

GENERAL DESCRIPTION

The MS90N08 is a N-channel enhancement-mode MOSFET , providing the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost effectiveness. The TO-220 package is universally preferred for all commercial-industrial applications

FEATURES

- Low On Resistance
- Low Thermal Impedence
- Fast Switching Speed
- RoHS compliant / Halogen free package available

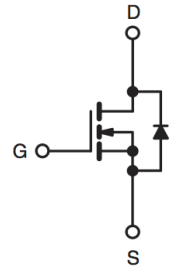
APPLICATION

- White LED boost converters
- Automotive Systems
- Industrial DC/DC Conversion Circuits

TO-220



1. Gate 2. Drain 3. Source



PRODUCT SUMMARY		
VDS (V)	rDS(on) (mΩ)	ID(A)
80	11 @ VGS = 10V	90A
	13 @ VGS = 4.5V	

ABSOLUTE MAXIMUM RATINGS (TA = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Limit	Units
Drain-Source Voltage	VDS	80	V
Gate-Source Voltage	VGS	±20	
Continuous Drain Current a	ID	90a	A
Pulsed Drain Current b			
Continuous Source Current (Diode Conduction) a	IS	120	A
Power Dissipation a	PD	300	W
Operating Junction and Storage Temperature Range	TJ, Tstg	-55 to 175	°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Maximum	Units
Maximum Junction-to-Ambient a	t ≤ 10 sec	62.5	°C/W
	Steady State	0.5	



MS90N08 80V N-Channel MOSFET

Electrical Characteristics						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate-Source Threshold Voltage	VGS(th)	VDS = VGS, ID = 250 μ A	1			V
Gate-Body Leakage	IGSS	VDS = 0 V, VGS = \pm 20 V			\pm 100	nA
Zero Gate Voltage Drain Current	IDSS	VDS = 64 V, VGS = 0 V			1	μ A
		VDS = 64V, VGS = 0 V, TJ = 55°C			25	
On-State Drain Current	ID(on)	VDS = 5 V, VGS = 10 V	45			A
Drain-Source On-Resistance	rDS(on)	VGS = 10 V, ID = 45 A			11	m Ω
		VGS = 4.5 V, ID = 44 A			13	
Forward Transconductance	gfs	VDS = 15 V, ID = 45 A		40		S
Diode Forward Voltage	VSD	IS = 60 A, VGS = 0 V		0.9		V
Dynamic						
Total Gate Charge	Qg	VDS = 40 V, VGS = 4.5 V, ID = 20 A		58		nC
Gate-Source Charge	Qgs			14		
Gate-Drain Charge	Qgd			39		
Turn-On Delay Time	td(on)	VDS = 40 V, RL = 2 Ω , ID = 20 A, VGEN = 10 V, RGEN = 6 Ω		19		ns
Rise Time	tr			45		
Turn-Off Delay Time	td(off)			178		
Fall Time	tf			62		
Input Capacitance	Ciss	VDS = 15 V, VGS = 0 V, f = 1 MHz		4021		Pf
Output Capacitance	Coss			449		
Reverse Transfer Capacitance	Crss			440		

Notes

- a. Pulse test: PW \leq 300 μ s duty cycle \leq 2%.
- b. Guaranteed by design, not subject to production testing.

• **Characteristic Curves**

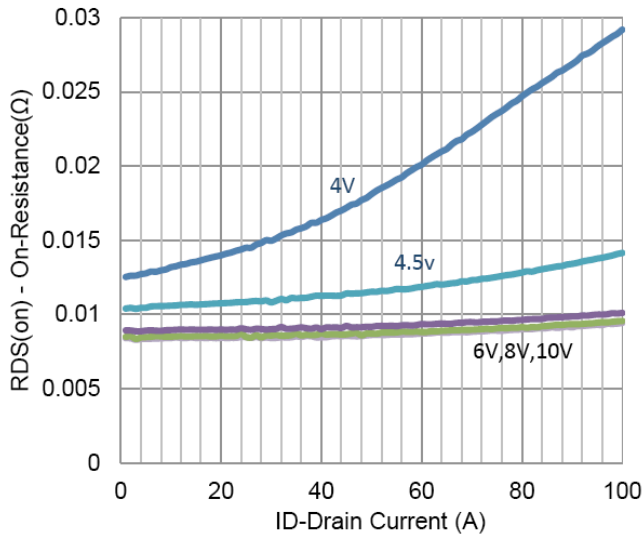


Figure 1. On Region Characteristics

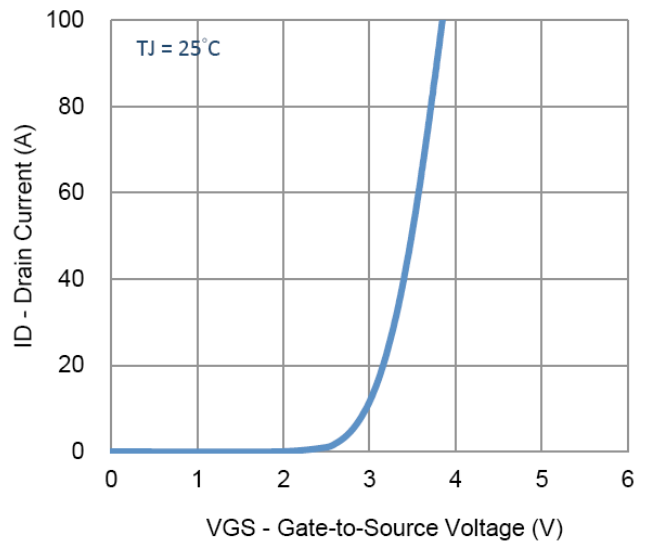


Figure 2. Transfer Characteristics

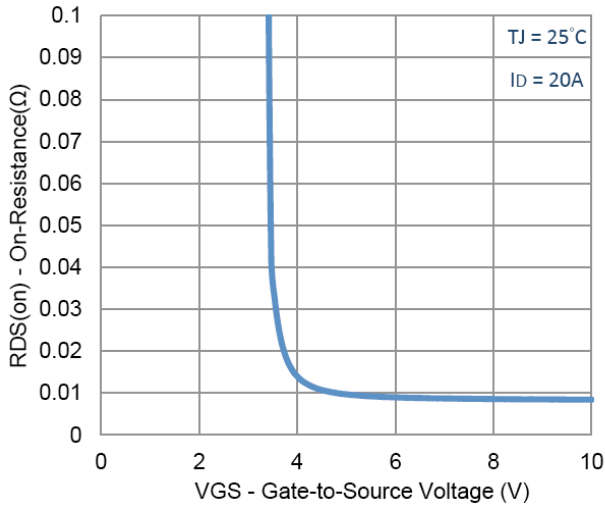


Figure 3. On Resistance Variation vs Drain Current and Gate Voltage

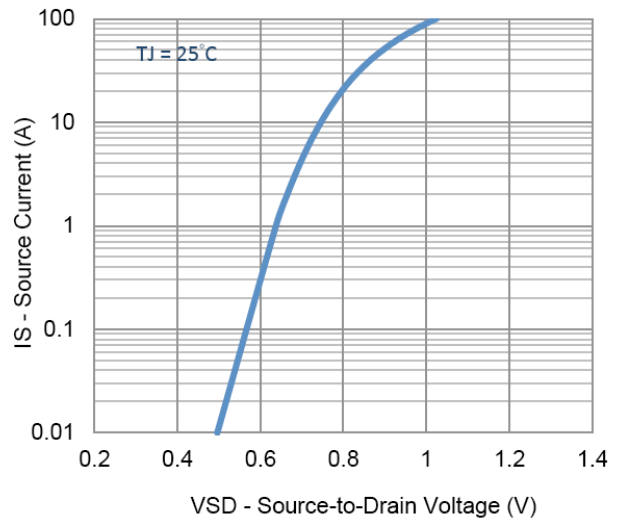


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

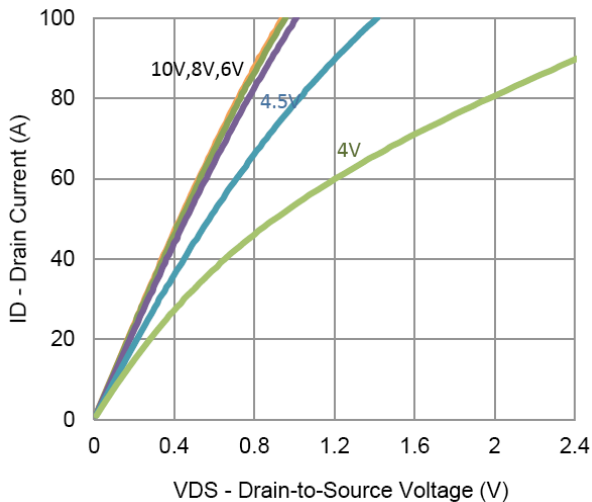


Figure 5. Output Characteristics

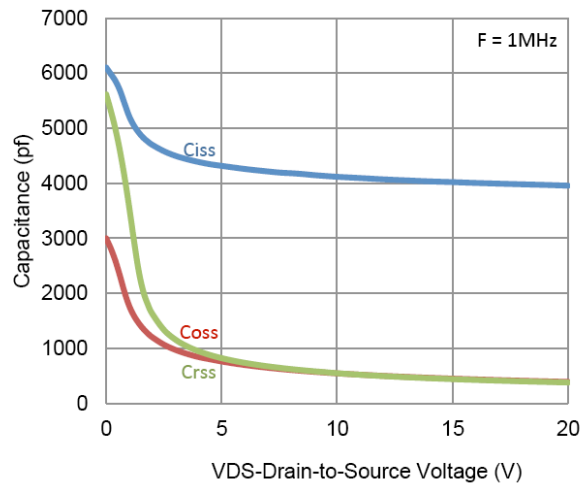


Figure 6. Capacitance Characteristics

• **Characteristic Curves**

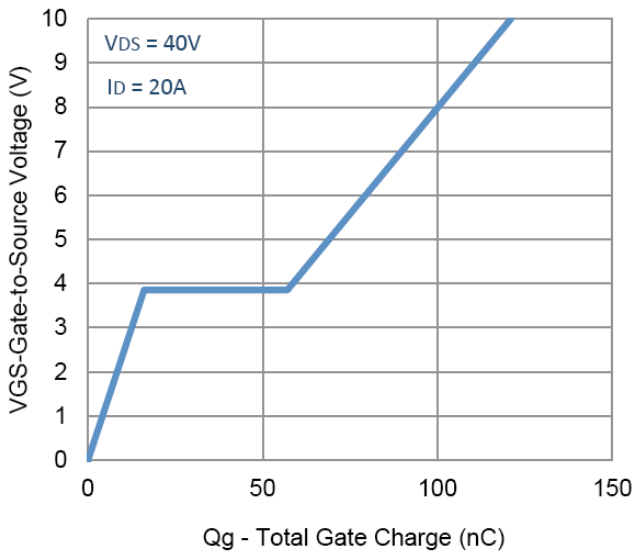


Figure 7. Gate Charge

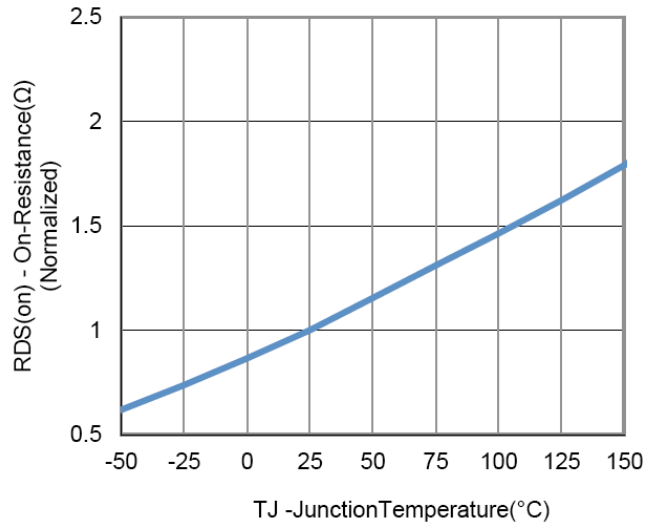


Figure 8. Normalized On-Resistance Vs Junction Temperature

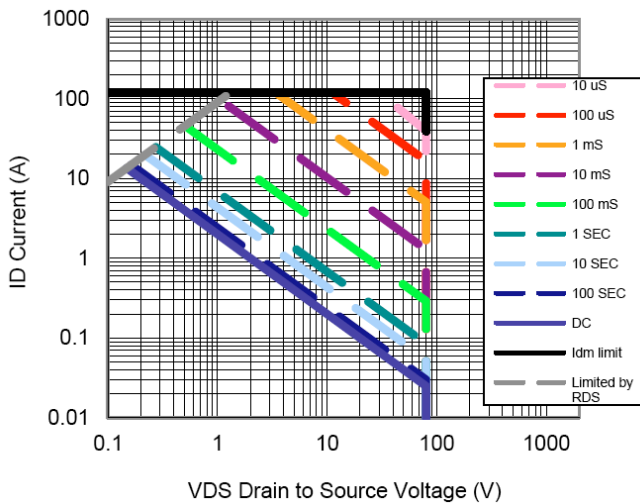


Figure 9. Maximum Safe Operating Area

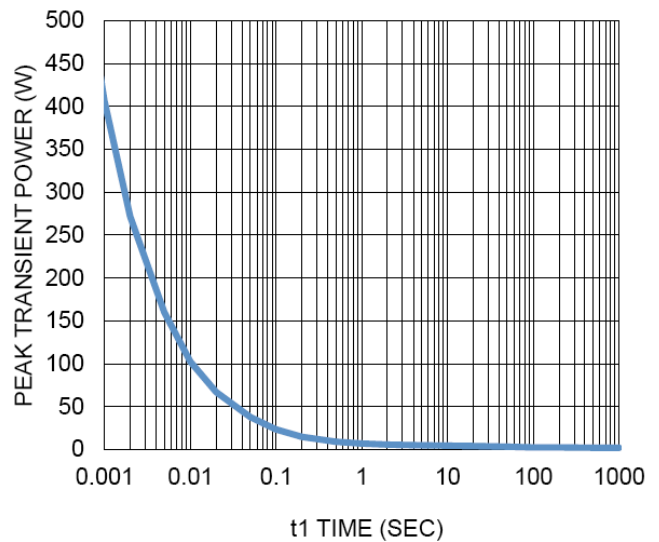


Figure 10. Single Pulse Maximum Power Dissipation

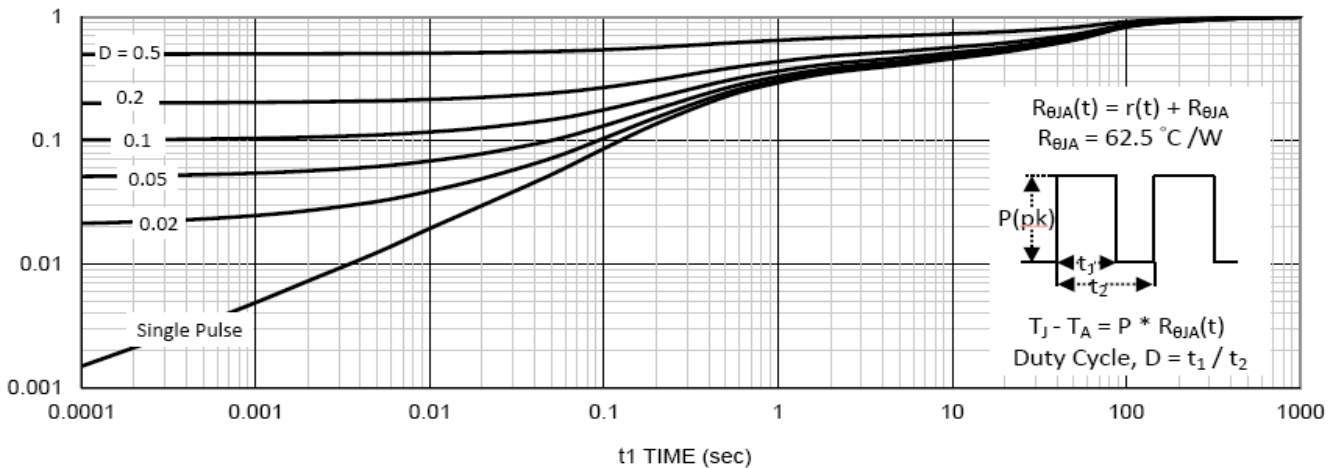


Figure 11. Transient Thermal Response Curve

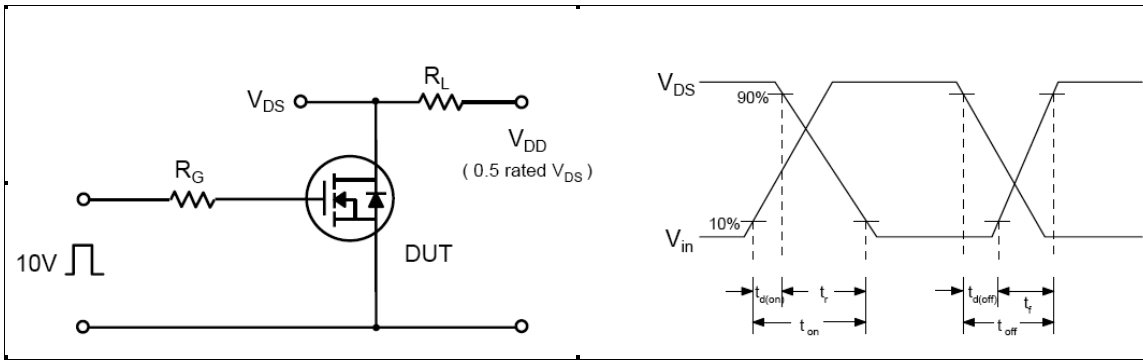


Fig 12. Resistive Switching Test Circuit & Waveforms

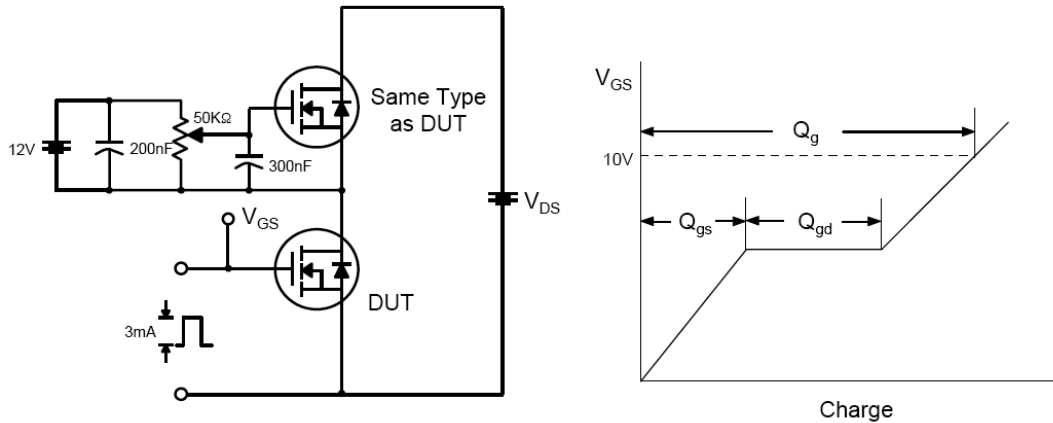


Fig 13. Gate Charge Test Circuit & Waveform

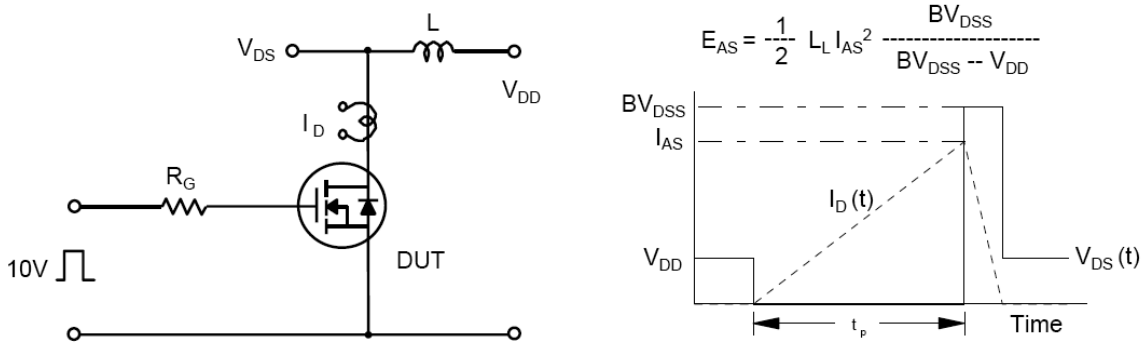


Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms

$$E_{AS} = \frac{1}{2} L_L I_{AS}^2 \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

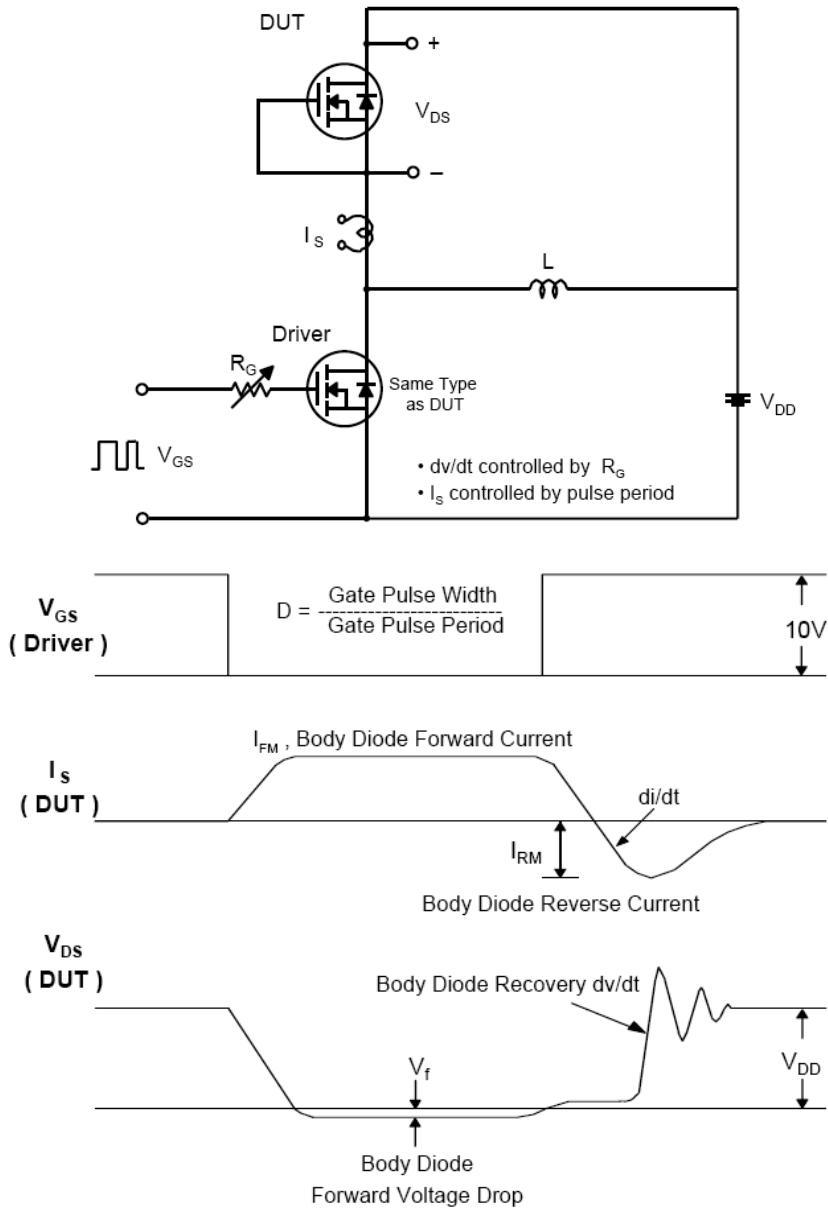
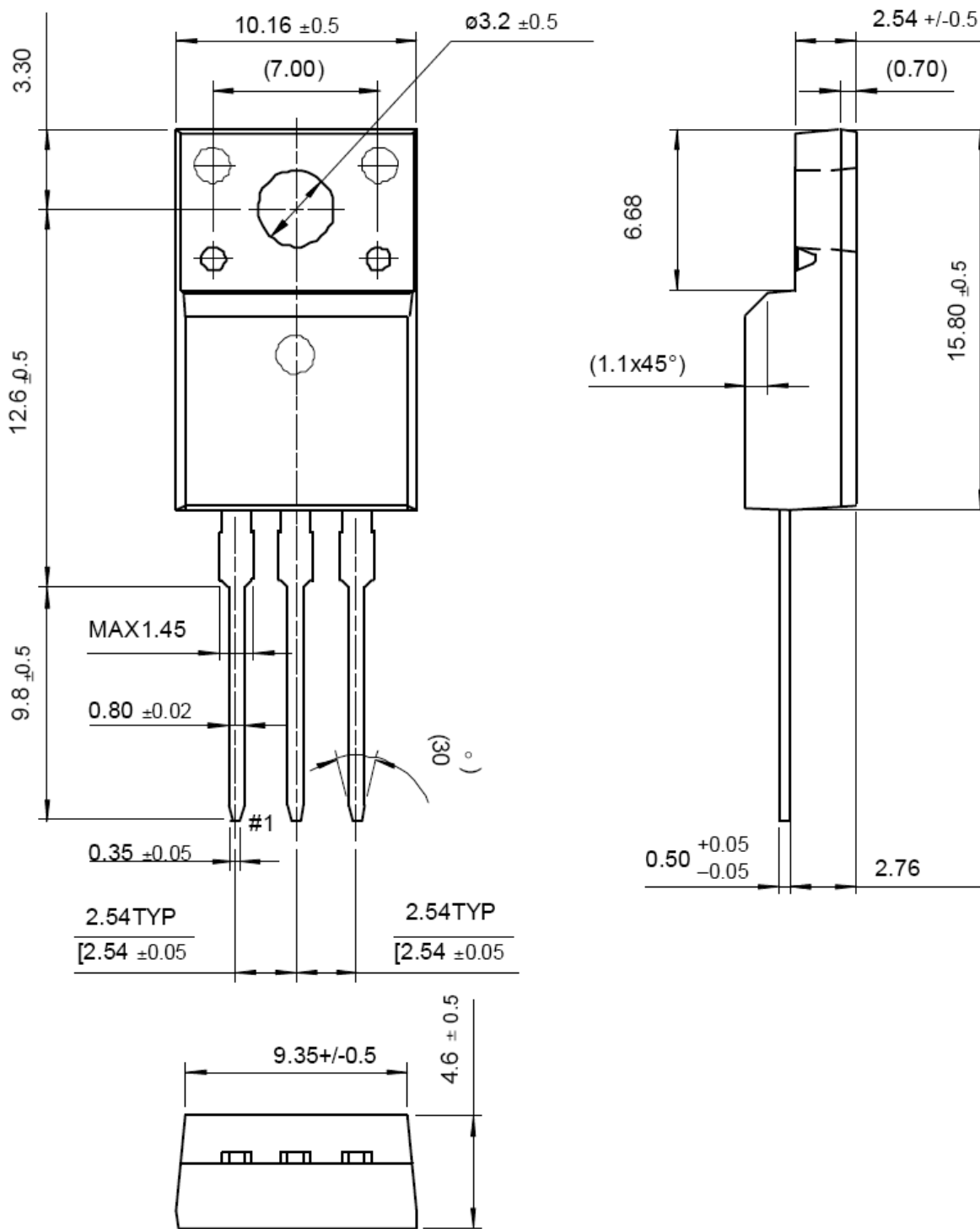


Fig 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms

Package Dimensions

Dimensions in Millimeters





MS90N08 80V N-Channel MOSFET

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