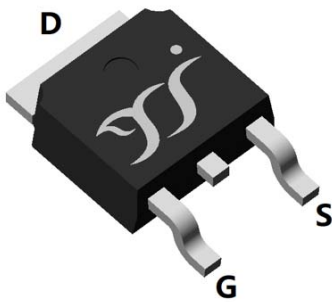
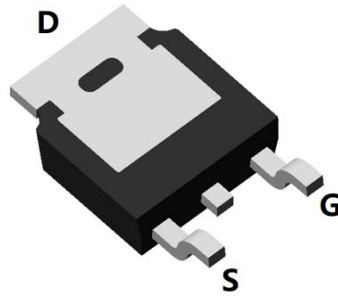


N-Channel Enhancement Mode Field Effect Transistor

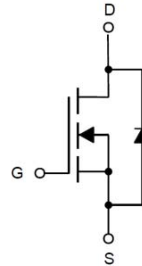


Top View



Bottom View

TO-252



Product Summary

- V_{DS} 60V
- I_D 80A
- $R_{DS(on)}$ (at $V_{GS}=10V$) $<7.5m\Omega$
- $R_{DS(on)}$ (at $V_{GS}=4.5V$) $<10m\Omega$
- 100% EAS Tested
- 100% ∇V_{DS} Tested

General Description

- Low $R_{DS(on)}$ & FOM
- Extremely low switching loss
- Excellent stability and uniformity
- Fast switching and soft recovery
- Part no. with suffix "Q" means AEC-Q101 qualified

Applications

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply
- DC-DC convertor
- 12V and 24V Automotive systems

■ Absolute Maximum Ratings ($T_A=25^\circ C$ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-source Voltage		V_{DS}	60	V
Gate-source Voltage		V_{GS}	± 20	V
Drain Current	$T_C=25^\circ C$	I_D	80	A
	$T_C=100^\circ C$		50	
Pulsed Drain Current ^A		I_{DM}	240	A
Avalanche energy ^B		EAS	144	mJ
Total Power Dissipation ^C	$T_C=25^\circ C$	P_D	78	W
	$T_C=100^\circ C$		31	
Junction and Storage Temperature Range		T_J, T_{STG}	-55~+150	$^\circ C$



YJD80G06CQ

■ Thermal resistance

Parameter		Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Ambient ^D	Steady-State	$R_{\theta JA}$	40	50	°C/W
Thermal Resistance Junction-to-Case	Steady-State	$R_{\theta JC}$	1.3	1.6	

■ Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
YJD80G06CQ	F1	YJD80G06C	2500	/	25000	13"Reel

- A. Repetitive rating; pulse width limited by max. junction temperature.
- B. $T_J=25^{\circ}\text{C}$, $V_{DD}=40\text{V}$, $V_G=10\text{V}$, $R_G=25\Omega$, $L=0.5\text{mH}$, $I_{AS}=24\text{A}$.
- C. P_q is based on max. junction temperature, using junction-case thermal resistance.
- D. The value of $R_{\theta JA}$ is measured with the device mounted on the minimum recommend pad size, in the still air environment with $T_A=25^{\circ}\text{C}$. The maximum allowed junction temperature of 150°C . The value in any given application depends on the user's specific board design.



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■ Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	60			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V$			1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2	1.7	2.5	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$		5.5	7.5	m Ω
		$V_{GS}=4.5V, I_D=10A$		6.5	10	
Diode Forward Voltage	V_{SD}	$I_S=20A, V_{GS}=0V$		0.85	1.3	V
Maximum Body-Diode Continuous Current	I_S				80	A
Gate resistance	R_G	$f=1\text{MHz}$		1.5		Ω
Dynamic Parameters						
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V, f=1\text{MHz}$	-	2100	-	pF
Output Capacitance	C_{oss}		-	670	-	
Reverse Transfer Capacitance	C_{rss}		-	30	-	
Switching Parameters						
Total Gate Charge	Q_g	$V_{GS}=10V, V_{DS}=30V, I_D=20A$	-	31	-	nC
Gate-Source Charge	Q_{gs}		-	6	-	
Gate-Drain Charge	Q_{gd}		-	5	-	
Reverse Recovery Charge	Q_{rr}	$I_F=20A, di/dt=500A/us$	-	18	-	nC
Reverse Recovery Time	t_{rr}		-	30	-	ns
Turn-on Delay Time	$t_{D(on)}$	$V_{GS}=10V, V_{DD}=30V, I_D=20A$ $R_{GEN}=3\Omega$	-	10	-	ns
Turn-on Rise Time	t_r		-	34	-	
Turn-off Delay Time	$t_{D(off)}$		-	26.2	-	
Turn-off fall Time	t_f		-	45	-	



YJD80G06CQ

Typical Electrical and Thermal Characteristics Diagrams

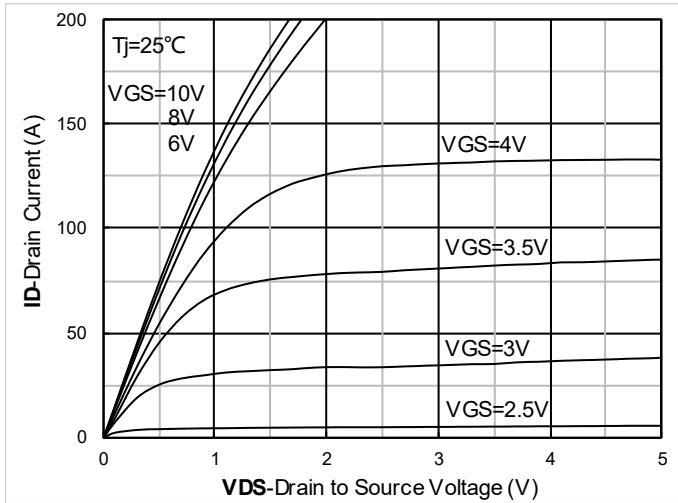


Figure 1. Output Characteristics

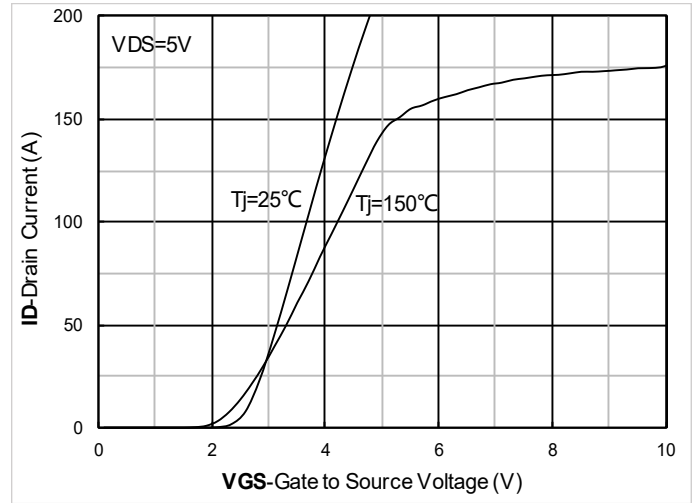


Figure 2. Transfer Characteristics

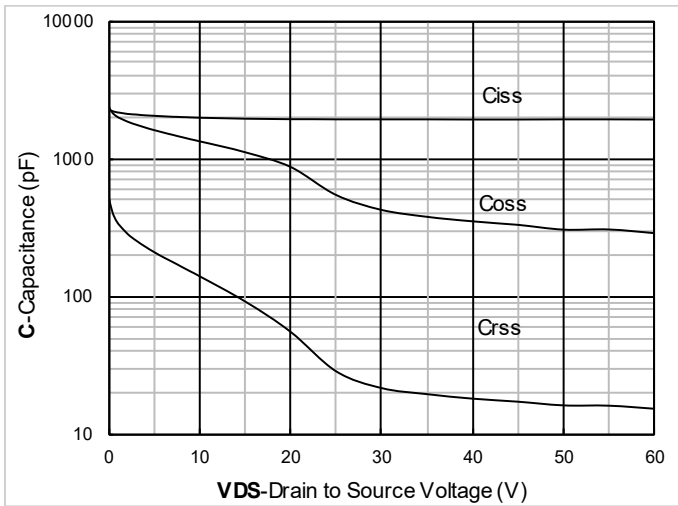


Figure 3. Capacitance Characteristics

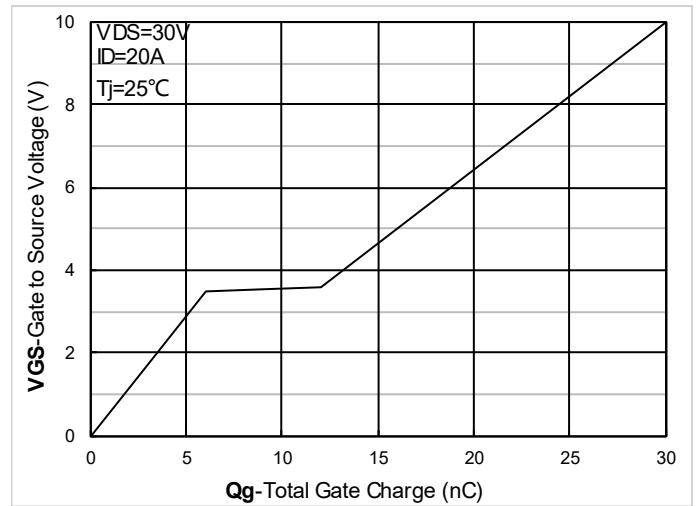


Figure 4. Gate Charge

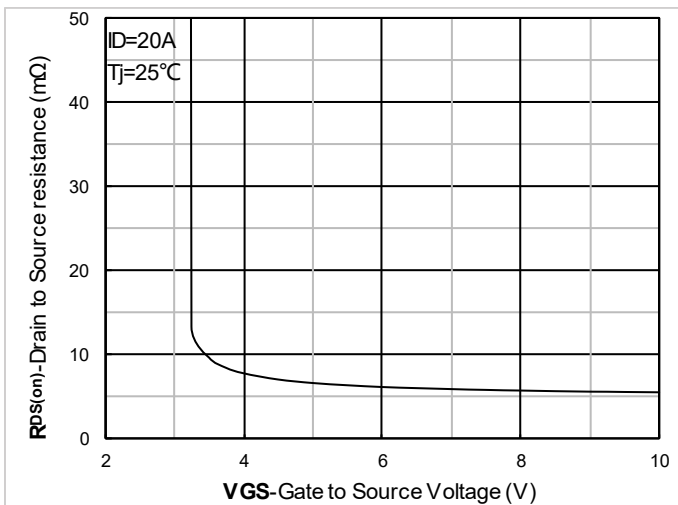


Figure 5. On-Resistance vs Gate to Source Voltage

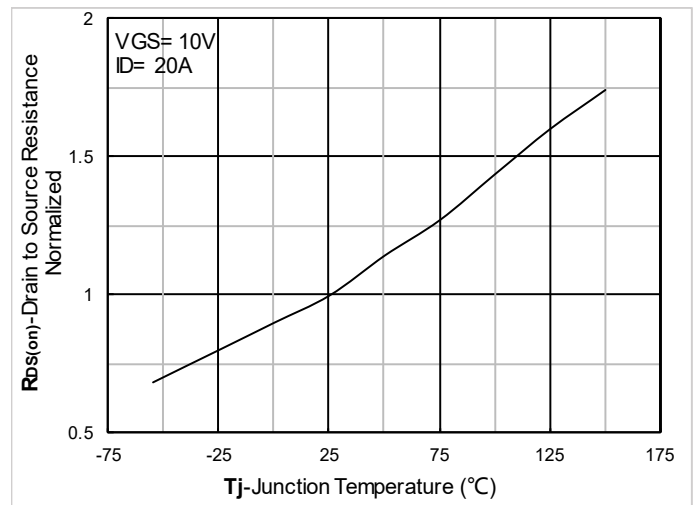


Figure 6. Normalized On-Resistance



YJD80G06CQ

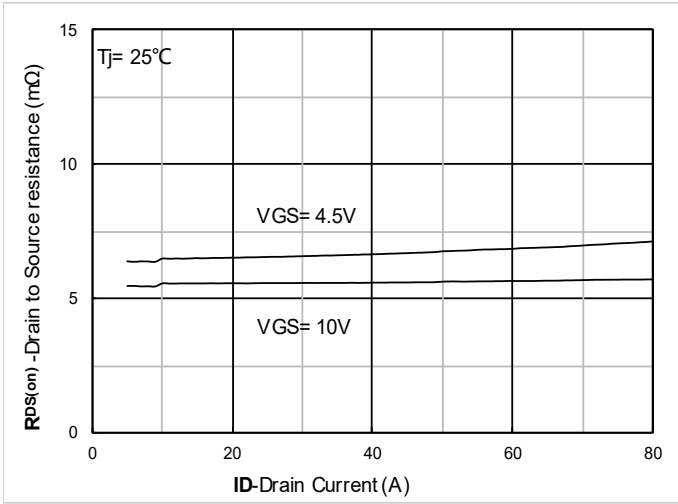


Figure 7. $R_{DS(on)}$ VS Drain Current

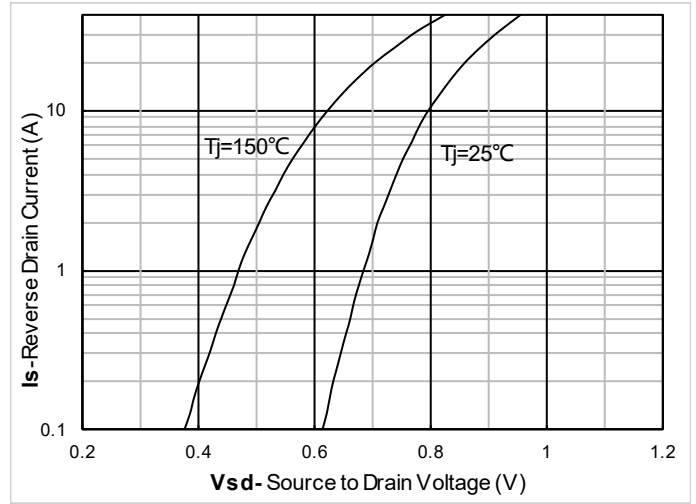


Figure 8. Forward characteristics of reverse diode

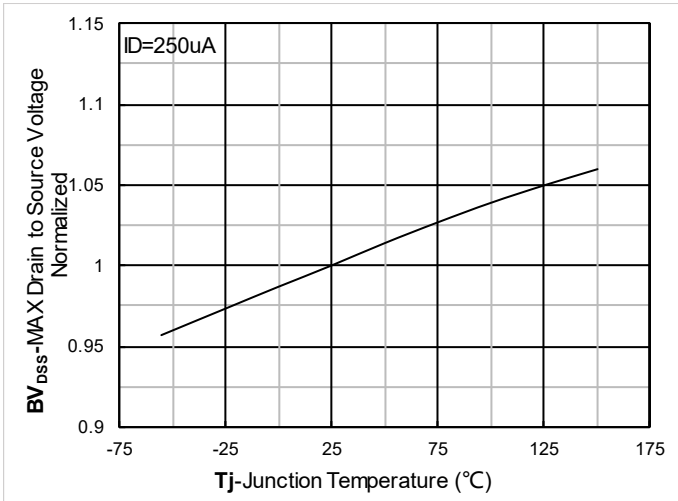


Figure 9. Normalized breakdown voltage

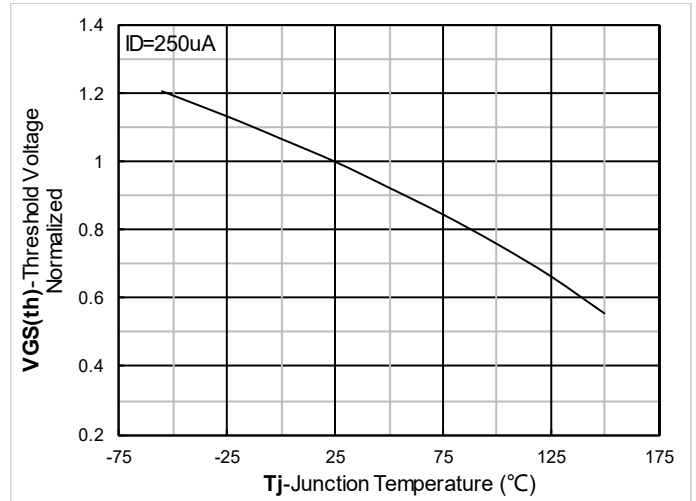


Figure 10. Normalized Threshold voltage

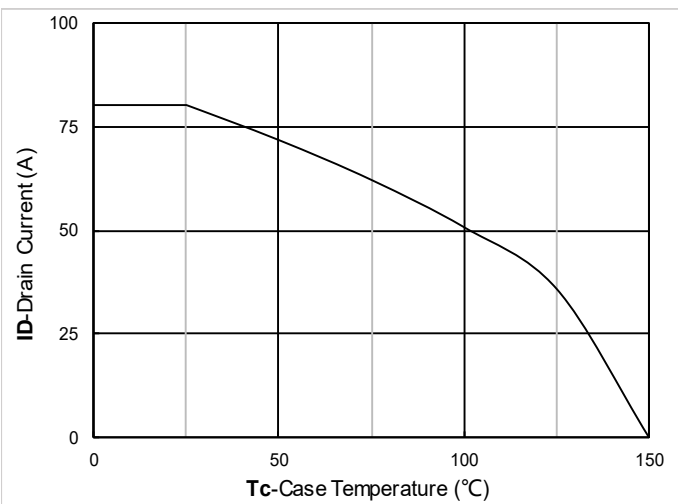


Figure 11. Current dissipation

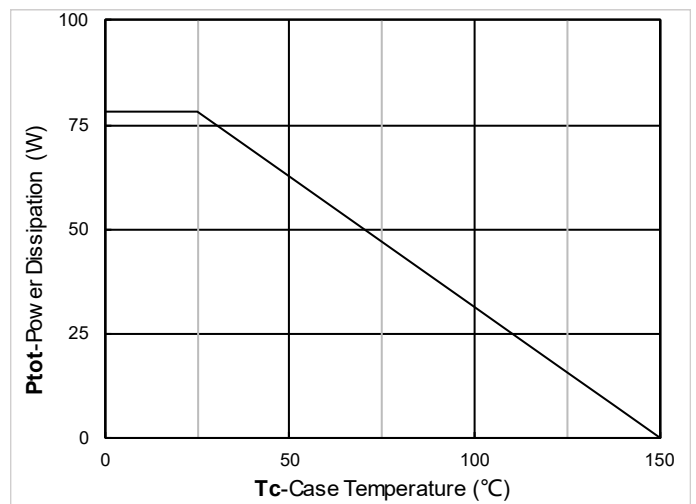


Figure 12. Power dissipation



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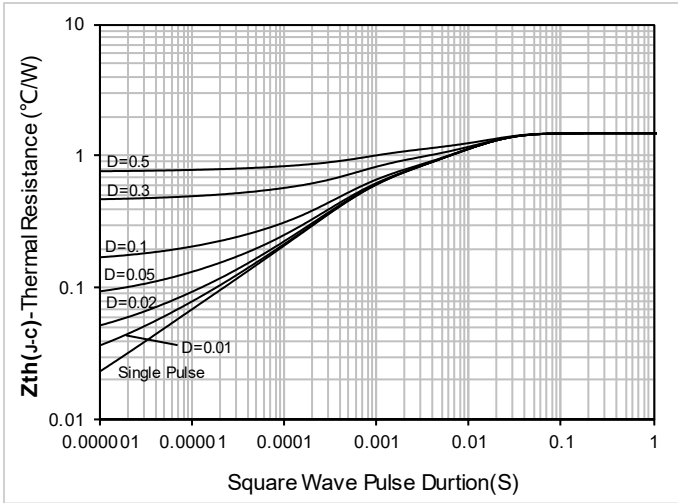


Figure 13. Maximum Transient Thermal Impedance

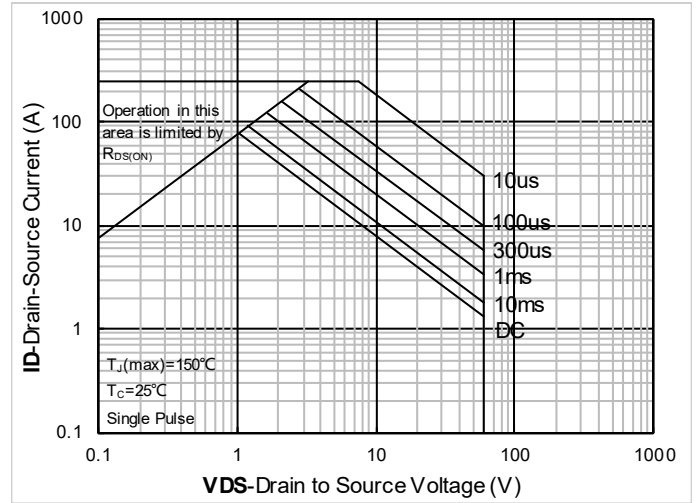


Figure 14. Safe Operation Area

■ Test Circuits & Waveforms

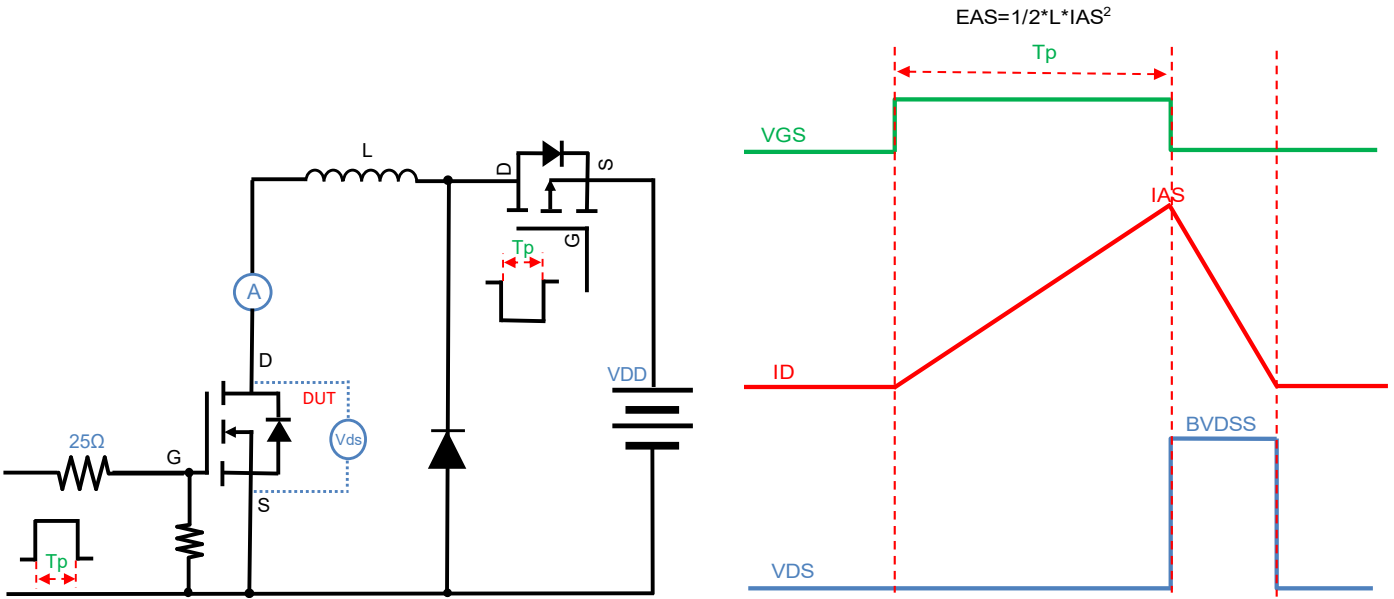


Figure A. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

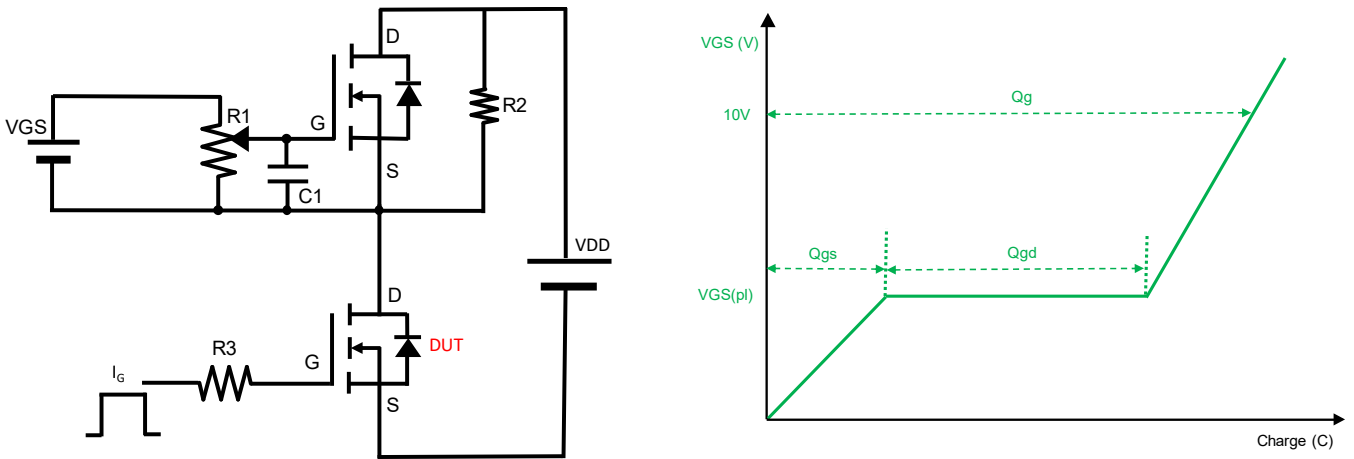


Figure B. Gate Charge Test Circuit & Waveform

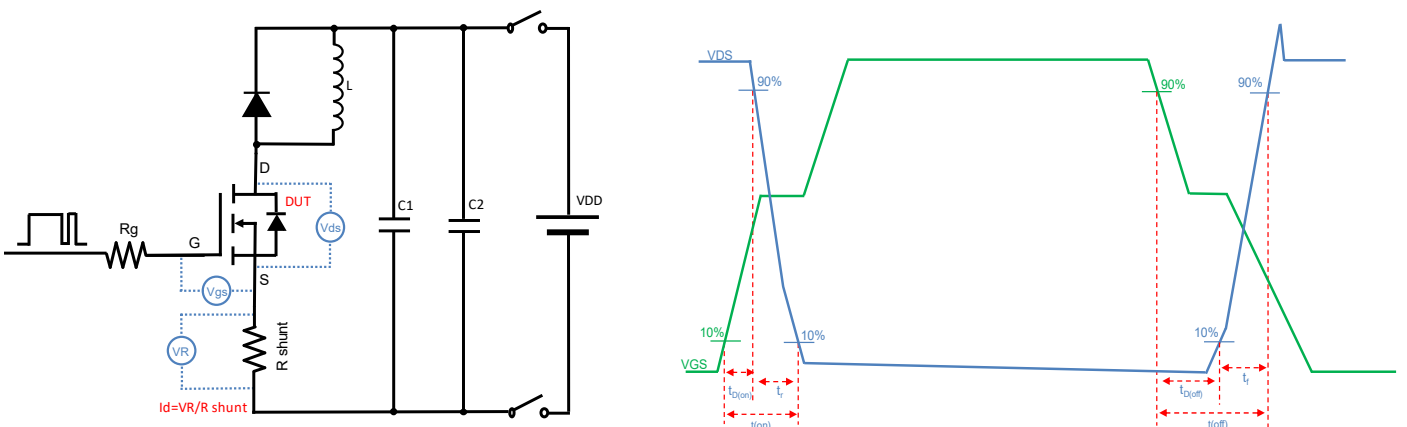


Figure C. Resistive Switching Test Circuit & Waveform

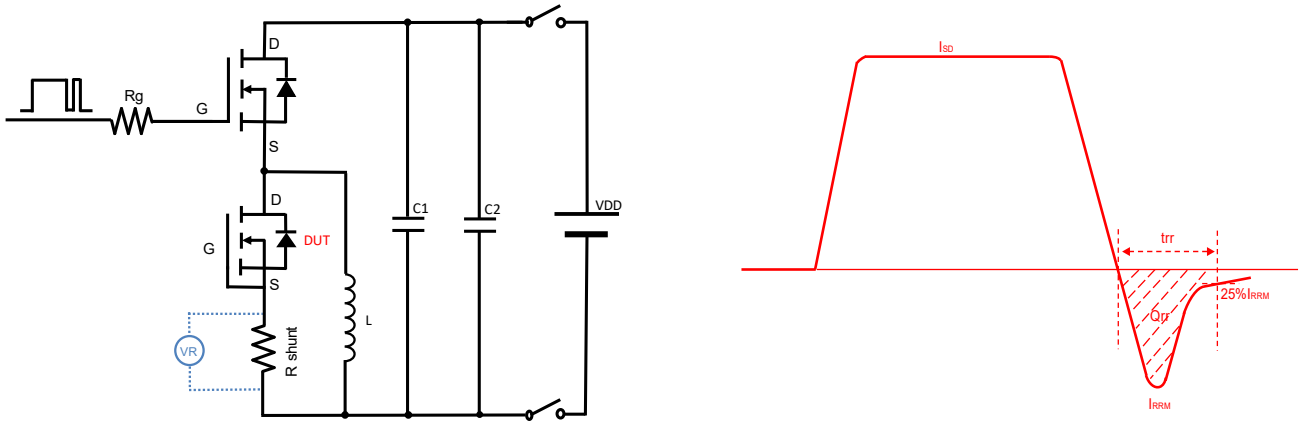
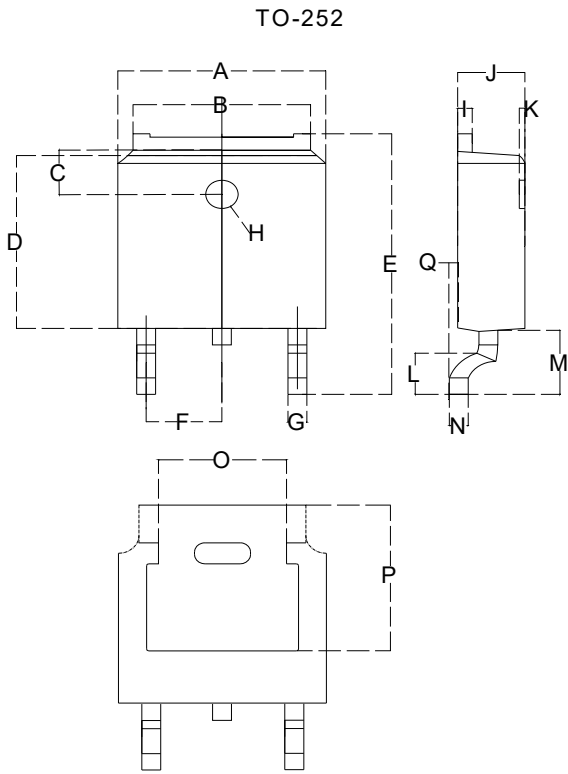


Figure D. Diode Recovery Test Circuit & Waveform

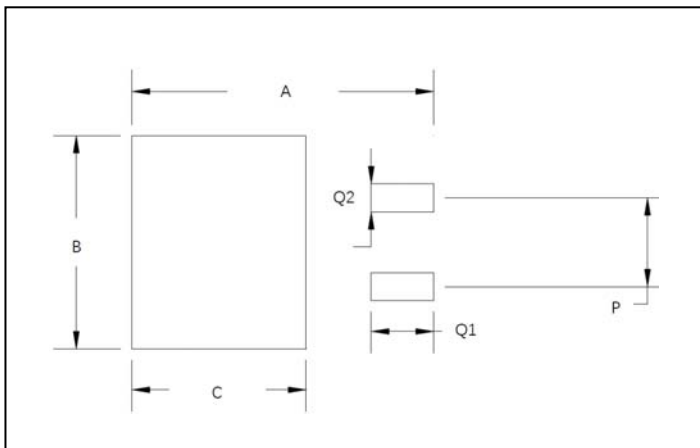
■ TO-252 Package information



Dimensions in millimeters

TO-252		
Dim	Min	Max
A	6.500	6.700
B	5.100	5.460
C	1.400	1.800
D	6.000	6.200
E	10.000	10.400
F	2.166	2.366
G	0.660	0.860
H	Φ1.050	Φ1.350
I	0.460	0.580
J	2.200	2.400
K	0	0.300
L	0.890	2.290
M	2.730	3.080
N	0.430	0.580
O	4.20	4.95
P	5.15	5.45
Q	0	0.2

■ Suggested Pad Layout



Dim	Millimeters
A	11.4
B	6.74
C	6.23
P	4.56
Q1	2.28
Q2	1.52



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