60V N-Channel MOSFET

Lead Free Package and Finish

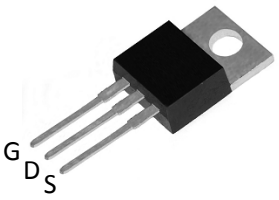
Applications:

- Power Supply
- DC-DC Converters

V_{DSS}	$R_{DS(ON)}$(MAX)	I_D[a]
60V	8mΩ	110A

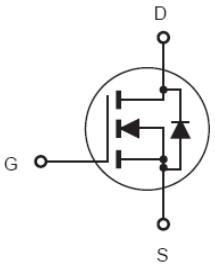
Features:

- Lead Free
- Low $R_{DS(ON)}$ to Minimize Conductive Loss
- Low Gate Charge for Fast Switching Application
- Optimized B_{VDSS} Capability



TO-220

Package Not to Scale



Ordering Information

Part Number	Package	Brand
PTP08N06N	TO-220	

Absolute Maximum Ratings

T_C=25℃ unless otherwise specified

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-to-Source Voltage	60	V
I_D[a]	Continuous Drain Current	110	A
I_{DM}	Pulsed Drain Current @V_G=10V	439	
P_D	Power Dissipation	156	W
	Derating Factor above 25℃	1.04	W/℃
V_{GS}	Gate-to-Source Voltage	+/-20	V
E_{AS}	Single Pulse Avalanche Energy (L=1mH)	800	mJ
I_{AS}	Pulsed Avalanche Energy	Figure 9	A
T_J and T_{STG}	Operating Junction and Storage Temperature Range	-55 to 175	℃

Thermal Resistance

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
$R_{\theta JC}$	Junction-to-Case			0.96	℃/W	Water cooled heatsink, P_D adjusted for a peak junction Temperature of 175℃

Note:

a: Calculated continuous current based upon maximum allowable junction temperature +175℃. Package limitation current is 80A.

OFF Characteristics

T_J=25℃ unless otherwise specified

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
B_{VDSS}	Drain-to-Source Breakdown Voltage	60			V	V_{GS}=0V, I_D=250uA
I_{DSS}	Drain-to-Source Leakage Current			1	uA	V_{DS}=48V, V_{GS}=0V
				100		V_{DS}=48V, V_{GS}=0V, T_J=125 ℃
I_{GSS}	Gate-to-Source Forward Leakage			100	nA	V_{GS}=+20V
	Gate-to-Source Reverse Leakage			100		V_{GS}= -20V

ON Characteristics

T_J=25℃ unless otherwise specified

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
$R_{DS(ON)}$	Static Drain-to-Source On-Resistanc		6.5	8	mΩ	V_{GS}=10V, I_D=24A
$V_{GS(TH)}$	Gate Threshold Voltage.	2		4	V	V_{GS}=V_{DS}, I_D=250uA

Dynamic Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
Ciss	Input Capacitance		3396		pF	V_{GS}=0V, V_{DS}=55V, f=1.0MHz
Coss	Output Capacitance		435			
Crss	Reverse Transfer Capacitance		151			
Qg	Total Gate Charge		51		nC	V_{DD}=30V, I_D=55A, V_{GS}=10V
Qgs	Gate-to-Source Charge		22			
Qgd	Gate-to-Drain ("Miller") Charge		15			
Td(on)	Turn-in Delay Time		14		nS	V_{DD}=30V, I_D=55A, V_G=10V, R_G=2.5Ω
Tr	Rise Time		44			
Td(off)	Turn-off Delay Time		31			
Tf	Fall Time		12			

Source-Drain Diode Characteristics

T_J=25℃ unless otherwise specified

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
V_{SD}	Diode Forward Voltage			1.2	V	I_S=24A, V_{GS}=0V
Trr	Reverse Recovery Time			78.5	nS	Is=38A, di/dt=100A/μs
Qrr	Reverse Recovery Charge			112.0	nC	

Typical Characteristics

Figure 1. Maximum Power Dissipation V.S Case Temperature

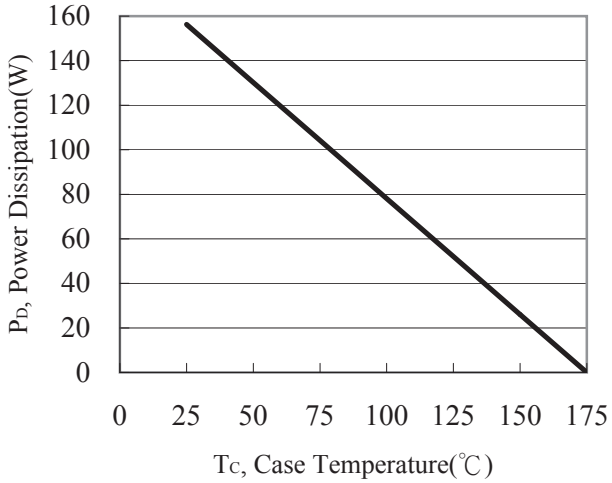


Figure 2. Maximum Continuous Drain Current V.S Case Temperature

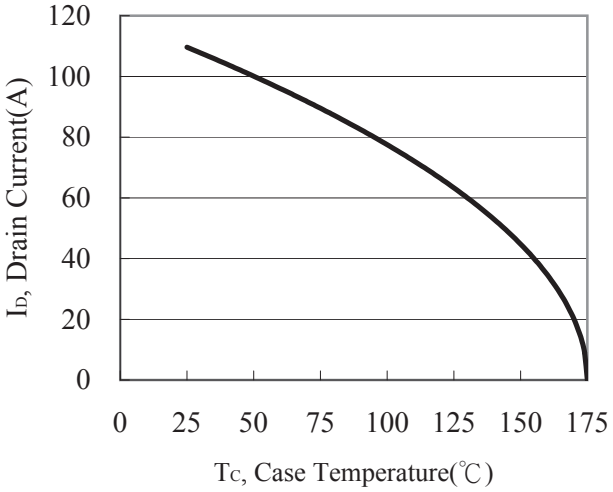


Figure 3. Typical Output Characteristics

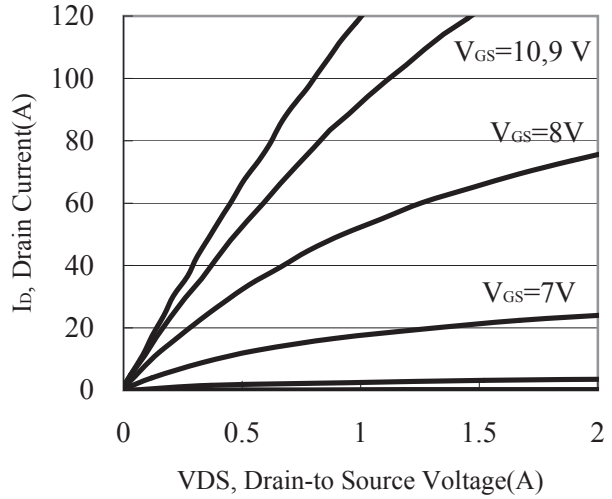


Figure 4. Breakdown Voltage V.S Junction Temperature

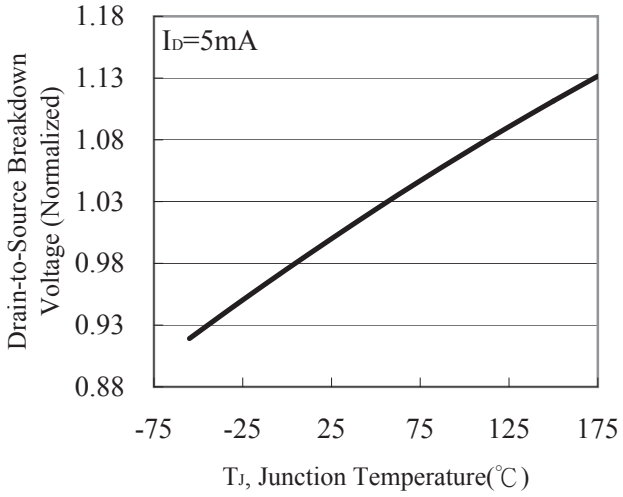


Figure 5. Threshold Voltage V.S Junction Temperature

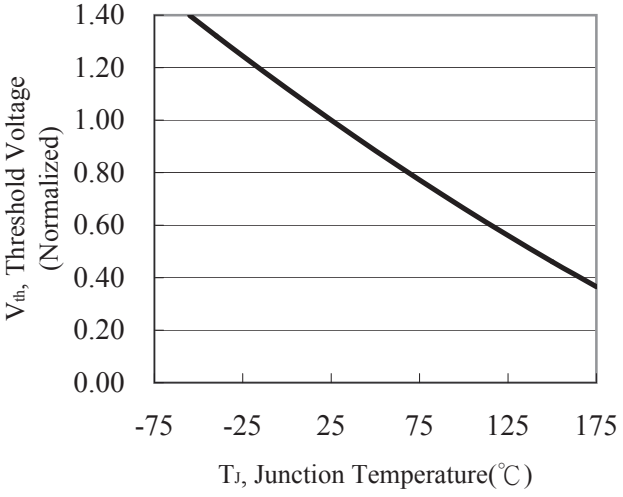
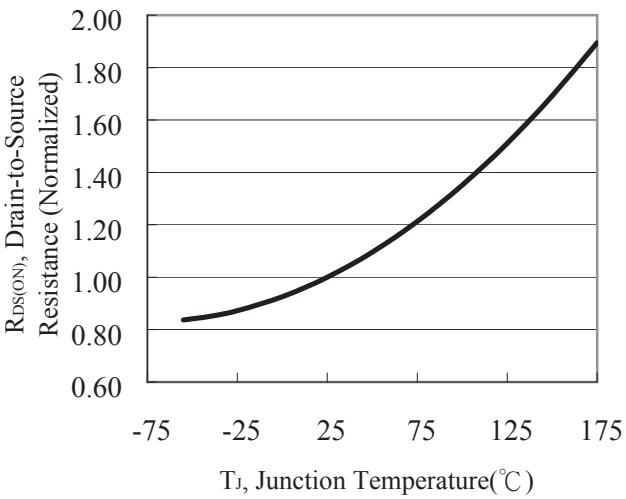


Figure 6. Drain-to-Source Resistance V.S Junction Temperature



Typical Characteristics

Figure 7. Typical Gate Charge vs. Gate-to-Source Voltage

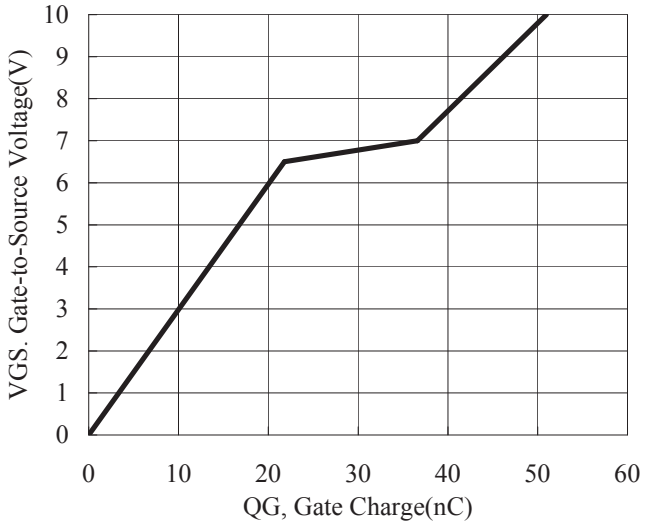


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

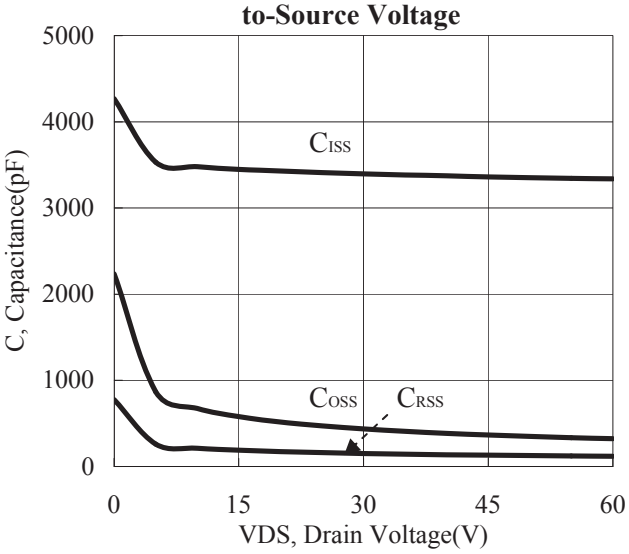


Figure 9. Unclamped Inductive Switching Capability

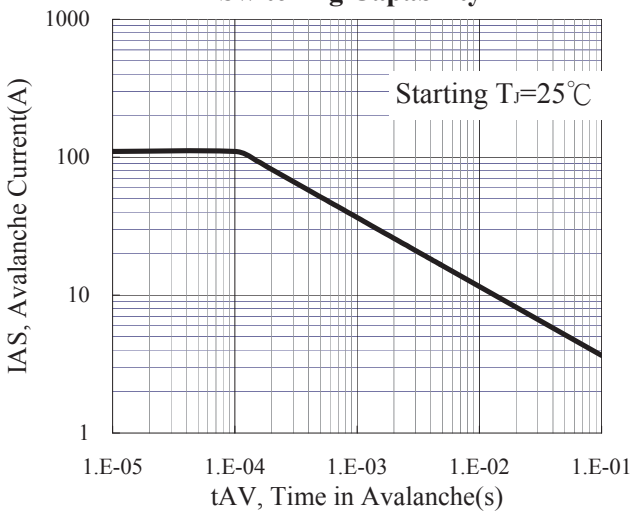
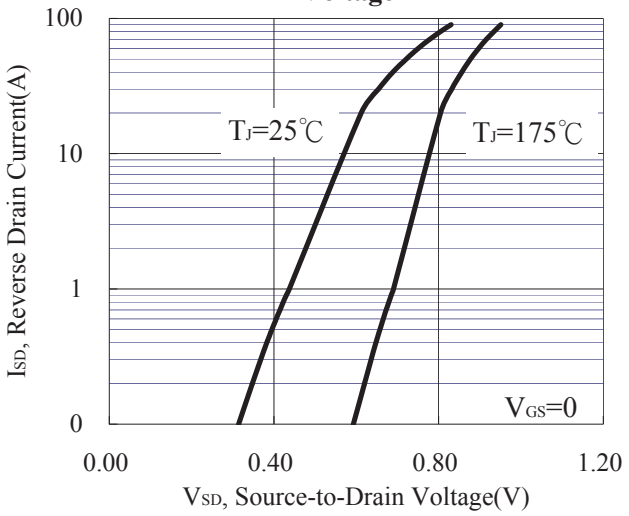


Figure 10. Source-Drain Diode Forward Voltage



TEST CIRCUITS AND WAVEFORMS

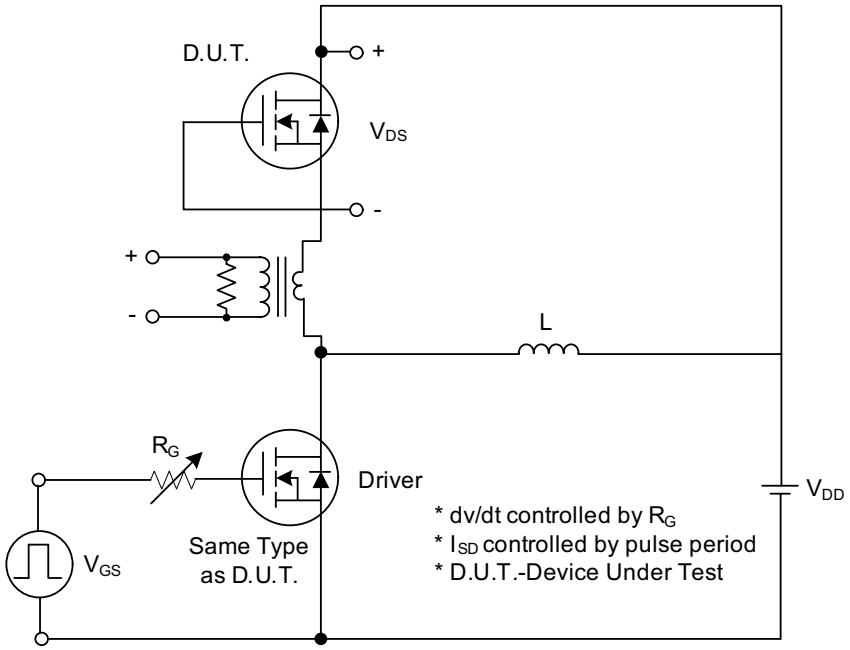


Fig. 1.1 Peak Diode Recovery dv/dt Test Circuit

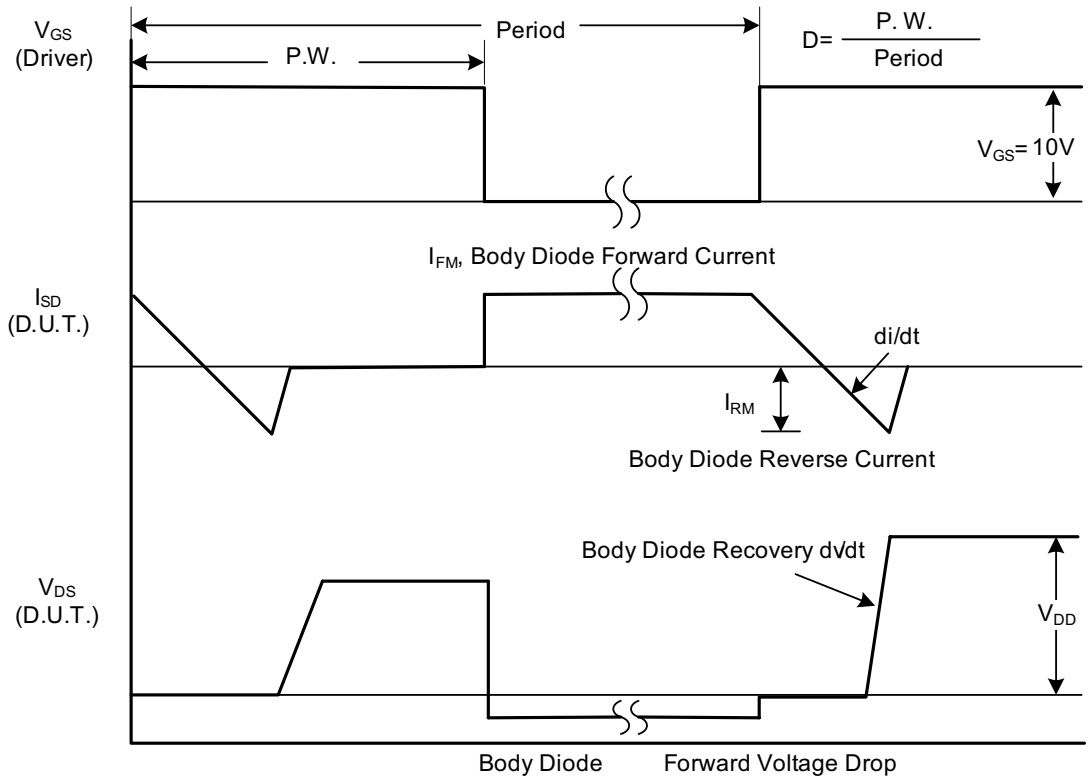


Fig. 1.2 Peak Diode Recovery dv/dt Waveforms

TEST CIRCUITS AND WAVEFORMS (Cont.)

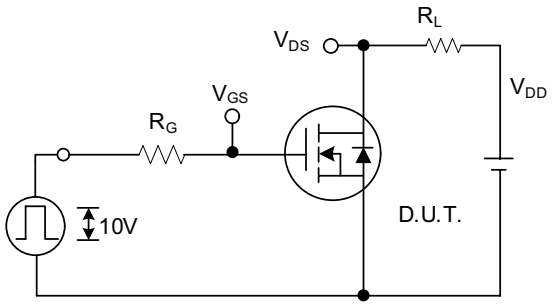


Fig. 2.1 Switching Test Circuit

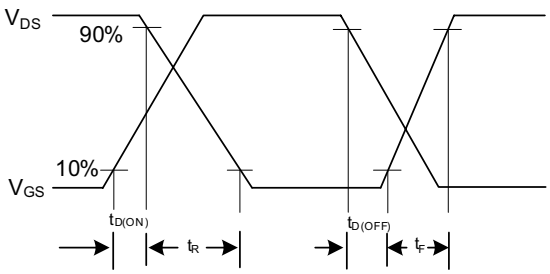


Fig. 2.2 Switching Waveforms

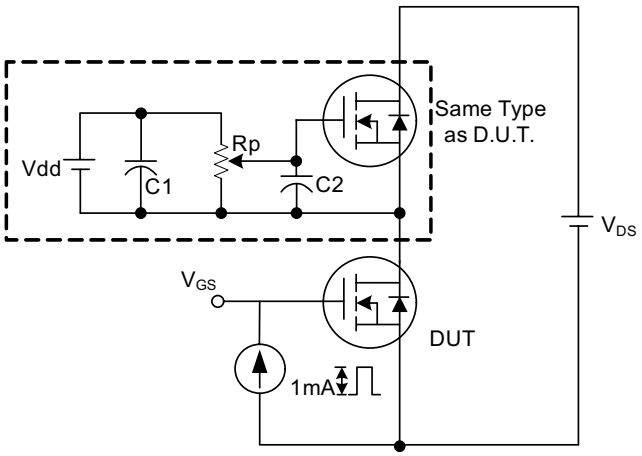


Fig. 3 . 1 Gate Charge Test Circuit

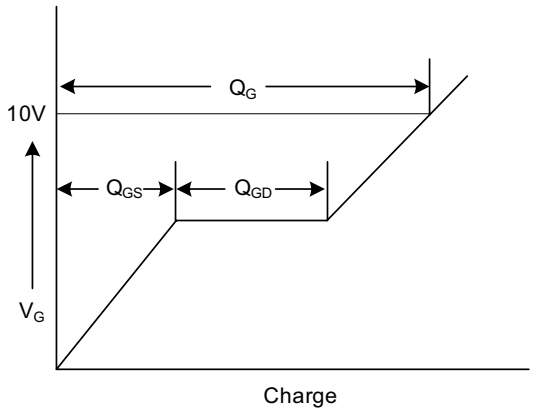


Fig. 3 . 2 Gate Charge Waveform

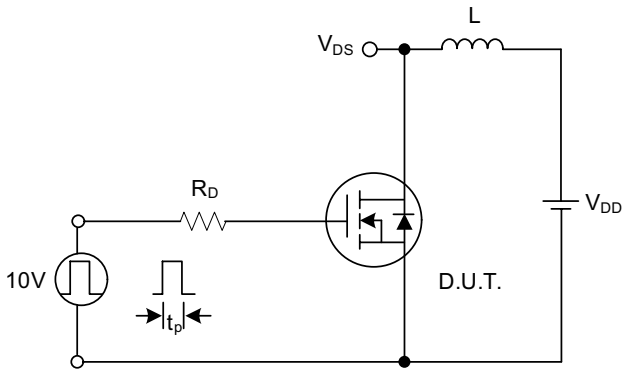


Fig. 4.1 Unclamped Inductive Switching Test Circuit

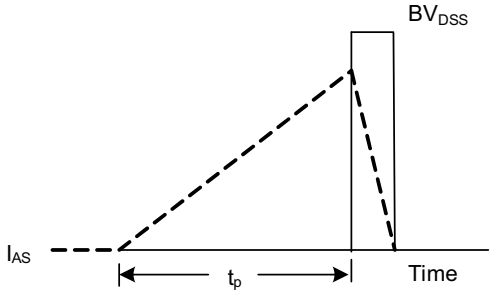


Fig. 4.2 Unclamped Inductive Switching Waveforms

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