

Multi-Epi Super Junction MOSFET



Lead Free Package and Finish

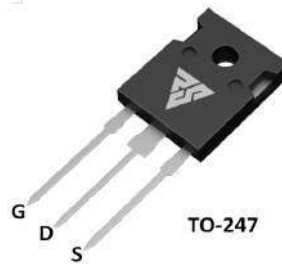
Applications:

- PFC Power Supply Stages
- Switching Applications
- Adapter
- LED Lighting Power

Features:

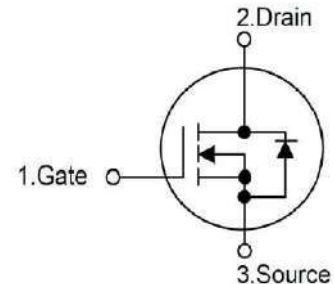
- Low Power Loss by High Speed Switching
- Low On-Resistance
- 100% Avalanche Tested
- RoHS Compliant

I_D	$R_{DS(ON)}(Typ.)$	V_{DSS}
78A	36mΩ	650V



TO-247

Not to Scale



Ordering Information:

Part Number	Package	Marking
RS65R041W	TO-247	RS65R041W

Absolute Maximum Ratings $T_c=25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	RS65R041W	Units
V_{DSS}	Drain-to-Source Voltage	650	V
I_D	Continuous Drain Current	78	A
$I_{D@ 100^{\circ}\text{C}}$	Continuous Drain Current	46	
I_{DM}	Pulsed Drain Current (Note*1)	230	
P_D	Power Dissipation	500	W
V_{GS}	Gate-to-Source Voltage	± 30	V
EAS	Single Pulse Avalanche Energy (Note*2)	2350	mJ
T_L TPKG	Maximum Temperature for Soldering	300 260	$^{\circ}\text{C}$
	Leads at 0.063in(1.6mm)from Case for 10 seconds		
	Package Body for 10 seconds		
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	RS65R041W	Units	Test Conditions
$R_{\theta JC}$	Junction-to-Case	0.25	$^{\circ}\text{C/W}$	Drain lead soldered to water cooled heatsink,PD adjusted for a peak junction temperature of $+150^{\circ}\text{C}$.
$R_{\theta JA}$	Junction-to-Ambient	62		1 cubic foot chamber,free air.

OFF Characteristics TJ=25°C unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BVDSS	Drain-to-source Breakdown Voltage	650	--	--	V	V _{GS} =0V, I _D =250μA
IDSS	Drain-to-Source Leakage Current	--	--	5.0	μA	V _{DS} =650V, V _{GS} =0V
IGSS	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°C unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
RDS(on)	Static Drain-to-Source On-Resistance	--	0.036	0.041	Ω	V _{GS} =10V, I _D =20A
VGS(TH)	Gate Threshold Voltage	2.5	--	5.0	V	V _{GS} =V _{DS} , I _D =250μA

Resistive Switching Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
td(ON)	Turn-on Delay Time	--	46	--	nS	V _{DS} =400V I _D =39A R _G =10Ω V _{GS} = 10V
trise	Rise Time	--	52	--		
td(OFF)	Turn-OFF Delay Time	--	342	--		
tfall	Fall Time	--	8.6	--		

Dynamic Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
Ciss	Input Capacitance	--	7710	--	pF	V _{GS} =0V
Coss	Output Capacitance	--	251	--		V _{DS} =100V
Crss	Reverse Transfer Capacitance	--	7	--		f=250KHz
Qg	Total Gate Charge	--	100	--	nC	V _{DS} =400V
Qgs	Gate-to-Source Charge	--	25	--		I _D =39A
Qgd	Gate-to-Drain("Miller") Charge	--	42	--		V _{GS} =10V

Source-Drain Diode Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I_S	Continuous Source Current	--	--	78	A	Integral pn-diode in MOSFET
I_{SM}	Maximum Pulsed Current	--	--	230	A	
V_{SD}	Diode Forward Voltage	--	--	1.2	V	$I_S=39A, V_{GS}=0V$
t_{rr}	Reverse Recovery Time	--	200	--	nS	$V_{GS}=0V$ $I_S=39A, di/dt=100A/\mu s$
Q_{rr}	Reverse Recovery Charge	--	1.9	--	μC	

Notes:

- *1. Repetitive rating;pulse width limited by maximum junction temperature.
- *2. $I_{AS}=10A, V_{DD}=60V, R_G=25\Omega, \text{Starting } T_J=25^\circ C$.

Typical Feature curve

Figure 1. On-Region Characteristics

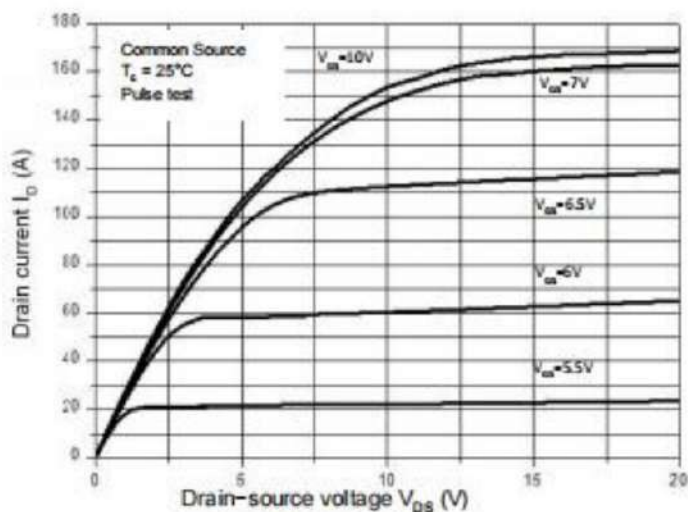


Figure 2. Transfer Characteristics

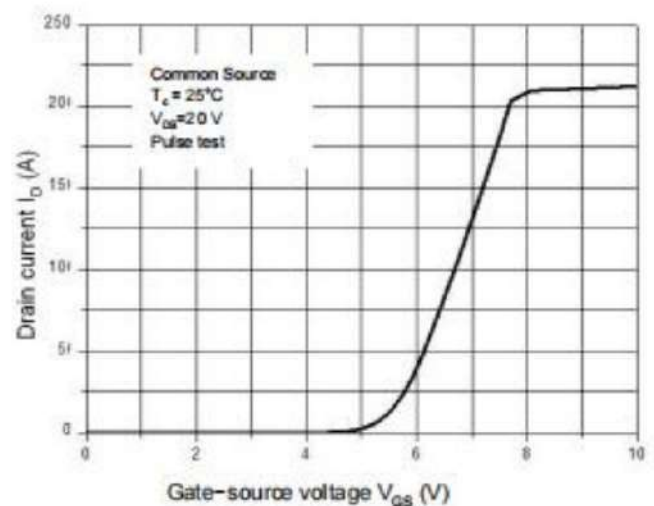


Figure 3. On-Resistance Variation vs. Drain Current

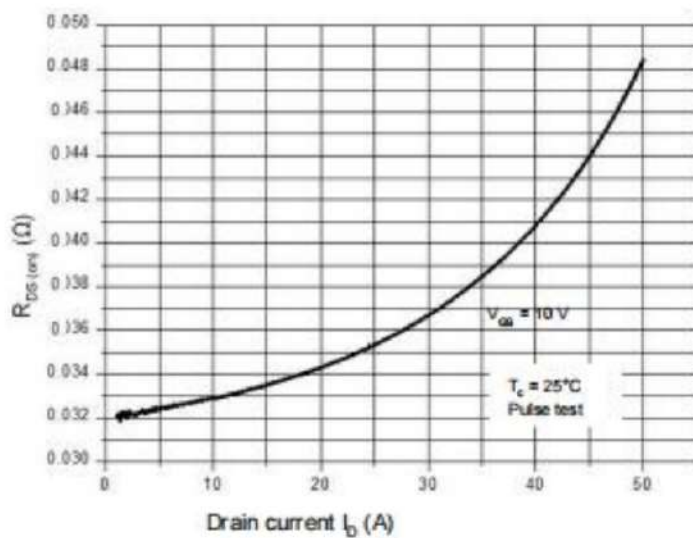


Figure 4. Threshold Voltage vs. Temperature

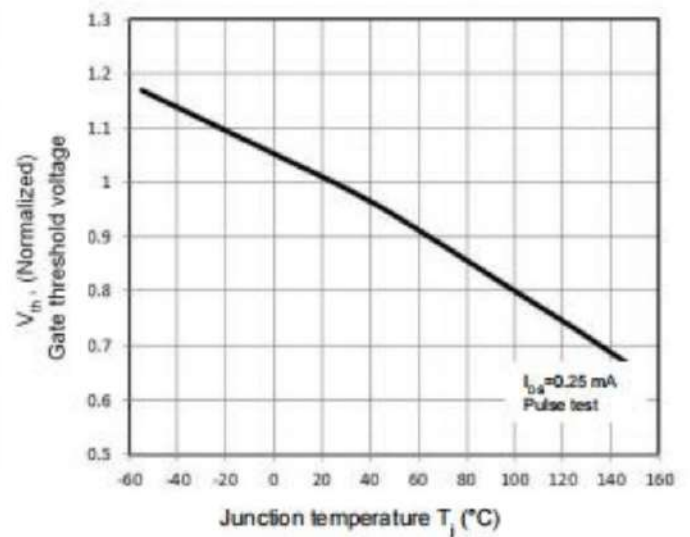


Figure 5. Breakdown Voltage vs. Temperature

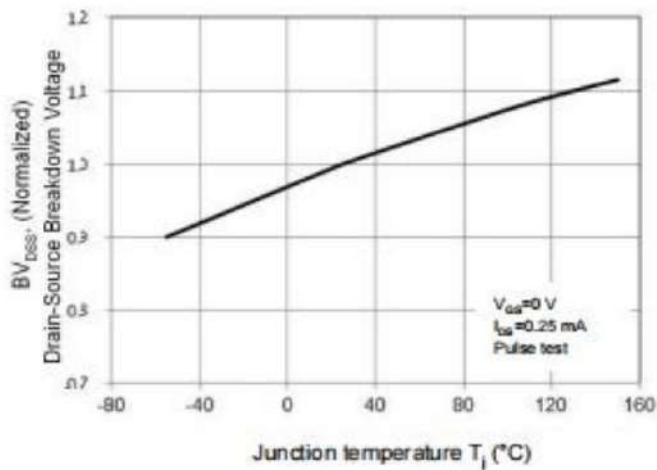


Figure 6. On-Resistance vs. Temperature

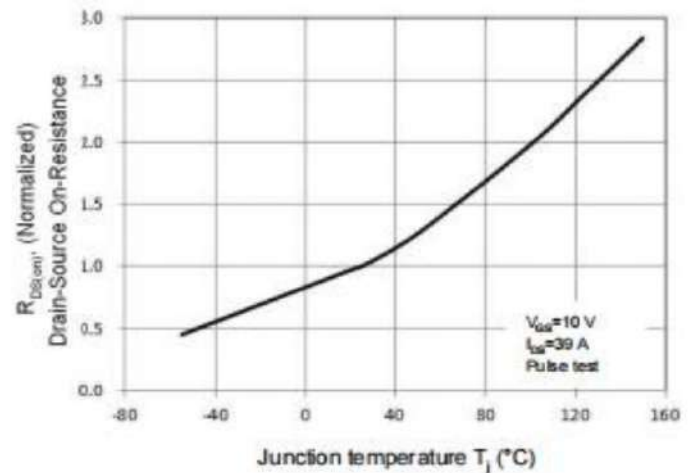


Figure 7. Capacitance Characteristics

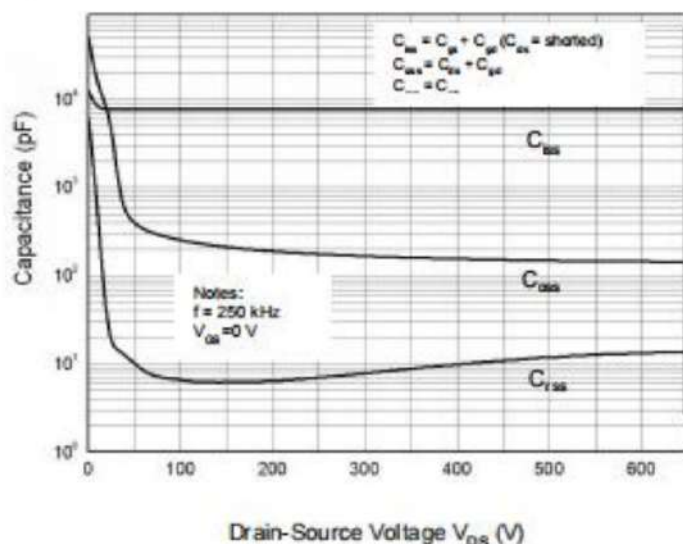


Figure 8. Gate Charge Characterist

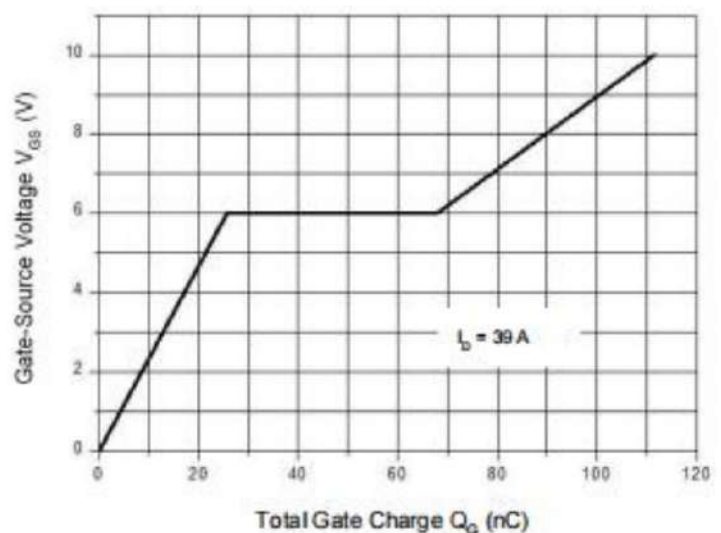


Figure 9 Maximum Safe Operating Area

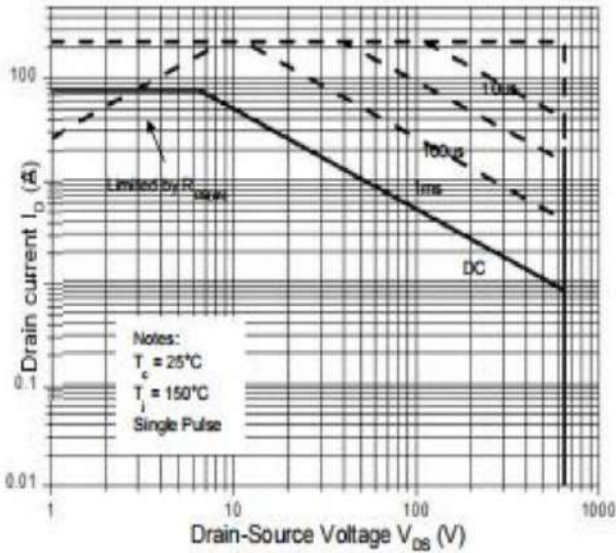
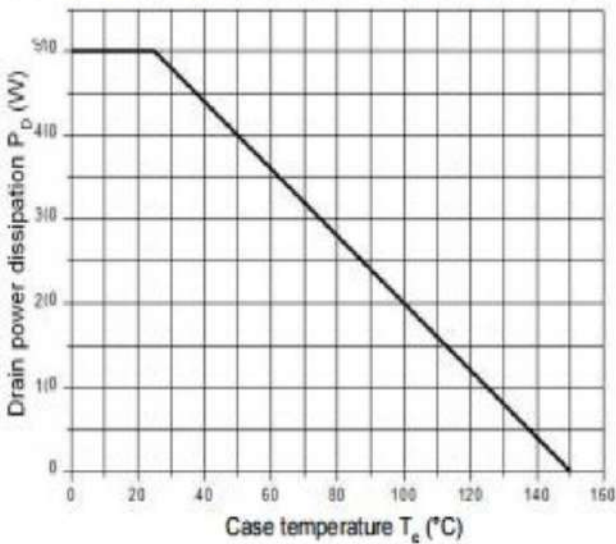


Figure 10 Power Dissipation vs. Temperature



Test Circuits and Waveforms

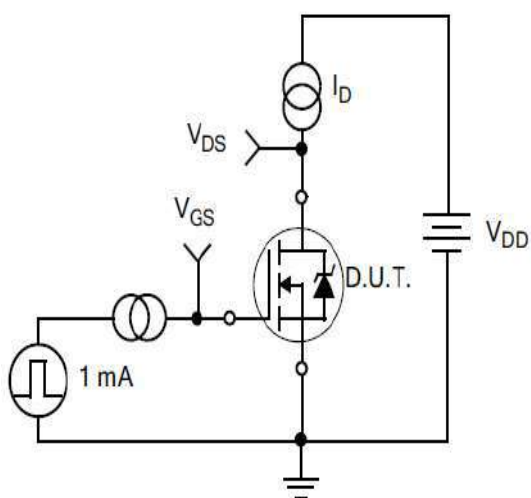


Figure A.
Gate Charge Test Circuit

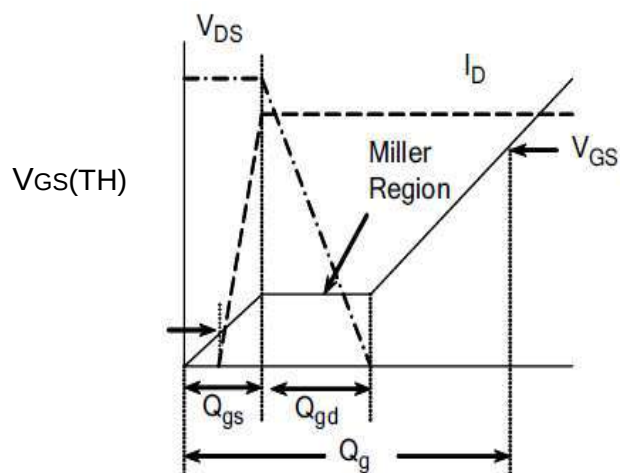


Figure B.
Gate Charge Waveform

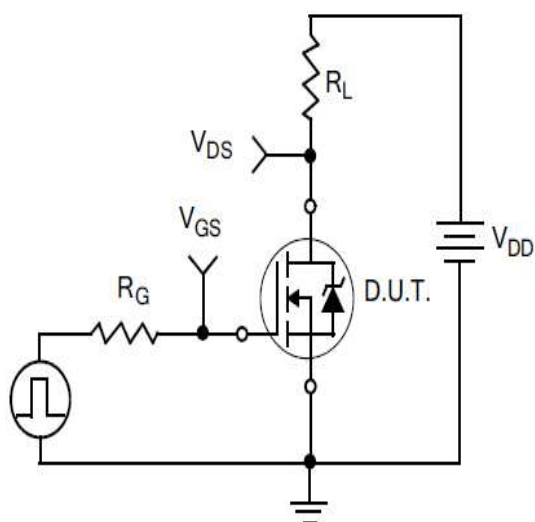


Figure C.
Resistive Switching Test Circuit

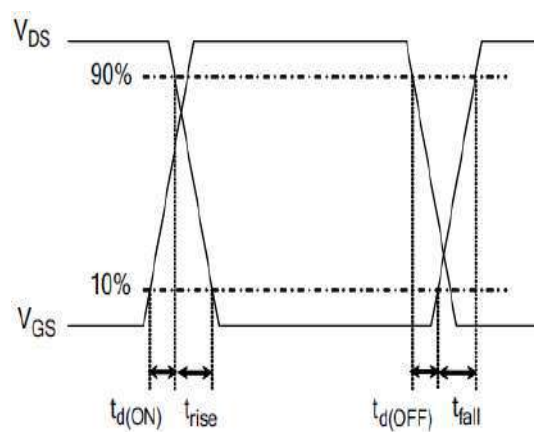


Figure D.
Resistive Switching Waveforms

Test Circuits and Waveforms

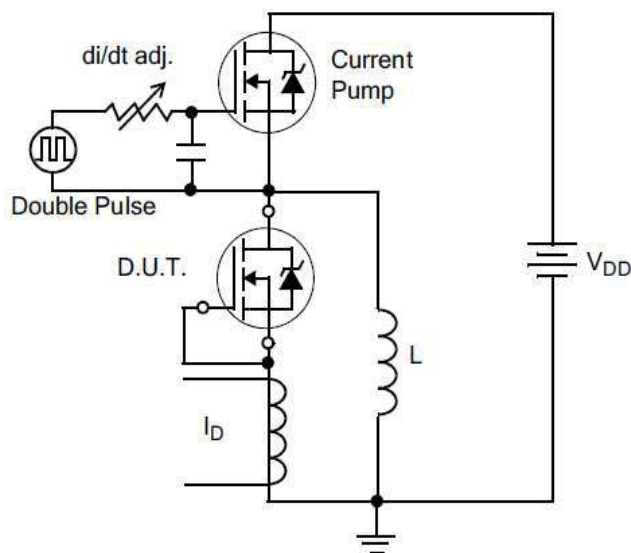


Figure E. Diode Reverse Recovery Test Circuit

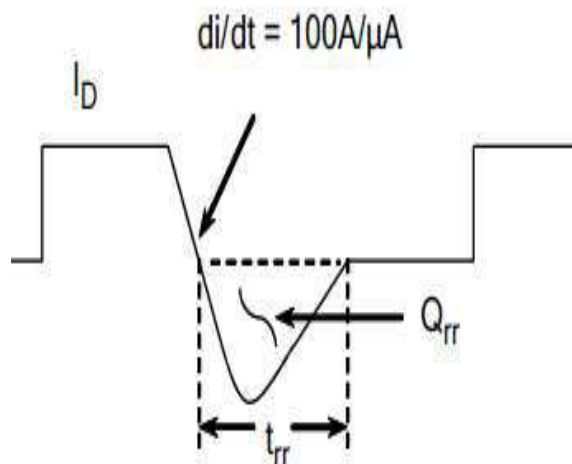


Figure F. Diode Reverse Recovery Waveform

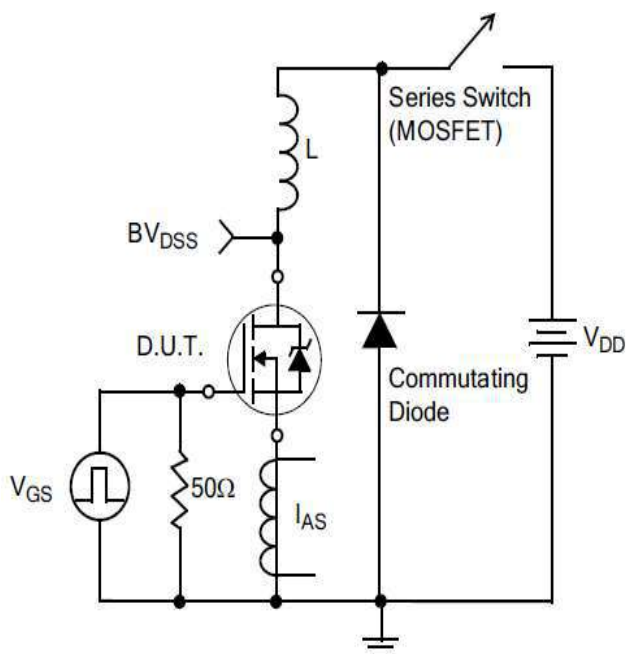
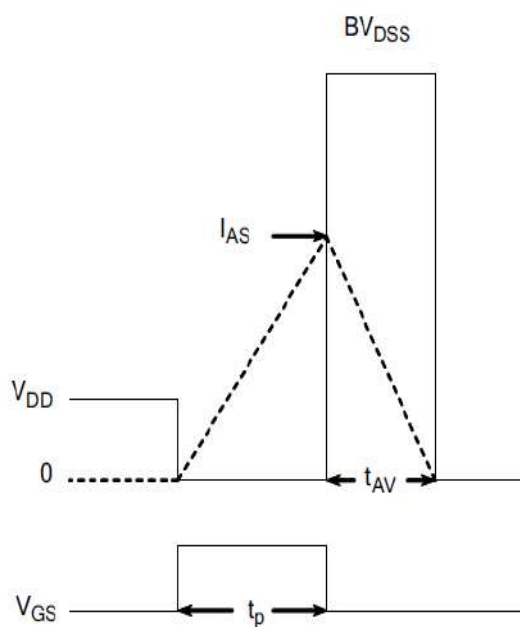


Figure G. Unclamped Inductive Switching Test Circuit

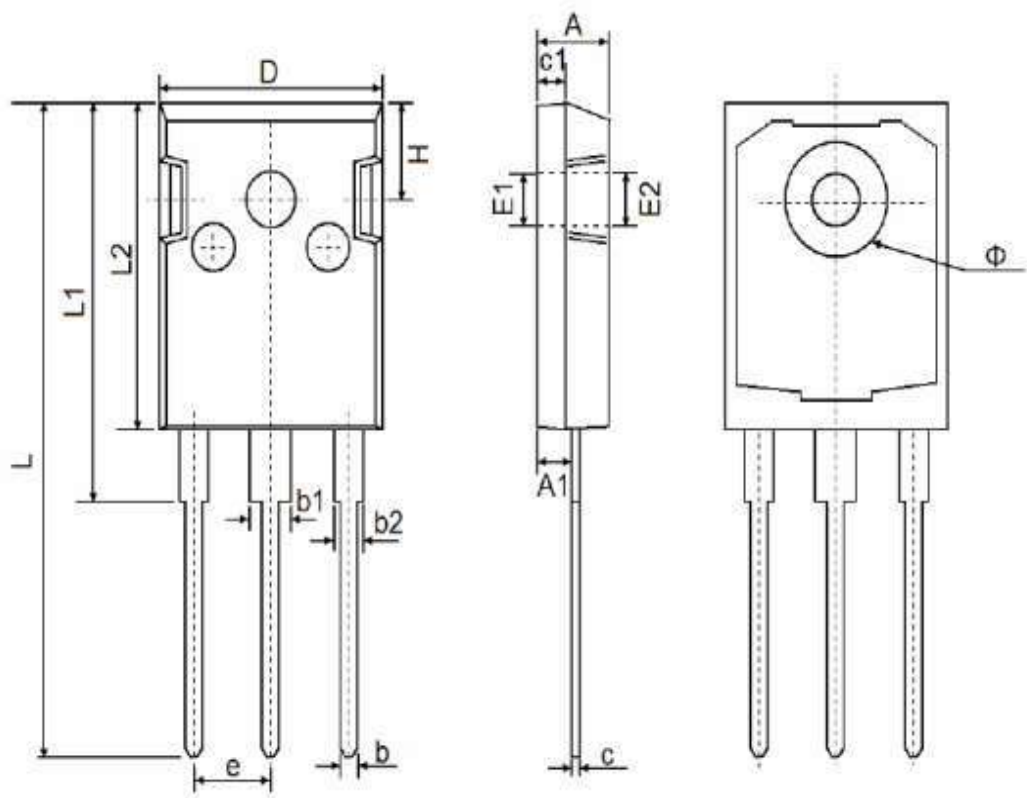


$$E_{AS} = \frac{I_{AS}^2 L}{2}$$

Figure H. 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	

Disclaimers:

Reasunos Semiconductor Technology CO.,LTD(Reasunos)reserves the right to make changes without notice in order to improve reliability,function or design and to discontinue any product or service without notice .Customers should obtain the latest relevant information before orders and should verify that such information in current and complete.All products are sold subject to Reasunos's terms and conditions supplied at the time of order acknowledgement.

Reasunos Semiconductor Technology CO.,LTD warrants performance of its hardware products to the specifications at the time of sale.Testing,reliability and quality control are used to the extene Reasunos deems necessary to support this warrantee. Except where agreed upon by contr-actual agreement,testing of all parameters of each product is not necessarily performed.

Reasunos Semiconductor Technology CO.,LTD does not assume any liability arising from the use of any product or circuit designs described herein.Customers are responsible for their products and applications using Reasunos's components.To minimize risk,customers must provide adequate design and operating safeguards.

Reasunos Semiconductor Technology CO.,LTD does not warrant or convey any license either expressed or implied under its patent rights,nor the rights of others.Reproduction of information in Reasunos's data sheets or data books is permissible only if reproduction is without modification or alteration.Reproduction of this information with any alteration is an unfair and deceptive business practice. Reasunos Semiconductor Technology CO.,LTD is not responsible or liable for such altered documentation.

Resale of Reasunos's products with statements different from or beyond the parameters stated by Reasunos Semiconductor Technology CO.,LTD for that product or service voids all express or implied warranties for the associated Reasunos's product or service and is unfair and deceptive business practice. Reasunos Semiconductor Technology CO.,LTD is not responsible or liable for such statements.

Life Support Policy:

Reasunos Semiconductor Technology CO.,LTD's Products are not authorized for use as critical components in life support devices or systems without the expressed written approval of Reasunos Semiconductor Technology CO.,LTD.

As used herein:

- 1.Life support devices or systems are devices or systems which:
 - a.are intended for surgical implant into the human body,
 - b.support or sustain life,
 - c.whose failure to when properly used in accordance with instructions for use provided in the labeling,can be reasonably expected to result in significant injury to the user.
 - 2.A critical component is any component of a life support device or system whose failure to system whose failure to perform can be reasonably expected to cause the failure of the life support device or system,or to affect its safety or effectiveness.
-