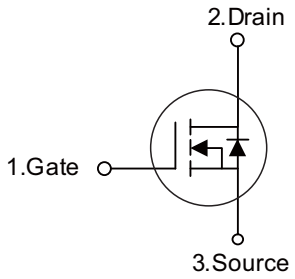
■ PRODUCT CHARACTERISTICS

VDSS	60V
R_{DS}(on)Typ(@V_{GS} =4.5 V)	7.2mΩ
R_{DS}(on)Typ(@V_{GS} =10 V)	5.7mΩ
ID	90A

Symbol



■ APPLICATIONS

* Switching applications

■ FEATURES

* High Switching Speed
* Improved dv/dt capability

TO-220

■ ORDER INFORMATION

Order codes		Package	Packing
Halogen-Free	Halogen		
N/A	MOT90N06A	TO-220	50 pieces/Tube

■ ABSOLUTE MAXIMUM RATINGS (T_C=25°C, unless otherwise noted)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	Continuous	I_D	90	A
	Pulsed (Note 2)	I_{DM}	180	A
Single Pulsed Avalanche Energy (Note 3)		E_{AS}	122	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.5	V/ns
Power Dissipation		P_D	157	W
Junction Temperature		T_J	+150	°C
Storage Temperature Range		T_{STG}	-55 ~ +150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. Repetitive Rating: Pulse width limited by maximum junction temperature.
3. L= 0.1mH, I_{AS} = 49.4A, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25°C
4. I_{SD} ≤ 30A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

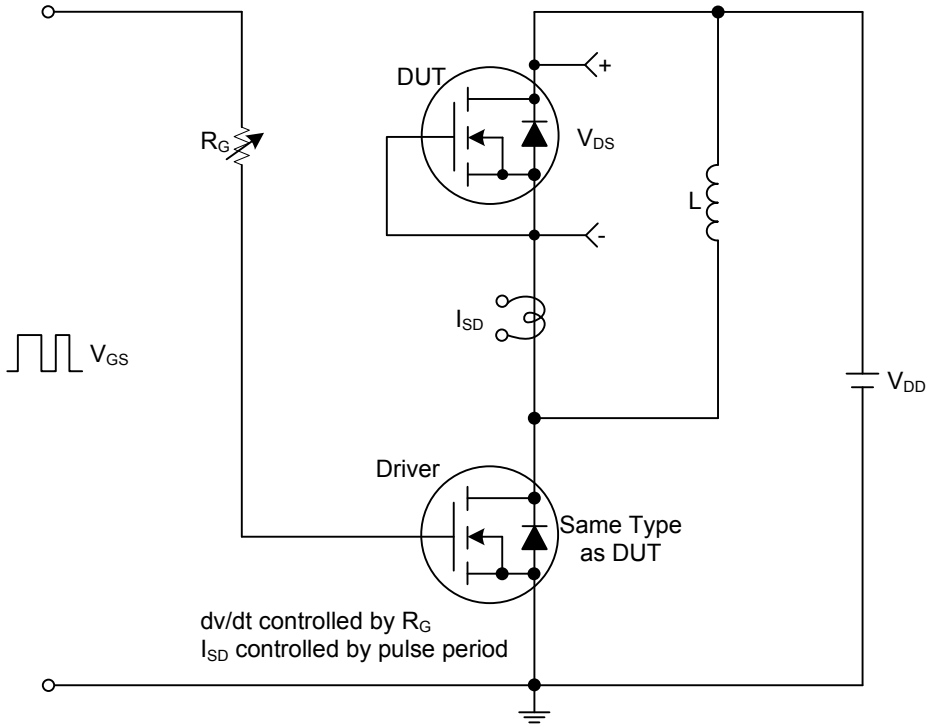
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	62.5	°C/W
Junction to Case	θ_{JC}	0.79	°C/W

■ ELECTRICAL CHARACTERISTICS (T_C=25°C, unless otherwise noted)

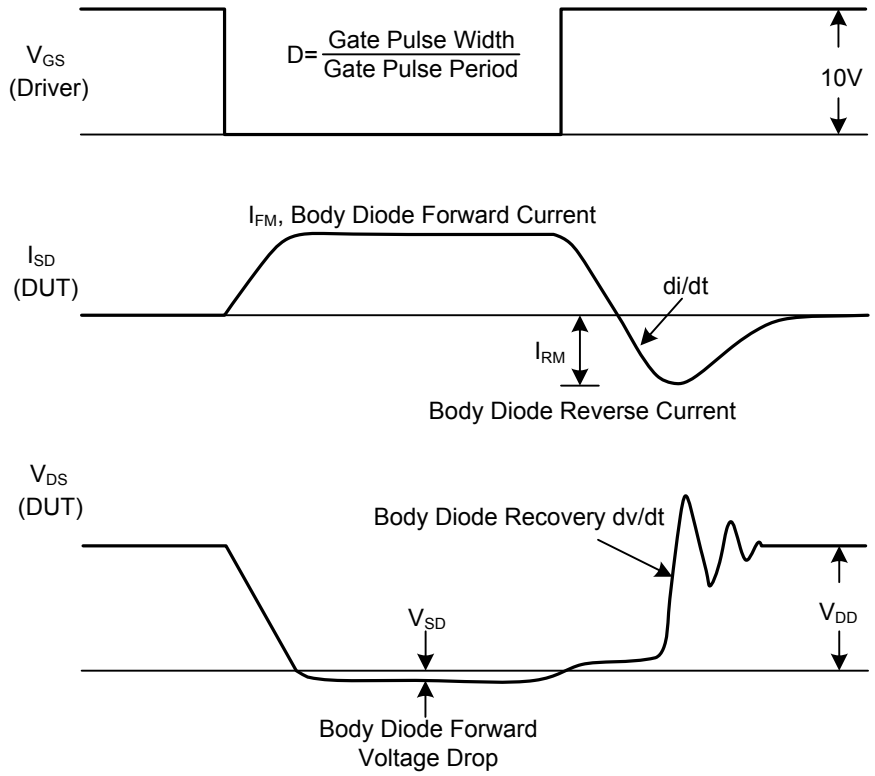
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Off characteristics							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=250μA, V_{GS}=0V	60	-	-	V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=60V, V_{GS}=0V	-	-	1	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V, V_{DS}=0V	-	-	+100	nA
	Reverse		V_{GS}=-20V, V_{DS}=0V	-	-	-100	nA
On characteristics							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	1.0	-	3.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=45A	-	5.7	7.5	mΩ
			V_{GS}=4.5V, I_D=45A	-	7.2	9.5	mΩ
Dynamic characteristics							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1.0MHz	-	3900	-	pF
Output Capacitance		C_{OSS}		-	350	-	pF
Reverse Transfer Capacitance		C_{RSS}		-	300	-	pF
Switching characteristics							
Total Gate Charge (Note 1)		Q_G	V_{DS}=48V, V_{GS}=10V, I_D=90A, I_G=1mA (Note 1, 2)	-	90	-	nC
Gate to Source Charge		Q_{GS}		-	8	-	nC
Gate to Drain Charge		Q_{GD}		-	7	-	nC
Turn-on Delay Time (Note 1)		$t_{D(ON)}$	V_{DD}=30V, V_{GS}=10V, I_D=90A, R_G =3.3Ω (Note 1, 2)	-	15	-	ns
Rise Time		t_R		-	21	-	ns
Turn-off Delay Time		$t_{D(OFF)}$		-	66	-	ns
Fall-Time		t_F		-	25	-	ns
Source-drain diode ratings and characteristics							
Maximum Body-Diode Continuous Current		I_S		-	-	90	A
Maximum Body-Diode Pulsed Current		I_{SM}		-	-	180	A
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	I_S=90A, V_{GS}=0V	-	-	1.4	V
Reverse Recovery Time (Note 1)		t_{rr}	I_S=30A, V_{GS}=0V, dI_F/dt =100A/μs	-	47	-	nS
Reverse Recovery Charge		Q_{rr}		-	145	-	nC

Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating ambient temperature.

■ TEST CIRCUITS AND WAVEFORMS



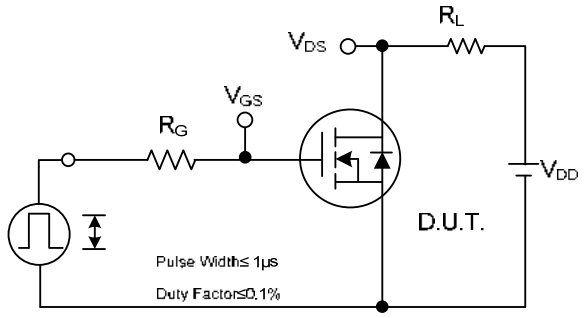
Peak Diode Recovery dv/dt Test Circuit



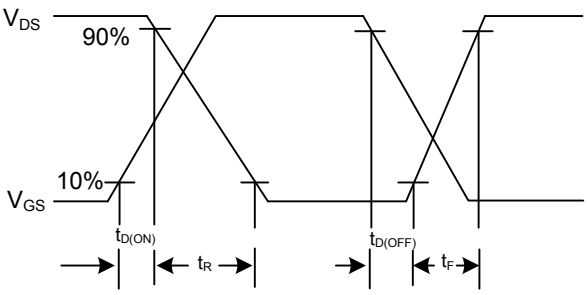
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

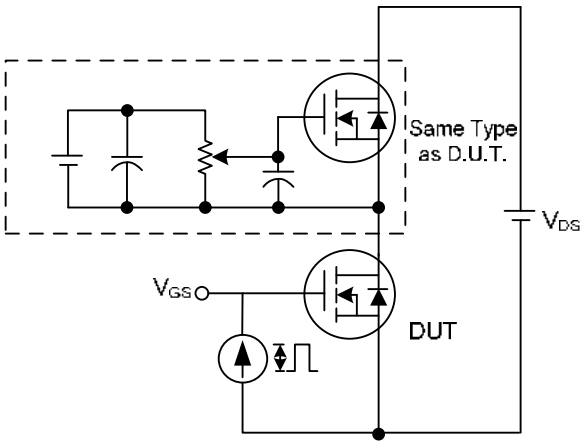
■ TEST CIRCUITS AND WAVEFORMS(Cont.)



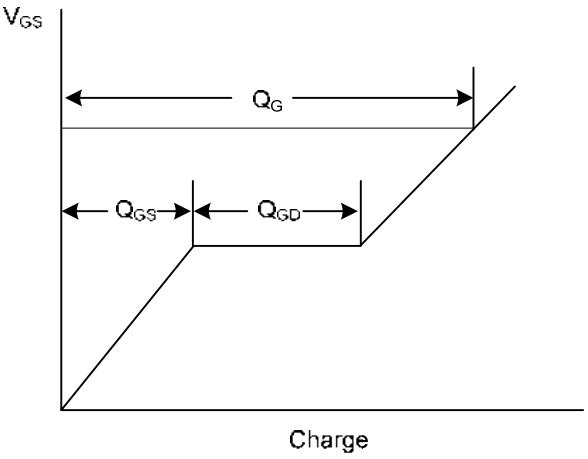
Switching Test Circuit



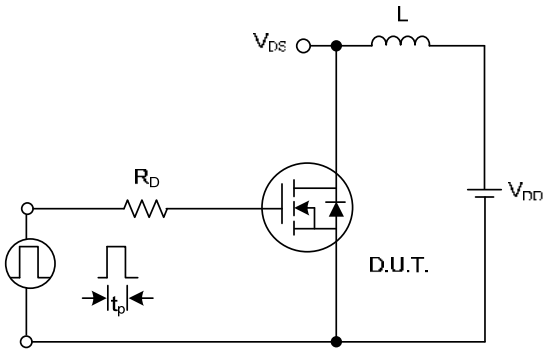
Switching Waveforms



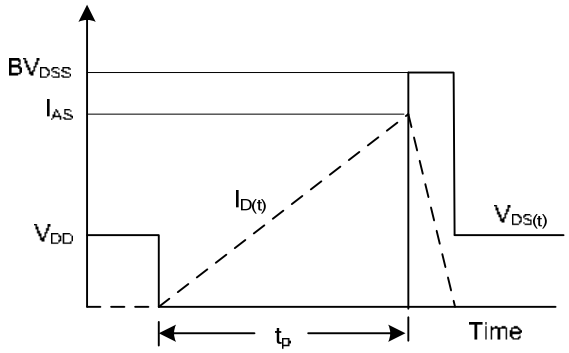
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

■ TO-220-3L PACKAGE OUTLINE DIMENSIONS