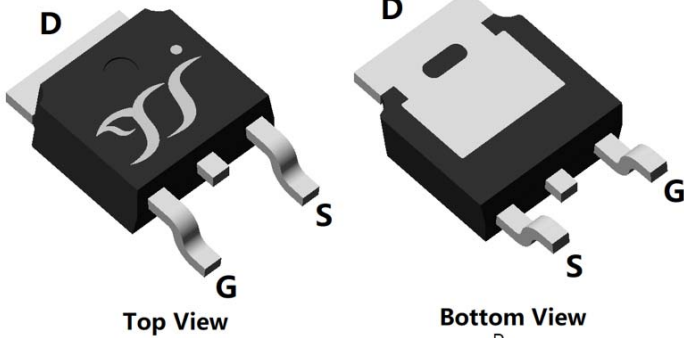
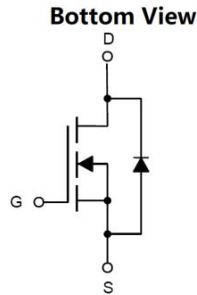


## N-Channel Enhancement Mode Field Effect Transistor



**TO-252**



### Product Summary

$V_{DS}$	60V
$I_D$	80A
$R_{DS(ON)}$ (at $V_{GS}=10V$ )	7.5m
$R_{DS(ON)}$ (at $V_{GS}=4.5V$ )	10m
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 ( $T_A=25$ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-source Voltage		$V_{DS}$	60	V
Gate-source Voltage		$V_{GS}$	$\pm 20$	V
Drain Current	$T_C=25^\circ C$	$I_D$	80	A
	$T_C=100^\circ C$		50	
Pulsed Drain Current <sup>A</sup>		$I_{DM}$	240	A
Avalanche energy <sup>B</sup>		EAS	144	mJ
Total Power Dissipation <sup>C</sup>	$T_C=25^\circ C$	$P_D$	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 <sup>D</sup>	Steady-State	$R_{JA}$	40	50	°C/W
Thermal Resistance Junction-to-Case	Steady-State	$R_{JC}$	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  $R_{JA}$  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  $150^{\circ}\text{C}$ . The value in any given application depends on the user's specific board design.



# YJD80G06CQ

## Electrical Characteristics (T<sub>J</sub>=25 unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
<b>Static Parameter</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA	60			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V			1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> =0V			± 100	nA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250μA	1.2	1.7	2.5	V
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A		5.5	7.5	m
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A		6.5	10	
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =20A, V <sub>GS</sub> =0V		0.85	1.3	V
Maximum Body-Diode Continuous Current	I <sub>S</sub>				80	A
Gate resistance	R <sub>G</sub>	f=1MHz		1.5		
<b>Dynamic Parameters</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz	-	2100	-	pF
Output Capacitance	C <sub>oss</sub>		-	670	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	30	-	
<b>Switching Parameters</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>GS</sub> =10V, V <sub>DS</sub> =30V, I <sub>D</sub> =20A	-	31	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	6	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	5	-	
Reverse Recovery Charge	Q <sub>rr</sub>	I <sub>F</sub> =20A, di/dt=500A/us	-	18	-	nC
Reverse Recovery Time	t <sub>rr</sub>		-	30	-	ns
Turn-on Delay Time	t <sub>D(on)</sub>	V <sub>GS</sub> =10V, V <sub>DD</sub> =30V, I <sub>D</sub> =20A R <sub>GEN</sub> =3	-	10	-	ns
Turn-on Rise Time	t <sub>r</sub>		-	34	-	
Turn-off Delay Time	t <sub>D(off)</sub>		-	26.2	-	
Turn-off fall Time	t <sub>f</sub>		-	45	-	



# YJD80G06CQ

## Typical Electrical and Thermal Characteristics Diagrams

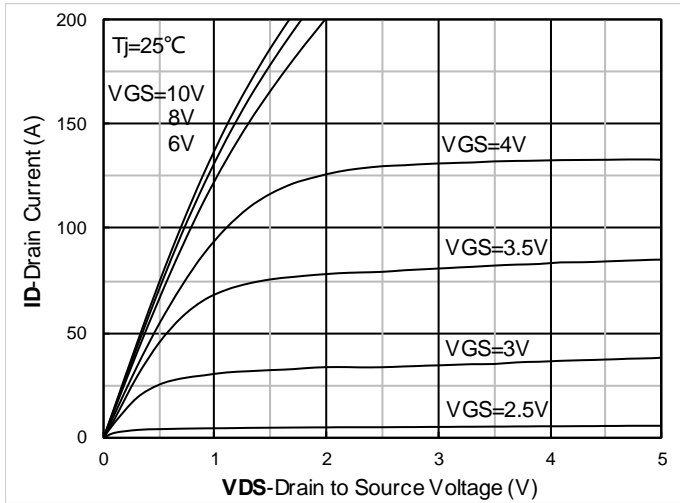


Figure 1. Output Characteristics

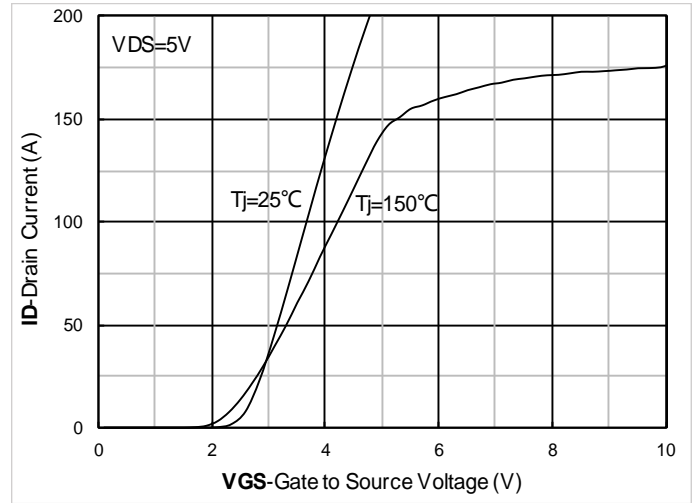


Figure 2. Transfer Characteristics

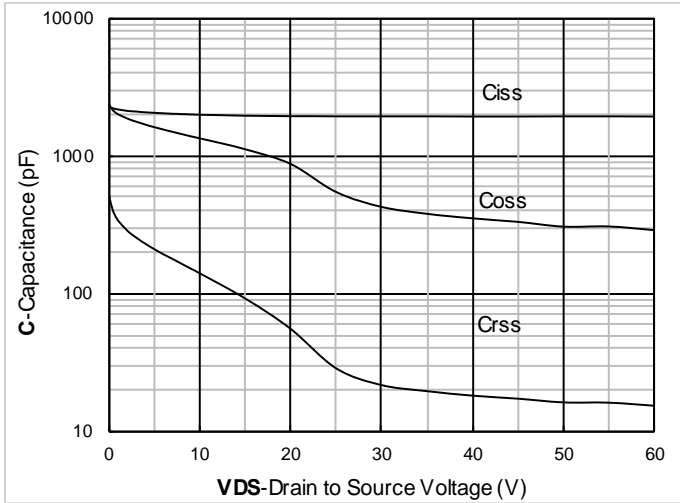


Figure 3. Capacitance Characteristics

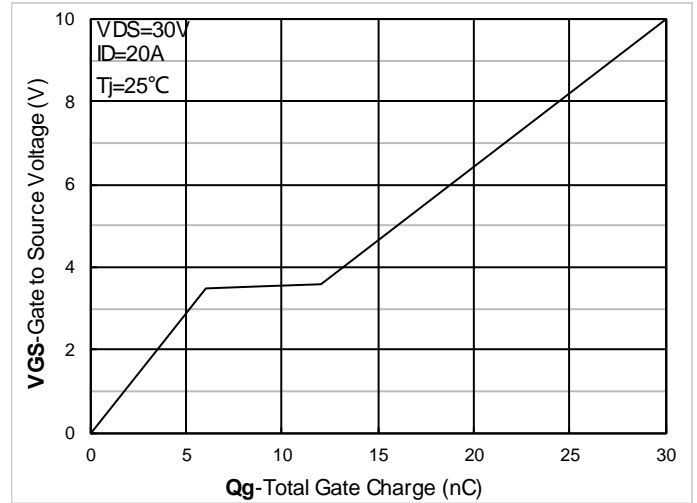


Figure 4. Gate Charge

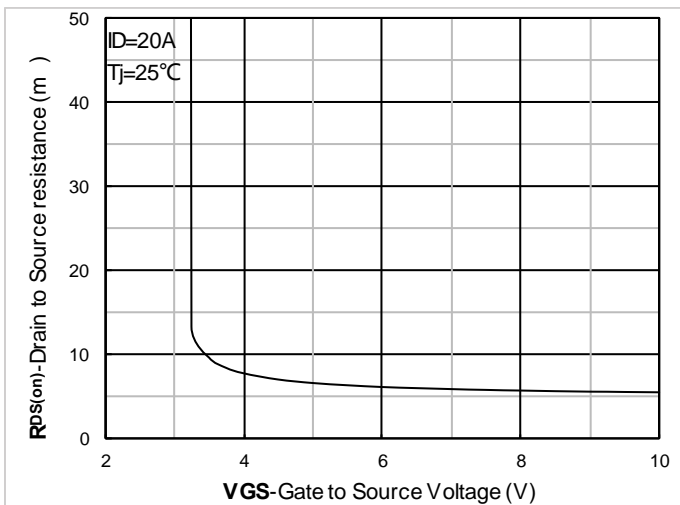


Figure 5. On-Resistance vs Gate to Source Voltage

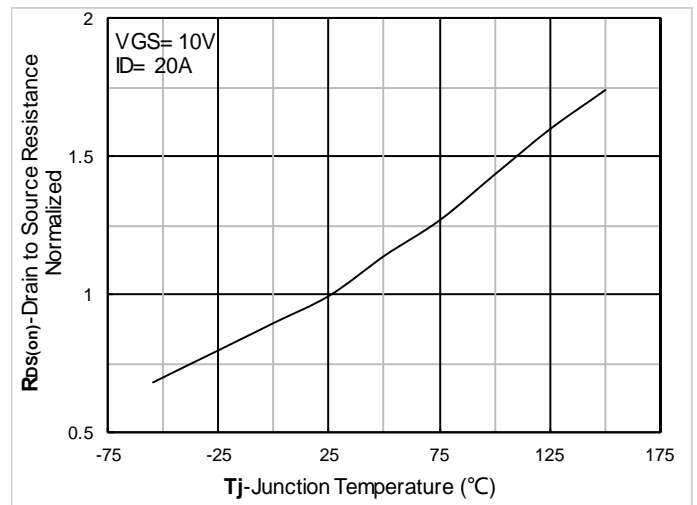


Figure 6. Normalized On-Resistance



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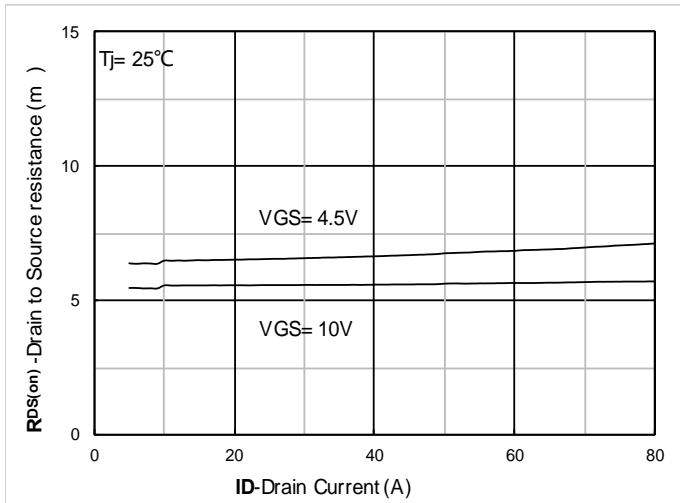


Figure 7.  $R_{DS(on)}$  VS Drain Current

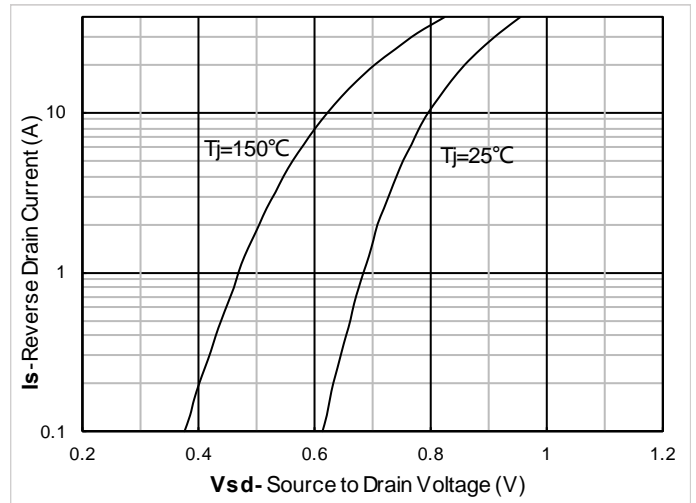


Figure 8. Forward characteristics of reverse diode

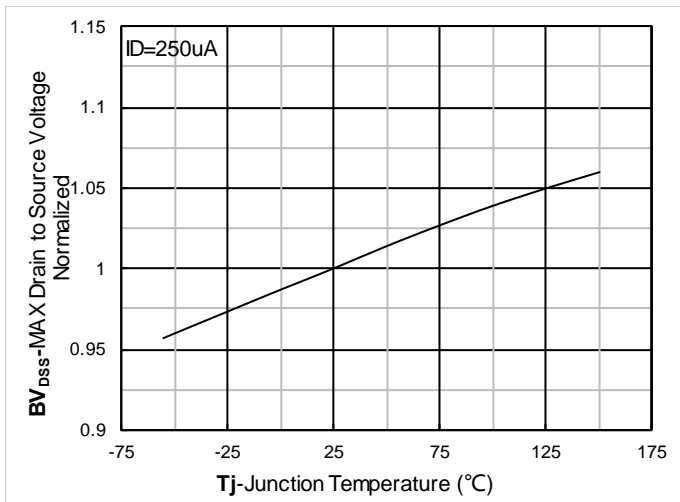


Figure 9. Normalized breakdown voltage

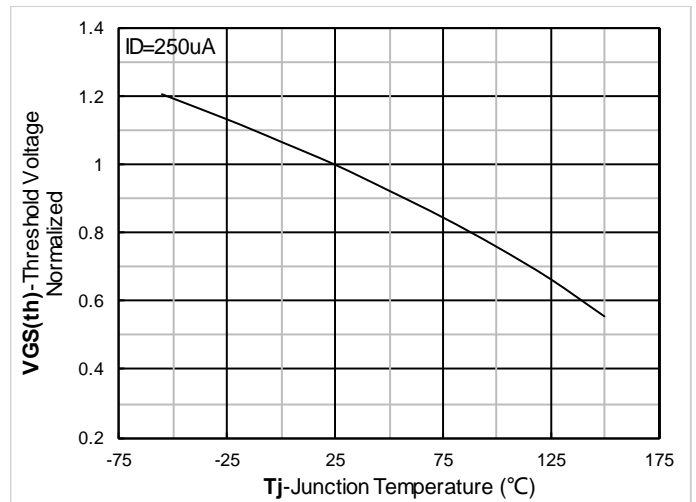


Figure 10. Normalized Threshold voltage

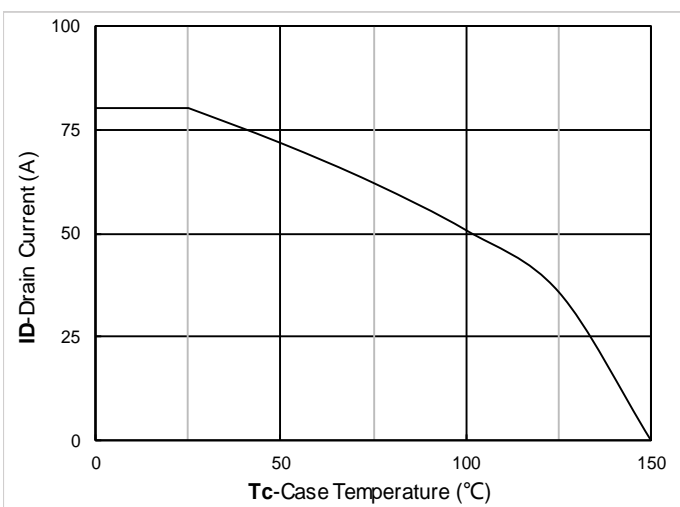


Figure 11. Current dissipation

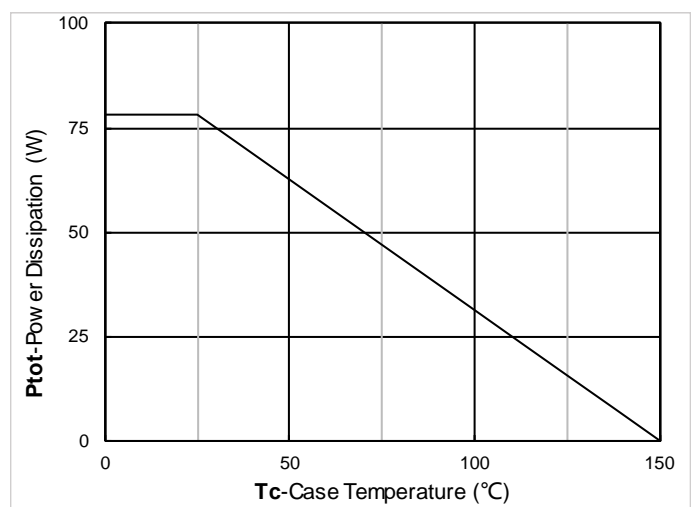


Figure 12. Power dissipation



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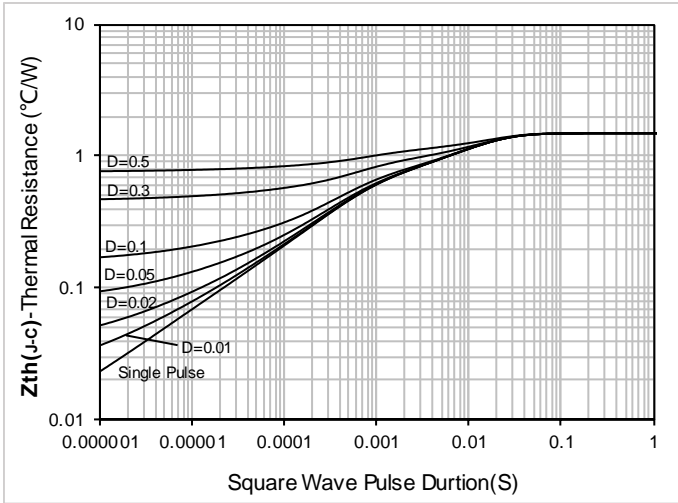


Figure 13. Maximum Transient Thermal Impedance

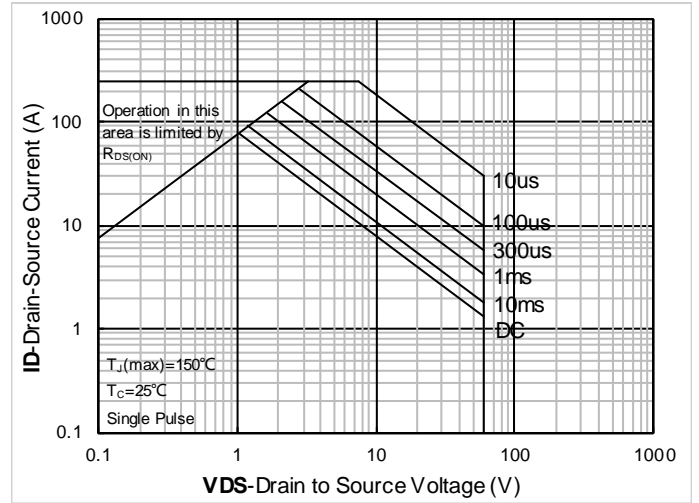


Figure 14. Safe Operation Area

## Test Circuits & Waveforms

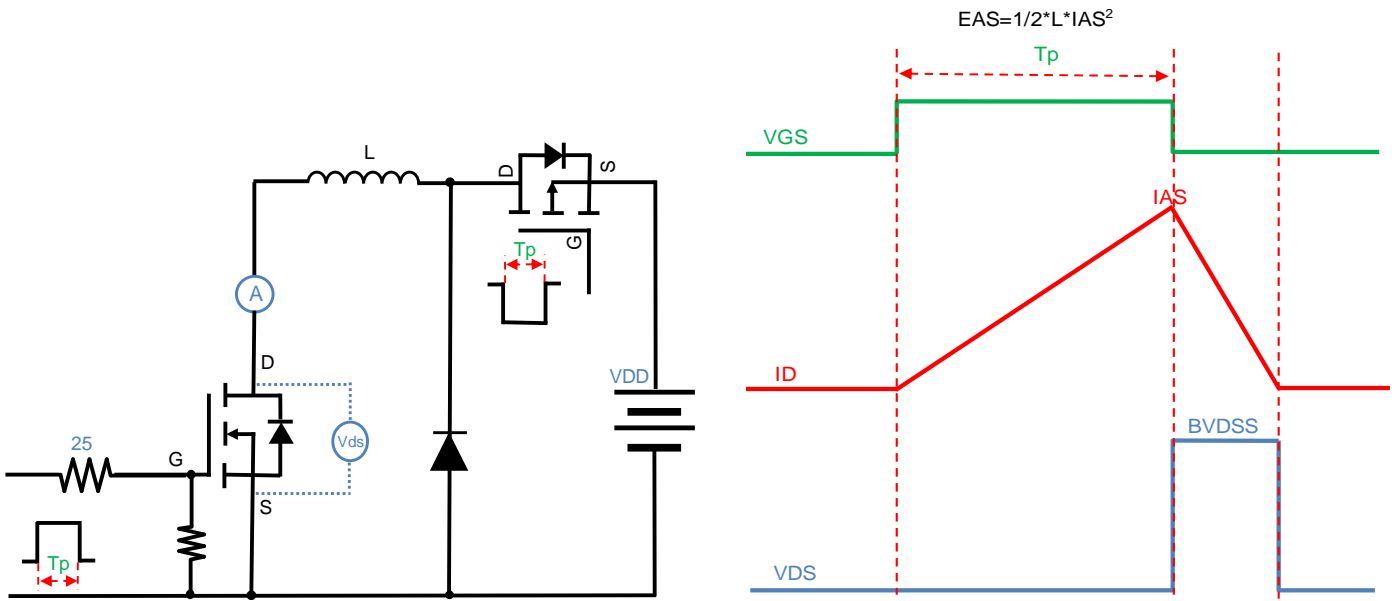


Figure A. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

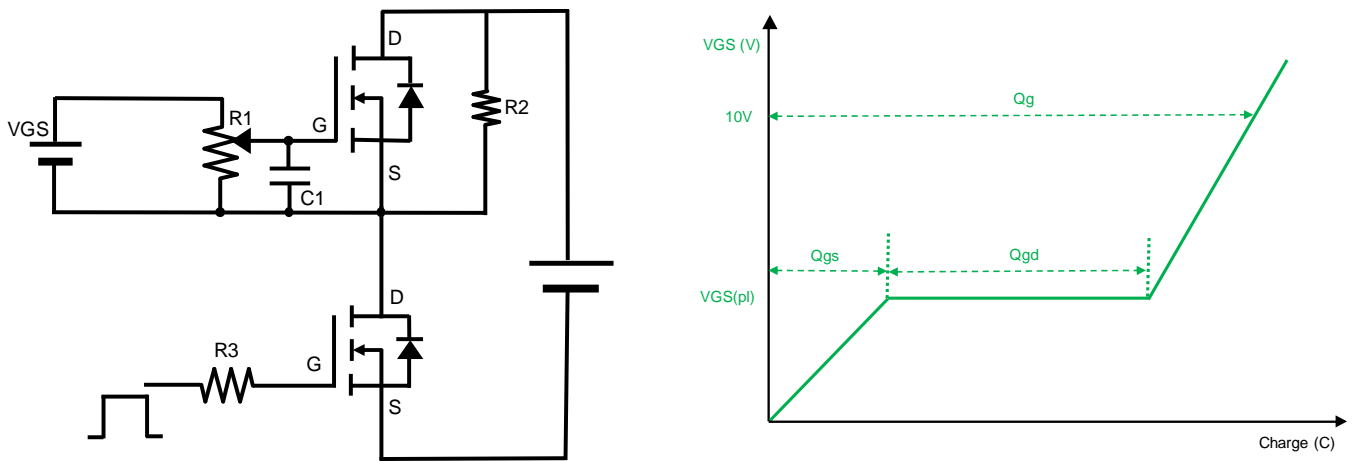


Figure B. Gate Charge Test Circuit & Waveform

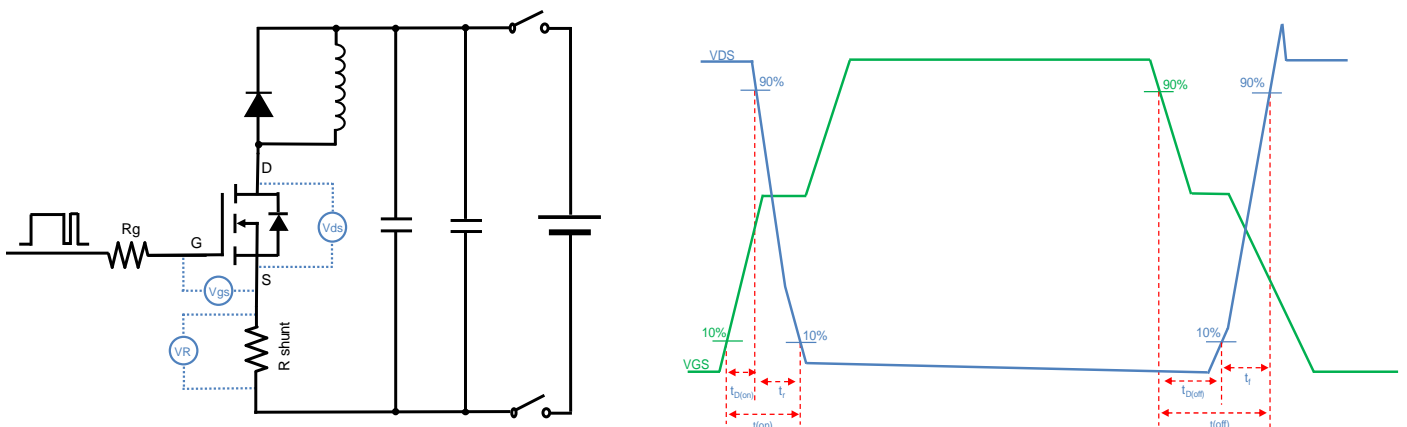


Figure C. Resistive Switching Test Circuit & Waveform

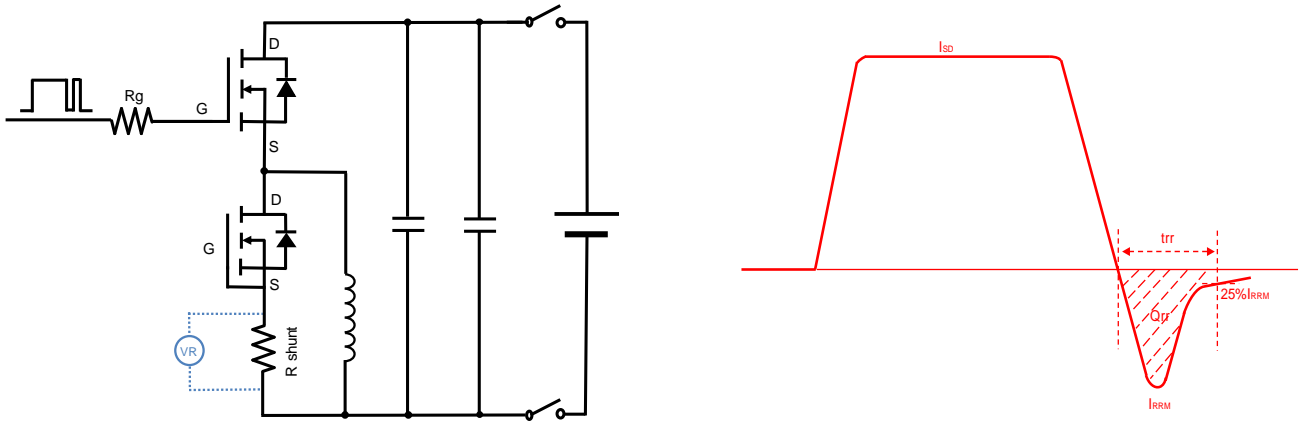
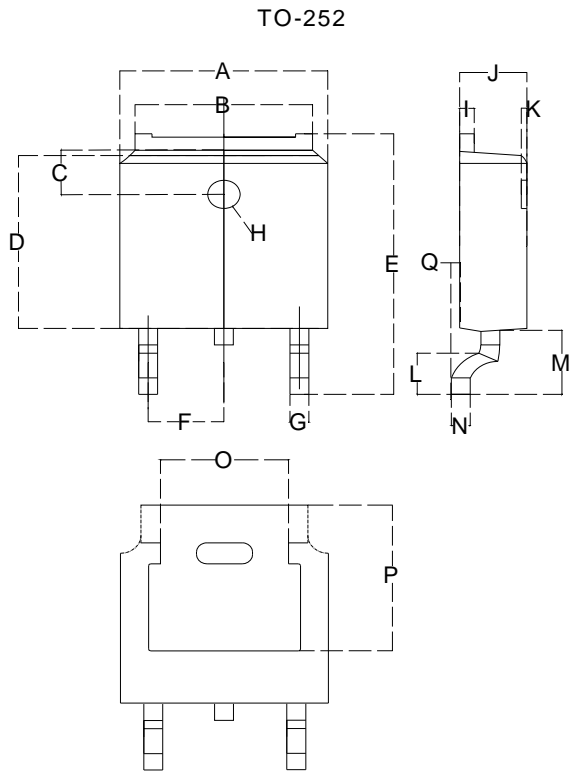


Figure D. Diode Recovery Test Circuit & Waveform



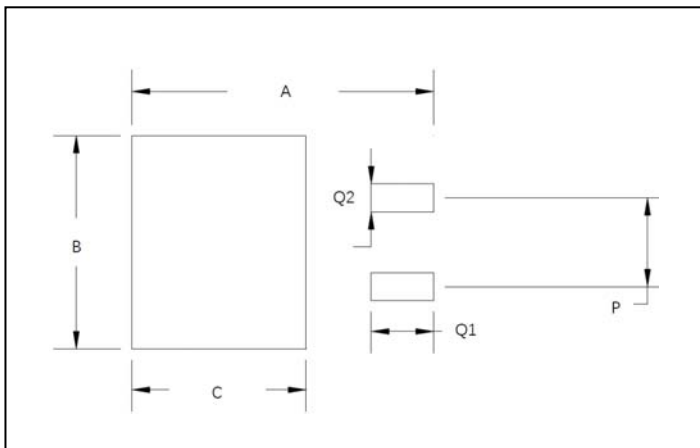
## TO-252 Package information



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	1.050	1.350
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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