



# 110A, 55V

## N-CHANNEL POWER MOSFET

### Features

Advanced process technology

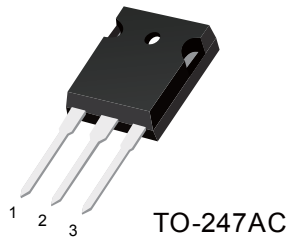
Ultra low On-Resistance

175 °C Operating Temperature

Fast Switching

Repetitive Avalanche Allowed up to  $T_{jmax}$

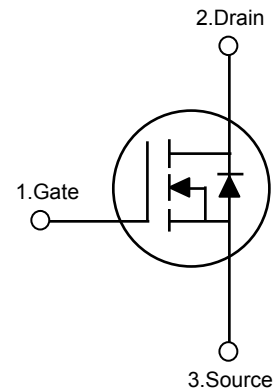
Lead-Free



TO-247AC

### Product Summary

$V_{DS}$	55	V
$R_{DS(ON)}$ Max.	8.0	m $\Omega$
$I_D$	110	A



### ORDERING INFORMATION

Order Number	Package	Pin Assignment			Packing
		1	2	3	
HPW080NE5SPA	TO-247AC	G	D	S	Tube BOX

### ABSOLUTE MAXIMUM RATINGS ( $T_C=25^\circ\text{C}$ , unless otherwise specified )

Parameter	Symbol	Conditions	Value	Unit
Drain source voltage	$V_{DS}$		55	V
Gate source voltage	$V_{GS}$		$\pm 20$	
Continuous Drain Current	$I_D$	$T_C=25^\circ\text{C}$	110	A
		$T_C=100^\circ\text{C}$	80	
Pulsed Drain Current	$I_{D,pulse}$	$T_C=25^\circ\text{C}$	390	
Avalanche Current	$I_{AS}$		110	
Avalanche energy, single pulse	$E_{AS}$	$I_D=1\text{AS}, V_{DD}=50\text{V}$	1150	mJ
Peak Diode Recovery $dv/dt$	$dv/dt$		5	V/ $\mu\text{S}$
Power dissipation	$P_D$	$T_C=25^\circ\text{C}$	200	W
Linear Derating Factor			1.4	W/ $^\circ\text{C}$
Operating and storage temperature	$T_J, T_{stg}$		-55 to 150	$^\circ\text{C}$
Soldering Temperature, for 10 seconds		300 (1.6mm from case)		

**Thermal characteristics**

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Thermal resistance, junction-case	$R_{thJC}$	TO-247AC	--	--	0.75	°C/W
Case-to-Sink, Flat, Greased Surface	$R_{thcs}$	TO-247AC	0.24	--	--	
SMD Version, Device on PCB	$R_{thJA}$	TO-247AC	--	--	40	
Maximum Lead Temperature For Soldering Purpose	$T_l$	TO-248AC	--	--	300	°C

**Electrical characteristics, at=25 °C, unless otherwise specified**

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	55	--	--	V
Gate source voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	--	4.0	
Zero gate voltage drian current	$I_{DSS}$	$V_{DS}=55V, V_{GS}=0V, T_J=25^\circ C$	--	0.1	1	μA
		$V_{DS}=55V, V_{GS}=0V, T_J=125^\circ C$	--	1	100	
Gate-source leakage current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$	--	±10	±100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=55A$	--	6.8	8.0	mΩ
Gate Resistance	$R_G$		--	1.9	--	Ω
Transconductance	$g_{fs}$	$ V_{DS} >2 \times  I_D  \times R_{DS(on)max}$ $I_D=55A$	17	--	--	S

**Dynamic Characteristics**

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
lutput capacitance	$C_{iss}$	$V_{GS}=0V$ $V_{DS}=25V$ $f=1MHz$	--	3300	--	pF
Output capacitance	$C_{oss}$		--	670	--	
Reverse transfer capacitance	$C_{rss}$		--	120	--	
Turn-on delay time	$t_{d(on)}$	$V_{DS}=25V$ $V_{GS}=10V$ $I_D=55A$ $R_G=3\Omega$	--	19	--	nS
Risse time	$t_r$		--	50	--	
Turn-off delay time	$t_{d(off)}$		--	55	--	
Fall time	$t_f$		--	24	--	

**Gate Charge Characteristics**

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Gate to source charge	$Q_{gs}$	$V_{DS}=44V$ $I_D=55A$ $V_{GS}=10V$	--	112	--	nC
Gate to drain charge	$Q_{gd}$		--	23	--	
Gate charge total	$Q_g$		--	35	--	

**Reverse Diode**

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Diode continuous forward current	$I_S$	$T_C=25^\circ C$	--	--	110	A
Diode pulse current	$I_{S,pulse}$	$T_C=25^\circ C$	--	--	390	
Diode forward voltage	$V_{SD}$	$V_{GS}=0V$ $I_F=110A, T_C=25^\circ C$	--	--	1.0	V
Reverse recovery time	$t_{rr}$	$V_{GS}=0V, I_S=110A$ $di_F/dt=100A/\mu s$	--	62	--	$\mu s$
Reverse recovery charge	$Q_{rr}$		--	137	--	nC



Test Circuits and Waveforms

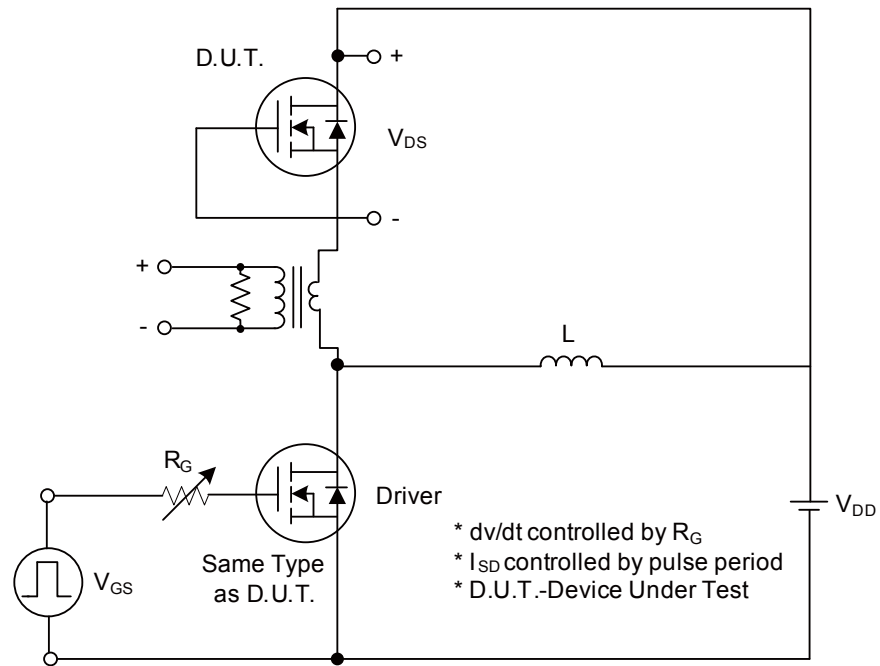


Fig. 1A Peak Diode Recovery  $dv/dt$  Test Circuit

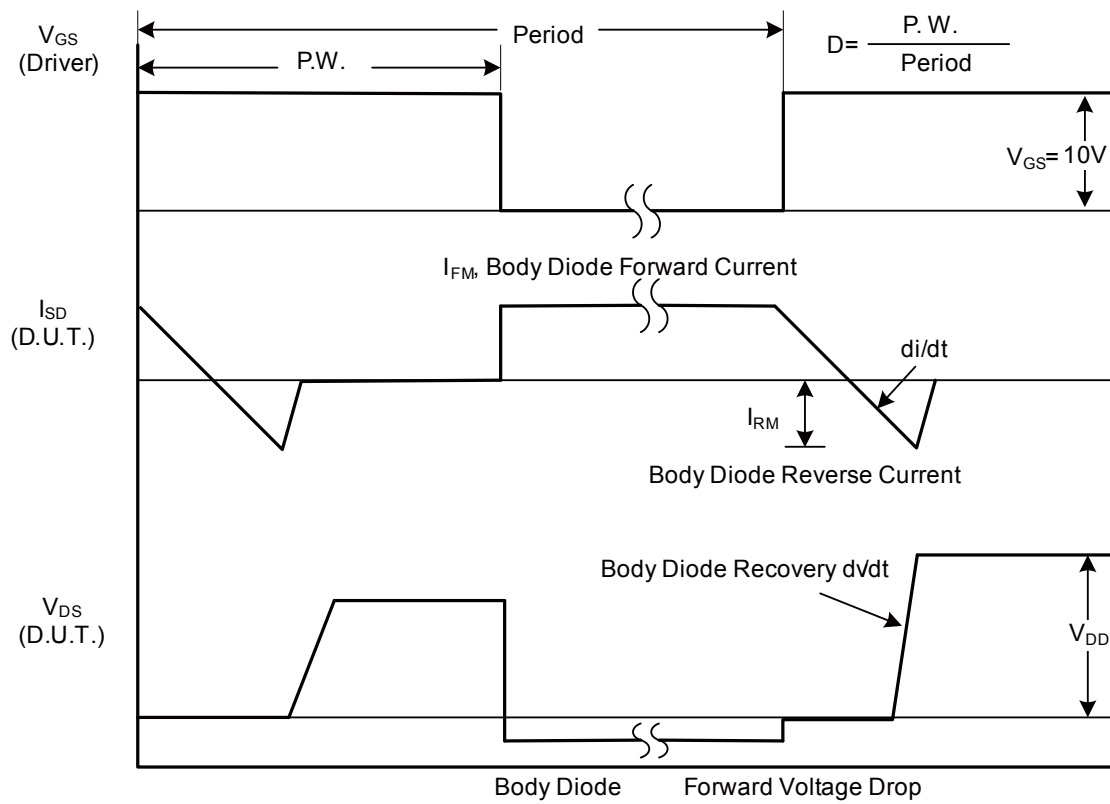


Fig. 1B Peak Diode Recovery  $dv/dt$  Waveforms



Test Circuits and Waveforms

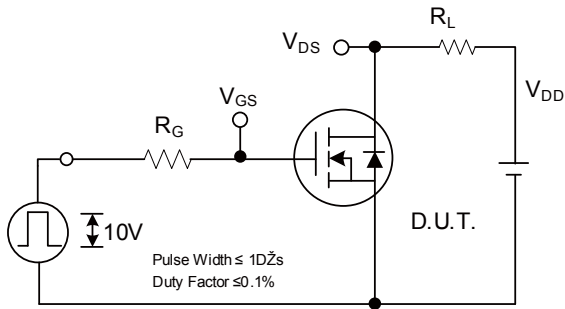


Fig. 2A Switching Test Circuit

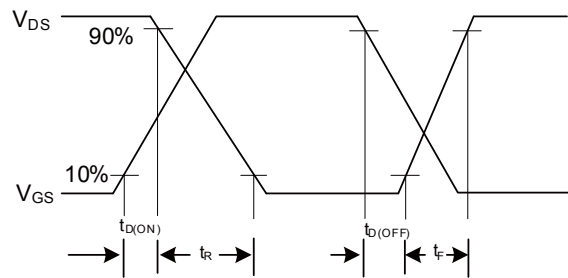


Fig. 2B Switching Waveforms

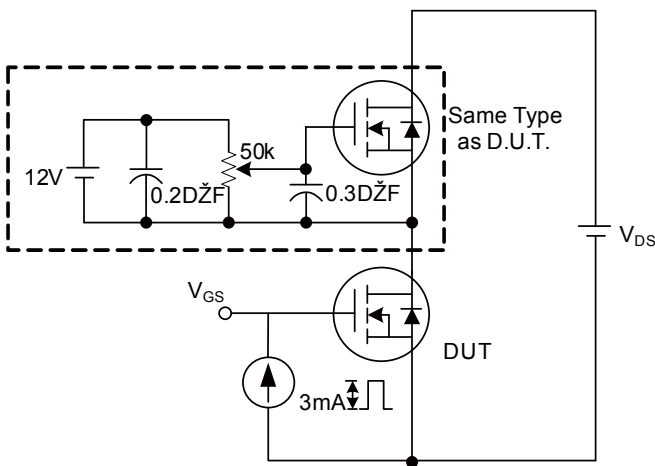


Fig. 3 A Gate Charge Test Circuit

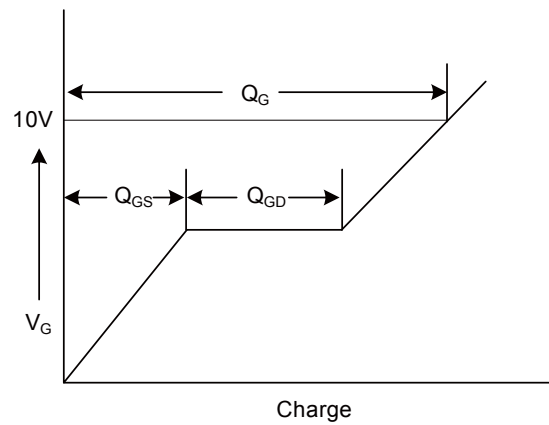


Fig. 3B Gate Charge Waveform

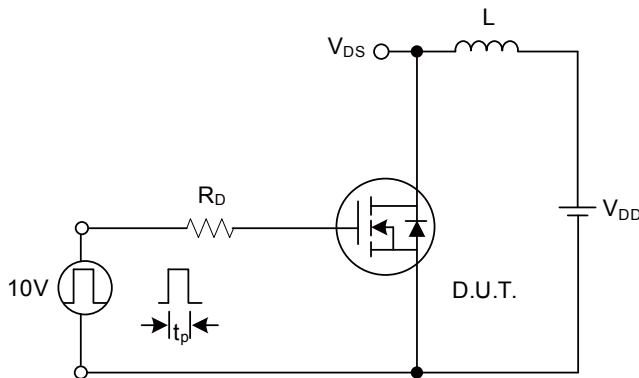


Fig.4A Unclamped Inductive Switching Test Circuit

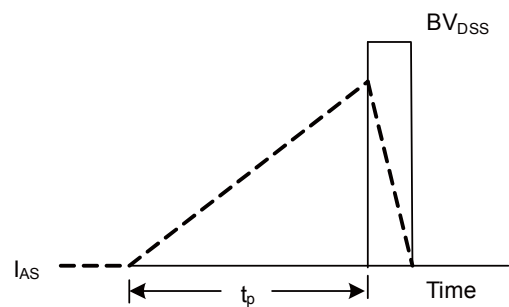


Fig.4B Unclamped Inductive Switching Waveforms

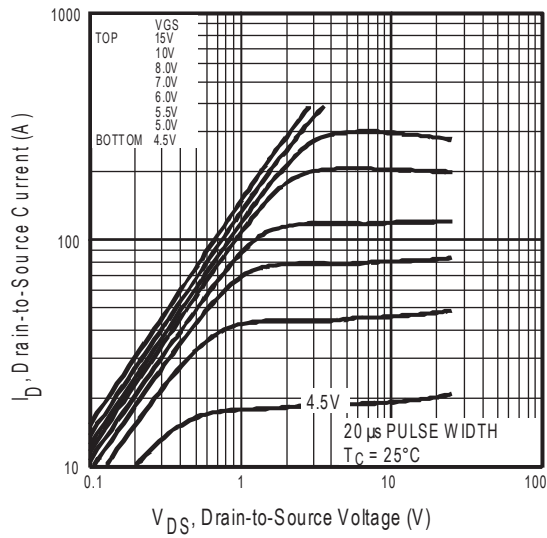


Fig 1. Typical Output Characteristics

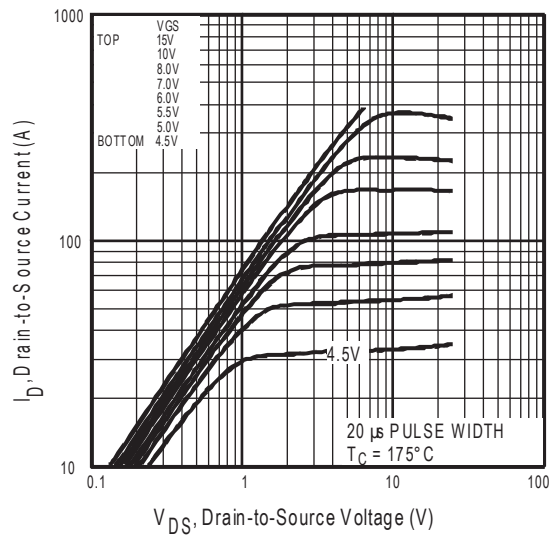


Fig 2. Typical Output Characteristics

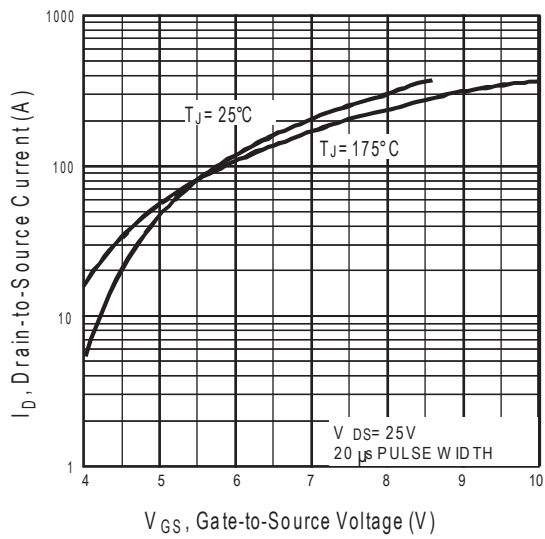


Fig 3. Typical Transfer Characteristics

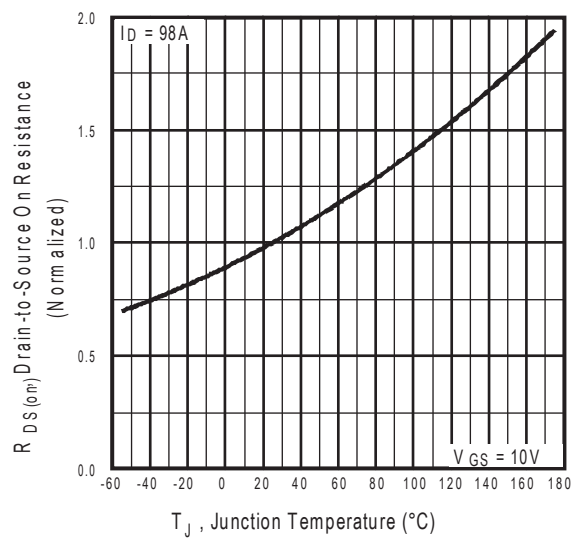


Fig 4. Normalized On-Resistance Vs. Temperature

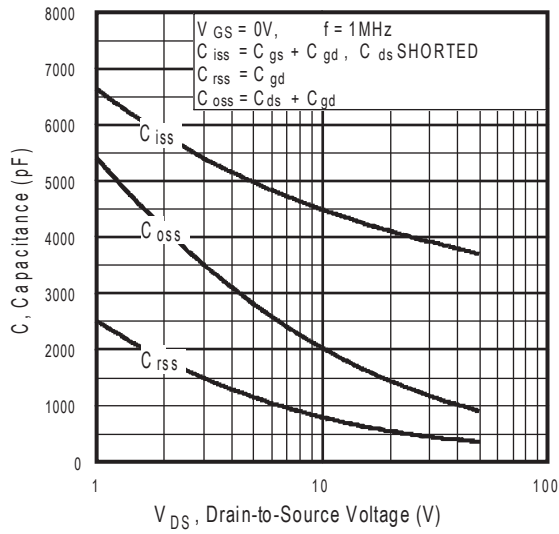


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

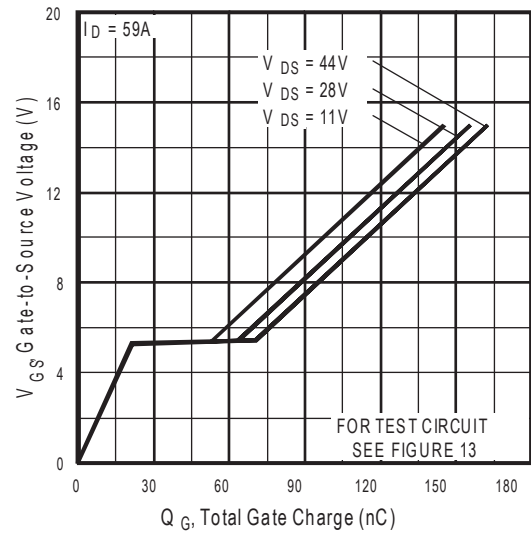


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

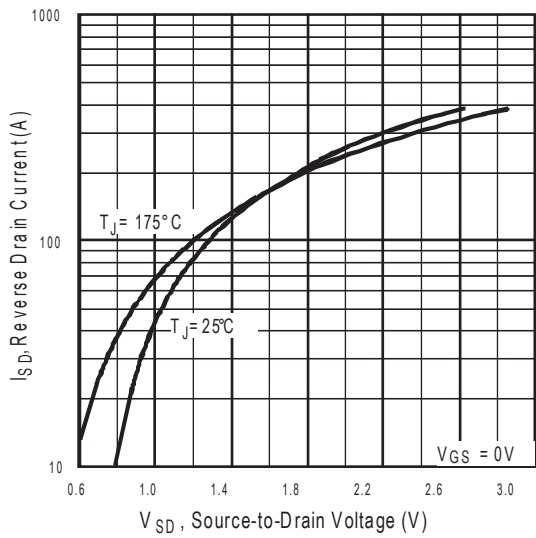


Fig 7. Typical Source-Drain Diode Forward Voltage

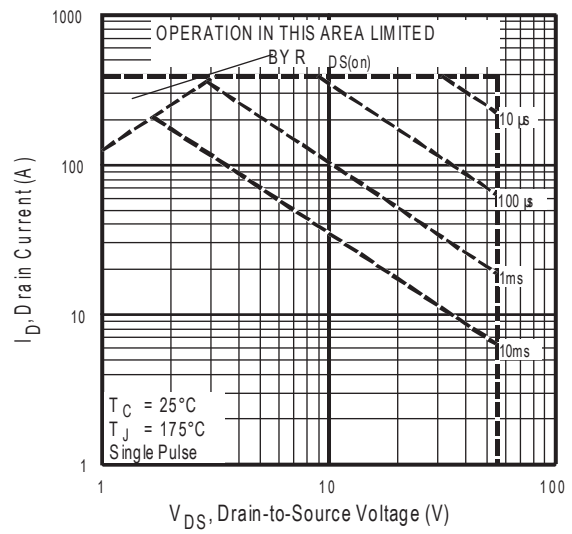


Fig 8. Maximum Safe Operating Area

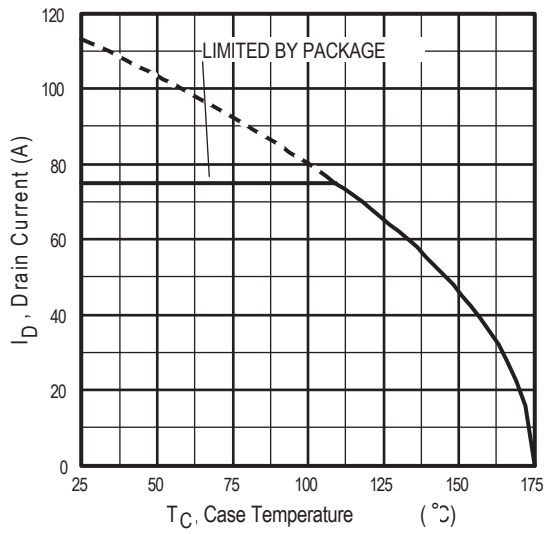


Fig 9. Maximum Drain Current Vs. Case Temperature

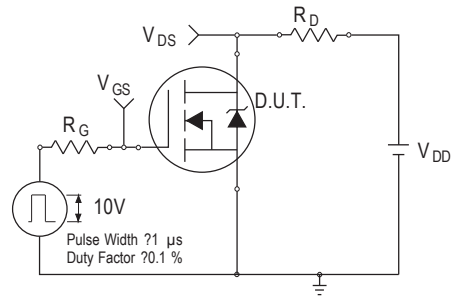


Fig 10a. Switching Time Test Circuit

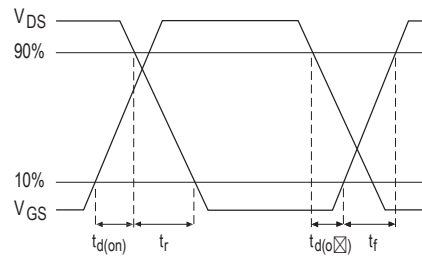


Fig 10b. Switching Time Waveforms

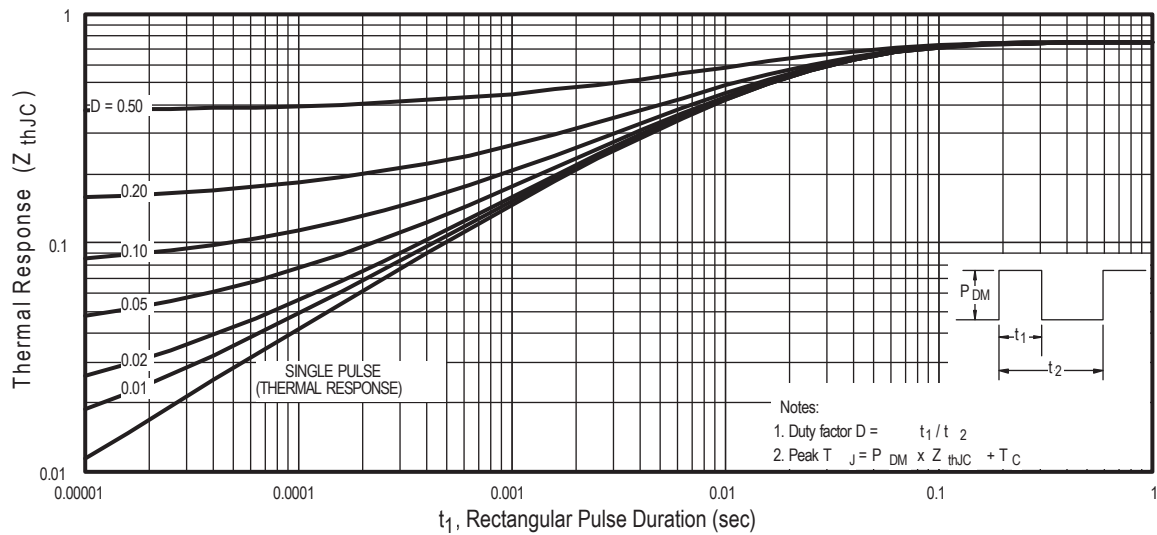


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case





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