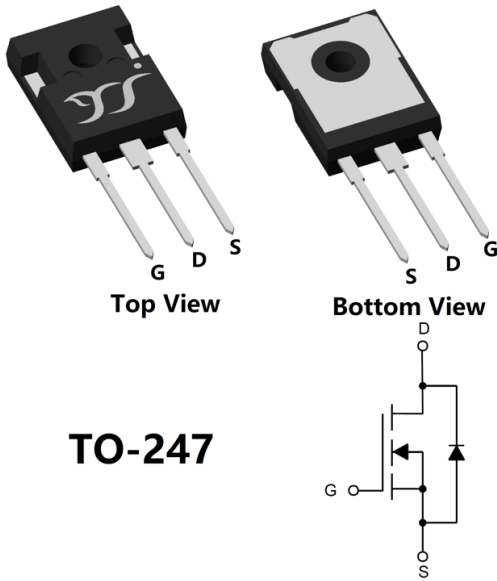


N-Channel Enhancement Mode Field Effect Transistor



TO-247

Product Summary

- V_{DS} 200V
- I_D 98A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) $< 11.5m\Omega$
- 100% EAS Tested
- 100% ∇V_{DS} Tested

General Description

- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

Applications

- UPS and Inverter applications
- Motor drivers
- DC-DC convertor

Limiting Values

Parameter	Conditions		Symbol	Min	Max	Unit
Drain-source Voltage			V_{DS}	-	200	V
Gate-source Voltage			V_{GS}	-20	20	
Continuous Drain Current (Note 1,2)	Steady-State	$T_A=25^\circ C, V_{GS}=10V$	I_D	-	10.5	A
		$T_A=100^\circ C, V_{GS}=10V$		-	6.6	
Continuous Drain Current (Note 1,3)	Steady-State	$T_C=25^\circ C, V_{GS}=10V, \text{Chip limitation}$		-	98	
		$T_C=100^\circ C, V_{GS}=10V$		-	62	
Pulsed Drain Current	$T_C=25^\circ C, t_p \leq 10\mu s$		I_{DM}	-	392	
Maximum Body-Diode Continuous Current	$T_C=25^\circ C$		I_S		98	
Avalanche energy (non-repetitive)	$T_J=25^\circ C, V_G=10V, R_G=25\Omega, L=0.5mH, I_{AS}=50A$		EAS	-	625	mJ
Total Power Dissipation (Note 1,2)	Steady-State	$T_A=25^\circ C$	P_D	-	2.97	W
		$T_A=100^\circ C$		-	1.19	
Total Power Dissipation (Note 1,3)	Steady-State	$T_C=25^\circ C$		-	260	
		$T_C=100^\circ C$		-	104	
Junction and Storage Temperature Range			T_J, T_{STG}	-55	150	$^\circ C$

Thermal Resistance

Parameter		Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Ambient (Note 2)	Steady-State	$R_{\theta JA}$	-	42	$^\circ C/W$
Thermal Resistance Junction-to-Case	Steady-State	$R_{\theta JC}$	-	0.48	

Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
YJW012G20H	B1	YJW012G20H	30	360	1800	Tube



YJW012G20H

■ Electrical Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A, T_j=25^\circ C$	200	-	-	V
		$V_{GS}=0V, I_D=1mA, T_j=25^\circ C$	200	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=200V, V_{GS}=0V, T_j=25^\circ C$	-	-	1	μA
		$V_{DS}=200V, V_{GS}=0V, T_j=125^\circ C$	-	-	100	
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V, T_j=25^\circ C$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A, T_j=25^\circ C$	2.2	3	3.8	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=50A, T_j=25^\circ C$	-	9.7	11.5	m Ω
Diode Forward Voltage	V_{SD}	$I_S=50A, V_{GS}=0V, T_j=25^\circ C$	-	0.86	1.2	V
Gate Resistance	R_G	$f=1MHz, T_j=25^\circ C$	-	0.8	-	Ω
Dynamic Parameters						
Input Capacitance	C_{iss}	$V_{DS}=100V, V_{GS}=0V, f=1MHz, T_j=25^\circ C$	-	3920	-	pF
Output Capacitance	C_{oss}		-	445	-	
Reverse Transfer Capacitance	C_{rss}		-	11.3	-	
Switching Parameters						
Total Gate Charge	Q_g	$V_{GS}=10V, V_{DS}=100V, I_D=50A, T_j=25^\circ C$	-	50.5	-	nC
Gate-Source Charge	Q_{gs}		-	18.4	-	
Gate-Drain Charge	Q_{gd}		-	8.2	-	
Reverse Recovery Charge	Q_{rr}	$I_F=50A, di/dt=100A/\mu s, V_{GS}=0V, V_R=100V, T_j=25^\circ C$	-	513	-	nC
Reverse Recovery Time	t_{rr}		-	135	-	ns
Turn-on Delay Time	$t_{D(on)}$	$V_{GS}=10V, V_{DS}=100V, I_D=50A, R_{GEN}=3\Omega, T_j=25^\circ C$	-	20	-	ns
Turn-on Rise Time	t_r		-	42	-	
Turn-off Delay Time	$t_{D(off)}$		-	32	-	
Turn-off Fall Time	t_f		-	9	-	

Note:

1. The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
2. The value of $R_{\theta JA}$ is measured in the still air environment with $T_A=25^\circ C$. The maximum allowed junction temperature of $150^\circ C$.
3. Thermal resistance from junction to soldering point (on the exposed drain pad).



Typical Electrical and Thermal Characteristics Diagrams

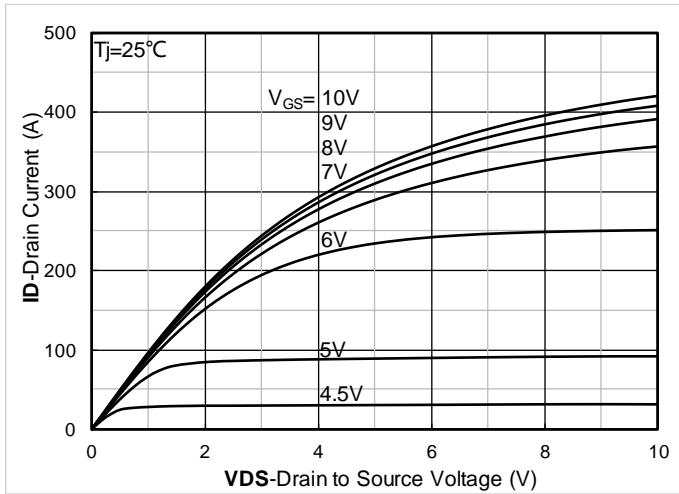


Figure 1. Output Characteristics; typical values

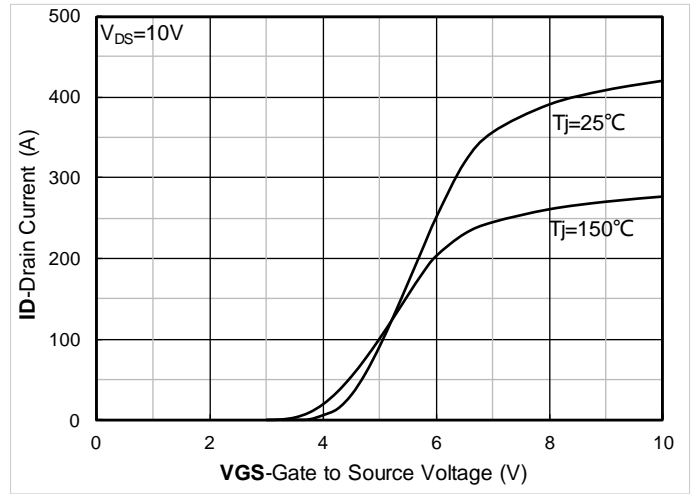


Figure 2. Transfer Characteristics; typical values

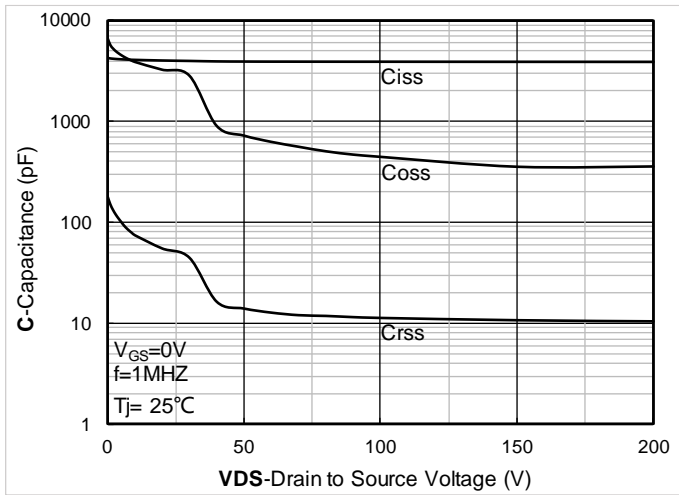


Figure 3. Capacitance Characteristics; typical values

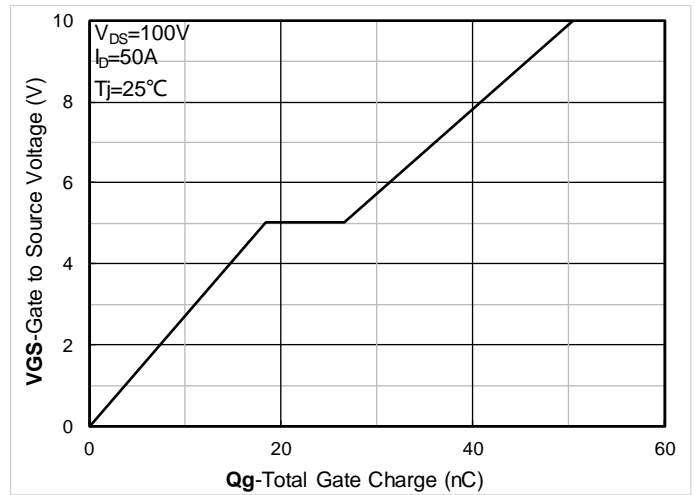


Figure 4. Gate Charge; typical values

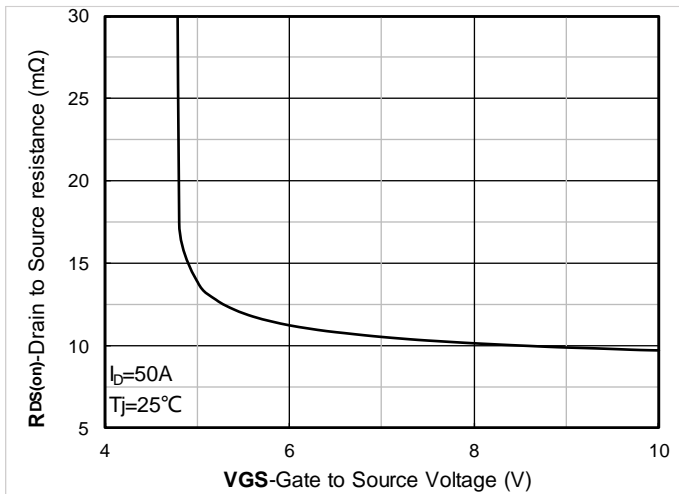


Figure 5. On-Resistance vs Gate to Source Voltage; typical values

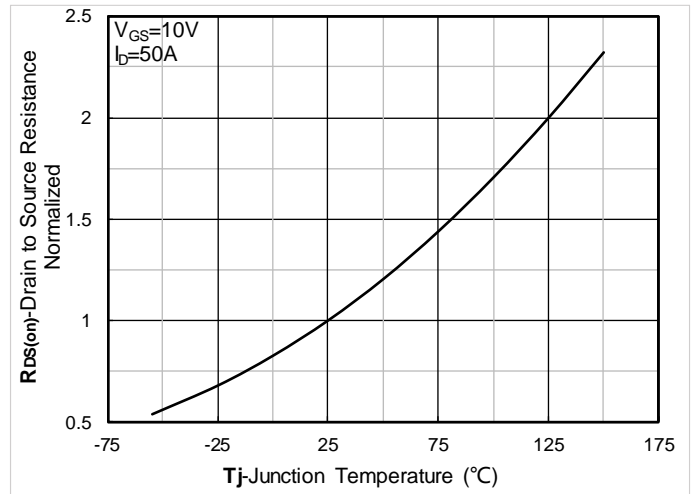


Figure 6. Normalized On-Resistance



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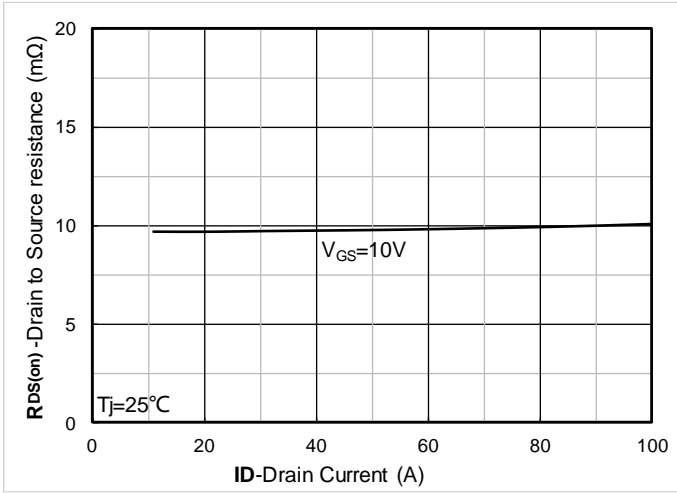


Figure 7. RDS(on) VS Drain Current; typical values

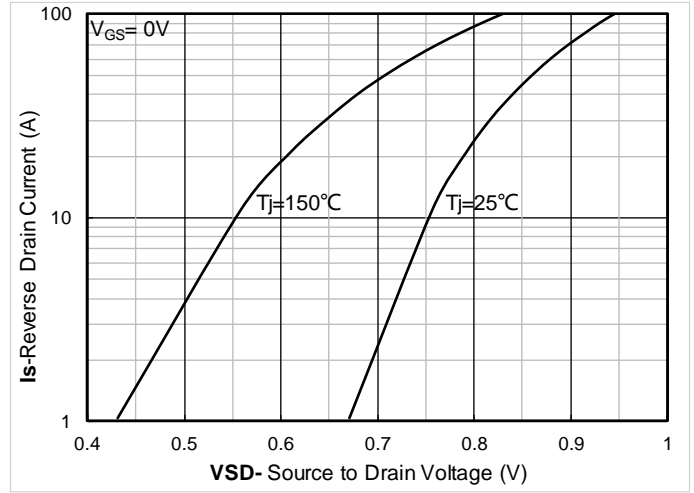


Figure 8. Forward characteristics of reverse diode; typical values

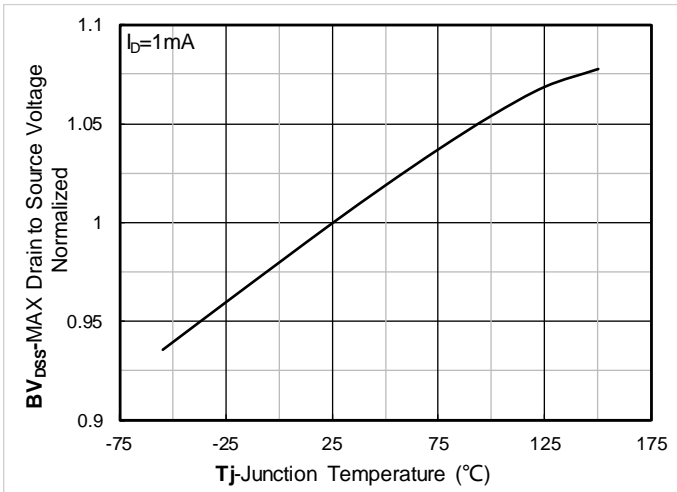


Figure 9. Normalized breakdown voltage

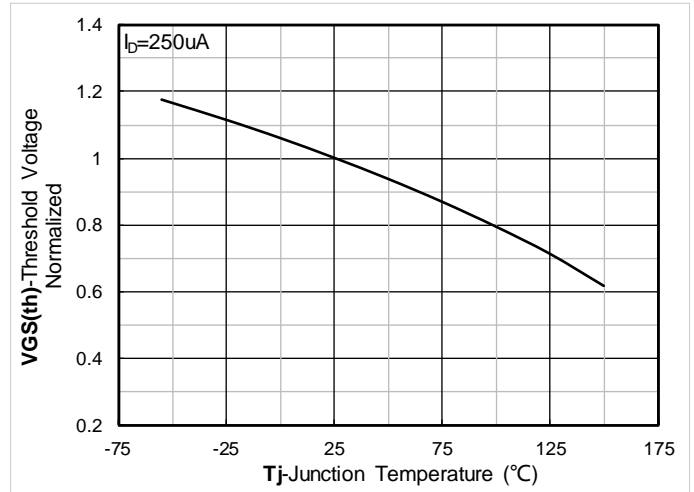


Figure 10. Normalized Threshold voltage

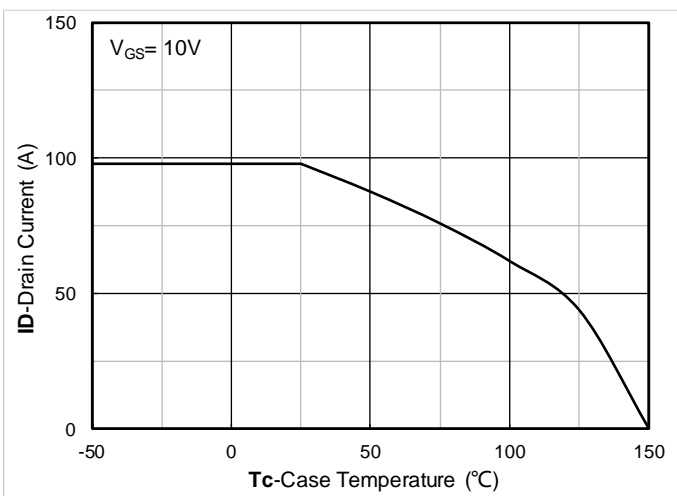


Figure 11. Current dissipation

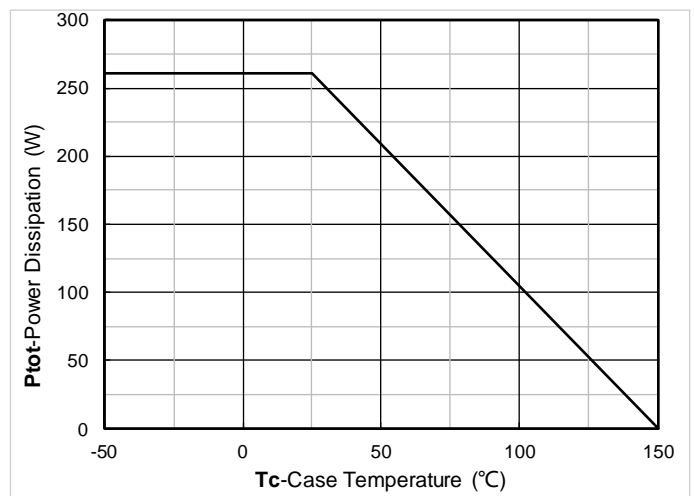


Figure 12. Power dissipation



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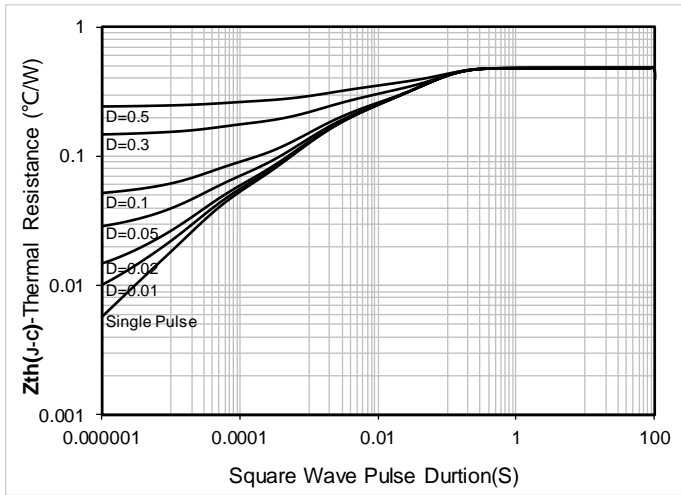


Figure 13. Maximum Transient Thermal Impedance

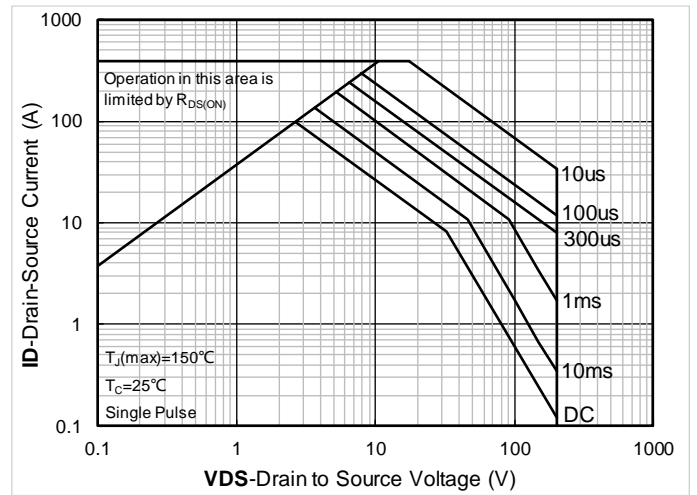


Figure 14. Safe Operation Area

■ Test Circuits & Waveforms

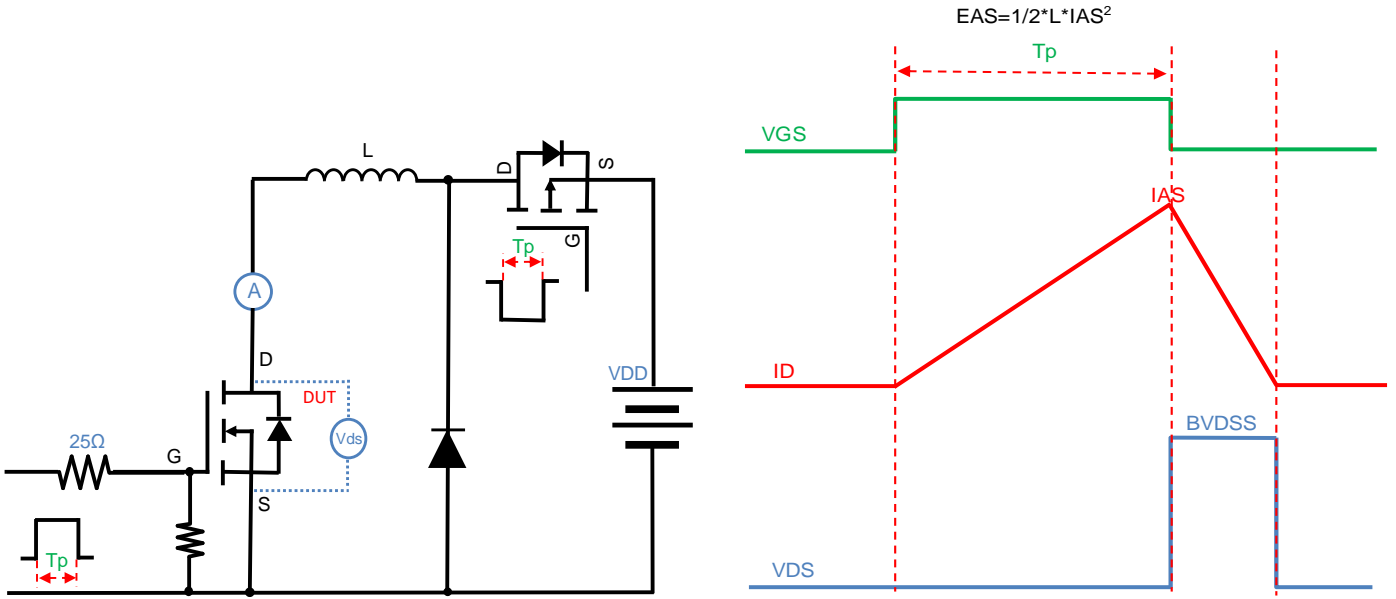


Figure A. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

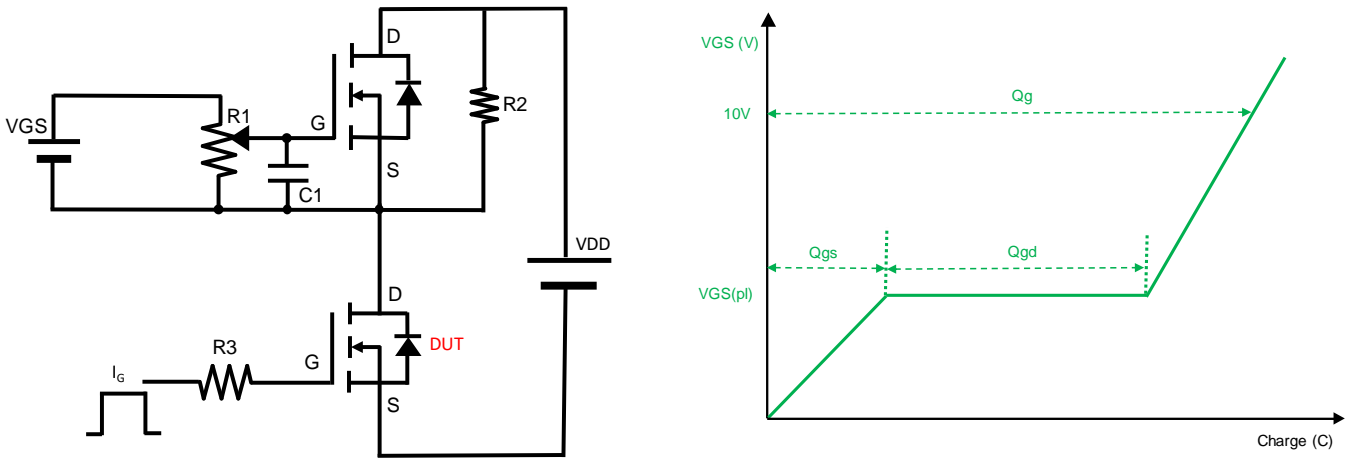


Figure B. Gate Charge Test Circuit & Waveform

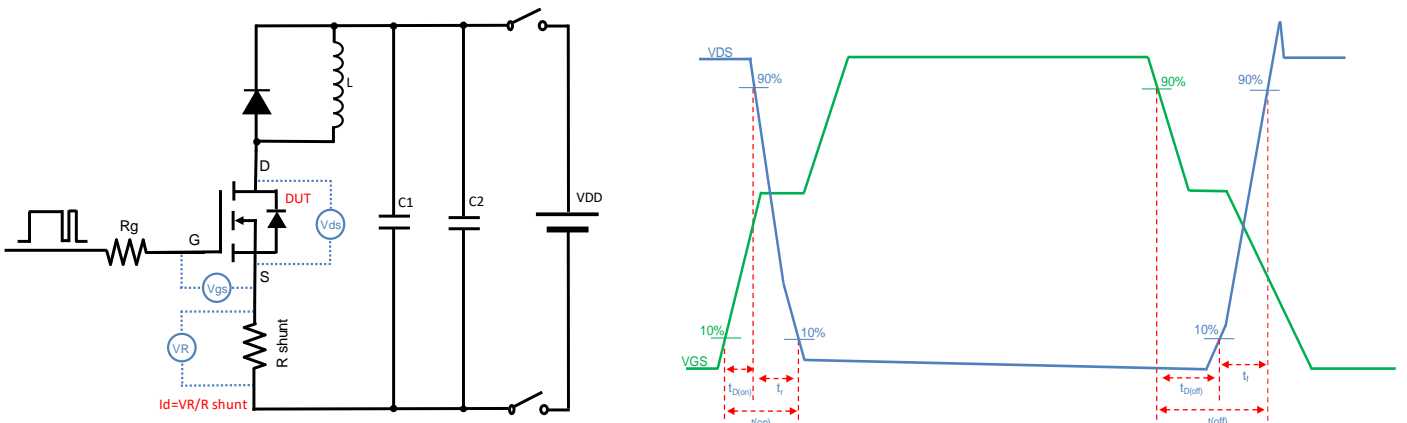


Figure C. Resistive Switching Test Circuit & Waveform

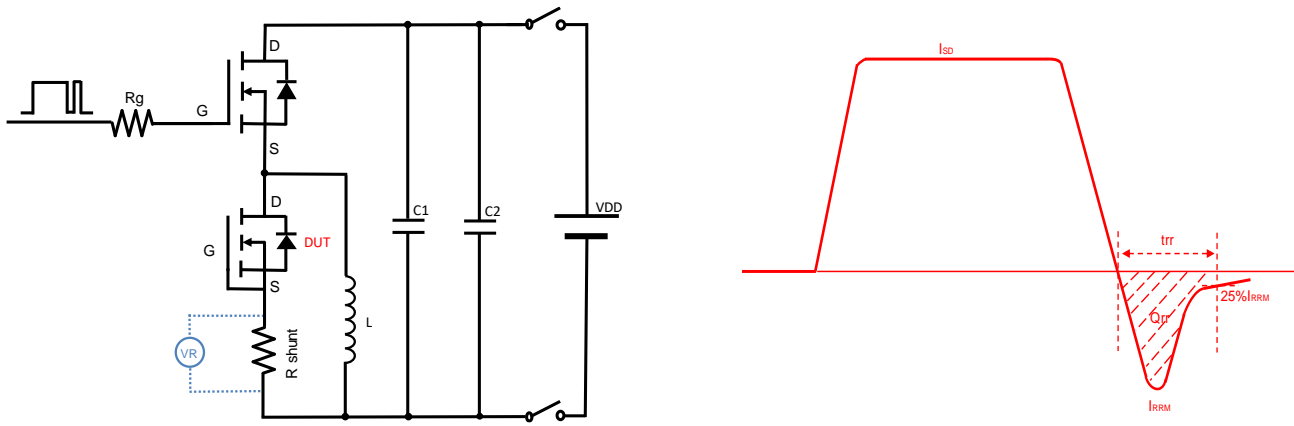
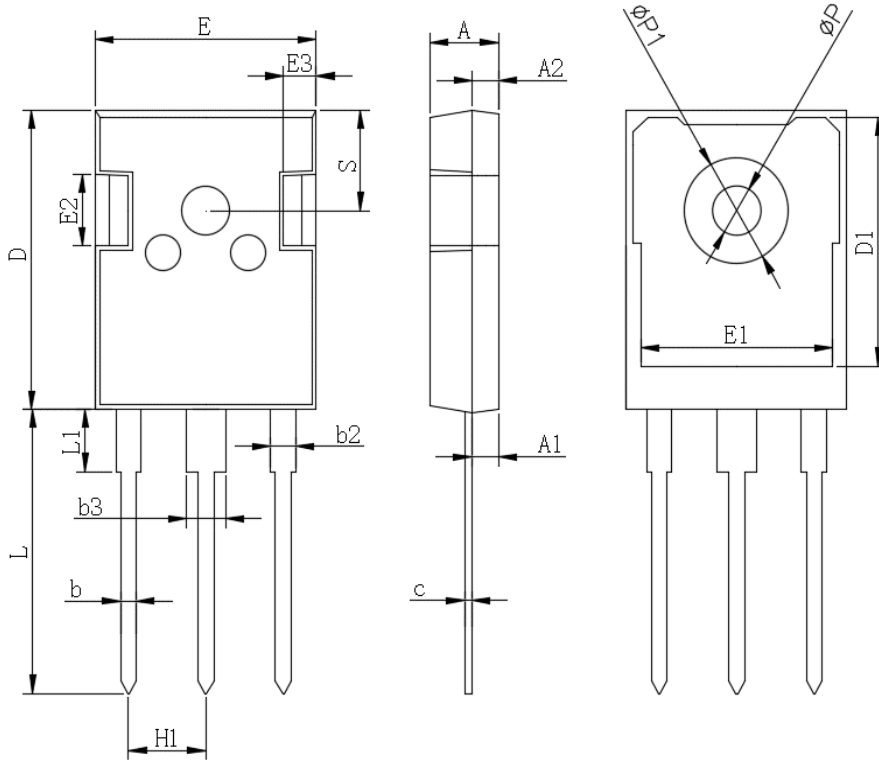


Figure D. Diode Recovery Test Circuit & Waveform

■ TO-247AB Package information

TO-247AB



TO-247AB		
Dim	Min	Max
A	4.80	5.20
A1	2.21	2.61
A2	1.85	2.15
b	1.0	1.4
b2	1.91	2.21
c	0.5	0.7
D	20.70	21.30
D1	16.25	16.85
E	15.50	16.10
E1	13.0	13.6
E2	4.80	5.20
E3	2.30	2.70
L	19.62	20.22
L1	-	4.30
ϕP	3.40	3.80
$\phi P1$	-	7.30
S	6.15TYP	
H1	5.44TYP	
b3	2.80	3.20



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