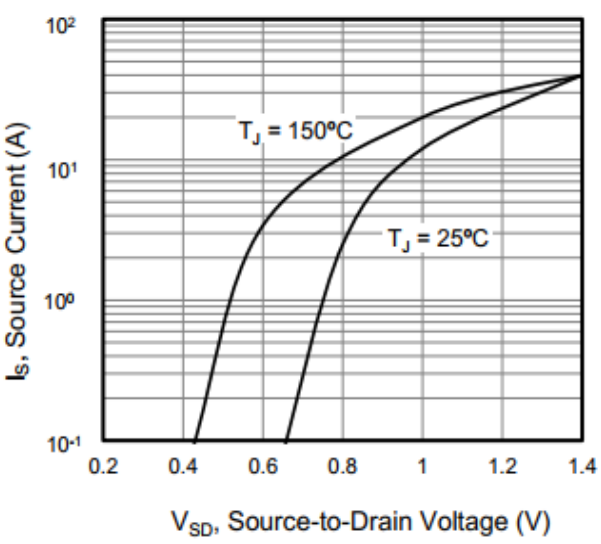


Figure 3. Drain Current vs. Temperature

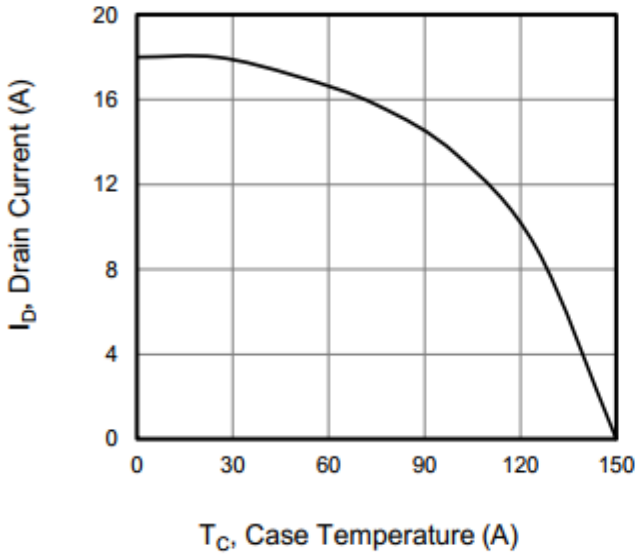


Figure 4. BV_{DSS} Variation vs. Temperature

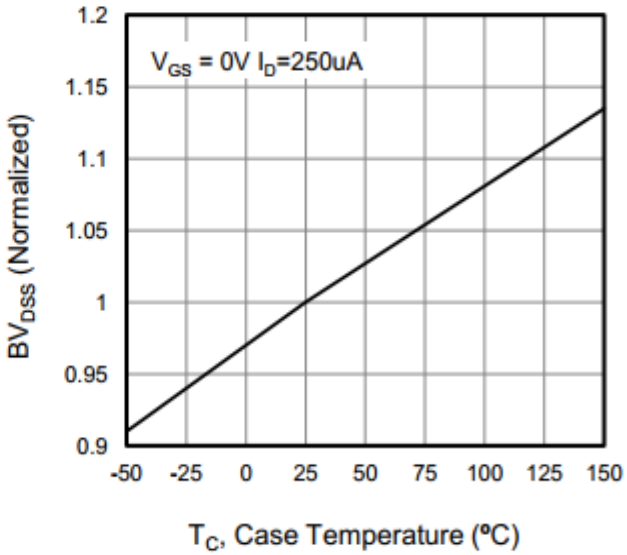


Figure 5. Transfer Characteristics

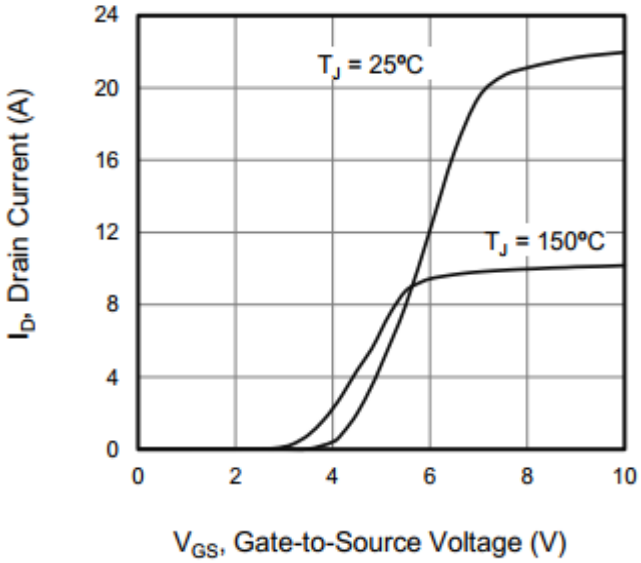


Figure 6. On-Resistance vs. Temperature

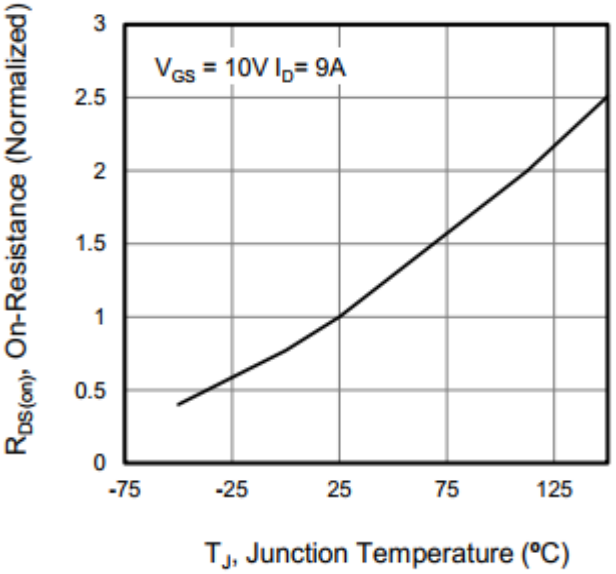


Figure 7. Capacitance

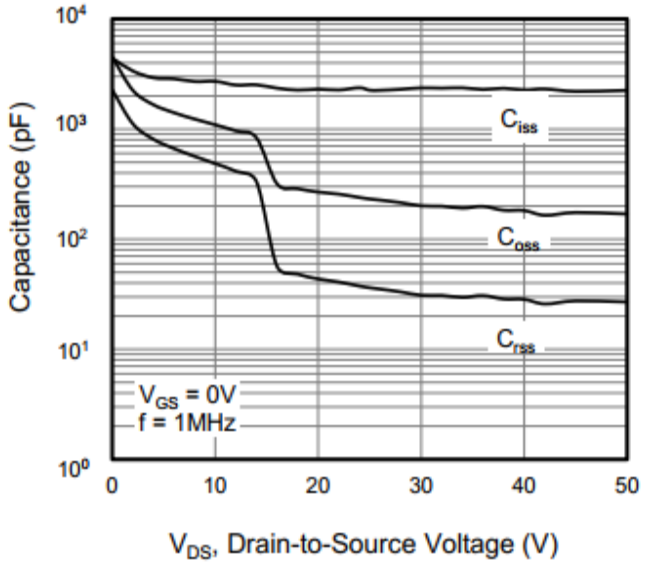


Figure 8. Gate Charge

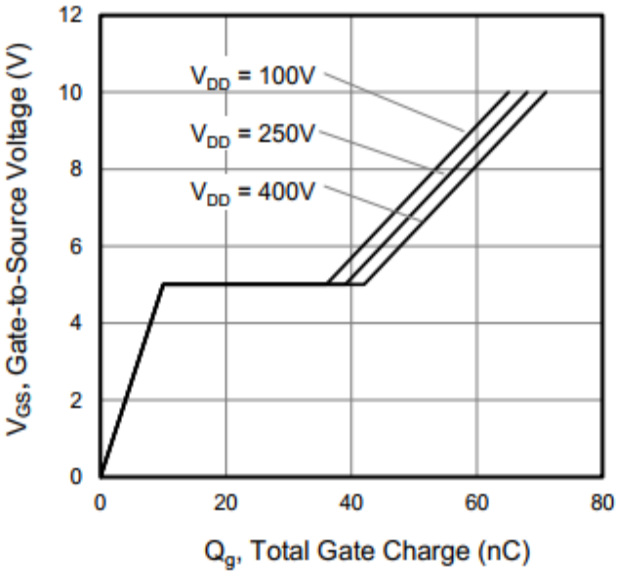
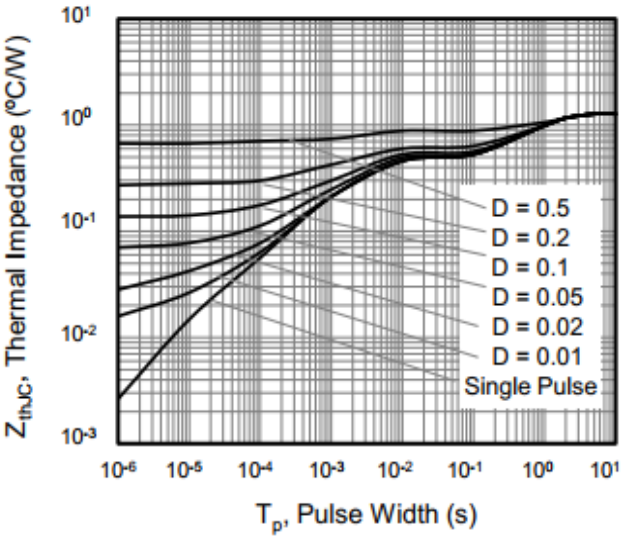


Figure 9. Transient Thermal Impedance



Test Circuits and Waveforms

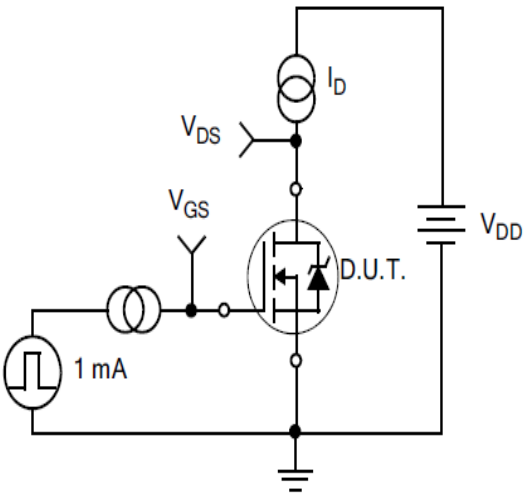


Figure10.
Gate Charge Test Circuit

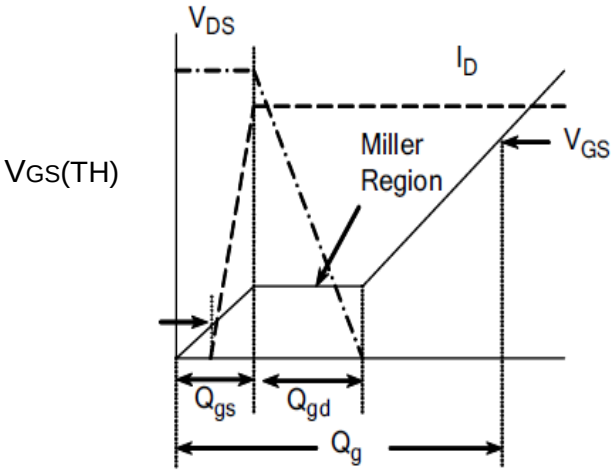


Figure11.
Gate Charge Waveform

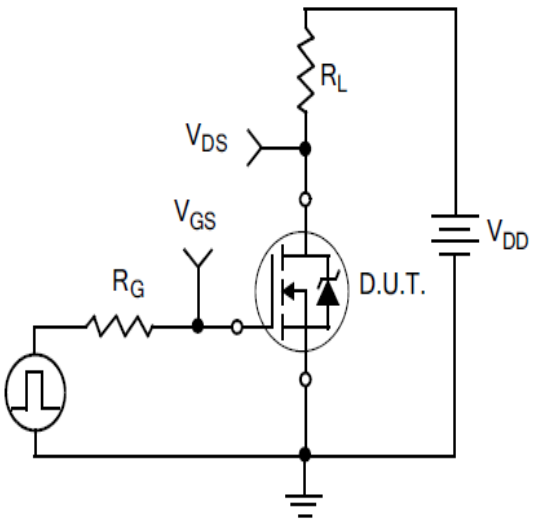


Figure12.
Resistive Switching Test Circuit

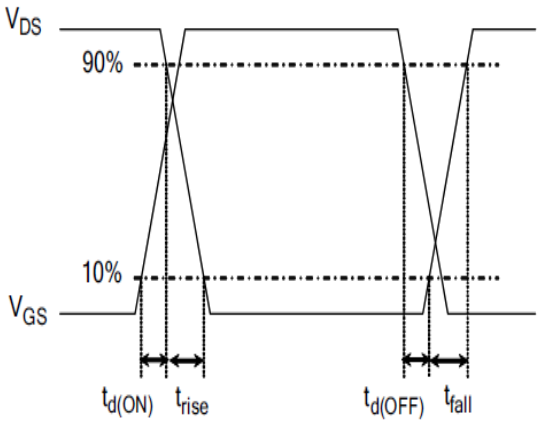


Figure13.
Resistive Switching Waveforms

Test Circuits and Waveforms

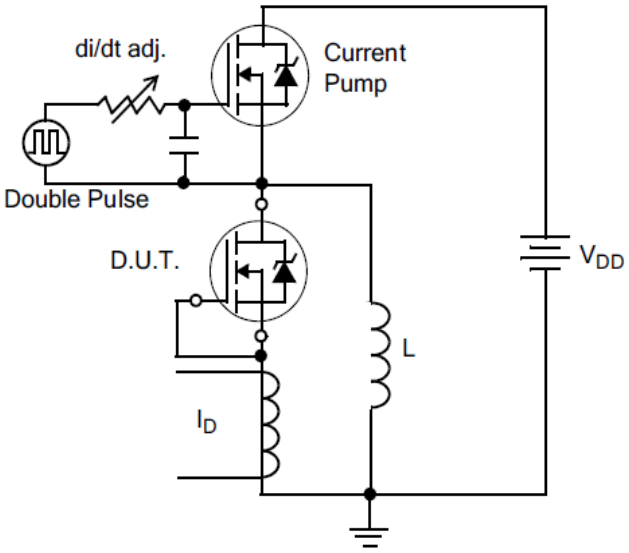


Figure14.Diode Reverse Recovery Test Circuit

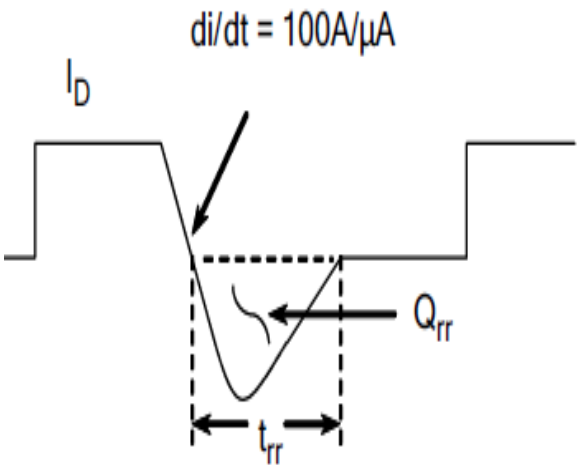


Figure15.Diode Reverse Recovery Waveform

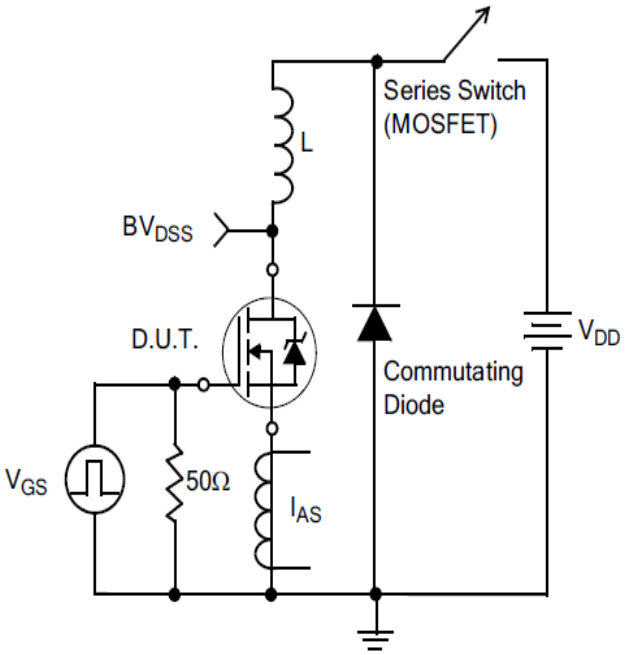
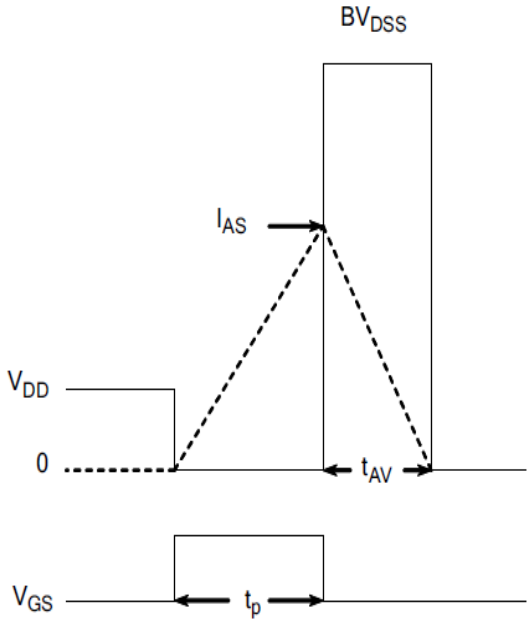


Figure16.Unclamped Inductive Switching Test Circuit

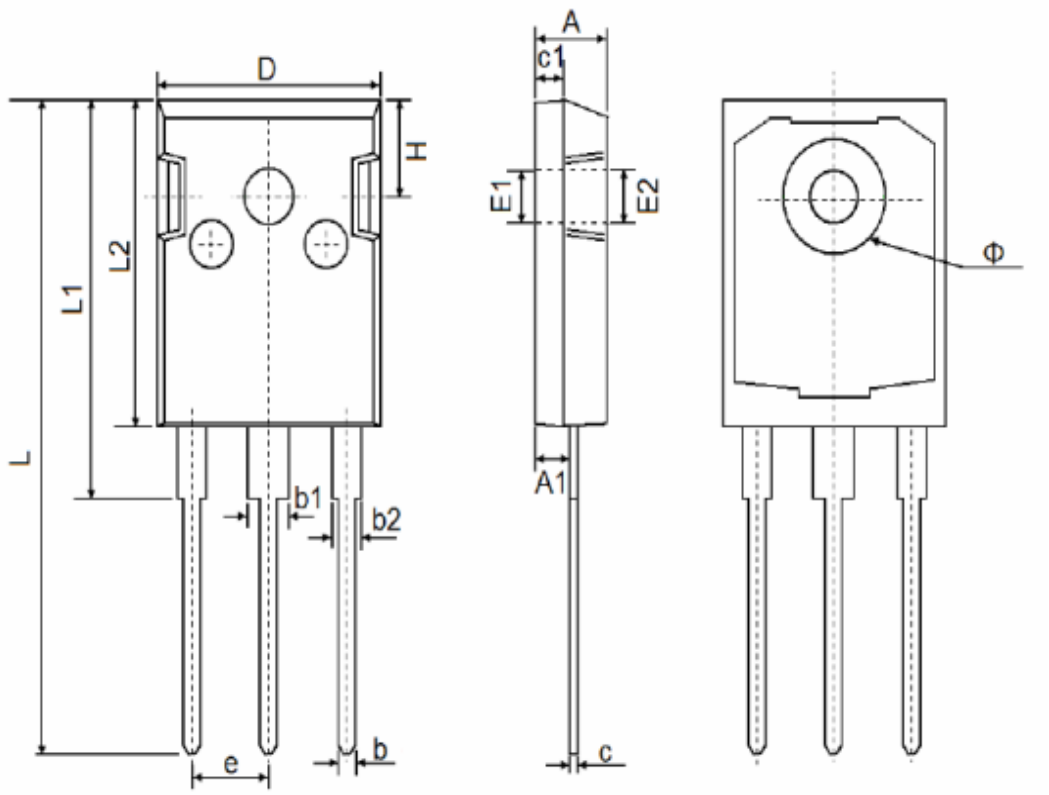


$$E_{AS}=\frac{I_{AS}^2 L}{2}$$

Figure17.Unclamped Inductive Switching Waveforms

Package outline drawing

Unit:mm



TO-247

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.850	5.150	0.191	0.200
A1	2.200	2.600	0.087	0.102
b	1.000	1.400	0.039	0.055
b1	2.800	3.200	0.110	0.126
b2	1.800	2.200	0.071	0.087
c	0.500	0.700	0.020	0.028
c1	1.900	2.100	0.075	0.083
D	15.450	15.750	0.608	0.620
E1	3.500 REF		0.138 REF	
E2	3.600 REF		0.142 REF	
L	40.900	41.300	1.610	1.626
L1	24.800	25.100	0.976	0.988
L2	20.300	20.600	0.799	0.811
Φ	7.100	7.300	0.280	0.287
e	5.450 TYP		0.215 TYP	
H	5.980 REF		0.235 REF	

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