DESCRIPTION

The AM04N65 is available in TO220F Package.

APPLICATION

- Adaptor
- Charger
- SMPS Standby Power

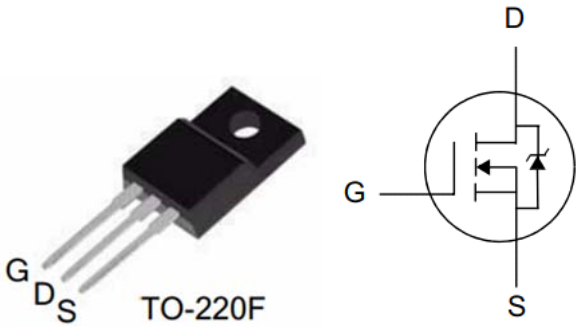
FEATURE

- $RDS_{(ON),typ.}$=2.1 Ω@V_{GS}=10V
- High Current Rating
- Lower Capacitance
- Lower Total Gate Charge Minimize Switching Loss
- Fast Recovery Body Diode

ORDERING INFORMATION

Package Type	Part Number	
TO220F SPQ:50pcs /Tube	T3F	AM04N65T3FU
		AM04N65T3FVU
Note	V: Halogen free Package U: Tube	
AiT provides all RoHS products		

PIN DESCRIPTION



Pin#	Symbol	Function
1	G	Gate
2	D	Drain
3	S	Source

ABSOLUTE MAXIMUM RATINGS

T_A = 25°C, unless otherwise specified.

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DSS}	650	V
Gate-to-Source Voltage	V_{GSS}	±30	
Continuous Drain Current	I_D	4.0	A
Pulsed Drain Current at V_{GS}=10V	I_{DM}	16	
Single Pulse Avalanche Energy	E_{AS}	250	mJ
Power Dissipation	P_D	30	W
Derating Factor above 25℃		0.24	W/℃
Soldering Temperature Distance of 1.6mm from case for 10 seconds	T_L	300	℃
Operating Temperature Range	T_J	-55 to 150	℃
Storage Temperature Range	T_{STG}	-55 to 150	℃

THERMAL RESISTANCE

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	4.17	℃/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	100	

Stresses above may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated in the Electrical Characteristics are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

T_A = 25°C, unless otherwise specified.

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250uA	650			V
Drain-to-Source Leakage Current	I_{DSS}	V_{DS}=650V, V_{GS}=0V			1	uA
		V_{DS}=520V, V_{GS}=0V, T_A =125°C			100	
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=+20V, V_{DS}=0V			+10	uA
		V_{GS}=-20V, V_{DS}=0V			-10	
ON CHARACTERISTICS						
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=2.0A		2.1	2.5	Ω
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250uA	2.0		4.0	V
Forward Transconductance	gfs	V_{DS}=15V, I_D=2.0A		5.0		S
Dynamic CHARACTERISTICS						
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=25V, f=1.0MHz		450		pF
Reverse Transfer Capacitance	C_{rss}			6.0		
Output Capacitance	C_{oss}			50		
Total Gate Charge	Q_g	V_{DD}=325V, I_D=4A, V_{GS}=0 to 10V		8.5		nC
Gate-to-Source Charge	Q_{gs}			2.8		
Gate-to-Drain (Miller) Charge	Q_{gd}			2.5		
Resistive Switching CHARACTERISTICS						
Turn-on Delay Time	$t_{d(ON)}$	V_{DD}=325V, I_D=4A, V_{GS}=10V, R_g=4.7Ω		9.0		nS
Rise Time	trise			7.0		
Turn-Off Delay Time	$t_{d(OFF)}$			22		
Fall Time	tfall			9.0		
Source-Drain Diode CHARACTERISTICS						
Continuous Source Current *	I_{SD}	Integral PN-diode in MOSFET			4.0	A
Pulsed Source Current *	I_{SM}				16	
Diode Forward Voltage	V_{SD}	I_S=4A, V_{GS}=0V			1.5	V
Reverse Recovery Time	t_{rr}	V_{GS}=0V I_F= I_S, di/dt=100A/μs		235		ns
Reverse Recovery Charge	Q_{rr}			750		nC

*Pulse width≤380μs; duty cycle≤2%.

TYPICAL PERFORMANCE CHARACTERISTICS

Fig 1. Maximum Transient Thermal Impedance

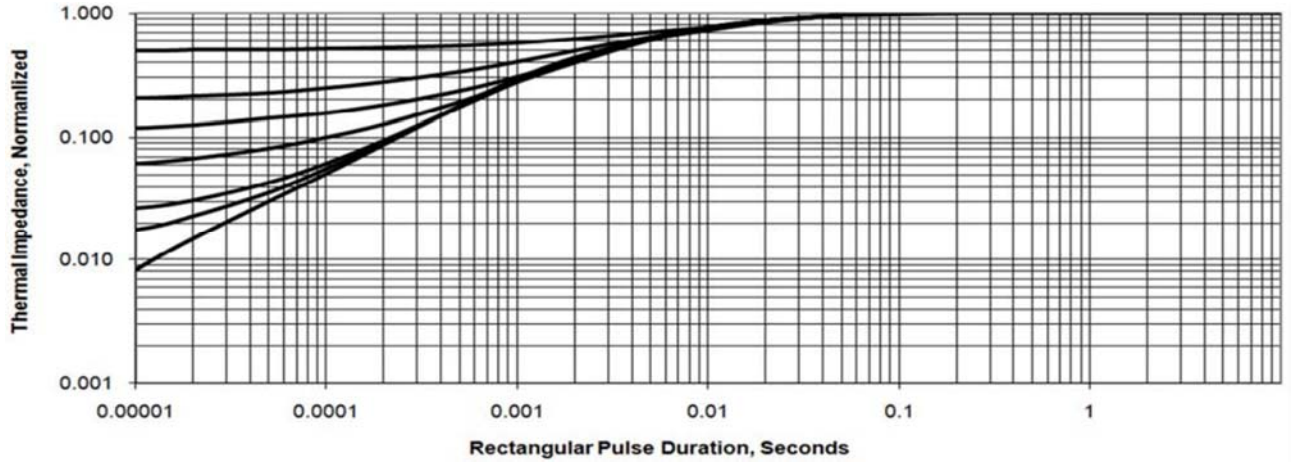


Fig 2. Maximum Power Dissipation vs Case Temperature

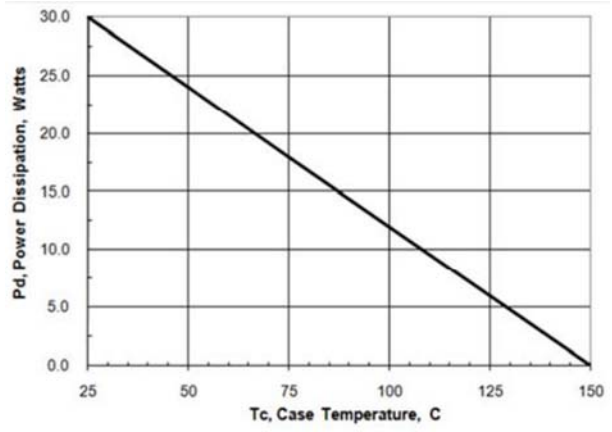


Fig 3. Maximum Continuous Drain Current vs Case Temperature

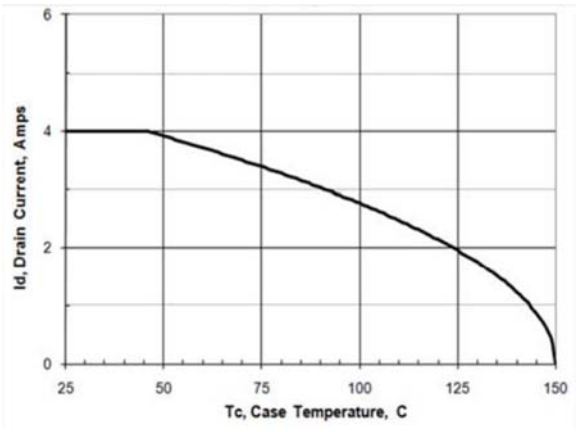


Fig 4. Typical Output Characteristics

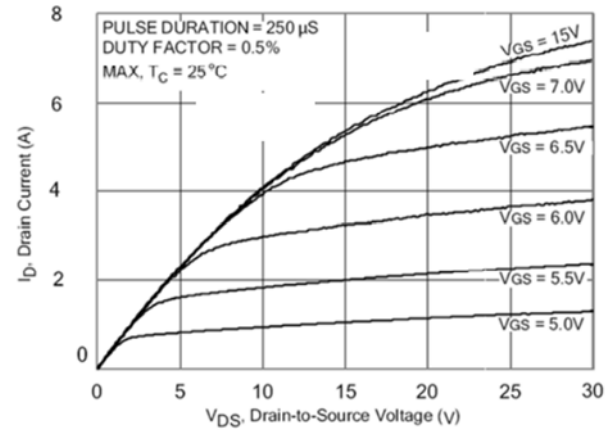


Fig 5. Typical Drain-to-Source ON Resistance Vs Gate Voltage and Drain Current

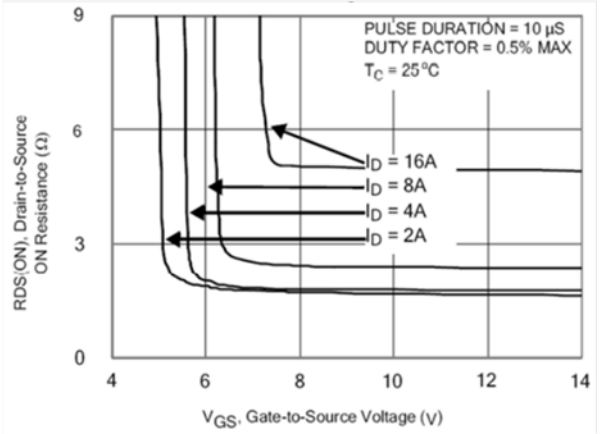


Fig 6. Maximum Peak Current Capability

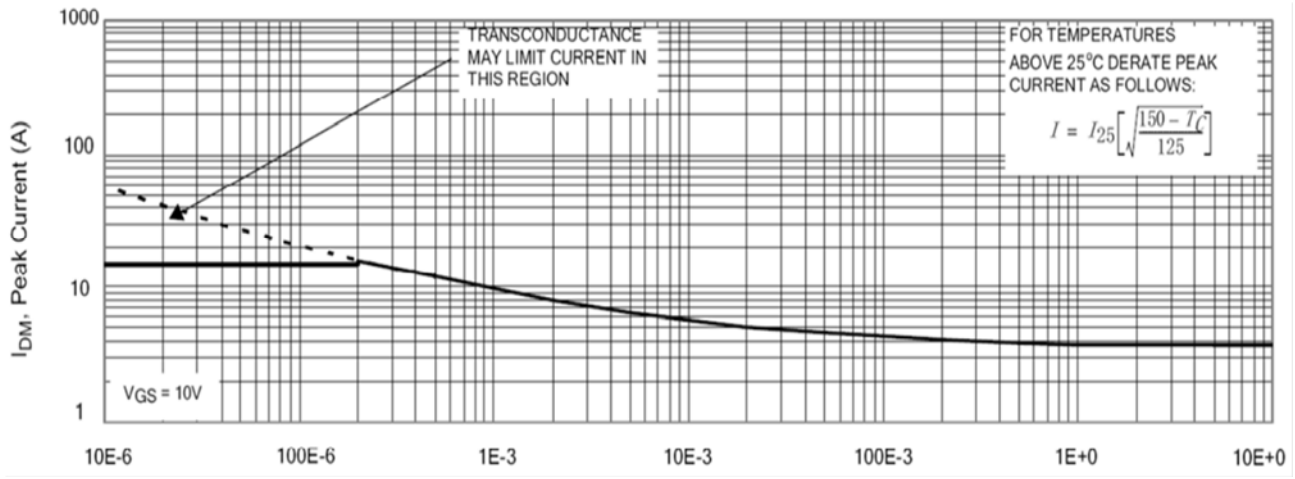


Fig 7. Typical Transfer Characteristics

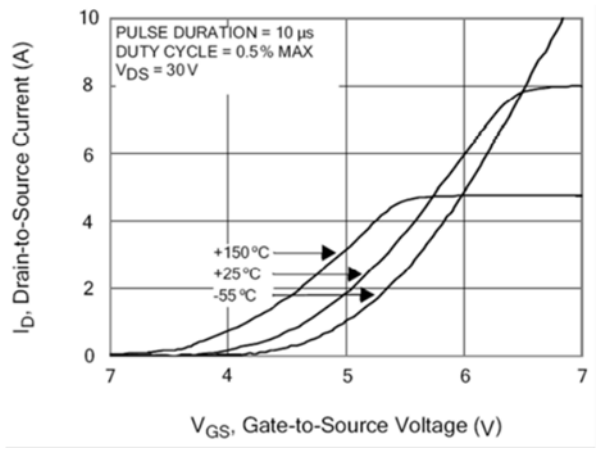


Fig 9. Typical Drain-to-Source ON Resistance vs Drain Current

Fig 8. Unclamped Inductive Switching Capability

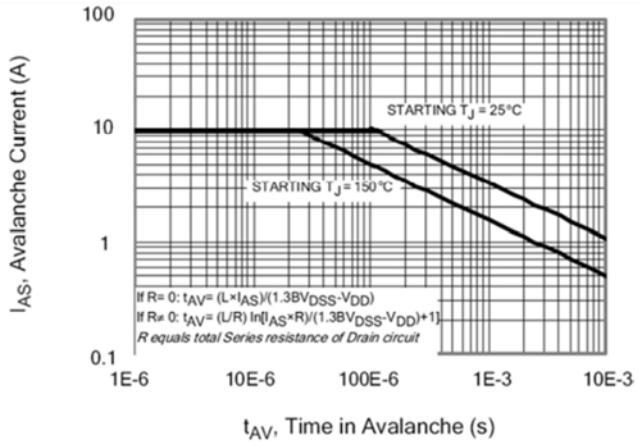
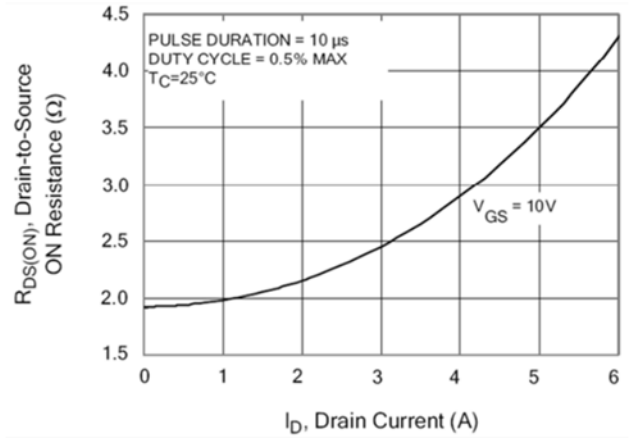


Fig 10. Typical Drain-to-Source ON Resistance vs Junction Temperature



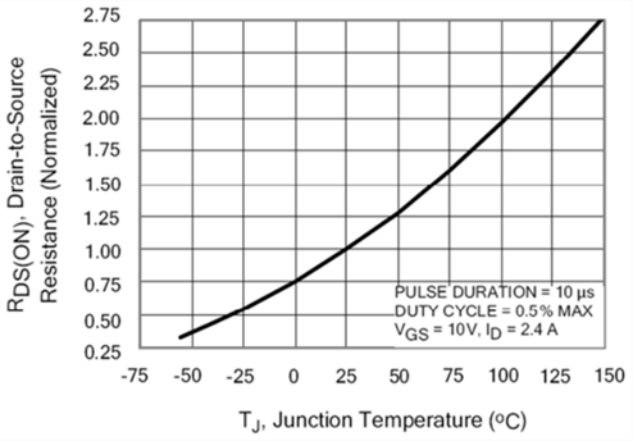


Fig11. Typical Breakdown Voltage vs Junction Temperature

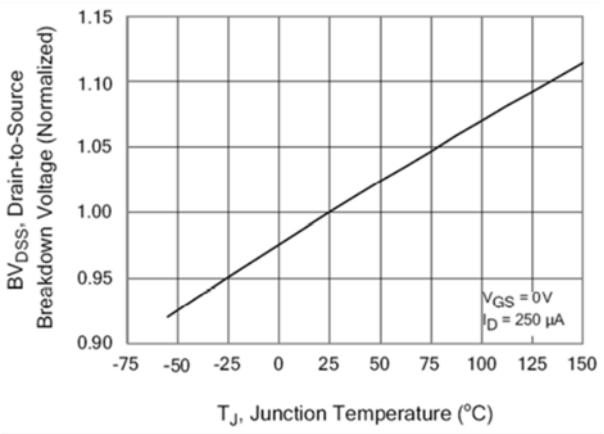


Fig 12. Typical Threshold Voltage vs Junction Temperature

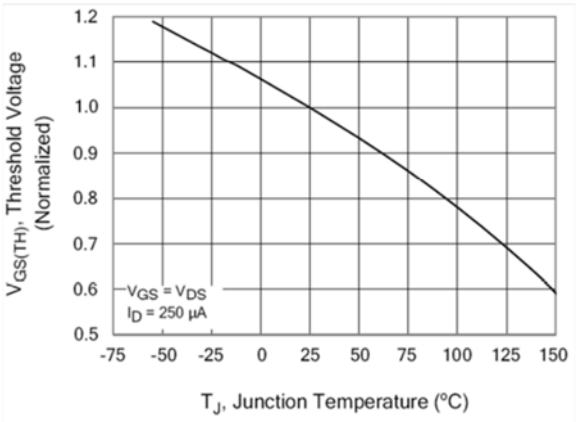


Fig 13. Maximum Safe Operating Area

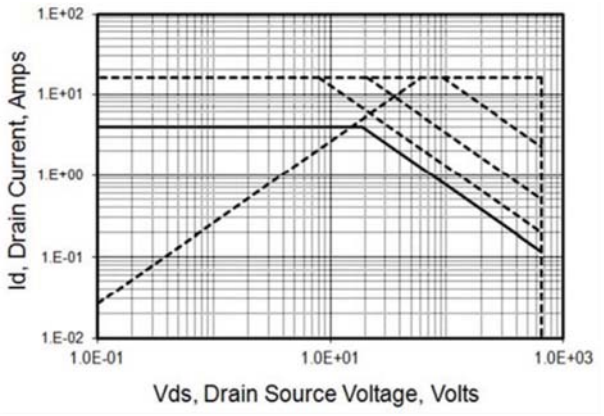


Fig 14. Typical Capacitance vs Drain-to-Source Voltage

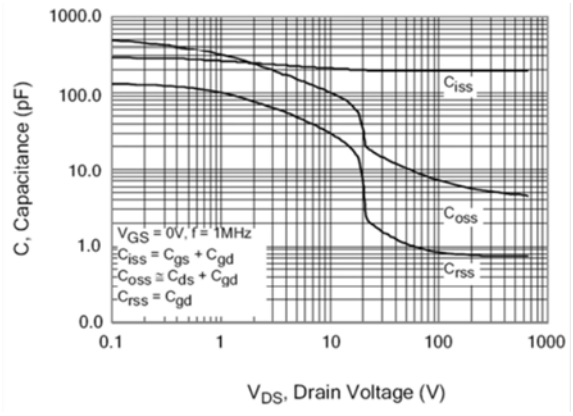


Fig 15. Typical Gate Charge

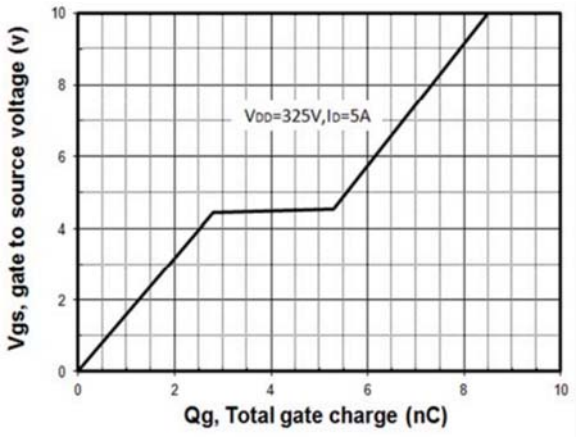
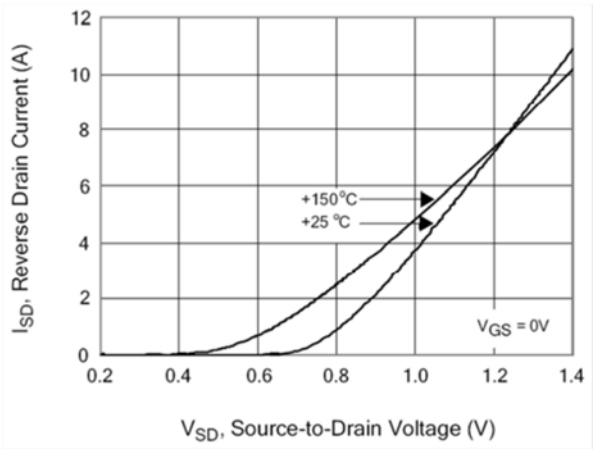


Fig 16. Typical Body Diode Transfer Characteristics



TEST CIRCUITS AND WAVEFORMS

Fig. 17 Peak Diode Recovery dv/dt Test Circuit

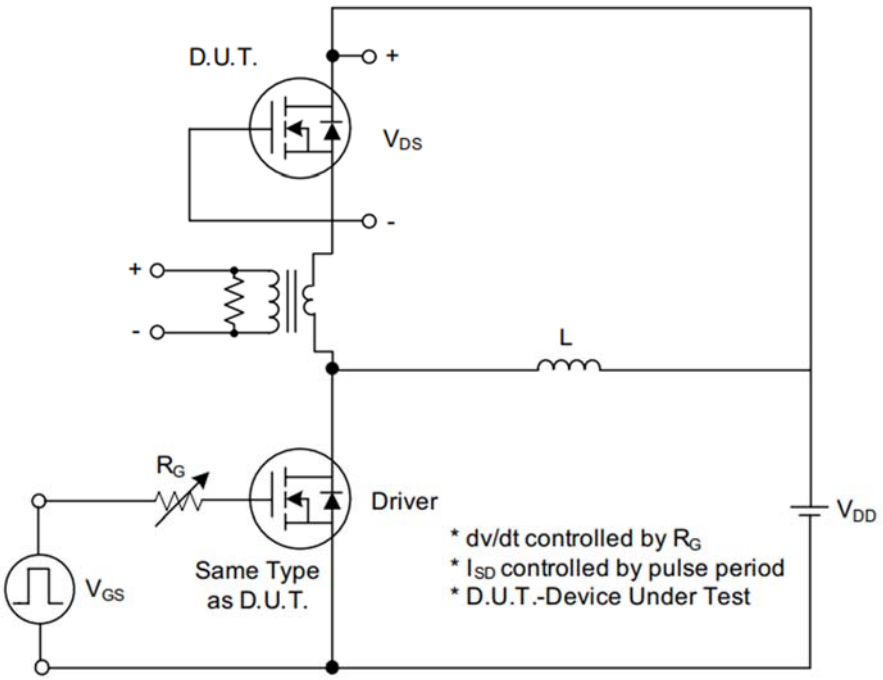


Fig. 18 Peak Diode Recovery dv/dt Waveforms

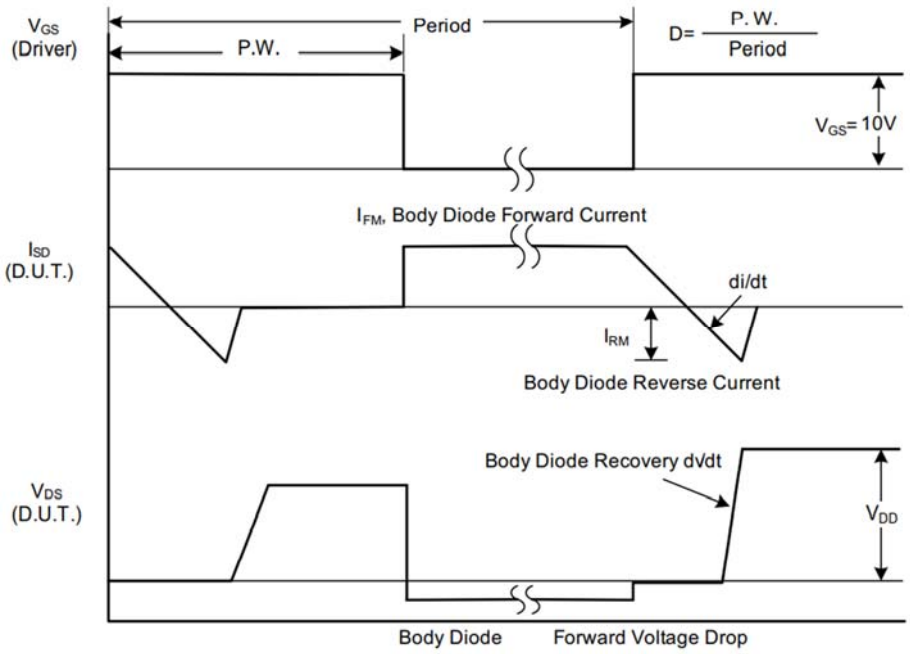


Fig 19. Switching Test Circuit

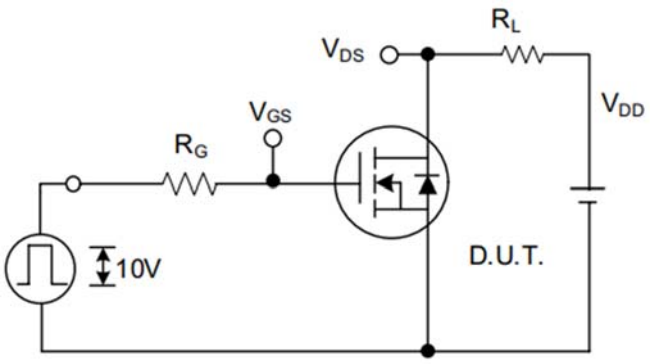


Fig 20. Switching Waveforms

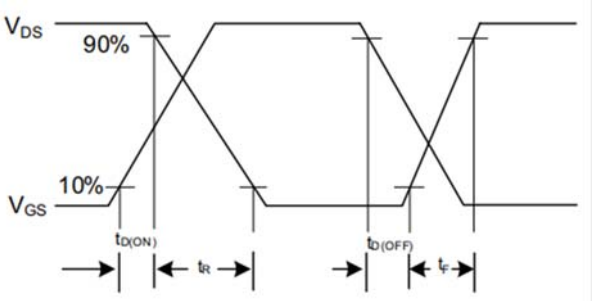


Fig 21. Gate Charge Test Circuit

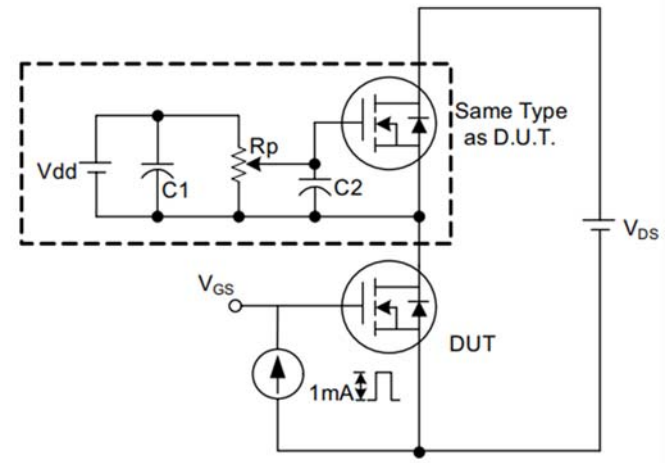


Fig 22. Gate Charge Waveform

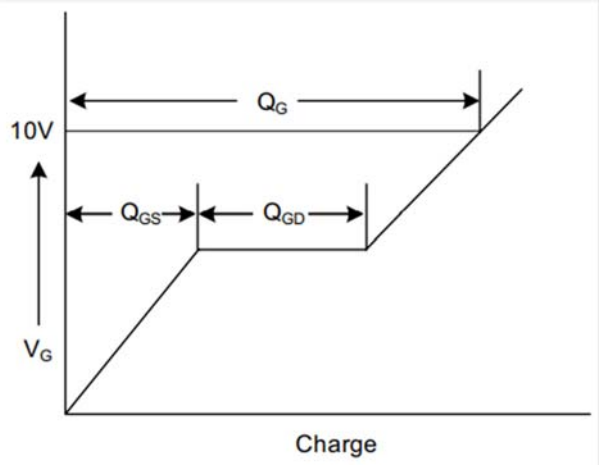


Fig 23. Unclamped Inductive Switching Test Circuit

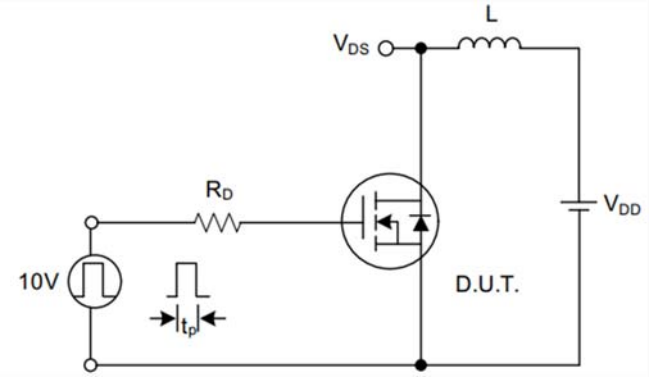
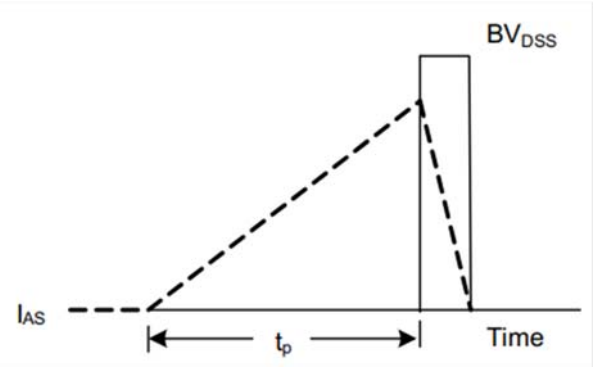
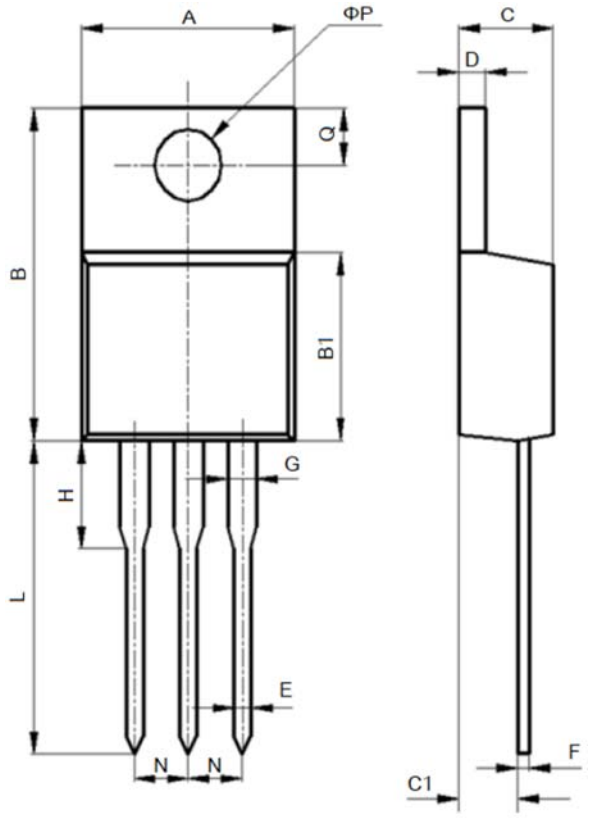


Fig 24. Unclamped Inductive Switching Waveforms



PACKAGE INFORMATION

Dimension in TO-220F (Unit: mm)



Symbol	Min.	Max.
A	9.70	10.30
B	15.50	16.10
B1	8.99	9.39
C	4.40	4.80
C1	2.15	2.55
D	2.50	2.90
E	0.70	0.90
F	0.40	0.60
G	1.12	1.42
H	3.40	3.80
L	12.6	13.6
N	2.34	2.74
Q	3.15	3.55
ΦP	3.00	3.30

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