

## General Description

The MY30N50TP is silicon N-channel Enhanced VDMOSFETS, obtained by the self-aligned planar Technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy.

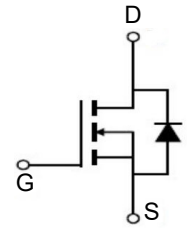
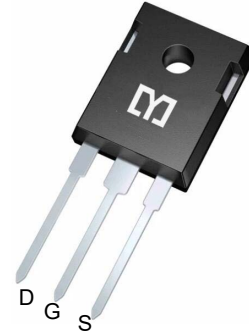


## Features

$V_{DSS}$	500	V
$I_D$	30	A
$P_D$ ( $T_C = 25\text{ }^\circ\text{C}$ )	250	W
$R_{DS(ON)}$ (at $V_{GS} = 10\text{V}$ )	< 0.12	$\Omega$

## Application

- High efficiency switch mode power supplies
- Power factor correction
- Electronic lamp ballast



## Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
MY30N50TP	TO-247	MY30N50TP	600

## Absolute Maximum Ratings ( $T_C = 25\text{ }^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Rating	Units
$V_{DSS}$	Drain-to-Source Voltage	500	V
$I_D$	Continuous Drain Current	30	A
	Continuous Drain Current $T_C = 100\text{ }^\circ\text{C}$	18.6	A
$I_{DM}^{a1}$	Pulsed Drain Current	120	A
$V_{GS}$	Gate-to-Source Voltage	$\pm 30$	V
$E_{AS}^{a2}$	Single Pulse Avalanche Energy	3200	mJ
$dv/dt^{a3}$	Peak Diode Recovery $dv/dt$	5.0	V/ns
$P_D$	Power Dissipation	250	W
	Derating Factor above $25\text{ }^\circ\text{C}$	2	W/ $^\circ\text{C}$
$T_J, T_{stg}$	Operating Junction and Storage Temperature Range	150, $-55$ to 150	$^\circ\text{C}$
$T_L$	Maximum Temperature for Soldering	300	$^\circ\text{C}$

**Electrical Characteristics (T<sub>c</sub>=25 °C, unless otherwise noted)**

<b>OFF Characteristics</b>						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V <sub>DSS</sub>	Drain to Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	500	--	--	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	Bvdss Temperature Coefficient	I <sub>D</sub> =250uA, Reference 25°C	--	0.60	--	V/°C
I <sub>DSS</sub>	Drain to Source Leakage Current	V <sub>DS</sub> = 500V, V <sub>GS</sub> = 0V, T <sub>a</sub> = 25°C	--	--	1	μA
		V <sub>DS</sub> = 400V, V <sub>GS</sub> = 0V, T <sub>a</sub> = 125°C	--	--	100	
I <sub>GSS(F)</sub>	Gate to Source Forward Leakage	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 30V	--	--	100	nA
I <sub>GSS(R)</sub>	Gate to Source Reverse Leakage	V <sub>DS</sub> = 0V, V <sub>GS</sub> = -30V	--	--	-100	nA
<b>ON Characteristics</b>						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
R <sub>DS(ON)</sub>	Drain-to-Source On-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =15A	--	0.09	0.12	Ω
V <sub>GS(TH)</sub>	Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	2.0	--	4.0	V
Pulse width tp ≤ 300μs, δ ≤ 2%						
<b>Dynamic Characteristics</b>						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g <sub>fs</sub>	Forward Trans conductance	V <sub>DS</sub> =15V, I <sub>D</sub> =15A	--	33	--	S
R <sub>g</sub>	Gate resistance	f = 1.0MHz	--	3.5	--	Ω
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> = 0V V <sub>DS</sub> = 25V f = 1.0MHz	--	7857.9	--	pF
C <sub>oss</sub>	Output Capacitance		--	751.2	--	
C <sub>rss</sub>	Reverse Transfer Capacitance		--	29.7	--	
<b>Resistive Switching Characteristics</b>						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
t <sub>d(ON)</sub>	Turn-on Delay Time	I <sub>D</sub> =30A V <sub>DD</sub> = 250V R <sub>G</sub> = 25Ω	--	68	--	ns
t <sub>r</sub>	Rise Time		--	141	--	
t <sub>d(OFF)</sub>	Turn-Off Delay Time		--	213	--	
t <sub>f</sub>	Fall Time		--	97.3	--	
Q <sub>g</sub>	Total Gate Charge	I <sub>D</sub> =30A V <sub>DD</sub> =400V V <sub>GS</sub> = 10V	--	153	--	nC
Q <sub>gs</sub>	Gate to Source Charge		--	36.3	--	
Q <sub>gd</sub>	Gate to Drain ("Miller") Charge		--	57.9	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$I_S$	Continuous Source Current (Body Diode)		--	--	30	A
$I_{SM}$	Maximum Pulsed Current (Body Diode)		--	--	120	A
$V_{SD}$	Diode Forward Voltage	$I_S=30A, V_{GS}=0V$	--	--	1.5	V
$t_{rr}$	Reverse Recovery Time	$I_S=30A, T_J = 25^\circ C$ $di_f/dt=100A/\mu s, V_{GS}=0V$	--	482	--	ns
$Q_{rr}$	Reverse Recovery Charge		--	8.5	--	$\mu C$
$I_{RRM}$	Reverse Recovery Current		--	33.2	--	A
Pulse width $t_p \leq 300\mu s, \delta \leq 2\%$						
Symbol	Parameter		Max.			Units
$R_{\theta JC}$	Junction-to-Case		0.5			$^\circ C/W$
$R_{\theta JA}$	Junction-to-Ambient		40			$^\circ C/W$

<sup>a1</sup>: Repetitive rating; pulse width limited by maximum junction temperature

<sup>a2</sup>:  $L=10.0mH, I_D=25.3A, Start T_J=25^\circ C$

<sup>a3</sup>:  $I_{SD} = 30A, di/dt \leq 300A/\mu s, V_{DD} \leq BV_{DS}, Start T_J=25^\circ C$

**Ratings and Characteristic curves**

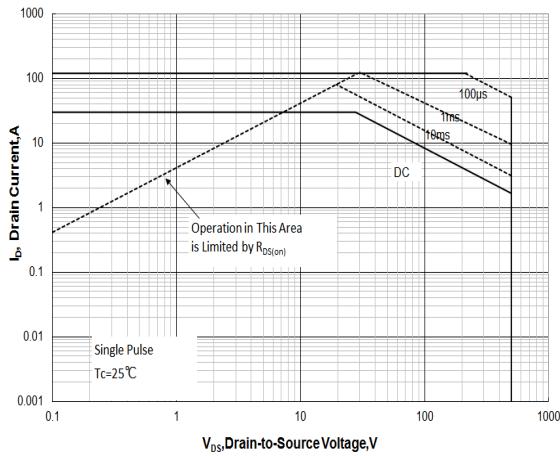


Figure 1 Maximum Forward Bias Safe Operating Area

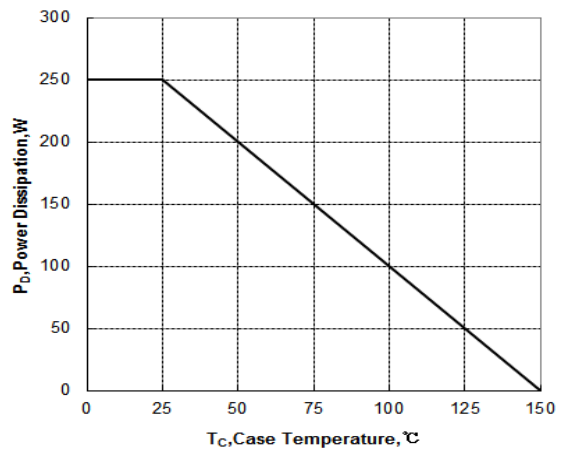


Figure 2 Maximum Power dissipation vs Case Temperature

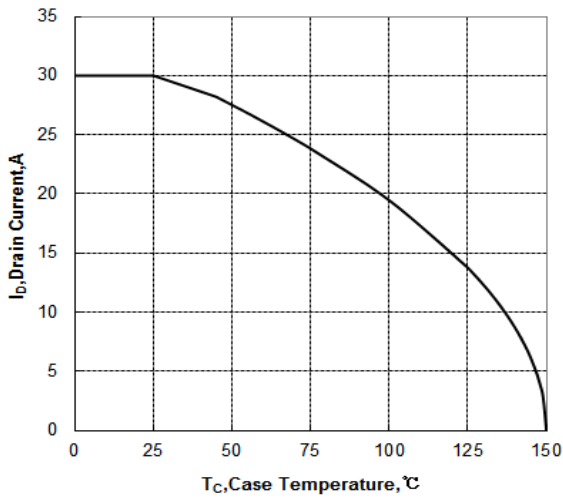


Figure 3 Maximum Continuous Drain Current vs Case Temperature

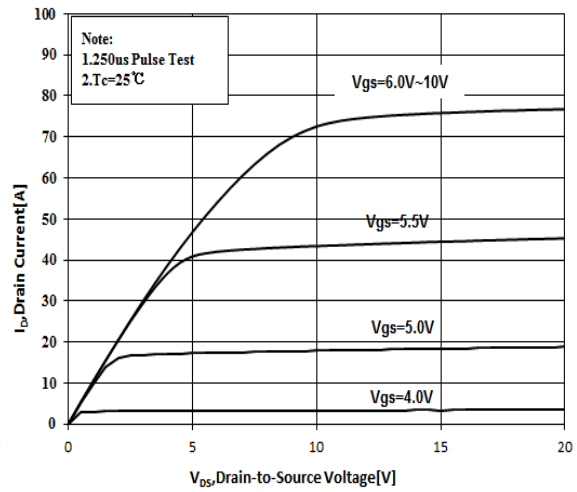


Figure 4 Typical Output Characteristics

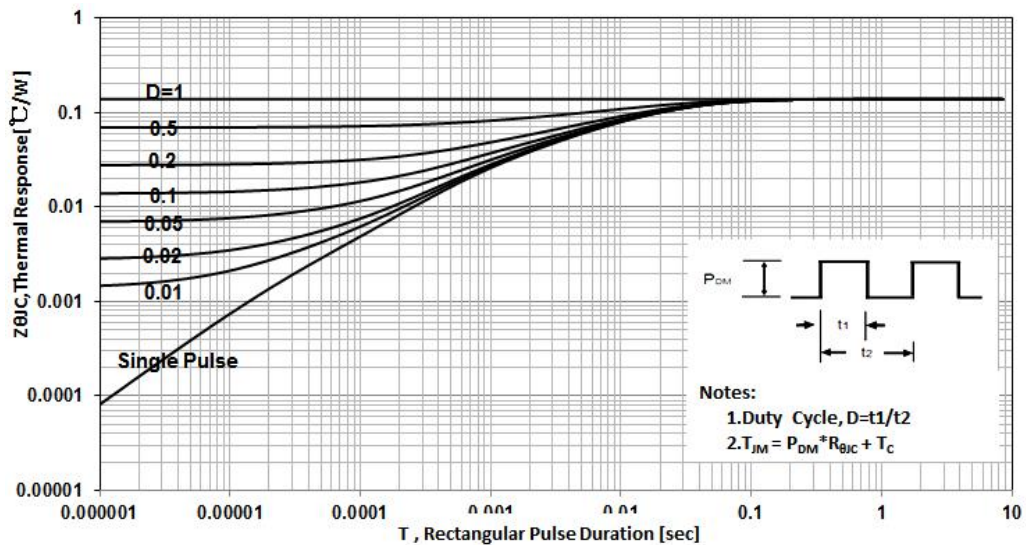


Figure 5 Maximum Effective Thermal Impedance , Junction to Case

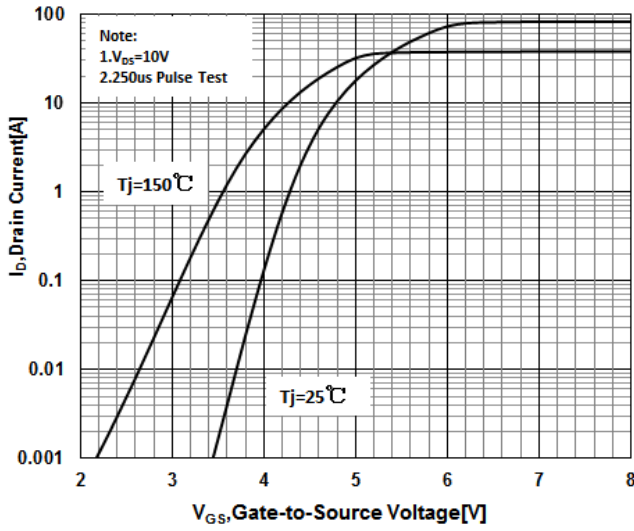


Figure 6 Typical Transfer Characteristics

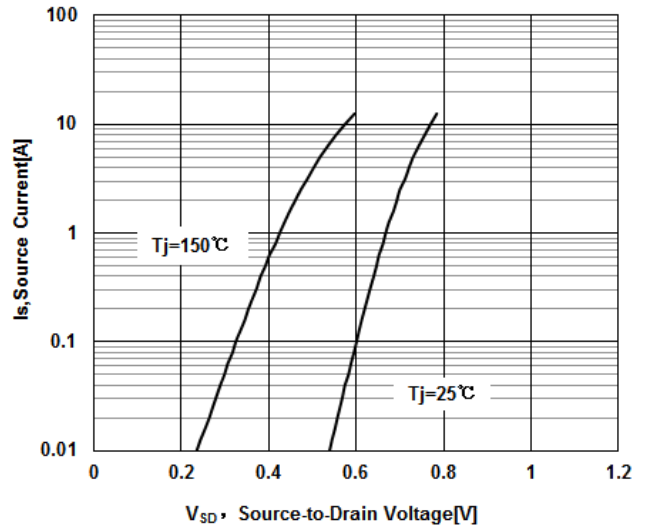


Figure 7 Typical Body Diode Transfer Characteristics

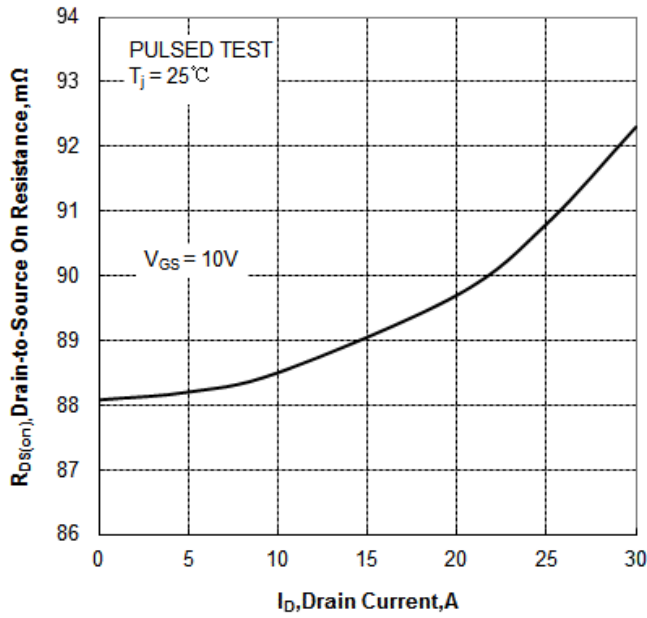


Figure 8 Typical Drain to Source ON Resistance vs Drain Current

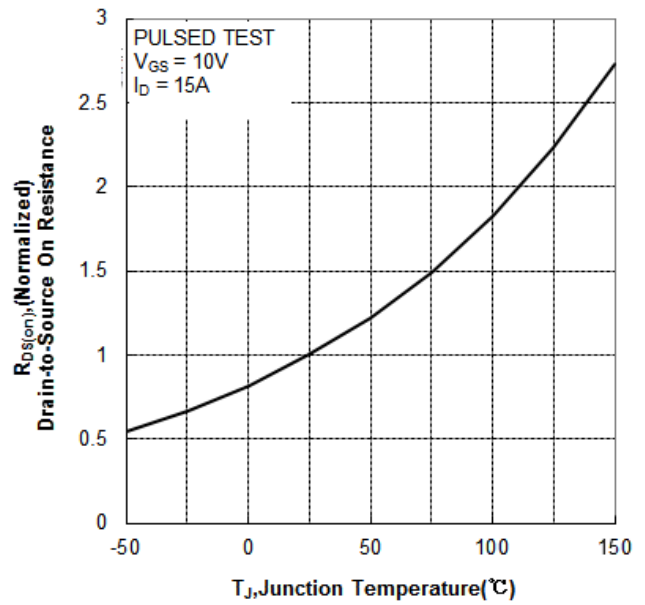


Figure 9 Typical Drain to Source on Resistance vs Junction Temperature

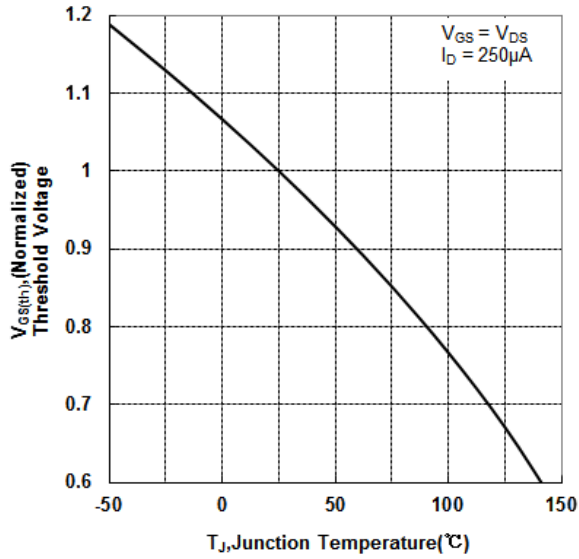


Figure 10 Typical Theshold Voltage vs Junction Temperature

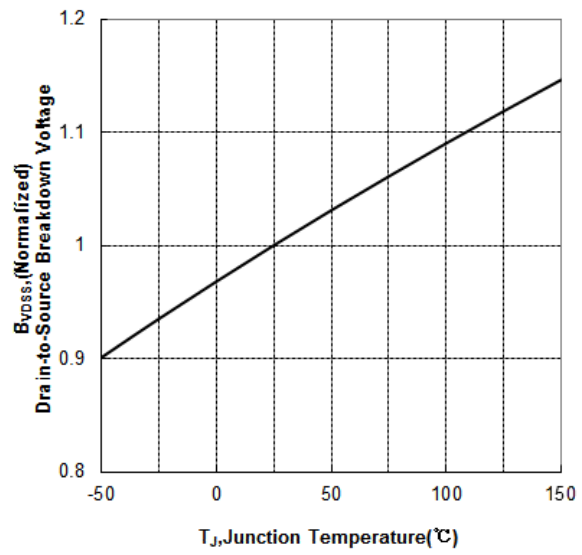


Figure 11 Typical Breakdown Voltage vs Junction Temperature

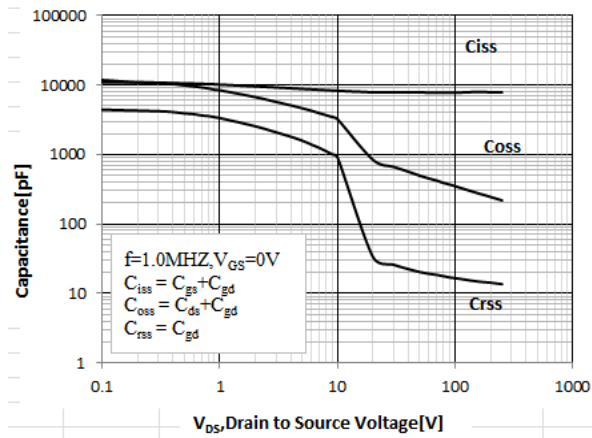


Figure 12 Typical Capacitance vs Drain to Source Voltage

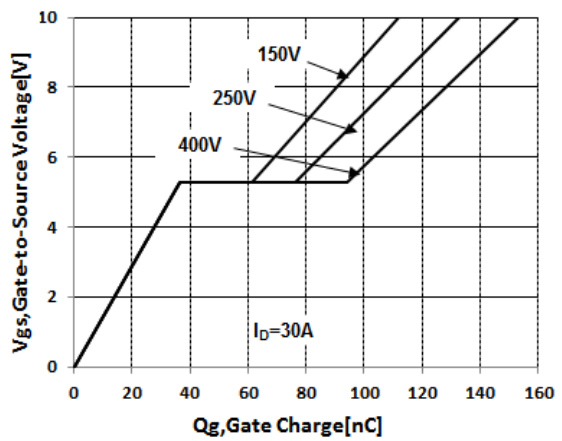


Figure 13 Typical Gate Charge vs Gate to Source Voltage

**Test Circuit and Waveform**

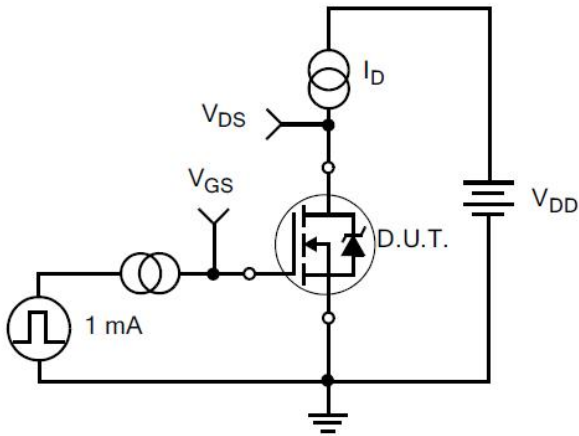


Figure 14. Gate Charge Test Circuit

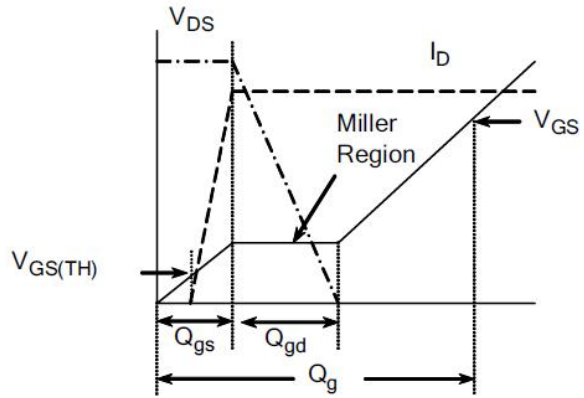


Figure 15. Gate Charge Waveforms

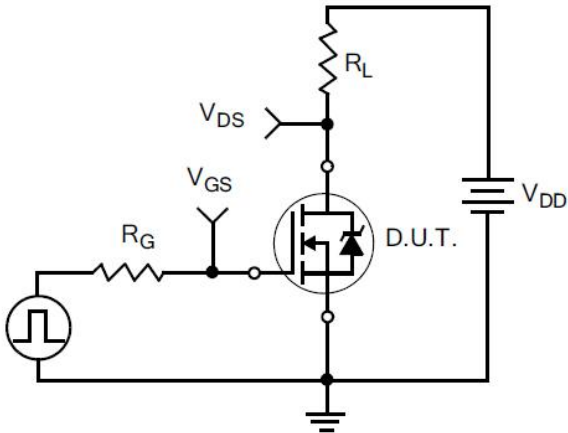


Figure 16. Resistive Switching Test Circuit

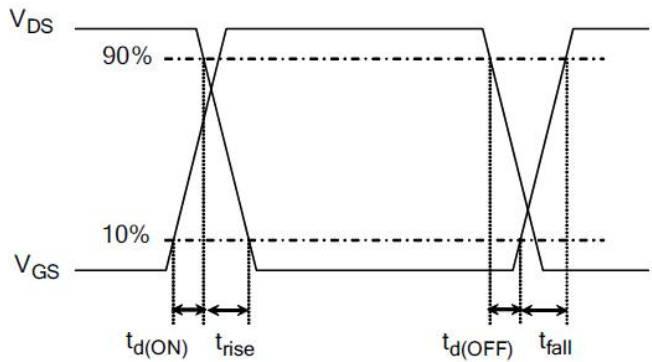


Figure 17. Resistive Switching Waveforms

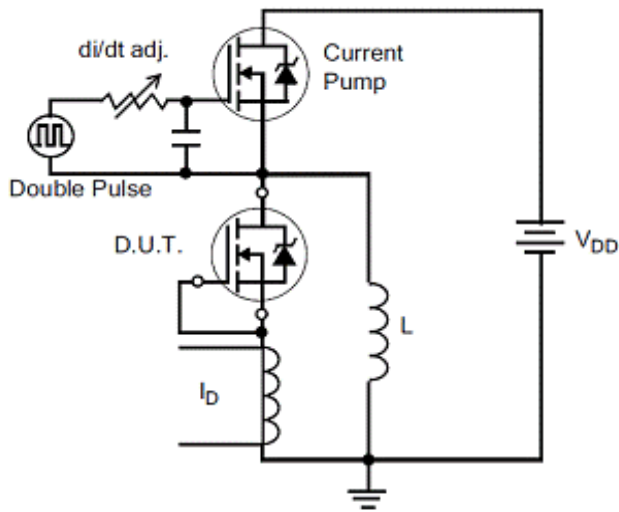


Figure 18. Diode Reverse Recovery Test Circuit

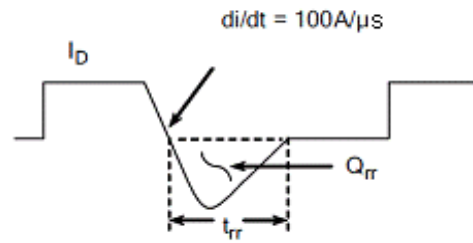


Figure 19. Diode Reverse Recovery Waveform

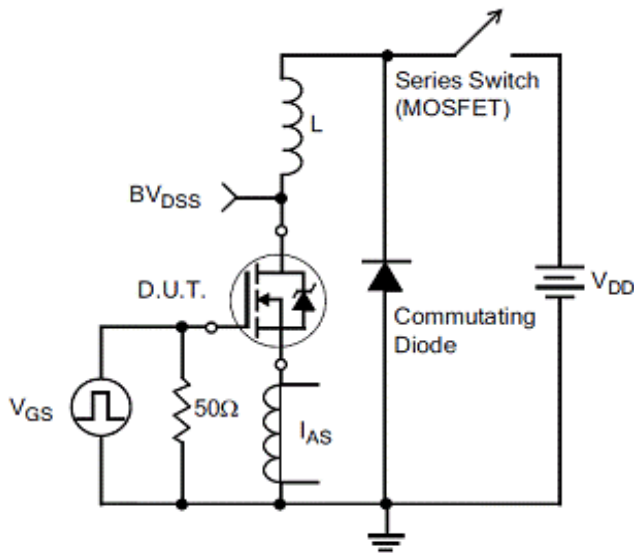


Figure20.Unclamped Inductive Switching Test Circuit

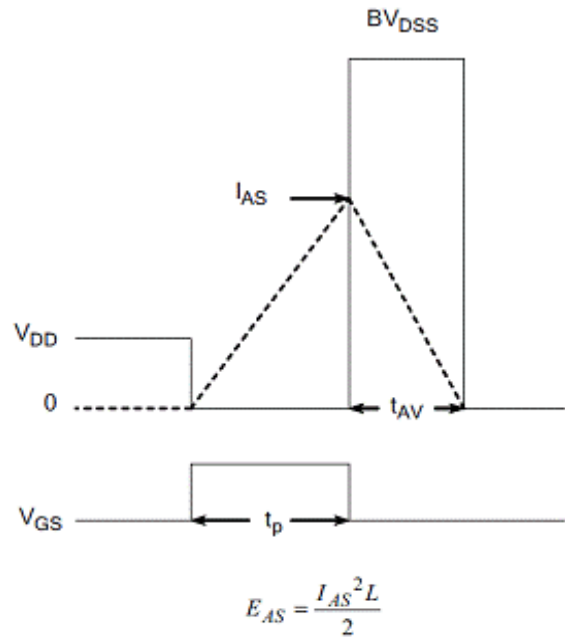
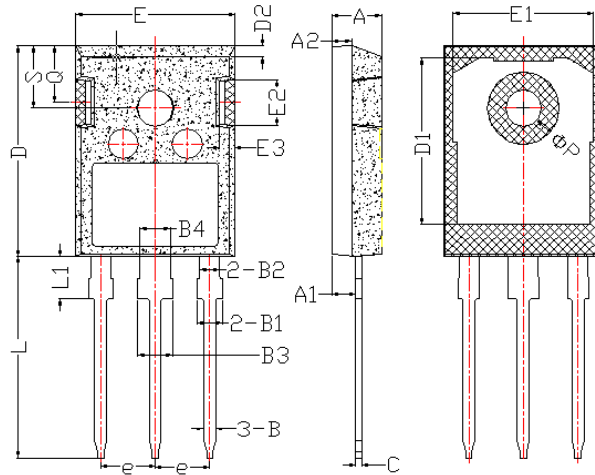


Figure21.Unclamped Inductive Switching Waveform



**Package Mechanical Data-TO-247 Single**



Items	Values(mm)	
	MIN	MAX
A	4.6	5.2
A1	2,2	2.6
B	0.9	1.4
B1	1.75	2.35
B2	1.75	2.15
B3	2.8	3.35
B4	2.8	3.15
C	0.5	0.7
D	20.60	21.30
D1	16	18
E	15.5	16.10
E1	13	14.7
E2	3.80	5.3
E3	0.8	2.60
e	5.2	5.7
L	19	20.5
L1	3.9	4.6
ΦP	3.3	3.70
Q	5.2	6.00
S	5.8	6.6