

## -100V P-Channel MOSFET

### ● Features

-100V/-18A,

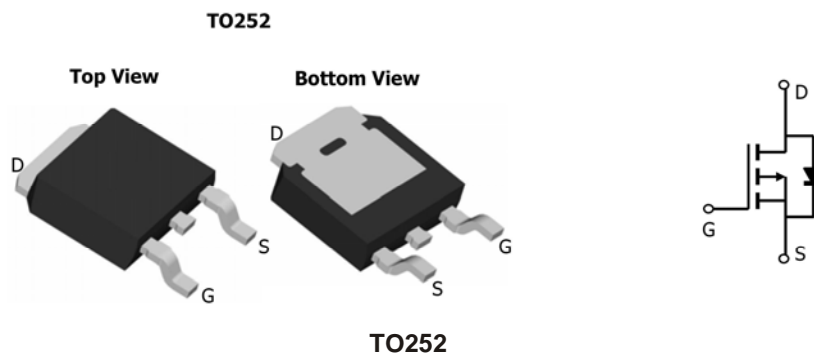
$R_{DS(ON)} < 100m\Omega @ V_{GS} = -10V$

Lead Free Available (RoHS Compliant)

### ● General Description

The FS2245 combines advanced trench MOSFET technology with a low resistance package to provide extremely low  $R_{DS(ON)}$ . this device is well suited for high current load applications.

### ● Pin Configuration



### ● Absolute Maximum Ratings $T_A=25^\circ C$ unless otherwise noted

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	$V_{DS}$	-100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current	$I_D$	$T_A=25^\circ C$	-18
		$T_A=70^\circ C$	-12
Pulsed Drain Current <sup>note</sup>	$I_{DM}$	-72	A
Avalanche energy $L=1mH$ <sup>note</sup>	$E_{AS}, E_{AR}$	722	mJ
Power Dissipation <sup>note</sup>	$P_D$	$T_A=25^\circ C$	50
		$T_A=70^\circ C$	25
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	$^\circ C$

Thermal Characteristics					
Parameter	Symbol	Typ	Max	Units	
Maximum Junction-to-Ambient <sup>A</sup>	$R_{\theta JA}$	17	26	$^\circ C/W$	
Maximum Junction-to-Ambient <sup>A D</sup>		40	50		
Maximum Junction-to-Lead	$R_{\theta JL}$	2.5	3		

#### Note:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec. Pulse Test: Pulse Width  $\leq 300 \mu s$ , Duty Cycle  $\leq 2\%$ .
3. EAS condition:  $T_J=25^\circ C, V_{DD}=-30V, V_G=-10V, L=1mH, R_g=25 \Omega, I_{AS}=38A$

## ● Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>STATIC PARAMETERS</b>						
B <sub>V</sub> DSS	Drain-Source Breakdown Voltage	I <sub>D</sub> =-250μA, V <sub>GS</sub> =0V	-100			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =-100V, V <sub>GS</sub> =0	T <sub>A</sub> =25°C	-0.002	-1	μA
			T <sub>A</sub> =55°C			
I <sub>GSS</sub>	Gate-Body leakage current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V			±0.1	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> I <sub>D</sub> =-250μA	-1.0	-1.9	-3.0	V
I <sub>D(ON)</sub>	On state drain current <sup>note</sup>	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-5V	50			A
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =-10V, I <sub>D</sub> =-20A	T <sub>A</sub> =25°C	85	100	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-10A		-	--	
g <sub>FS</sub>	Forward Trans conductance	V <sub>DS</sub> =-10V, I <sub>D</sub> =-20A		25		S
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> =-1A, V <sub>GS</sub> =0V		-0.75	-1.2	V
I <sub>S</sub>	Maximum Body-Diode Continuous Current				-12	A
<b>DYNAMIC PARAMETERS</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =-30V, f=1MHz		2460		pF
C <sub>oss</sub>	Output Capacitance			615		
C <sub>rss</sub>	Reverse Transfer Capacitance			246		
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz		6	10	Ω
<b>SWITCHING PARAMETERS</b>						
Q <sub>g</sub> (10V)	Total Gate Charge	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-30V, I <sub>D</sub> =-12A		55.5		nC
Q <sub>g</sub> (4.5V)				35		
Q <sub>gs</sub>	Gate Source Charge			16		
Q <sub>gd</sub>	Gate Drain Charge			19		
t <sub>D(on)</sub>	Turn-On Delay Time	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-30V, R <sub>L</sub> =2.5Ω, R <sub>GEN</sub> =3Ω		15		ns
t <sub>r</sub>	Turn-On Rise Time			17		
t <sub>D(off)</sub>	Turn-Off Delay Time			40		
t <sub>f</sub>	Turn-Off Fall Time			45		
t <sub>rr</sub>	Body Diode Reverse Recovery Time	I <sub>F</sub> =-12A, dI/dt=100A/μs		50	65	
Q <sub>rr</sub>	Body Diode Reverse Recovery Charge	I <sub>F</sub> =-12A, dI/dt=100A/μs		59		nC

A: The value of R<sub>θJA</sub> is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25°C. The Power dissipation P<sub>DSM</sub> is based on R<sub>θJA</sub> and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design, and the maximum temperature of 175°C may be used if the PCB allows it.

B: The power dissipation P<sub>D</sub> is based on T<sub>J(MAX)</sub>=175°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

C: Repetitive rating, pulse width limited by junction temperature T<sub>J(MAX)</sub>=175°C.

D: The R<sub>θJA</sub> is the sum of the thermal impedance from junction to case R<sub>θJC</sub> and case to ambient.

E: The static characteristics in Figures 1 to 6 are obtained using <300 μs pulses, duty cycle 0.5% max.

F: These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of T<sub>J(MAX)</sub>=175°C.

G: The maximum current rating is limited by bond-wires.

H: These tests are performed with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25°C. The SOA curve provides a single pulse rating.

\*This device is guaranteed green after data code 8X11 (Sep 1<sup>ST</sup> 2008).

## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

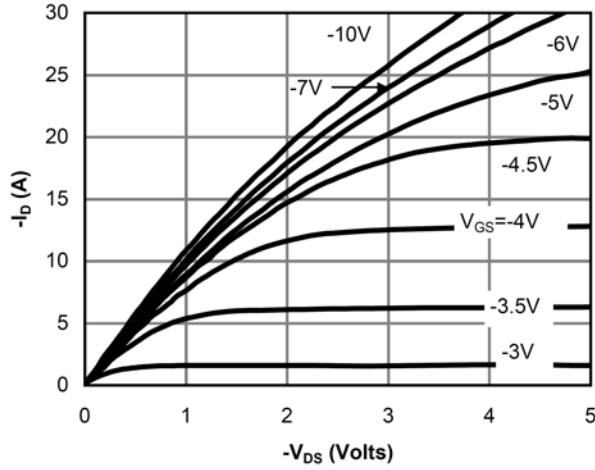


Fig 1: On-Region Characteristics

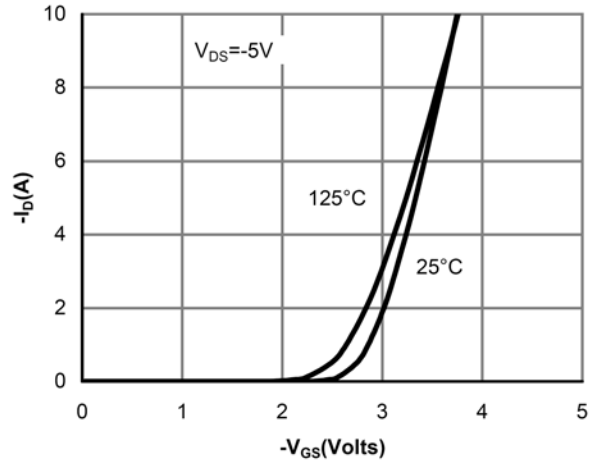


Figure 2: Transfer Characteristics

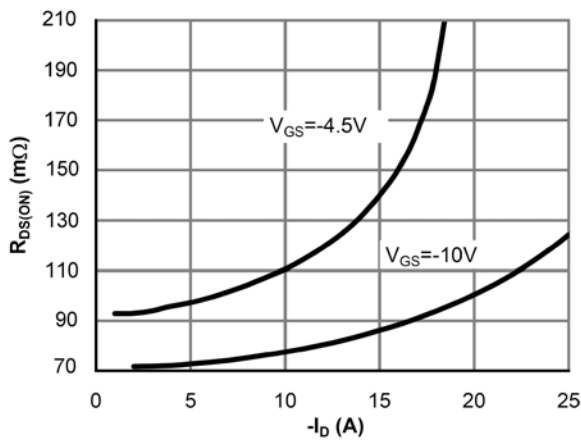


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

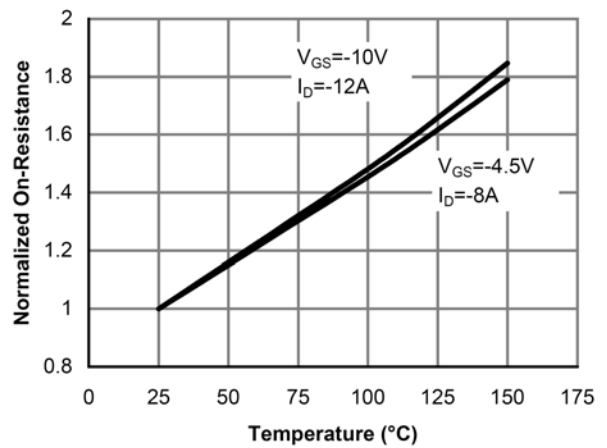


Figure 4: On-Resistance vs. Junction Temperature

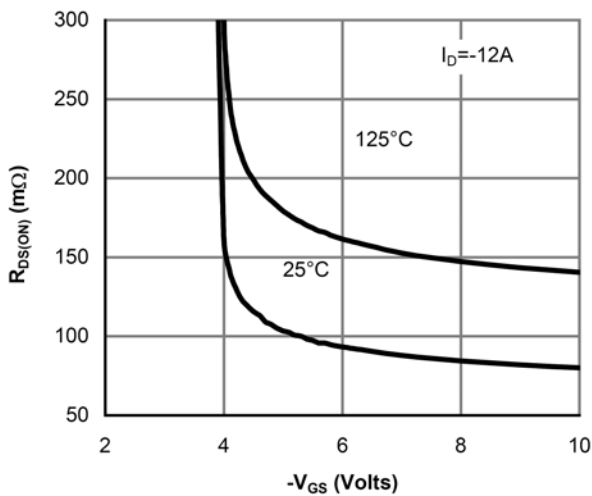


Figure 5: On-Resistance vs. Gate-Source Voltage

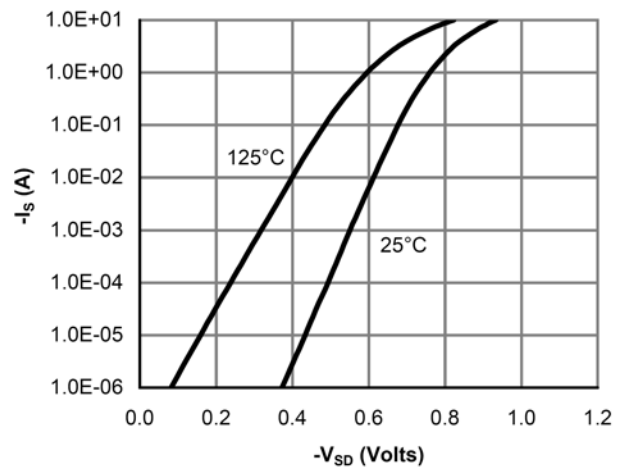


Figure 6: Body-Diode Characteristics

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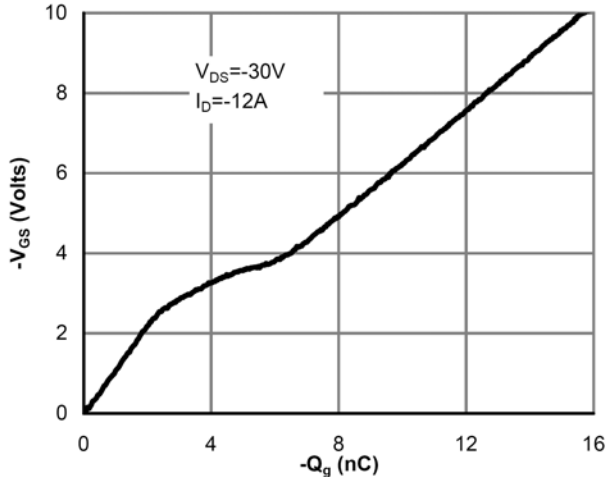


Figure 7: Gate-Charge Characteristics

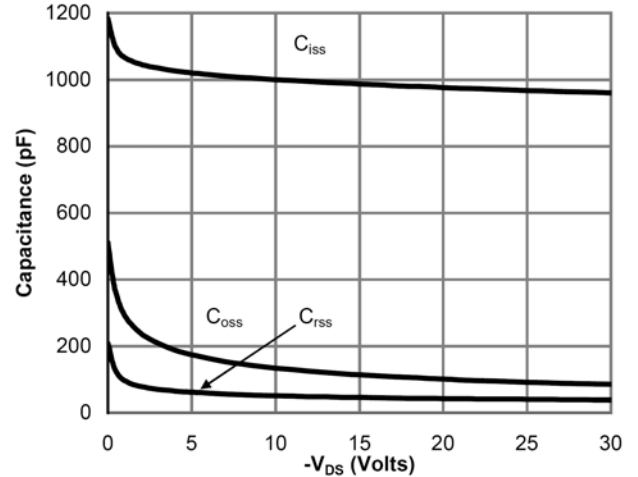


Figure 8: Capacitance Characteristics

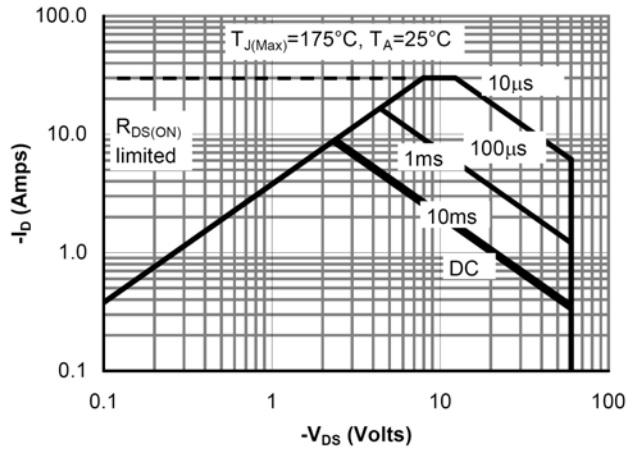


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

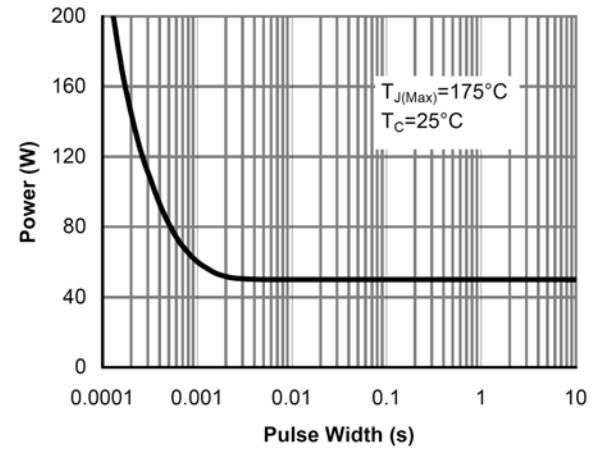


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

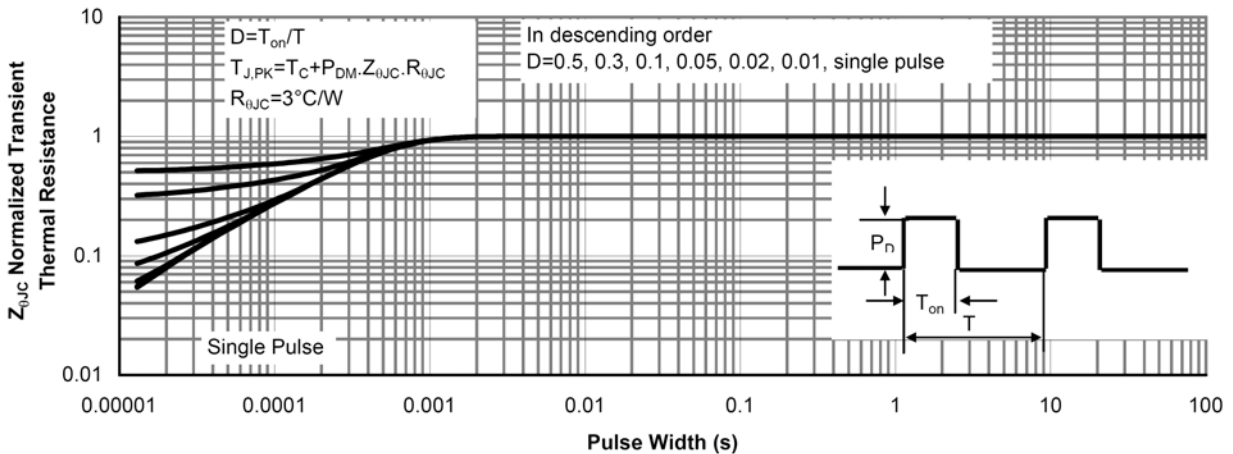
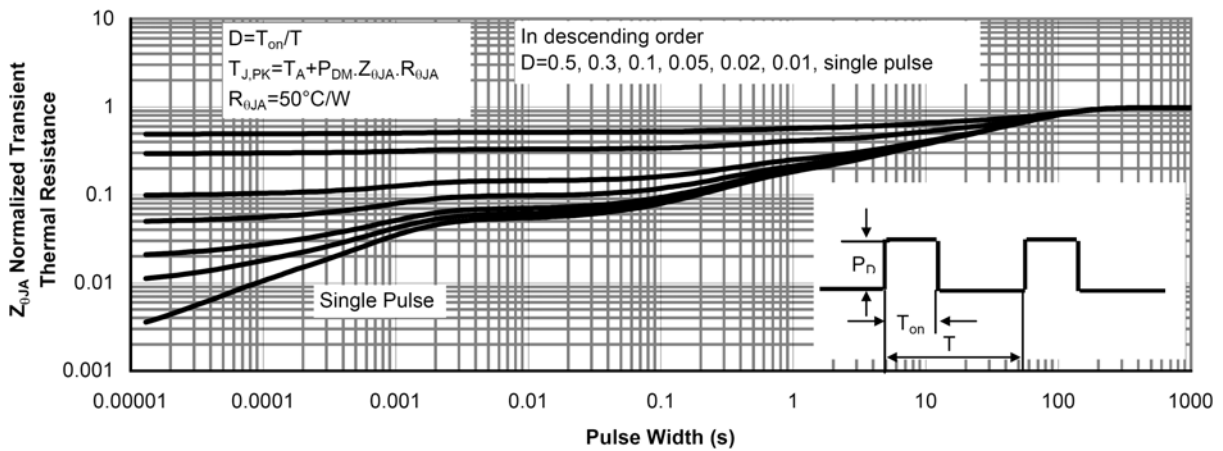
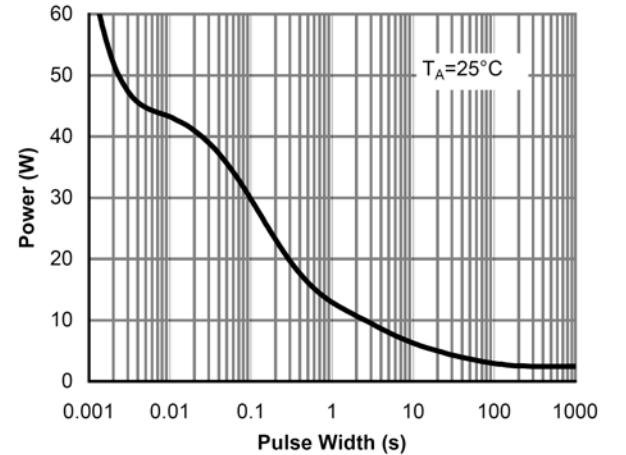
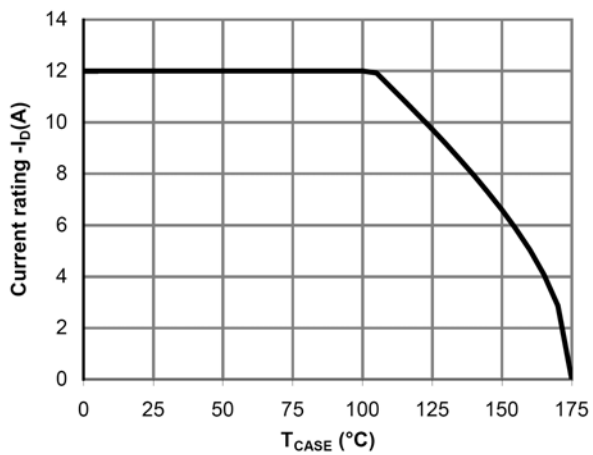
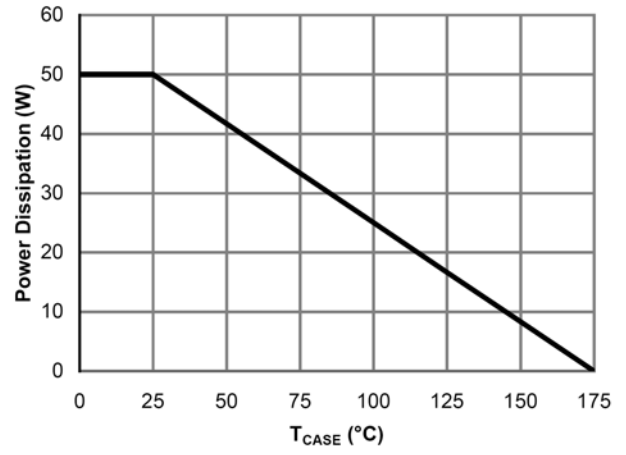
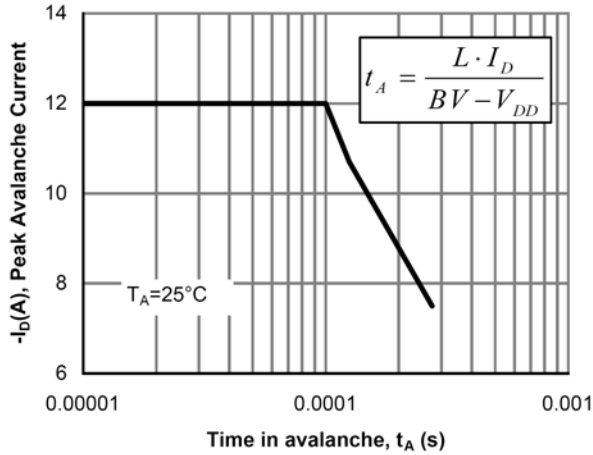
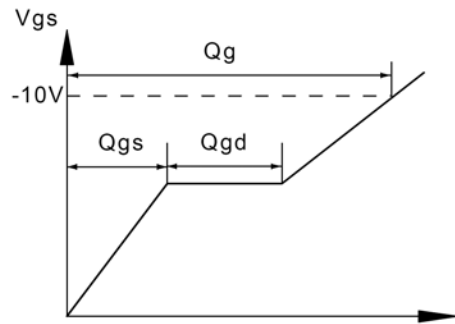
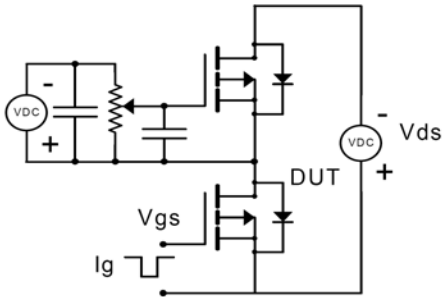


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

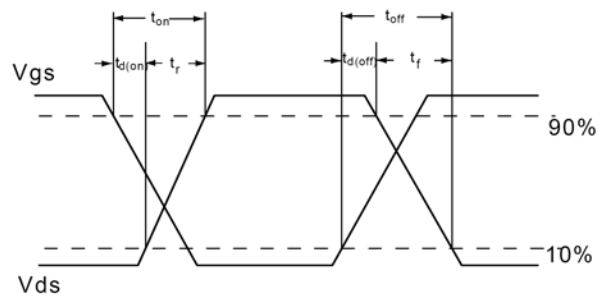
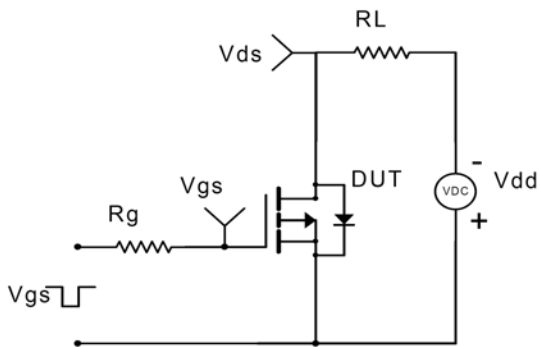
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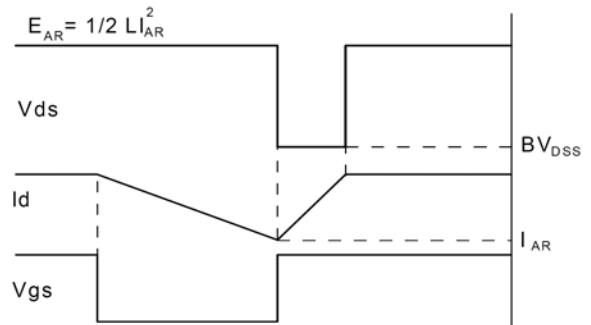
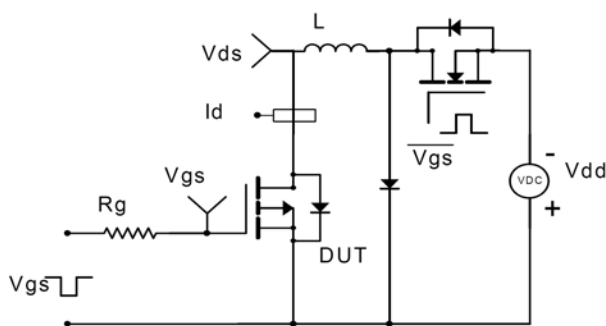
## Gate Charge Test Circuit & Waveform



## Resistive Switching Test Circuit & Waveforms



## Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



## Diode Recovery Test Circuit & Waveforms

