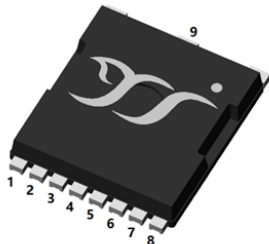
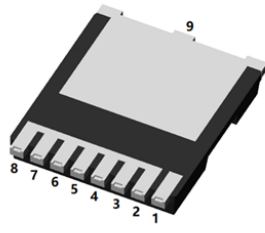


N-Channel Enhancement Mode Field Effect Transistor

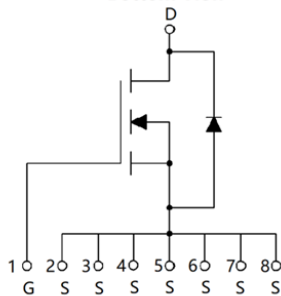


Top View



Bottom View

TOLL



Product Summary

- V_{DS} 150V
- I_D 180A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) $<4.5m\Omega$
- 100% EAS Tested
- 100% ∇V_{DS} Tested

General Description

- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

Applications

- Synchronous rectification in SMPS
- Uninterruptible power supply
- Motor control

Limiting Values

Parameter	Conditions		Symbol	Min	Max	Unit
Drain-source Voltage			V_{DS}	-	150	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	-	18	A
		$T_A=100^\circ C, V_{GS}=10V$		-	12.7	
Continuous Drain Current (Note 1,3)	Steady-State	$T_C=25^\circ C, V_{GS}=10V, \text{Chip limitation}$		-	180	
		$T_C=100^\circ C, V_{GS}=10V$		-	127	
Pulsed Drain Current	$T_C=25^\circ C, t_p \leq 10\mu s$		I_{DM}	-	720	
Maximum Body-Diode Continuous Current	$T_C=25^\circ C$		I_S		180	
Avalanche energy (non-repetitive)	$T_J=25^\circ C, V_G=10V, R_G=25\Omega, L=1mH, I_{AS}=49A$		EAS	-	1200.5	mJ
Total Power Dissipation (Note 1,2)	Steady-State	$T_A=25^\circ C$	P_D	-	3.5	W
		$T_A=100^\circ C$		-	1.7	
Total Power Dissipation (Note 1,3)	Steady-State	$T_C=25^\circ C$		-	357	
		$T_C=100^\circ C$		-	178	
Junction and Storage Temperature Range			T_J, T_{STG}	-55	175	$^\circ C$

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	$R_{\theta JC}$	-	0.42	

Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
YJT4D5G15H	F1	YJT4D5G15H	2000	4000	20000	13" reel



YJT4D5G15H

■ Electrical Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A, T_j=25^\circ C$	150	-	-	V
		$V_{GS}=0V, I_D=10mA, T_j=25^\circ C$	150	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=150V, V_{GS}=0V, T_j=25^\circ C$	-	-	1	μA
		$V_{DS}=150V, V_{GS}=0V, T_j=125^\circ C$	-	-	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	$R_{DS(on)}$	$V_{GS}=10V, I_D=50A, T_j=25^\circ C$	-	3.7	4.5	m Ω
Diode Forward Voltage	V_{SD}	$I_S=50A, V_{GS}=0V, T_j=25^\circ C$	-	0.81	1.2	V
Gate Resistance	R_G	$f=1MHz, T_j=25^\circ C$	-	0.95	-	Ω
Dynamic Parameters						
Input Capacitance	C_{iss}	$V_{DS}=75V, V_{GS}=0V, f=1MHz, T_j=25^\circ C$	-	5060	-	pF
Output Capacitance	C_{oss}		-	770	-	
Reverse Transfer Capacitance	C_{rss}		-	10	-	
Switching Parameters						
Total Gate Charge	Q_g	$V_{GS}=10V, V_{DS}=75V, I_D=50A, T_j=25^\circ C$	-	65.4	-	nC
Gate-Source Charge	Q_{gs}		-	23.2	-	
Gate-Drain Charge	Q_{gd}		-	9.7	-	
Reverse Recovery Charge	Q_{rr}	$I_F=50A, di/dt=100A/\mu s, V_{GS}=0V, V_R=75V, T_j=25^\circ C$	-	328	-	nC
Reverse Recovery Time	t_{rr}		-	111	-	ns
Turn-on Delay Time	$t_{D(on)}$	$V_{GS}=10V, V_{DS}=75V, I_D=50A, R_{GEN}=3\Omega, T_j=25^\circ C$	-	23.7	-	ns
Turn-on Rise Time	t_r		-	14.4	-	
Turn-off Delay Time	$t_{D(off)}$		-	40.4	-	
Turn-off Fall Time	t_f		-	13.5	-	

Note:

- The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
- The value of $R_{\theta JA}$ is measured with the device mounted on the 40mm*40mm*1.1mm single layer FR-4 PCB board with 1 in² pad of 2oz. Copper, in the still air environment with $T_A=25^\circ C$. The maximum allowed junction temperature of 175 $^\circ C$. The value in any given application depends on the user's specific board design.
- Thermal resistance from junction to soldering point (on the exposed drain pad).



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Typical Electrical and Thermal Characteristics Diagrams

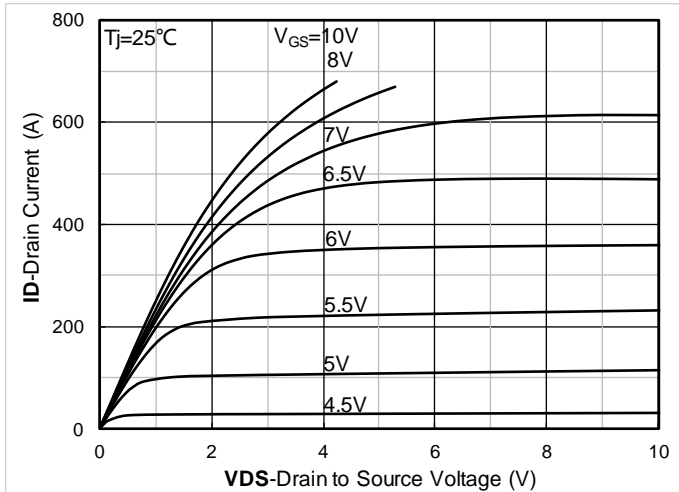


Figure 1. Output Characteristics; typical values

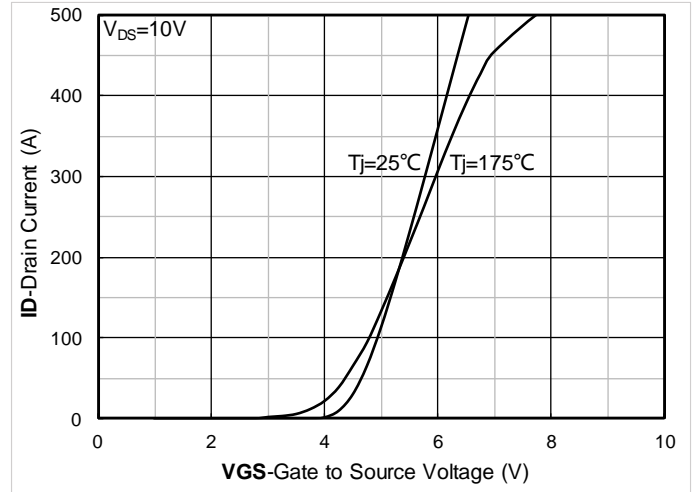


Figure 2. Transfer Characteristics; typical values

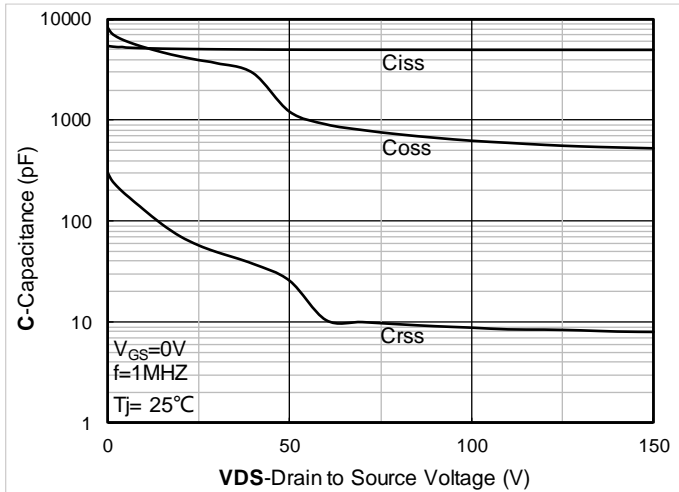


Figure 3. Capacitance Characteristics; typical values

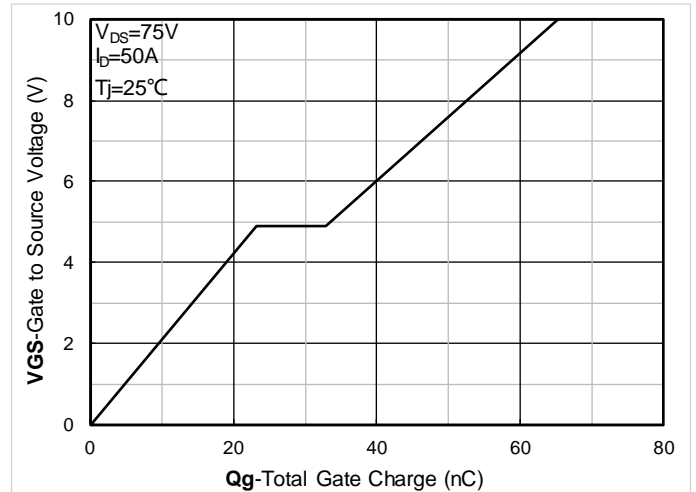


Figure 4. Gate Charge; typical values

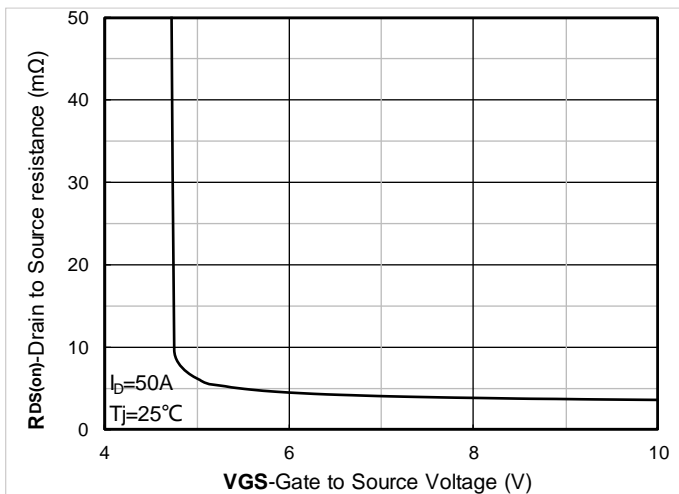


Figure 5. On-Resistance vs. Gate to Source Voltage; typical values

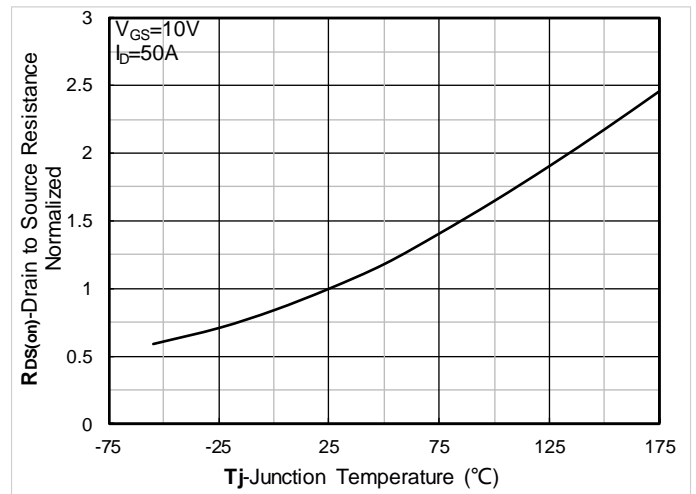


Figure 6. Normalized On-Resistance



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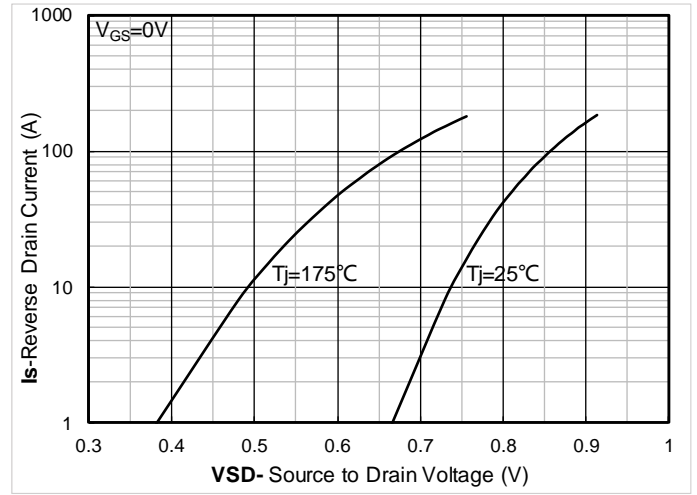
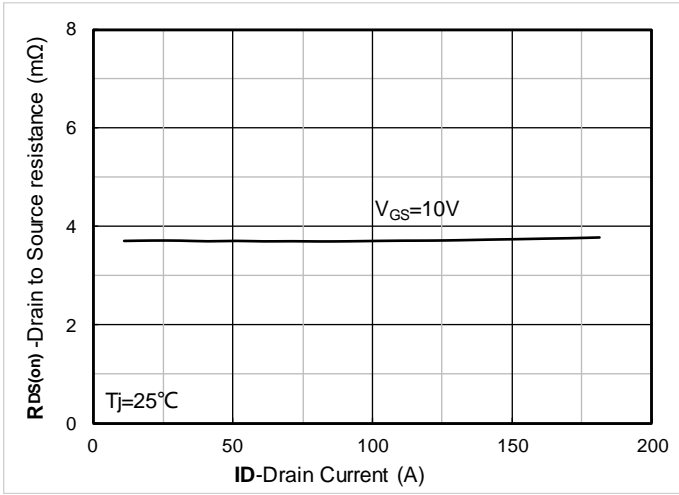


Figure 7. $R_{DS(on)}$ vs. Drain Current; typical values

Figure 8. Forward characteristics of reverse diode; typical values

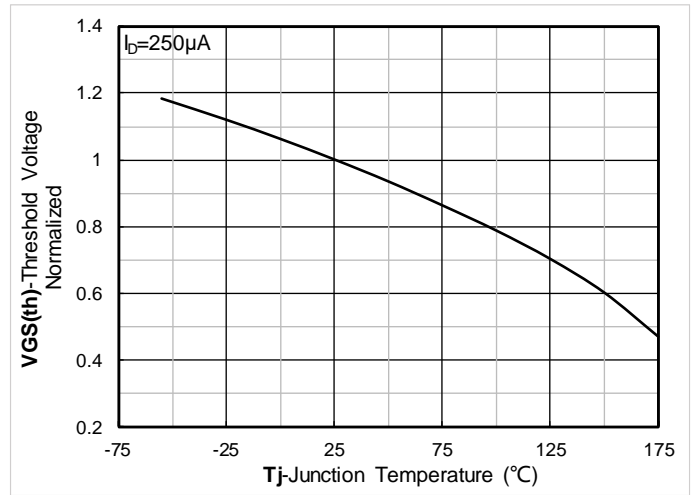
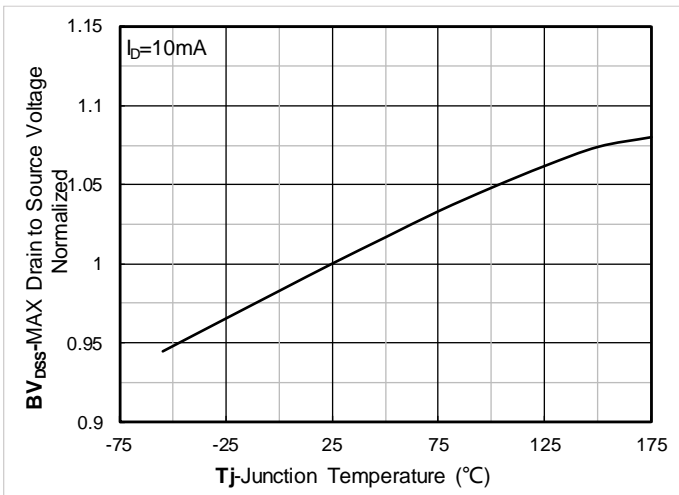


Figure 9. Normalized breakdown voltage

Figure 10. Normalized Threshold voltage

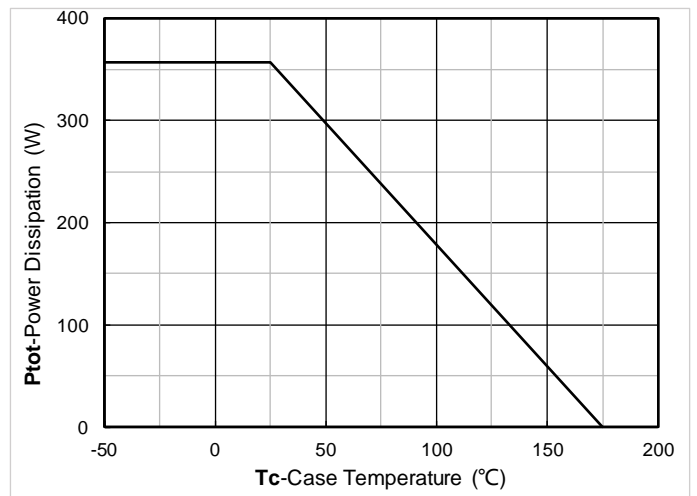
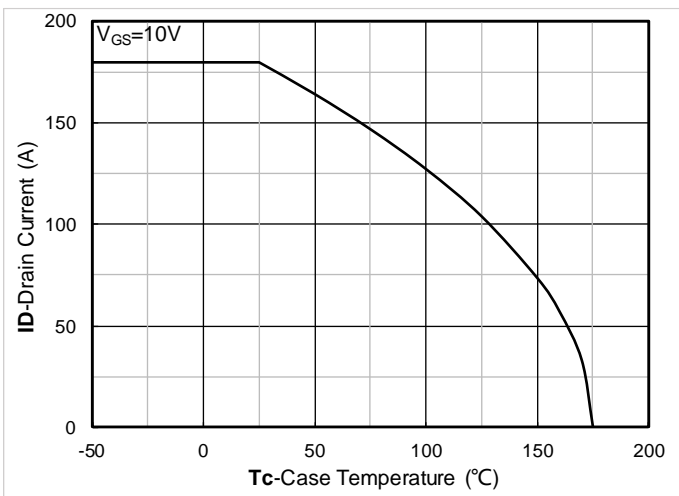


Figure 11. Current dissipation

Figure 12. Power dissipation



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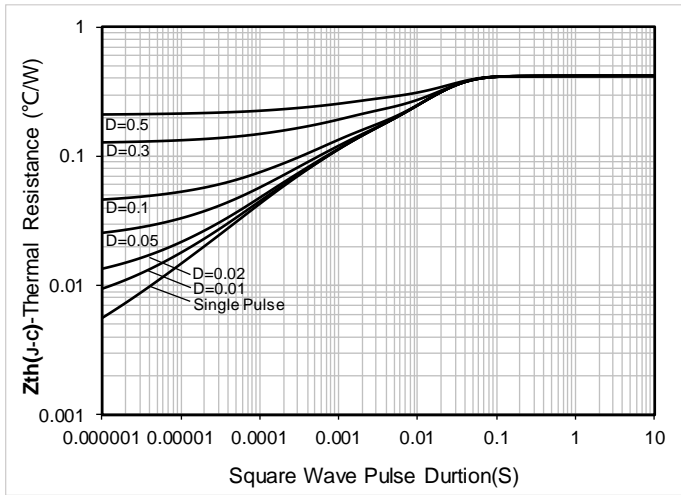


Figure 13. Maximum Transient Thermal Impedance

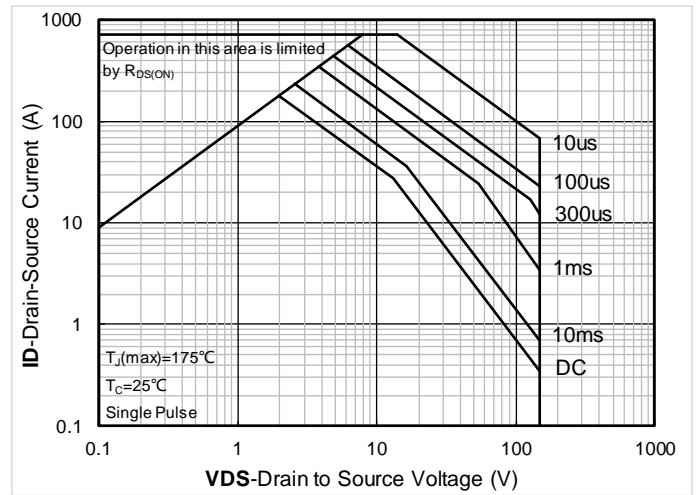


Figure 14. Safe Operation Area

■ Test Circuits & Waveforms

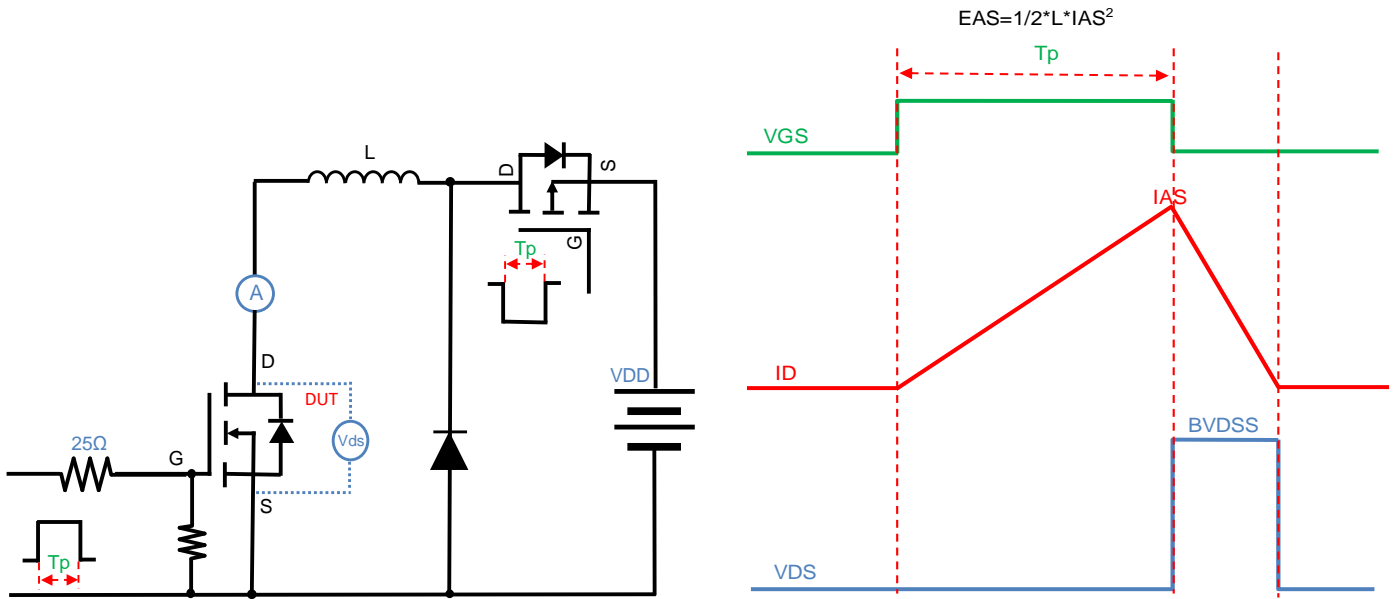


Figure A. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

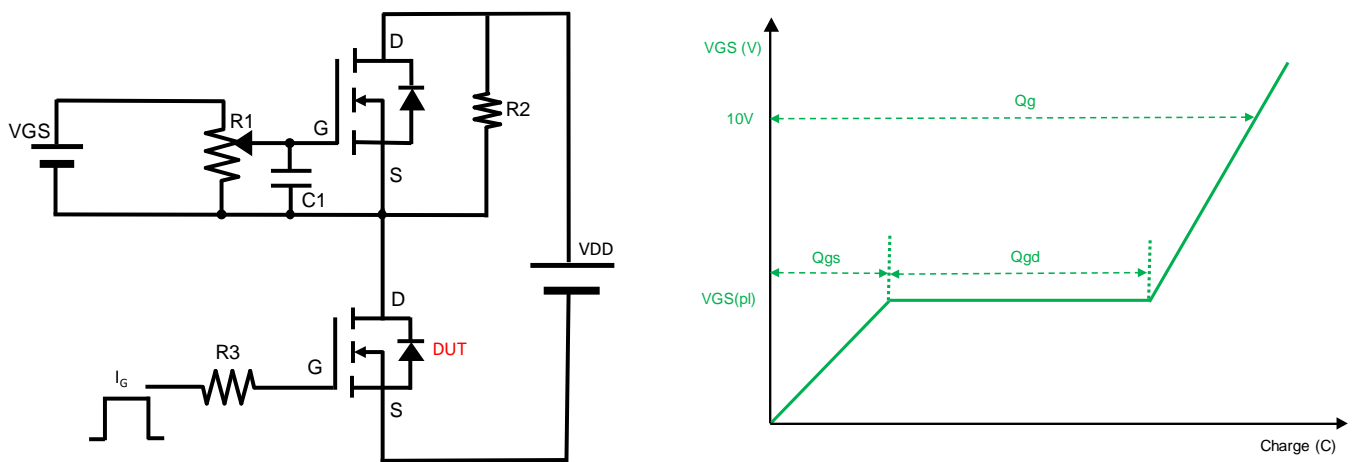


Figure B. Gate Charge Test Circuit & Waveform

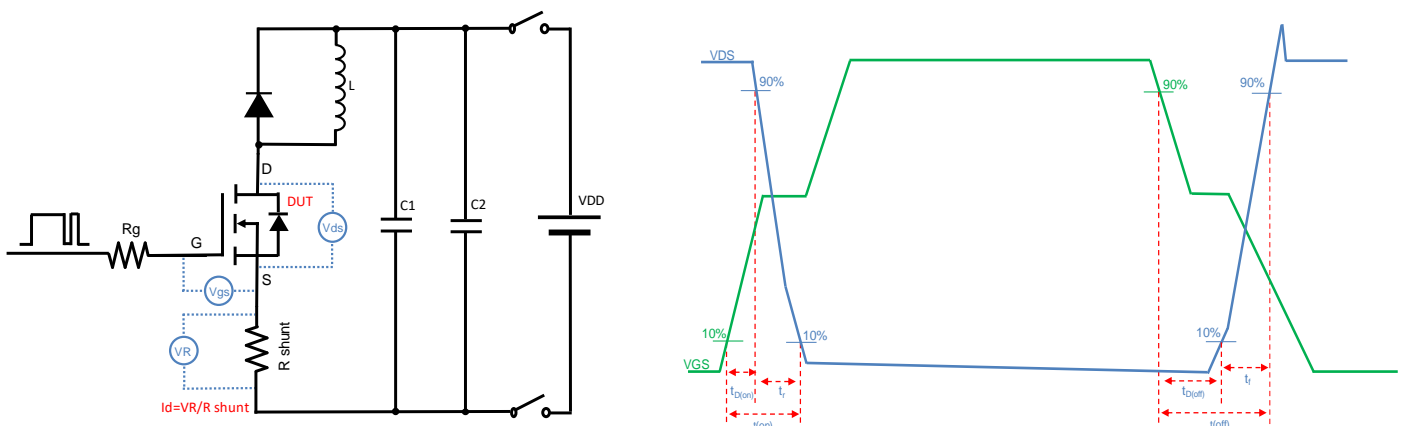


Figure C. Resistive Switching Test Circuit & Waveform

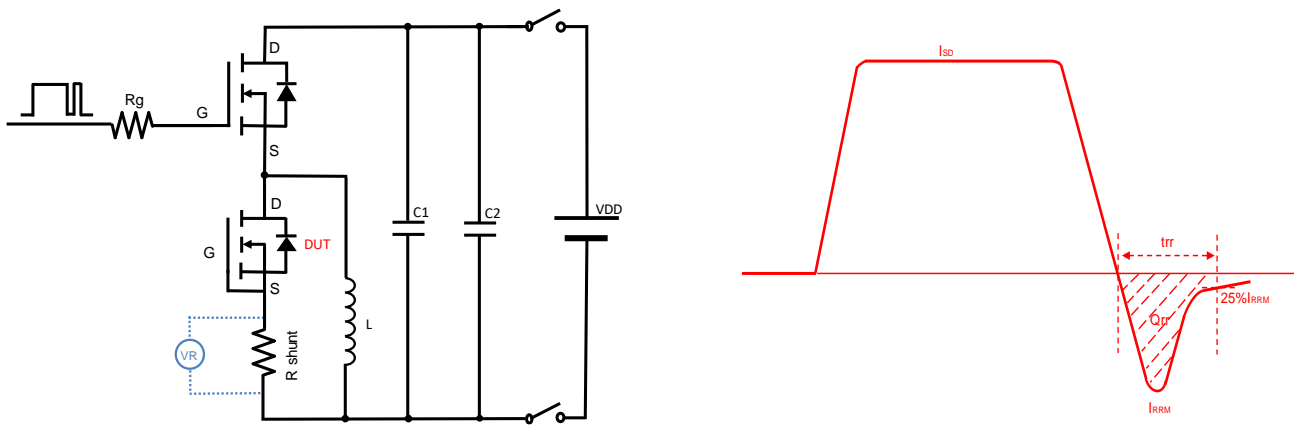
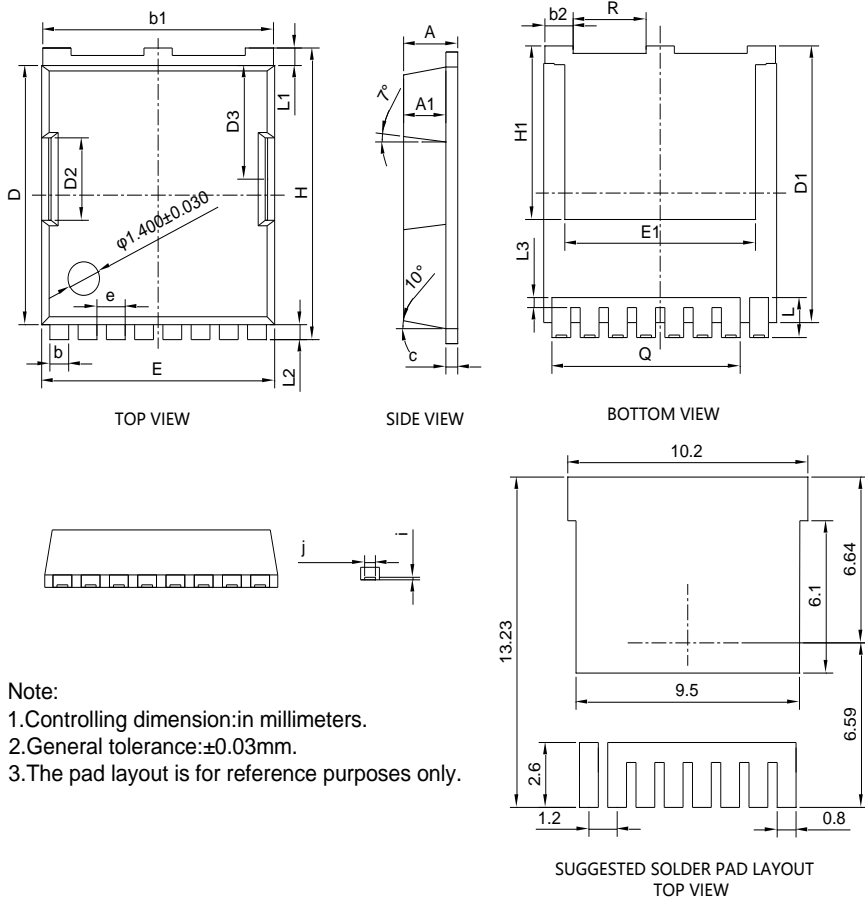


Figure D. Diode Recovery Test Circuit & Waveform



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■ TOLL Package information



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	2.2	2.3	2.4
A1	1.7	1.8	1.9
b	0.7	0.8	0.9
b1	9.7	9.8	9.9
b2	1.1	1.2	1.3
c	0.4	0.5	0.6
D	10.28	10.38	10.48
D1	10.98	11.08	11.18
D2	3.2	3.3	3.4
D3	4.45	4.55	4.65
E	9.8	9.9	10
E1	8	8.1	8.2
e	1.2 BSC		
H	11.58	11.68	11.78
H1	6.95 BSC		
i	0.1 REF		
j	0.46 REF		
L	1.5	1.6	1.7
L1	0.6	0.7	0.8
L2	0.5	0.6	0.7
L3	0.3	0.4	0.5
Q	8 REF		
R	3.0	3.1	3.2

- Note:
1. Controlling dimension: in millimeters.
 2. General tolerance: ± 0.03 mm.
 3. The pad layout is for reference purposes only.

UNIT: mm



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