

ATM10N65TF

N-Channel Enhancement Mode Field Effect Transistor

Drain-Source Voltage: 650V

Drain Current: 10A

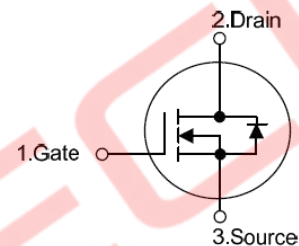
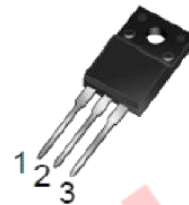
DESCRIPTION

The ATM10N65TF is a high voltage power MOSFET combines advanced trench MOSFET designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and high rugged avalanche characteristics. This power MOSFET is usually used in high speed switching applications of switching power supplies and adaptors.

FEATURES

- ◆ $R_{DS(ON)} < 1.0\Omega @ V_{GS} = 10V, I_D = 5A$
- ◆ Fast switching capability
- ◆ Avalanche energy tested
- ◆ Improved dv/dt capability, high ruggedness

TO-220F



ABSOLUTE MAXIMUM RATINGS (T_C = 25°C unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V _{DSS}	650	V
Gate-Source Voltage		V _{GSS}	± 30	V
Drain Current	Continuous	I _D	10	A
	Pulsed (Note 2)	I _{DM}	20	A
Avalanche Energy	Single Pulsed (Note 3)	E _{AS}	421	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.1	V/ns
Power Dissipation	TO-220F	P _D	38	W
Junction Temperature		T _J	+150	°C
Operating Temperature		T _{OPR}	-55 ~ +150	°C
Storage Temperature		T _{STG}	-55 ~ +150	°C
Junction to Ambient		θ _{JA}	62.5	°C/W
Junction to Case		θ _{JC}	3.29	°C/W

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 = 30mH, I_{AS} = 5.3A, V_{DD} = 50V, R_G = 25 Ω Starting T_J = 25°C

4. I_{SD} ≤ 10A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

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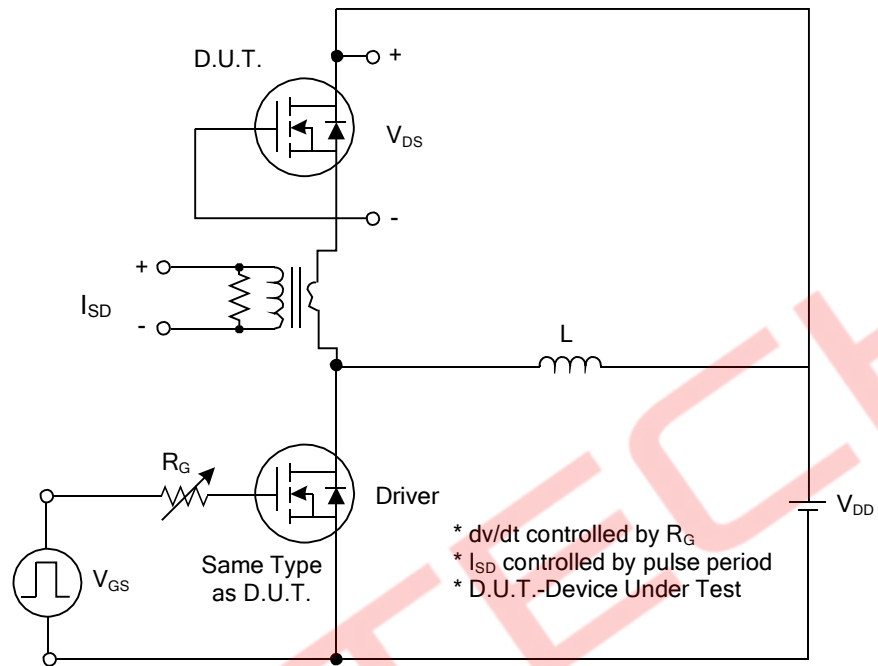
ELECTRICAL CHARACTERISTICS ($T_C=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	650			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=650V, V_{GS}=0V$			1	μA
Gate-Source Leakage Current	Forward	$V_{GS}=30V, V_{DS}=0V$			100	nA
	Reverse	$V_{GS}=-30V, V_{DS}=0V$			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0		4.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=5A$			1.0	Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	$V_{DS}=25V, V_{GS}=0V, f=1.0\text{ MHz}$		1300		pF
Output Capacitance	C_{OSS}			124		pF
Reverse Transfer Capacitance	C_{RSS}			9.3		pF
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{D(ON)}$	$V_{DS}=100V, V_{GS}=10V, I_D=10A, R_G=25\Omega$ (Note1, 2)		20		ns
Turn-On Rise Time	t_R			21		ns
Turn-Off Delay Time	$t_{D(OFF)}$			98		ns
Turn-Off Fall Time	t_F			35		ns
Total Gate Charge	Q_G	$V_{DS}=520V, V_{GS}=10V, I_D=10A, I_G=1mA, (Note1, 2)$		31		nC
Gate-Source Charge	Q_{GS}			7.6		nC
Gate-Drain Charge	Q_{GD}			5.8		nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=10A$			1.4	V
Maximum Continuous Drain-Source Diode Forward Current	I_S				10	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				20	A
Reverse Recovery Time	t_{rr}	$V_{GS}=0V, I_S=10A,$		376		ns
Reverse Recovery Charge	Q_{RR}	$dI_F/dt=100A/\mu s$ (Note1)		8.5		μC

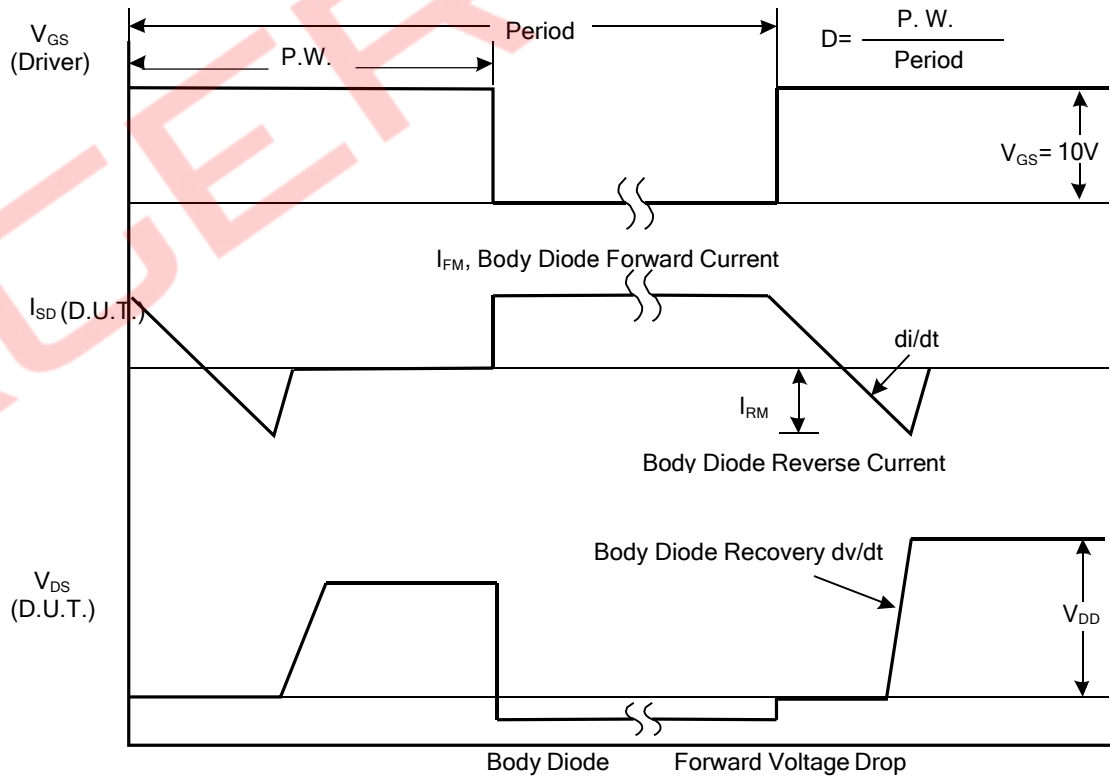
Notes: 1. Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$
 2. Essentially independent of operating temperature

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TEST CIRCUITS AND WAVEFORMS



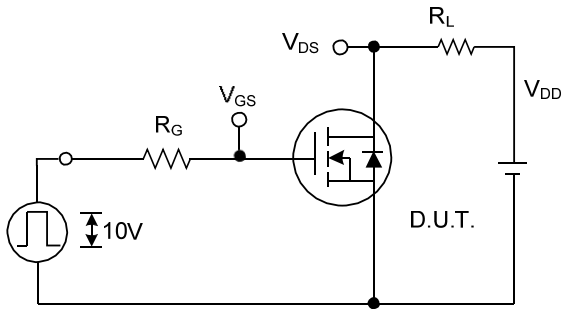
Peak Diode Recovery dv/dt Test Circuit



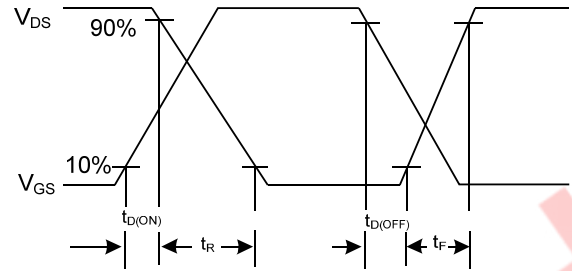
Peak Diode Recovery dv/dt Waveforms

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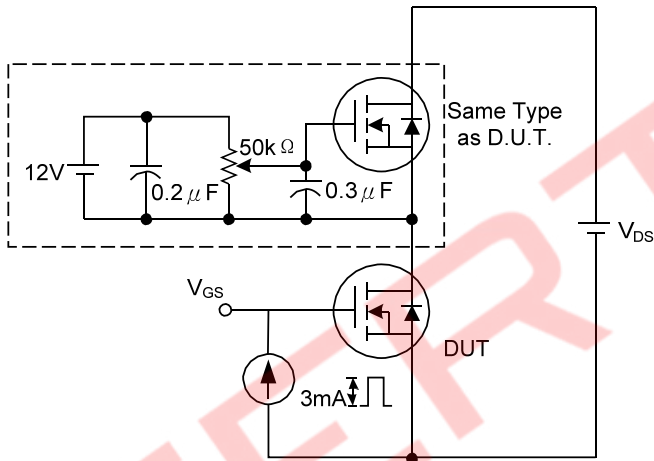
TEST CIRCUITS AND WAVEFORMS (Cont.)



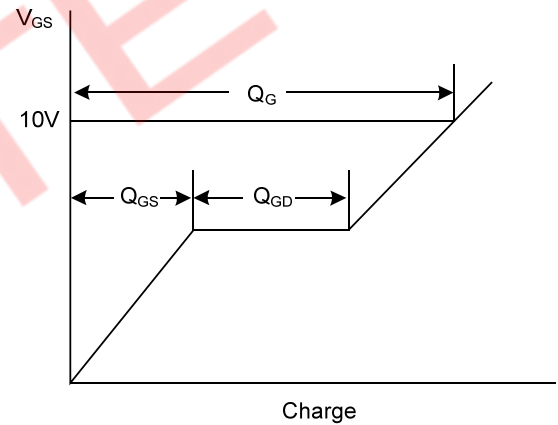
Switching Test Circuit



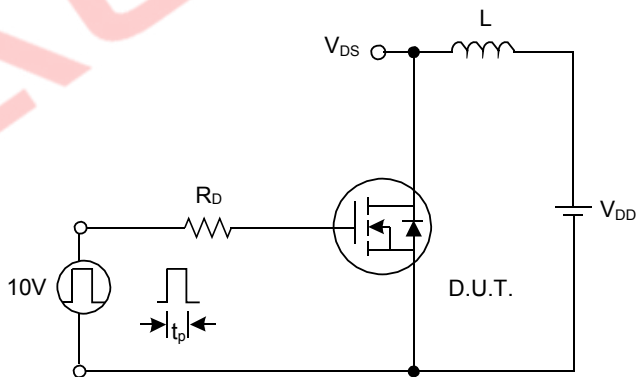
Switching Waveforms



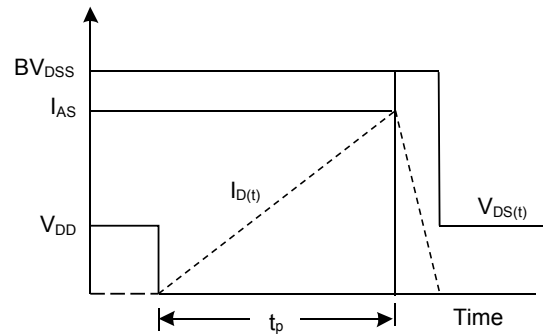
Gate Charge Test Circuit



Gate Charge Waveform



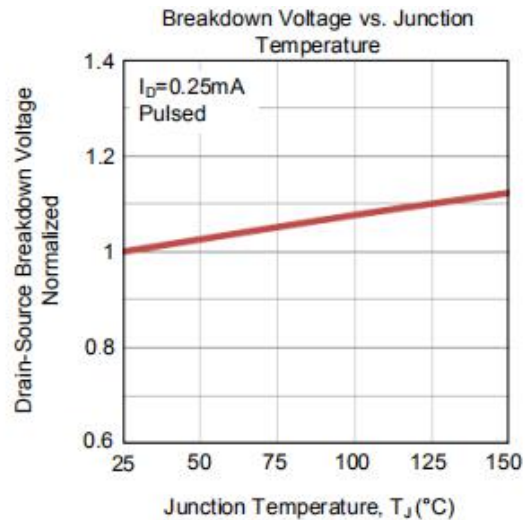
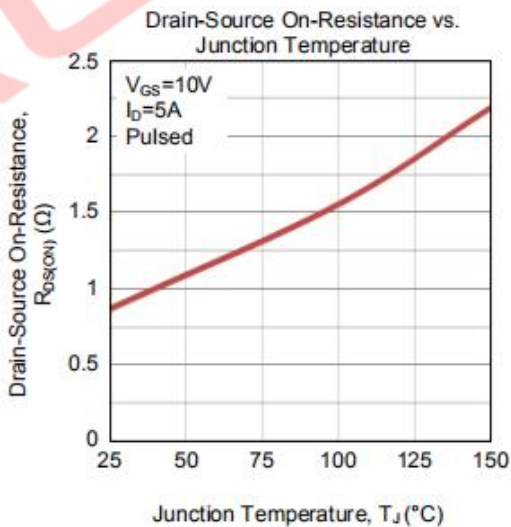
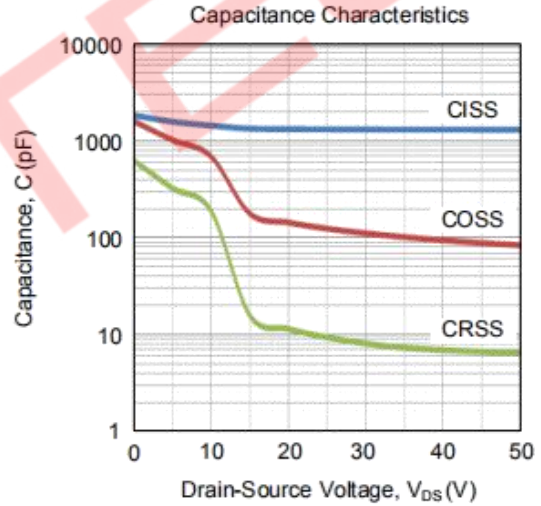
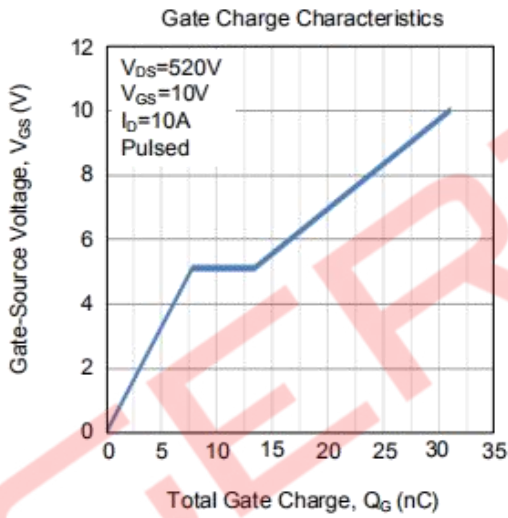
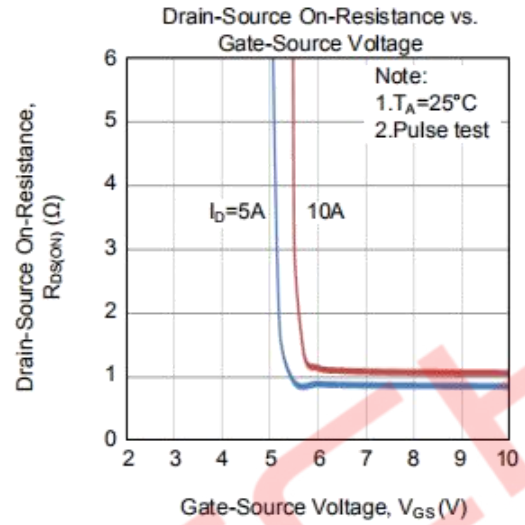
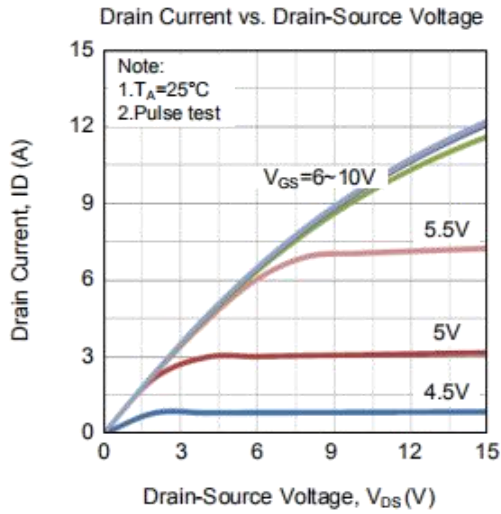
Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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TYPICAL CHARACTERISTICS CURVES



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