XNRUSEMI

XRS150N15H

N-Ch 150V Fast Switching MOSFETs

Features

- Split Gate Trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$

Product Summary

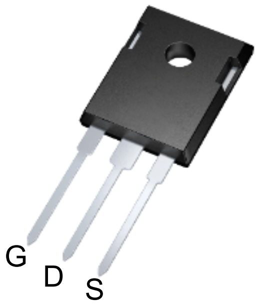
Green

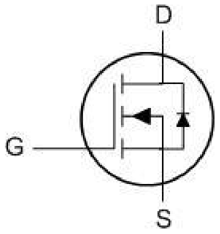
BVDSS	RDSON	ID
150V	5.9mΩ	150A

Applications

- DC-DC Converters
- Power management functions
- Synchronous-rectification applications

TO247 Pin Configuration





Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	150	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25°C	Continuous Drain Current, V_{GS} @ 10V[1,6]	150	A
I_D@T_C=100°C	Continuous Drain Current, V_{GS} @ 10V[1,6]	86	A
I_{DM}	Pulsed Drain Current[2]	560	A
EAS	Single Pulse Avalanche Energy[3]	1105	mJ
I_{AS}	Avalanche Current	66	A
P_D@T_C=25°C	Total Power Dissipation[4]	298	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	45	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	0.42	°C/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	150	---	---	V
△BV_{DSS}/△T_J	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	---	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=60A	---	5.9	7.1	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	2	3	4	V
△$V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	---	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=150V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=150V, V_{GS}=0V , T_J=100℃	---	---	100	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=60A	---	100.8	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	4	---	Ω
Q_g	Total Gate Charge	V_{DS}=75V , V_{GS}=10V , I_D=60A	---	74.5	---	nC
Q_{gs}	Gate-Source Charge		---	31.7	---	
Q_{gd}	Gate-Drain Charge		---	15.2	---	
$T_{d(on)}$	Turn-On Delay Time	V_{GS}=10V, V_{DD}=75V, R_G=2.7Ω, I_D=60A	---	19.1	---	ns
T_r	Rise Time		---	90.8	---	
$T_{d(off)}$	Turn-Off Delay Time		---	52.4	---	
T_f	Fall Time		---	82.5	---	
C_{iss}	Input Capacitance	V_{DS}=75V , V_{GS}=0V , f=1MHz	---	4936	---	pF
C_{oss}	Output Capacitance		---	609	---	
C_{rss}	Reverse Transfer Capacitance		---	21	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	150	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=60A , T_J=25C	---	---	1.4	V
t_{rr}	Reverse Recovery Time	IF=17A , di/dt=100A/μs , T_J=25C	---	132.7	---	nS
Q_{rr}	Reverse Recovery Charge		---	584.7	---	nC

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C
2. The EAS data shows Max. rating . The test condition is V_{DD}=75V,V_{GS}=10V,L=0.5mH，I_{AS}=66A.
3. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
5. This value is guaranteed by design hence it is not included in the production test.

Typical Performance Characteristics

Fig 1: Output Characteristics

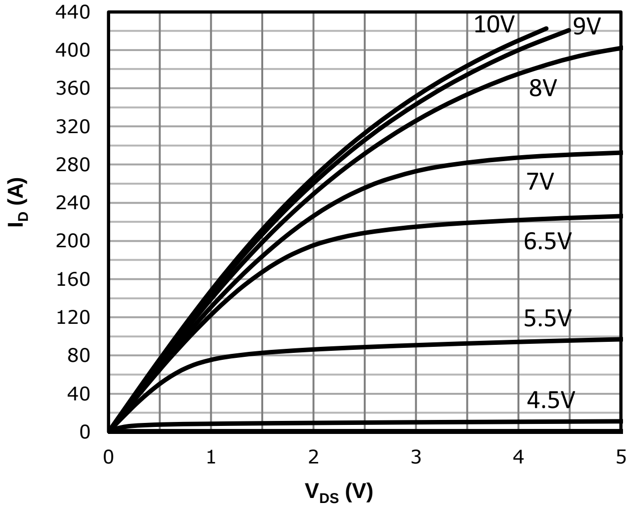


Fig 2: Transfer Characteristics

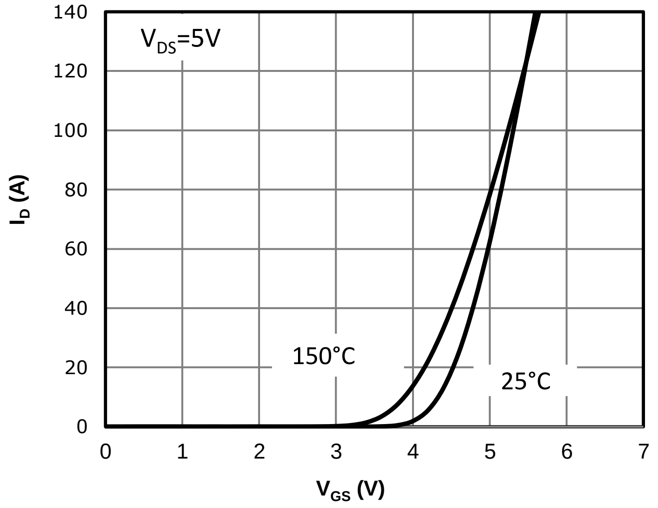


Fig 3: Rds(on) vs Drain Current and Gate Voltage

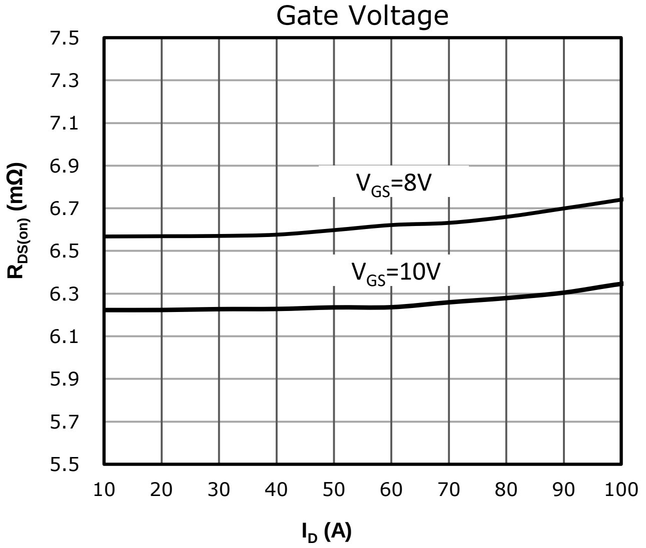


Fig 4: Rds(on) vs Gate Voltage

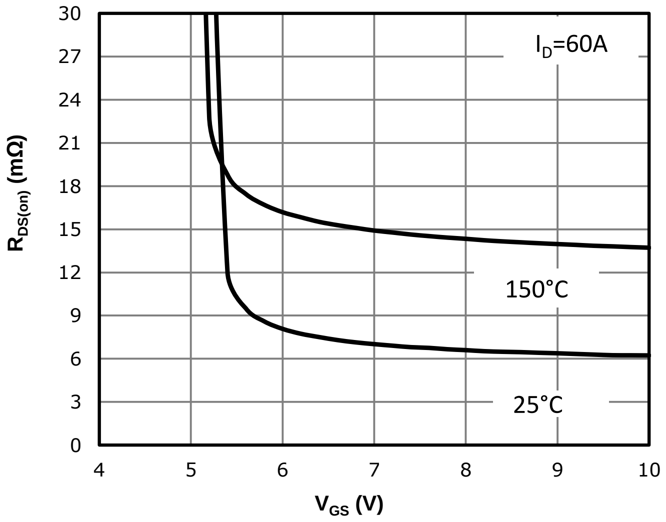


Fig 5: Rds(on) vs. Temperature

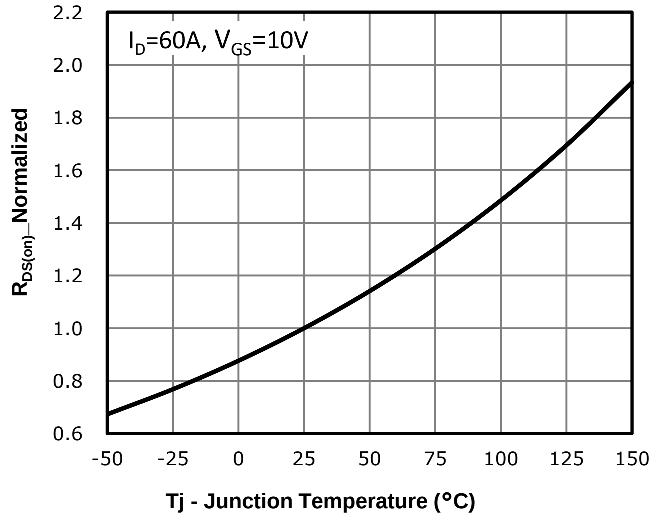


Fig 6: Vgs(th) vs. Temperature

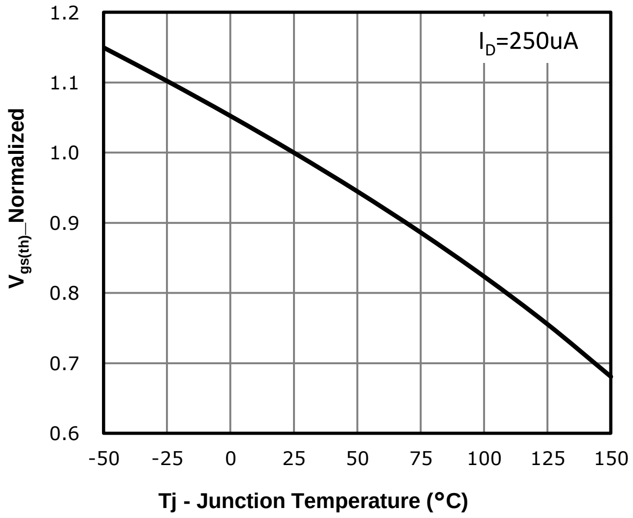


Fig 7: BVdss vs. Temperature

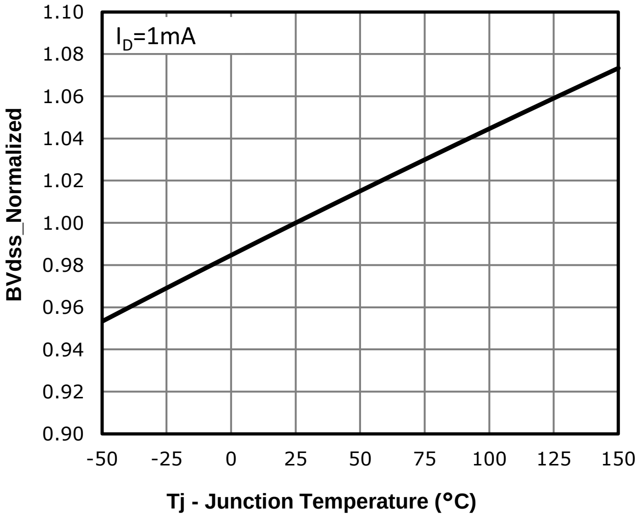


Fig 8: Capacitance Characteristics

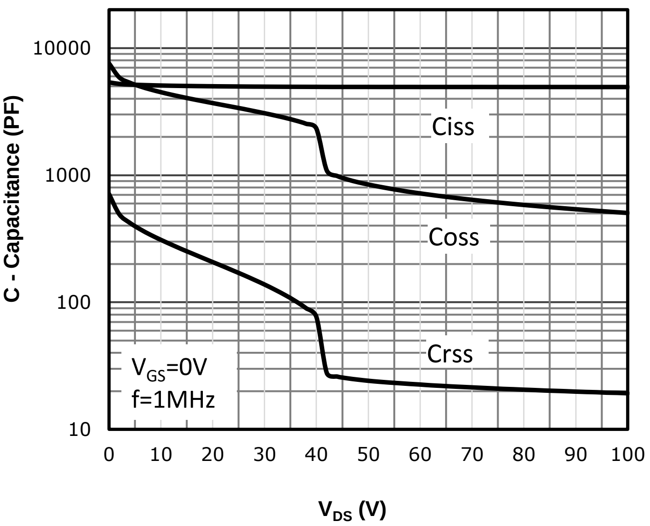


Fig 9:Gate Charge Characteristics

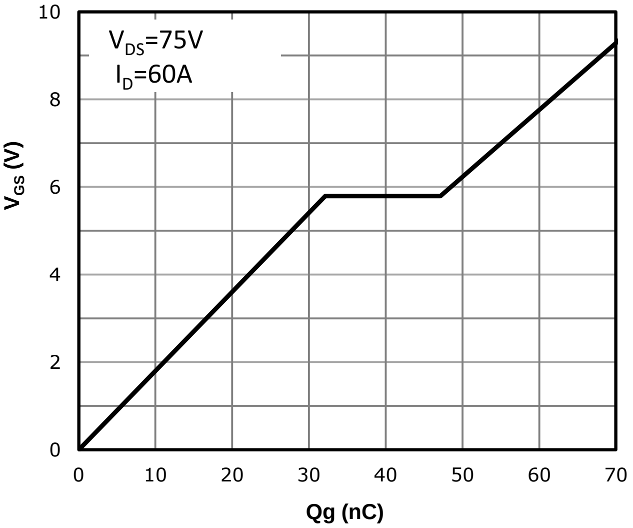


Fig 10: Body-diode Forward Characteristics

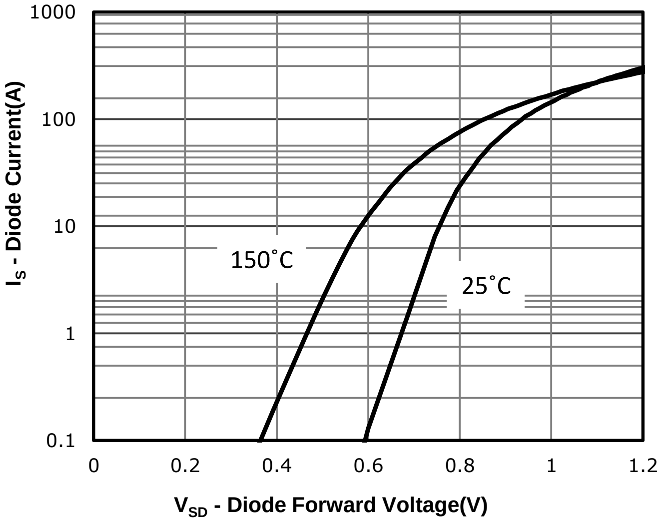


Fig 11: Power Dissipation

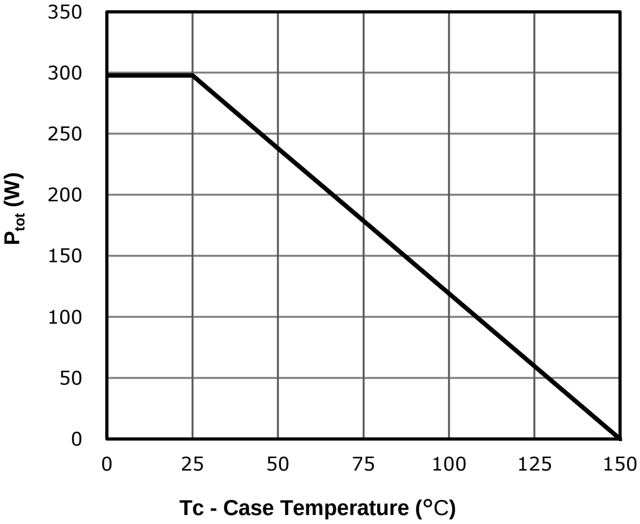


Fig 12: Drain Current Derating

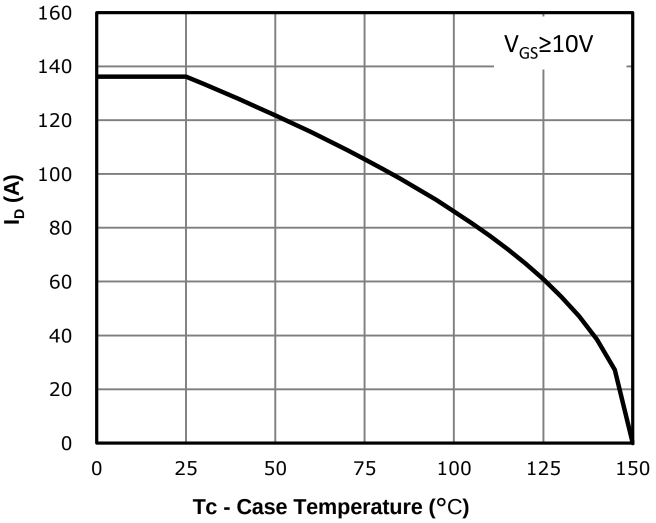


Fig 13: Safe Operating Area

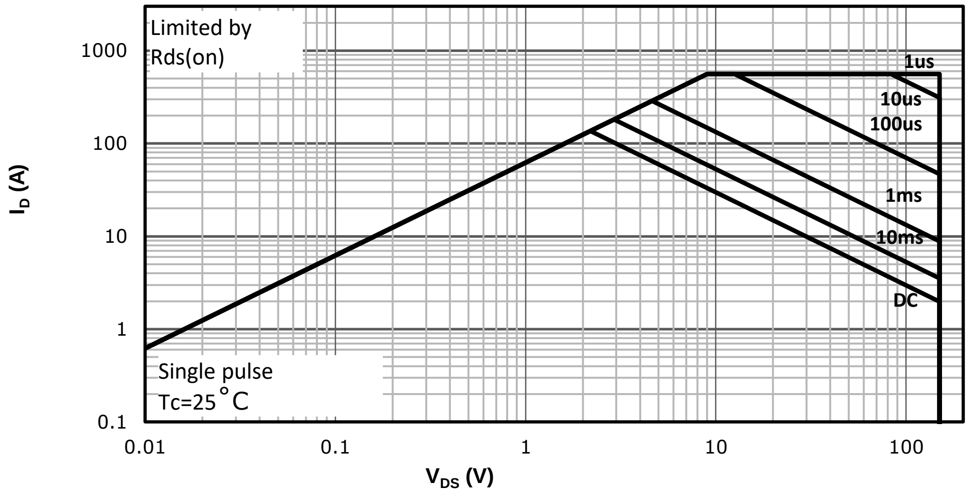
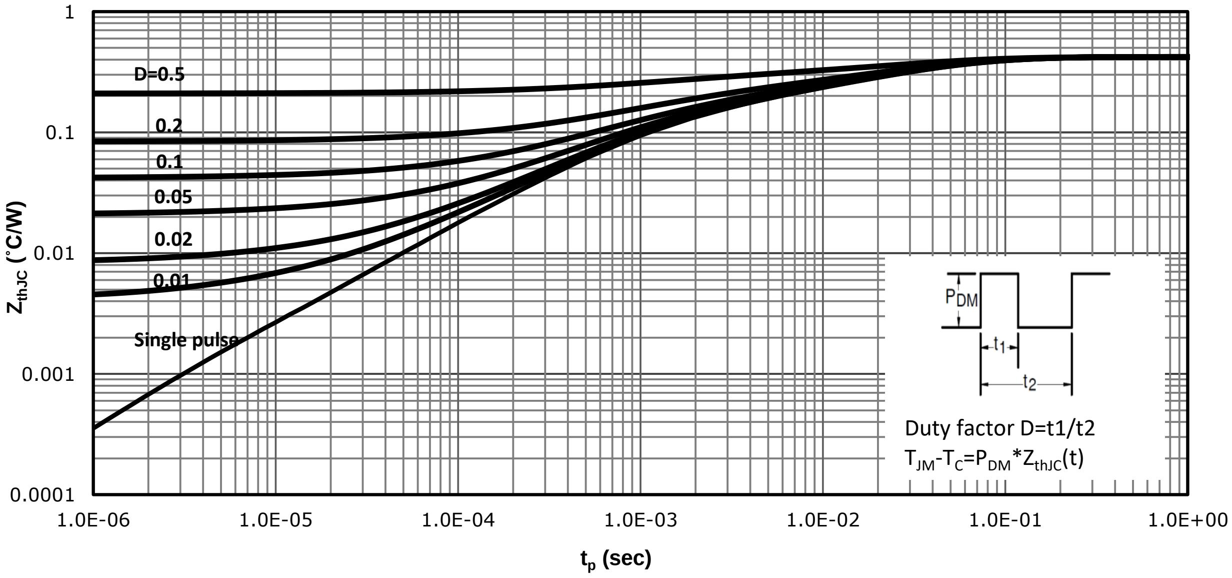
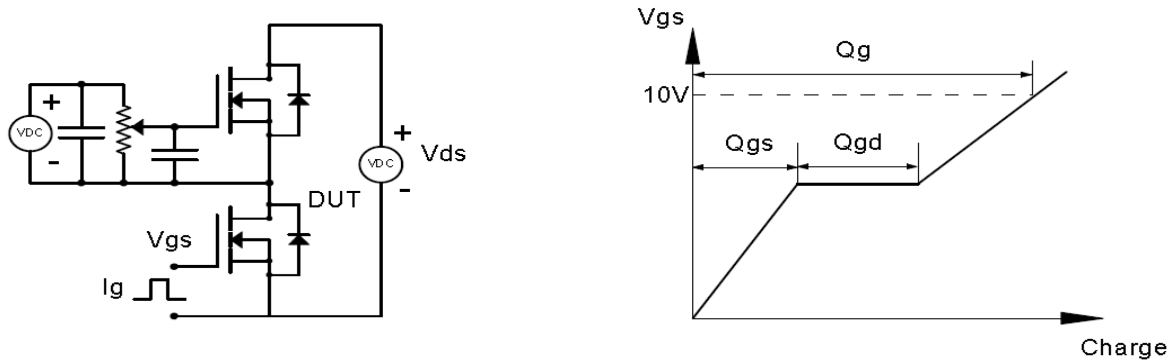


Fig 14: Max. Transient Thermal Impedance

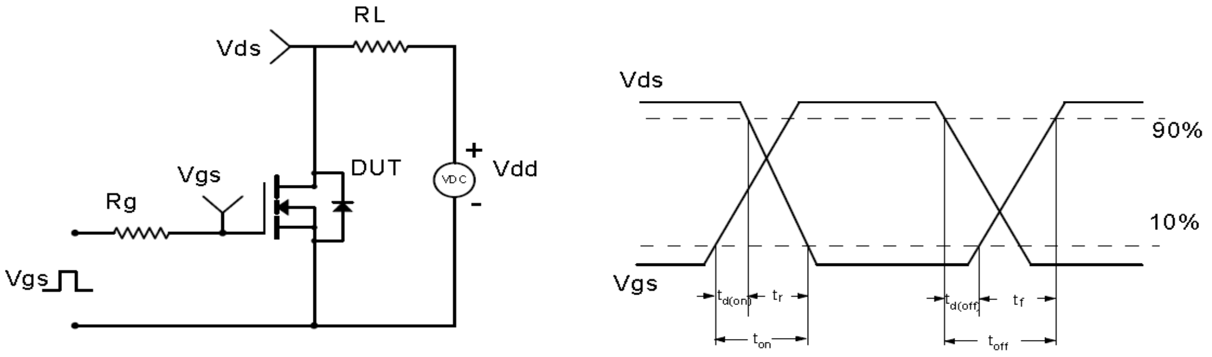


Test Circuit & Waveform

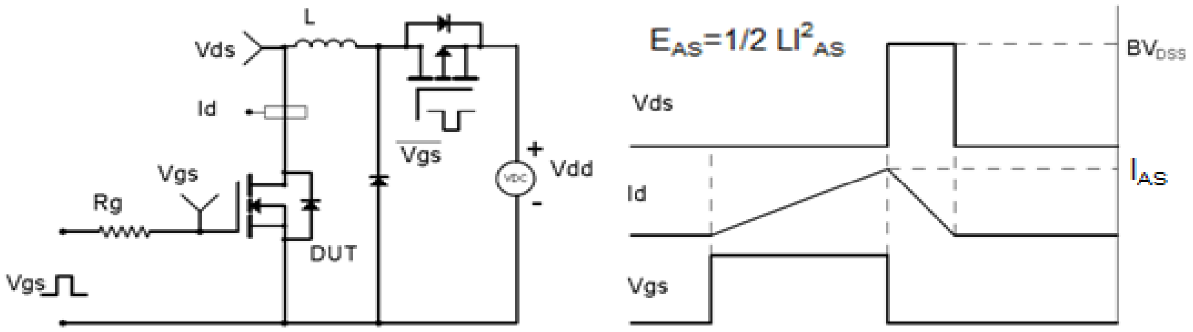
Gate Charge Test Circuit & Waveform



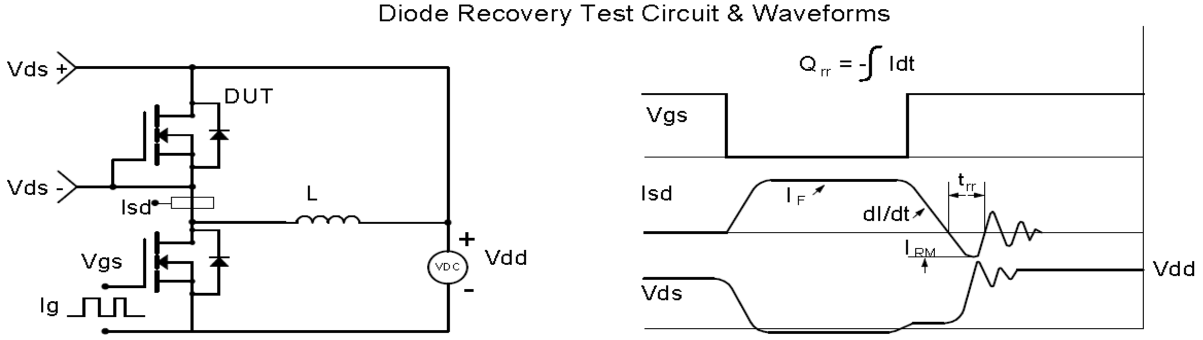
Resistive Switching Test Circuit & Waveforms



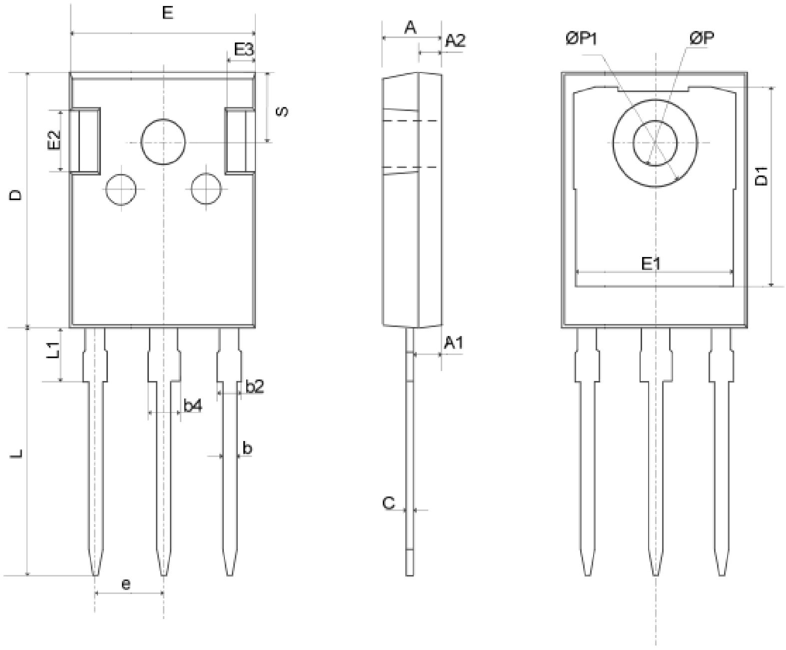
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Mechanical Dimensions for TO-247



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	4.80	5.20
A1	2.21	2.61
A2	1.85	2.15
b	1.11	1.36
b2	1.91	2.21
b4	2.91	3.21
c	0.51	0.75
D	20.70	21.30
D1	16.25	16.85
E	15.50	16.10
E1	13.00	13.60
E2	4.80	5.20
E3	2.30	2.70
e	5.44BSC	
L	19.62	20.22
L1	—	4.30
ØP	3.40	3.80
ØP1	—	7.30
S	6.15BSC	