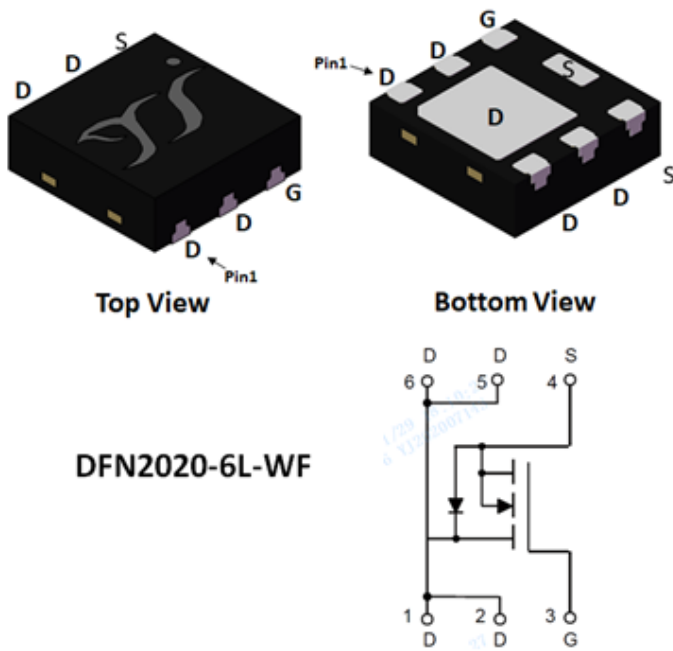


## N-Channel Enhancement Mode Field Effect Transistor



### Product Summary

• $V_{DS}$	20V
• $I_D$	27A
• $R_{DS(ON)}$ ( at $V_{GS}=4.5V$ )	< 15m $\Omega$
• $R_{DS(ON)}$ ( at $V_{GS}=2.5V$ )	< 20m $\Omega$
• $R_{DS(ON)}$ ( at $V_{GS}=1.8V$ )	< 30m $\Omega$

### 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
- Part no. with suffix "Q" means AEC-Q101 qualified

### Applications

- Power switching application
- Uninterruptible power supply
- DC-DC converter

### Limiting Values

Parameter	Conditions		Symbol	Min	Max	Unit
Drain-source Voltage			$V_{DS}$	-	20	V
Gate-source Voltage			$V_{GS}$	-10	10	
Continuous Drain Current (Note 1,2)	Steady-State	$T_A=25^\circ\text{C}, V_{GS}=10V$	$I_D$	-	8.2	A
		$T_A=100^\circ\text{C}, V_{GS}=10V$		-	5.2	
Continuous Drain Current (Note 1,3)	Steady-State	$T_C=25^\circ\text{C}, V_{GS}=10V, \text{Chip limitation}$		-	27	
		$T_C=100^\circ\text{C}, V_{GS}=10V$		-	17	
Pulsed Drain Current	$T_C=25^\circ\text{C}, t_p \leq 10\mu\text{s}$		$I_{DM}$	-	108	
Maximum Body-Diode Continuous Current	$T_C=25^\circ\text{C}$		$I_S$		15	
Total Power Dissipation (Note 1,2)	Steady-State	$T_A=25^\circ\text{C}$	$P_D$	-	1.6	W
		$T_A=100^\circ\text{C}$		-	0.6	
Total Power Dissipation (Note 1,3)	Steady-State	$T_C=25^\circ\text{C}$		-	17	
		$T_C=100^\circ\text{C}$		-	6.8	
Junction and Storage Temperature Range			$T_J, T_{STG}$	-55	150	$^\circ\text{C}$

### Thermal Resistance

Parameter		Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Ambient (Note 2)	Steady-State	$R_{\theta JA}$	-	78	$^\circ\text{C/W}$
Thermal Resistance Junction-to-Case	Steady-State	$R_{\theta JC}$	-	7.3	

### Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
YJQT015N02AQ	F1	015N02	3000	30000	120000	7" reel



# YJQT015N02AQ

## ■ Electrical Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Units
<b>Static Parameter</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A, T_j=25^\circ C$	20	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=20V, V_{GS}=0V, T_j=25^\circ C$	-	-	1	$\mu A$
		$V_{DS}=20V, V_{GS}=0V, T_j=125^\circ C$	-	-	100	
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 10V, V_{DS}=0V, T_j=25^\circ C$	-	-	$\pm 100$	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A, T_j=25^\circ C$	0.4	0.7	1	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=9A, T_j=25^\circ C$	-	12	15	$m\Omega$
		$V_{GS}=2.5V, I_D=5A, T_j=25^\circ C$	-	15	20	$m\Omega$
		$V_{GS}=1.8V, I_D=2.5A, T_j=25^\circ C$	-	21	30	$m\Omega$
Diode Forward Voltage	$V_{SD}$	$I_S=9A, V_{GS}=0V, T_j=25^\circ C$	-	0.84	1.2	V
Gate Resistance	$R_G$	$f=1MHz, T_j=25^\circ C$	-	2.4	-	$\Omega$
<b>Dynamic Parameters</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=10V, V_{GS}=0V, f=1MHz, T_j=25^\circ C$	-	680	-	$pF$
Output Capacitance	$C_{oss}$		-	115	-	
Reverse Transfer Capacitance	$C_{riss}$		-	105	-	
<b>Switching Parameters</b>						
Total Gate Charge	$Q_g$	$V_{GS}=4.5V, V_{DS}=10V, I_D=9A, T_j=25^\circ C$	-	9	-	$nC$
Gate-Source Charge	$Q_{gs}$		-	0.5	-	
Gate-Drain Charge	$Q_{gd}$		-	2.4	-	
Reverse Recovery Charge	$Q_{rr}$	$I_F=9A, di/dt=100A/\mu s, V_{GS}=0V, V_R=10V, T_j=25^\circ C$	-	1.8	-	nC
Reverse Recovery Time	$t_{rr}$		-	439	-	ns
Turn-on Delay Time	$t_{D(on)}$	$V_{GS}=4.5V, V_{DS}=10V, I_D=9A, R_{GEN}=3\Omega, T_j=25^\circ C$	-	12	-	$ns$
Turn-on Rise Time	$t_r$		-	51	-	
Turn-off Delay Time	$t_{D(off)}$		-	30	-	
Turn-off Fall Time	$t_f$		-	10	-	

### 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 in<sup>2</sup> pad of 2oz. Copper, in the still air environment with  $T_A=25^\circ C$ . The maximum allowed junction temperature of  $150^\circ C$ . 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).



## Typical Electrical and Thermal Characteristics Diagrams

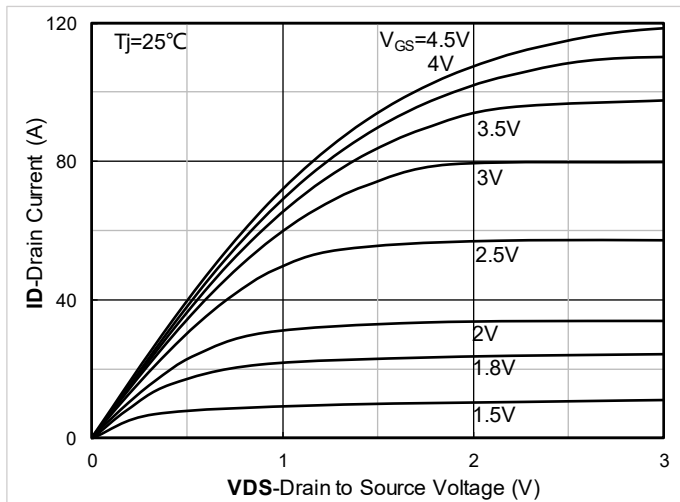


Figure 1. Output Characteristics; typical values

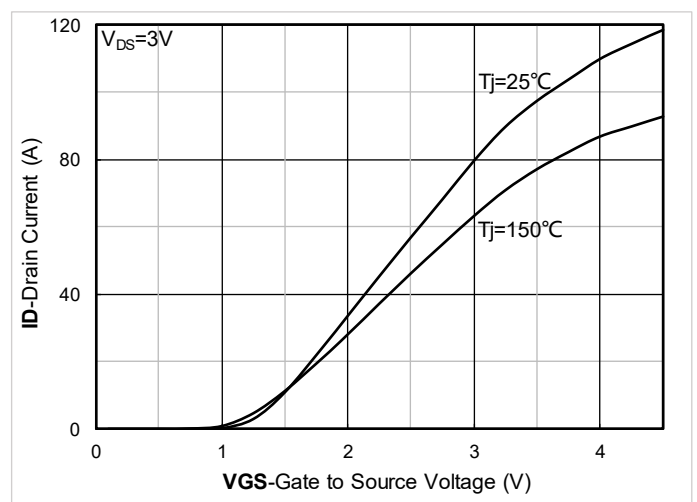


Figure 2. Transfer Characteristics; typical values

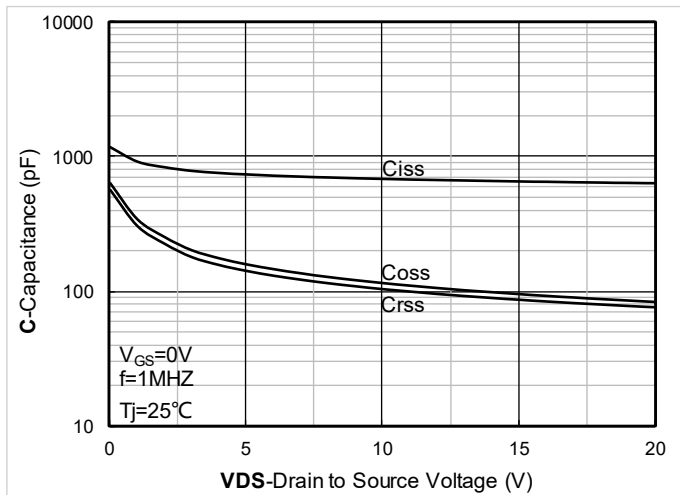


Figure 3. Capacitance Characteristics; typical values

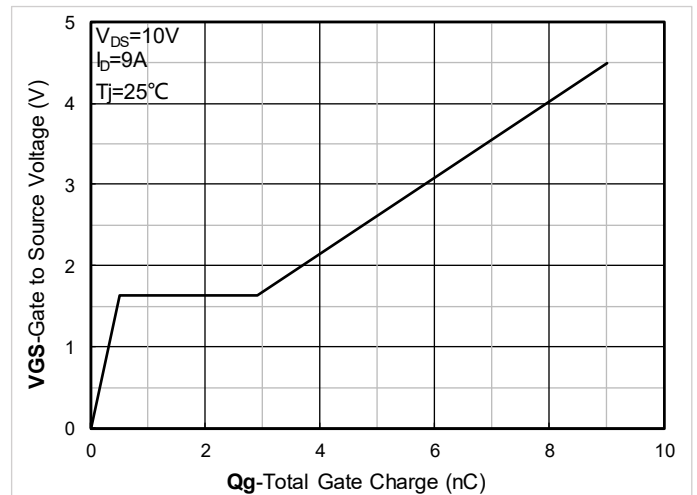


Figure 4. Gate Charge; typical values

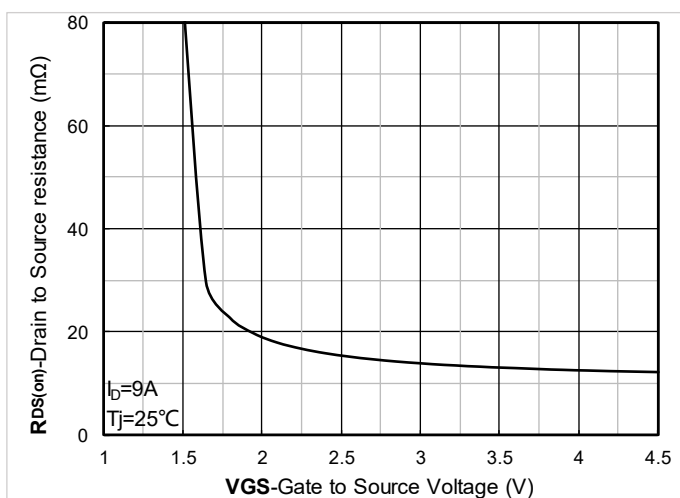


Figure 5. On-Resistance vs. Gate to Source Voltage; typical values

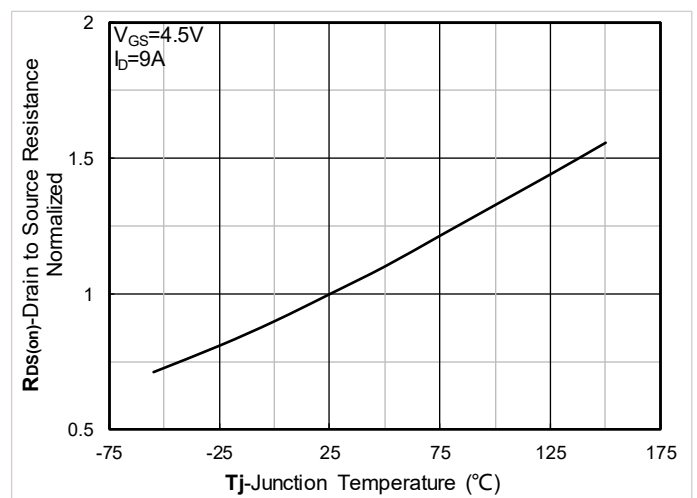


Figure 6. Normalized On-Resistance



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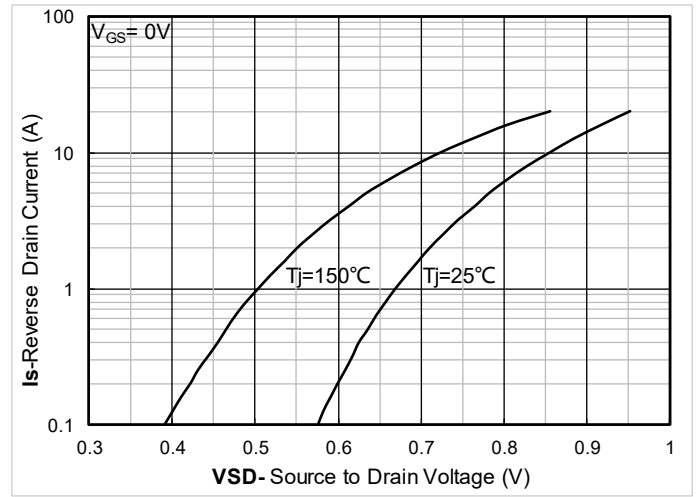
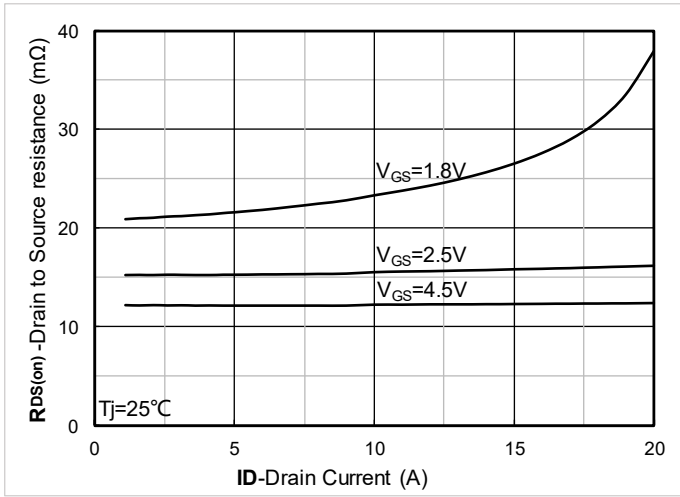


Figure 7.  $R_{DS(on)}$  vs. Drain Current; typical values

Figure 8. Forward characteristics of reverse diode; typical values

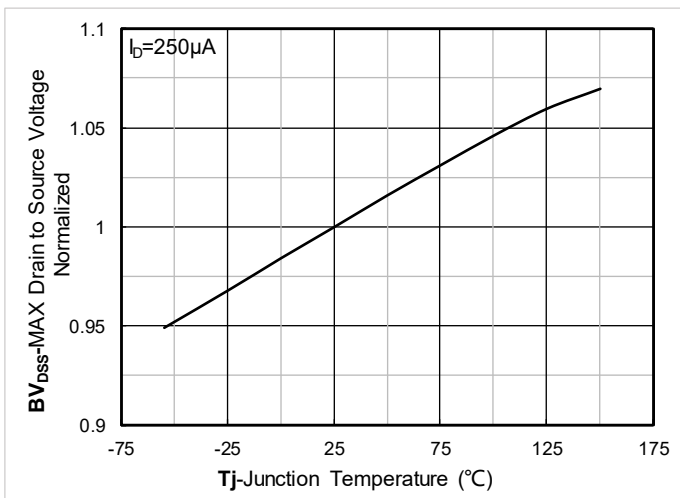


Figure 9. Normalized breakdown voltage

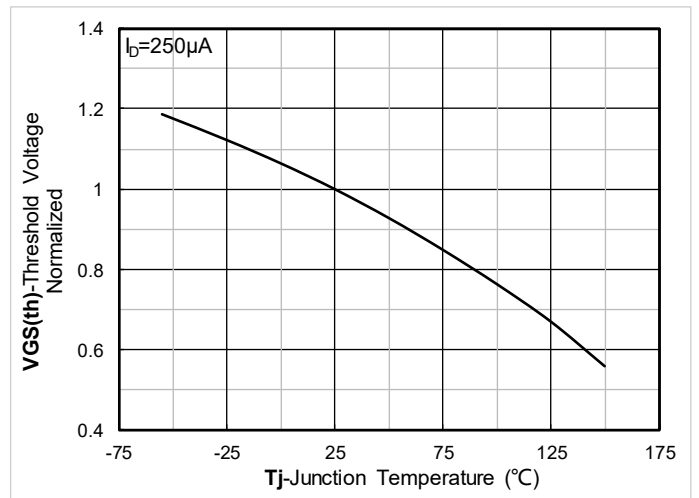


Figure 10. Normalized Threshold voltage

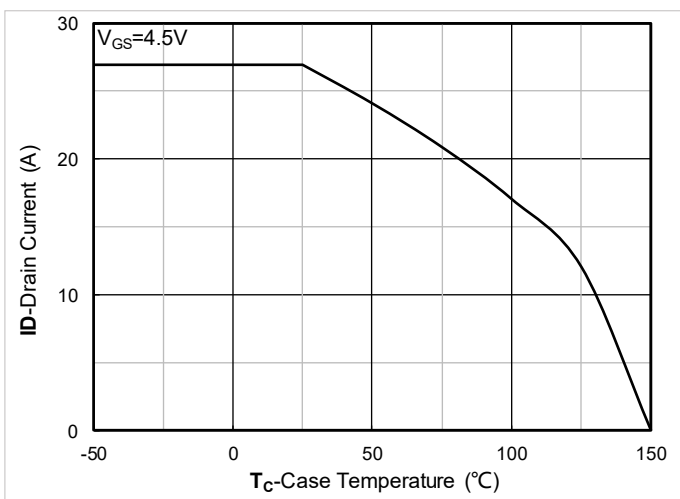


Figure 11. Current dissipation

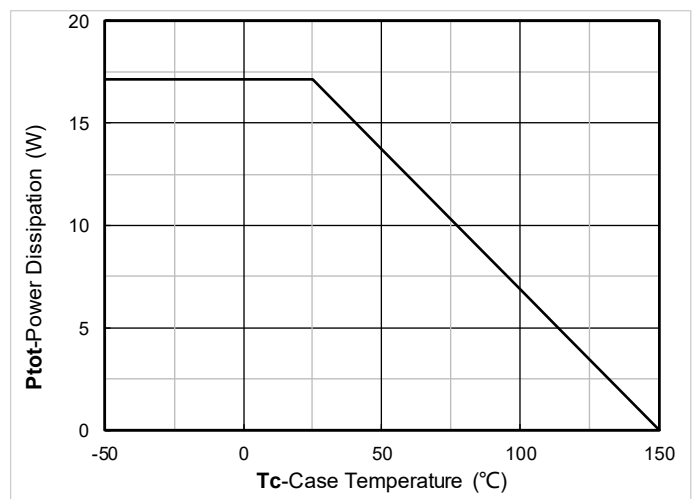


Figure 12. Power dissipation



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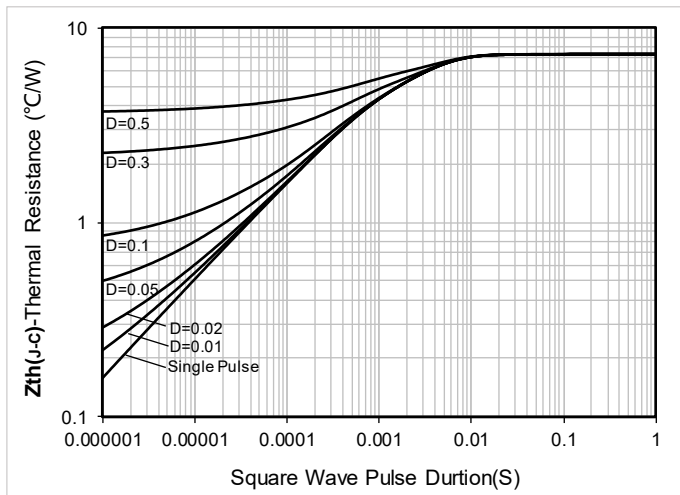


Figure 13. Maximum Transient Thermal Impedance

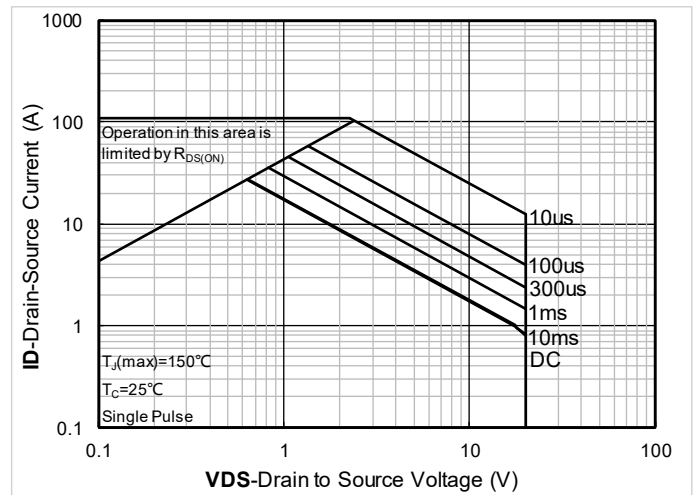


Figure 14. Safe Operation Area

## ■ Test Circuits & Waveforms

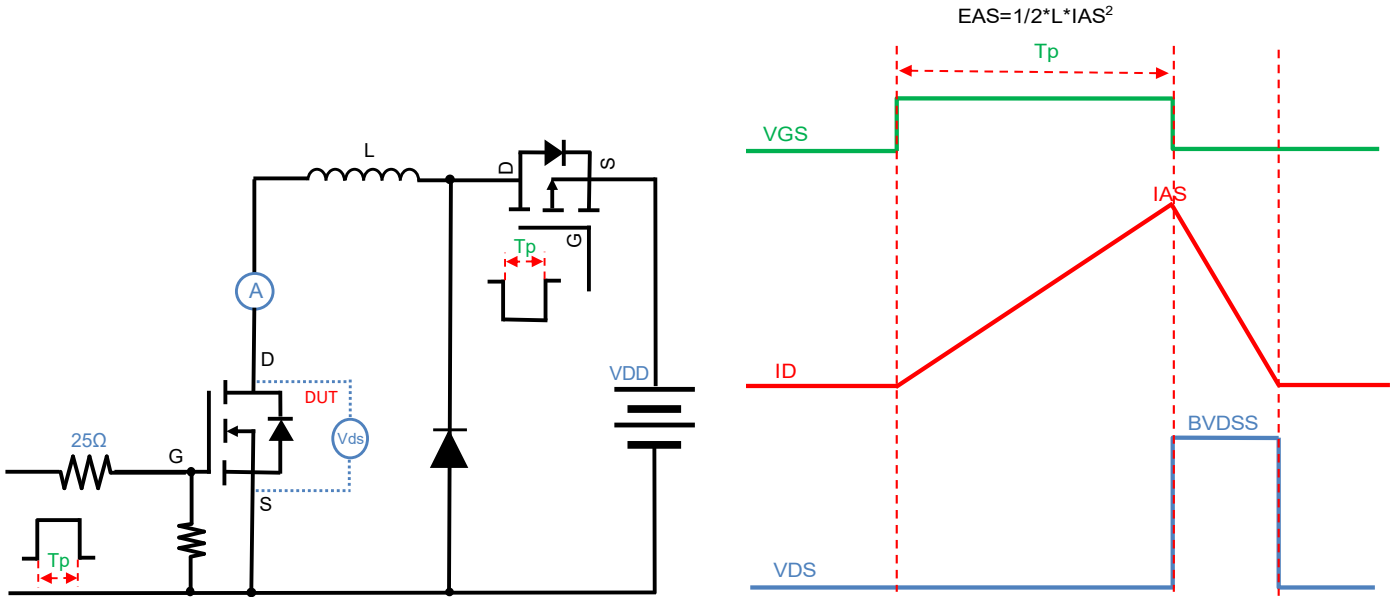


Figure A. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

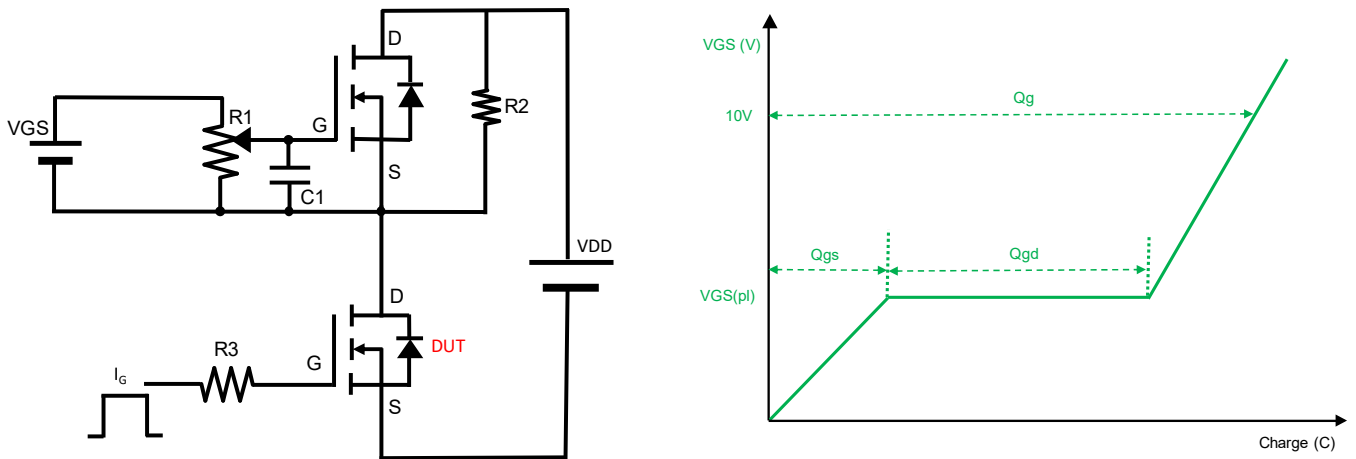


Figure B. Gate Charge Test Circuit & Waveform

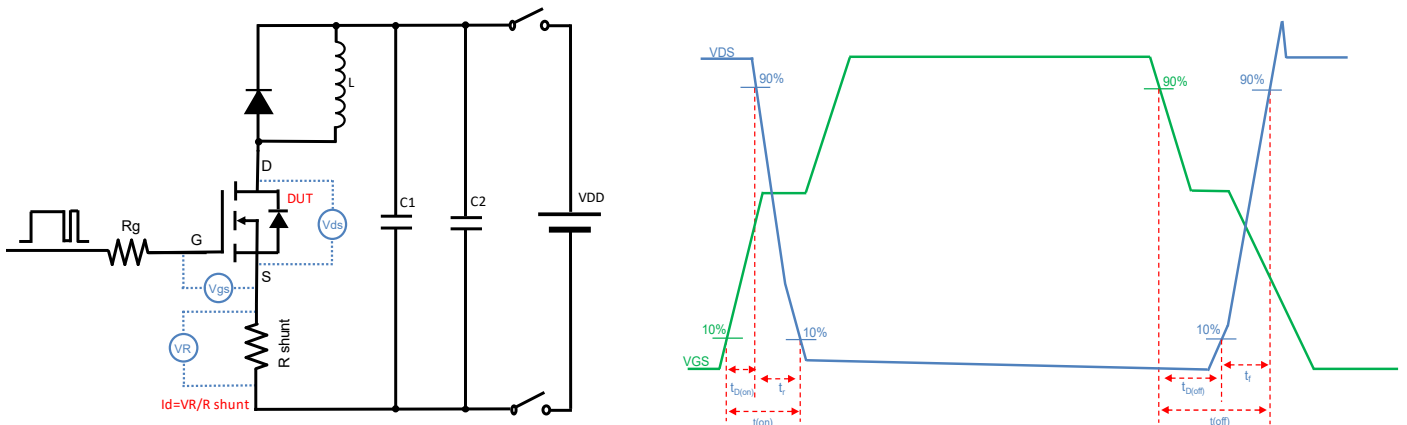


Figure C. Resistive Switching Test Circuit & Waveform

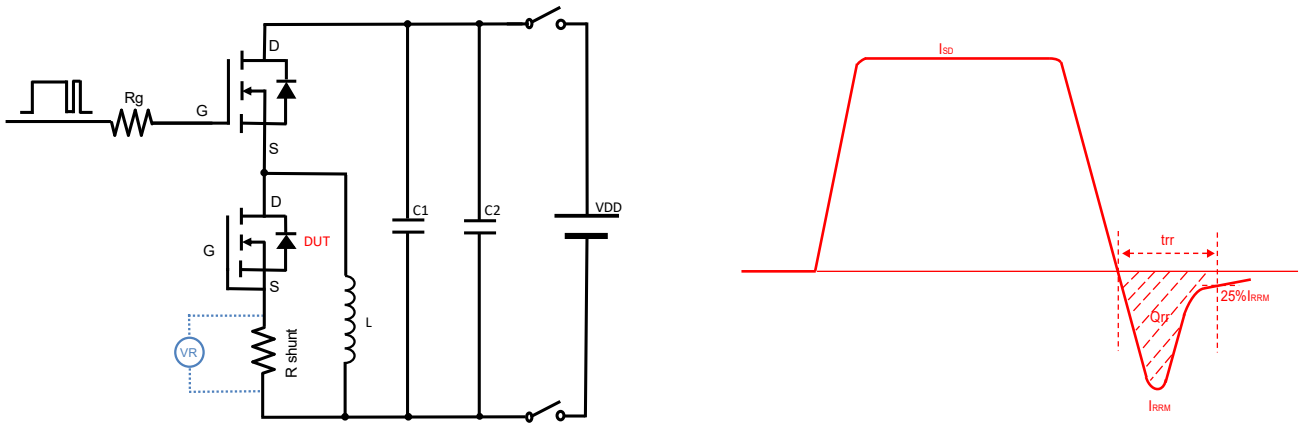
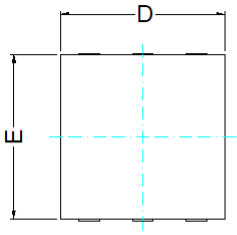


Figure D. Diode Recovery Test Circuit & Waveform

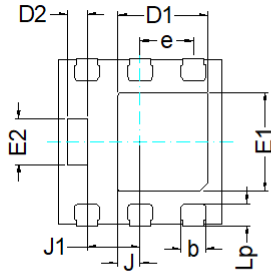


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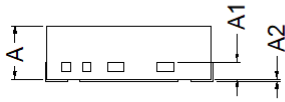
## ■ DFN2020-6L-H-0.65MM Package Information



Top View  
正面视图



Bottom View  
背面视图



Side View  
侧面视图

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
D	1.90	2.00	2.10
E	1.90	2.00	2.10
A	0.55	0.65	0.75
A1	0.20 BSC		
A2	0		0.10
D1	1.00	1.10	1.20
D2	0.20	0.25	0.35
E1	1.10	1.20	1.30
E2	0.51	0.56	0.66
Lp	0.20	0.25	0.35
J	0.27 BSC		
J1	0.64 BSC		
b	0.20	0.30	0.40
e	0.65 BSC		

### Note:

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.10$ mm.
3. The pad layout is for reference purposes only.





## YJQT015N02AQ

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