

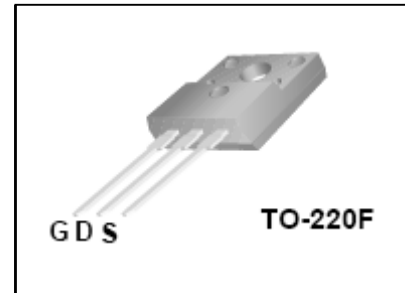
YD7N65-TO220F

N Channel Enhancement MOSFET

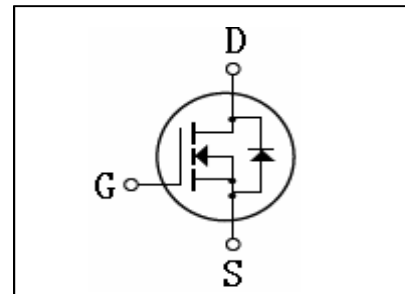
1. General Features 主要特点
 Shorter Switch Time 开关时间短
 Lower R_{DS(ON)} 通态电阻小
 RoHS Product 符合 RoHS 标准

BV _{DSS}	650	V
I _D	7	A
P _D (T _c =25°C)	48	W
R _{DS(on)}	1.21	Ω

2. Available Package TO-220F
 封装形式 TO-220F



3. Main Application 主要用途
 Adopter 电源适配器
 Electronics Rectifier 电子镇流器
 Switch Mode Power Supplier 开关电源等各类功率开关电路



4. Absolute Maximum Ratings 绝对最大额定值 T_c=25°C

Items 项目	Symbol 符号	Ratings 额定值	Units 单位
Drain-Source Voltage 漏极-源极反向电压	V _{DSS}	650	V
Gate-Source Voltage 栅极-源极电压	V _{GS}	± 30	V
Drain Current(cont.) 漏极电流(连续)	I _D	7	A
Avalanche Energy (pulse) 单脉冲能量(Note 1)	E _{AS}	530	mJ
Thermal Resistor(J-case) 热阻 (结到壳)	R _{th(j-c)}	2.6	°C/W
Thermal Resistor(J-amb.) 热阻 (结到环境)	R _{th(j-a)}	62.5	
Power Dissipation T _c =25°C 耗散功率 T _c =25°C	P _D	48	W
-Derate above 25°C -大于 25°C 每摄氏度减少		0.38	W/°C
Max Junction Temp. 最高结温	T _j	150	°C
Storage Temperature 贮存温度范围	T _{stg}	-55~150	°C

Note 1: L = 19.5mH, I_{AS} = 7A, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25°C

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5 Electronics Characteristics 电特性 $T_c=25^\circ\text{C}$

5.1 Off Characteristics 截止特性

Items 项目	Symbol 符号	Testing Condition 测试条件	Spec. Limit 规范			Units 单位
			Min.	Typ.	Max.	
Drain-Source Breakdown Voltage 漏极-源极反向击穿 电压	BV_{DSS}	$V_{GS}=0V, I_D=250\ \mu A$	650			V
Change rate of BV_{DSS} by Temperature 反向电压的温度系数	$\Delta BV_{DSS}/$ ΔT_J	$I_D=250\ \mu A$		0.6		V/°C
Zero gate voltage drain current 漏源截止电流	I_{DSS}	$V_{DS}=650V, V_{GS}=0V$			10	μA
Gate body leakage current 栅源截止电流	I_{GSS}	$V_{GS}=\pm 30V, V_{DS}=0V$			± 100	nA

5.2 On Characteristics 开启特性

Item 项目	Symbol 符号	Testing Condition 测试条件	Spec. Limit 规范			Units 单位
			Min	Typ.	Max.	
Gate Threshold Voltage 阈值电压	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\ \mu A$	2.0		4.0	V
Static Drain-source On Resistance 通态电阻	$R_{DS(on)}$	$V_{GS}=10V\ I_D=3.5A$		1.21	1.45	Ω
Forward Trans-conductance 跨导	g_{FS}	$V_{DS}=40V\ I_D=3.5A$ (Note 2)		6		S

5.3 Dynamic Characteristics 动态特性

Items 项目	Symbol 符号	Testing Condition 测试条件	Spec. Limit 规范			Units 单位
			Min.	Typ.	Max.	
Input Capacitance 输入电容	C_{iss}	$V_{DS}=25V\ V_{GS}=0V$ $f=1.0MHz$		1095	1430	pF
Output Capacitance 输出电容	C_{oss}			93	175	
Reverse Transfer Capacitance 反向传输电容	C_{rss}			2	21	

Note 2: Pulse width $\leq 300\ \mu s$, duty cycle $\leq 2\%$

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5.4 Switch Characteristics 开关特性

Items 项目	Symbol 符号	Testing Condition 测试条件	Spec. Limit 规范			Units 单位
			Min.	Typ.	Max.	
Turn-on Delay Time 导通延迟时间	$t_{d(on)}$	$V_{DD}=325V$ $I_D=7A$ $R_G=25\ \Omega$ (Note 2)		39	60	nS
Rise Time 上升时间	t_r			29	70	
Turn-off Delay Time 断开延迟时间	$t_{d(off)}$			248	300	
Fall Time 下降时间	t_f			36	90	
Total Gate Charge 栅极电荷	Q_g	$V_{DS}=520V$ $I_D=7A$ $V_{GS}=10V$ (Note 2)		26.8	37	nC
Gate-Source Charge 栅极—源极电荷	Q_{gs}			5.1		
Gate-Drain Charge 栅极—漏极电荷	Q_{gd}			8.5		

5.5 Drain-Source Diode Characteristics 漏源二极管特性

Items 项目	Symbol 符号	Testing Condition 测试条件	Spec. Limit 规范			Units 单位
			Min	Typ.	Max.	
Source Current 源极电流	I_S				7	A
S-D Current(pulsed) 脉冲电流	I_{SM}				28	A
Forward On Voltage 正向压降	V_{SD}	$I_S=7A, V_{GS}=0V$			1.4	V
Reverse Recovery Time 反向恢复时间	T_{rr}	$I_S=7A, V_{GS}=0V,$ $dI_F/dt=100A/\mu S$ (Note 2)		365		nS
Reverse Recovery Charge 反向恢复电荷	Q_{rr}			3.4		μC

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6. Typical Characteristics Curve

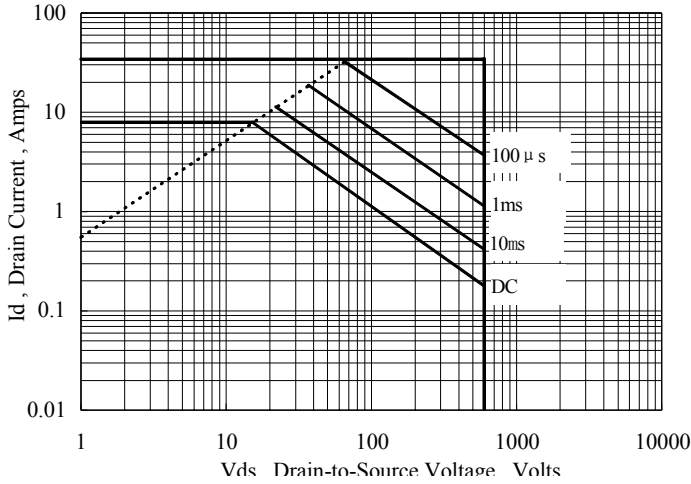


Figure 1 Maximum Forward Bias Safe Operating Area

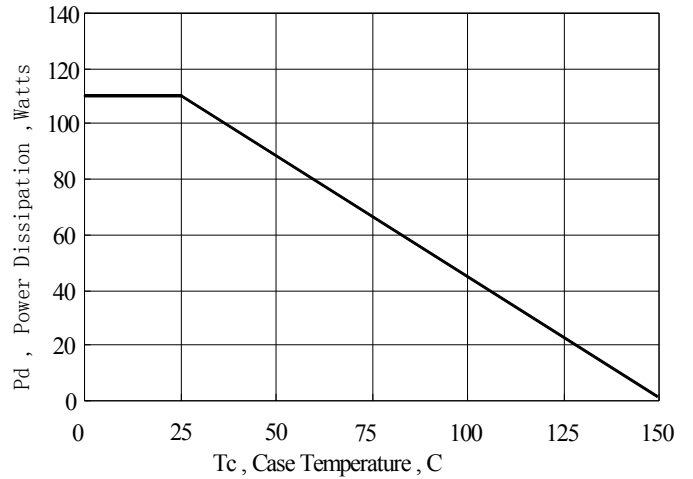


Figure 2 Maximum Power Dissipation vs Case Temperature

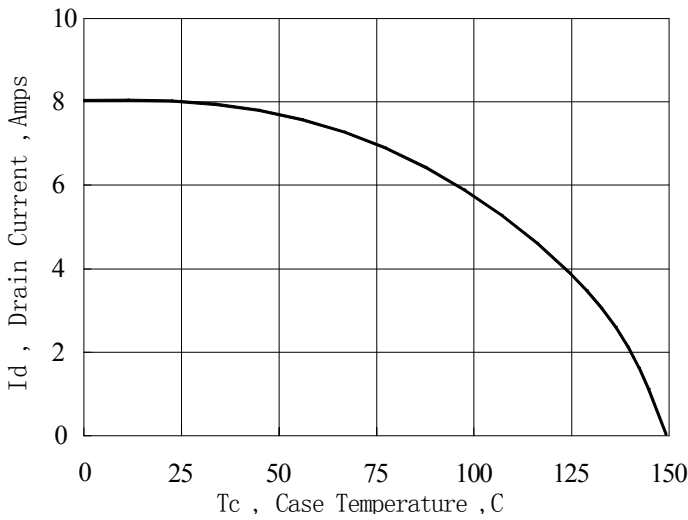


Figure 3 Maximum Continuous Drain Current vs Case Temperature

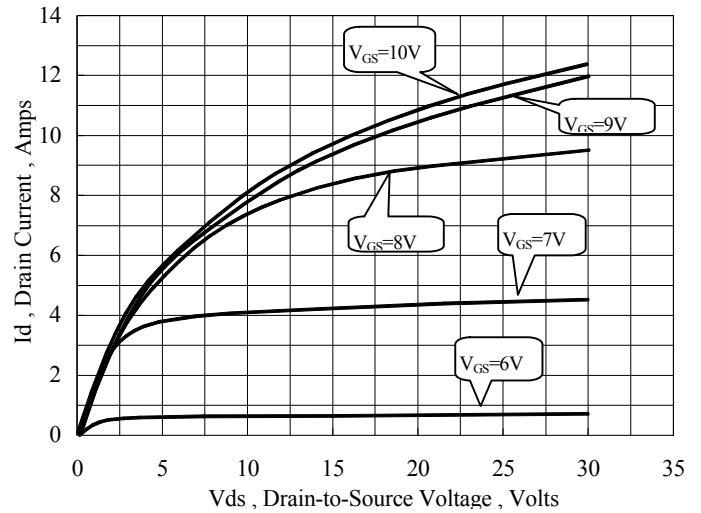


Figure 4 Typical Output Characteristics

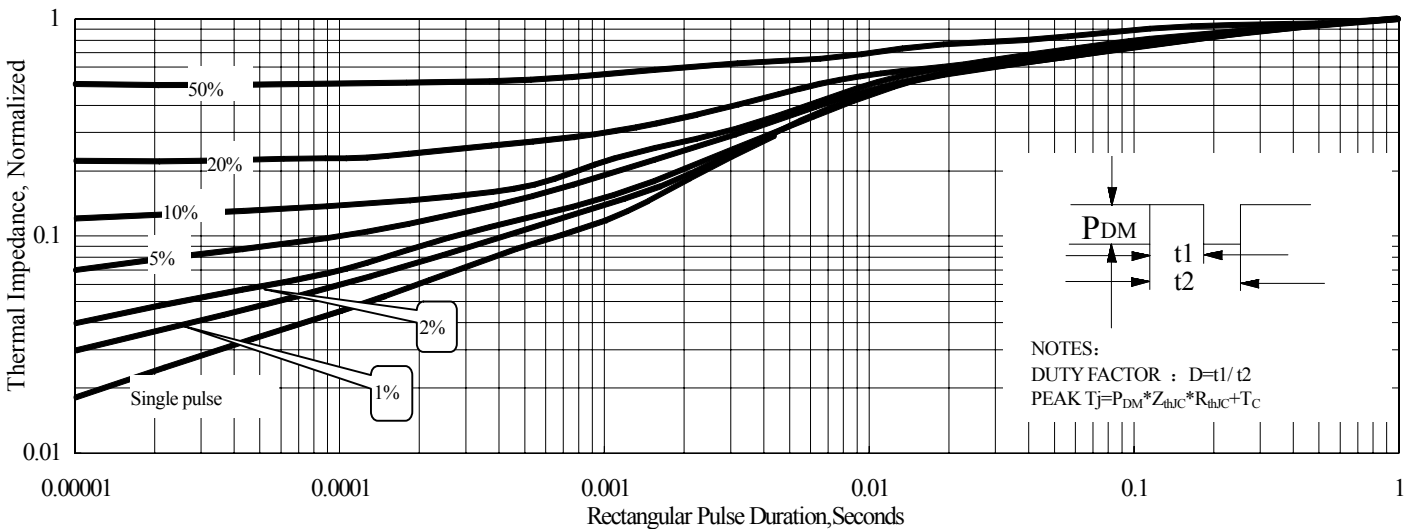


Figure 5 Maximum Effective Thermal Impedance, Junction to Case

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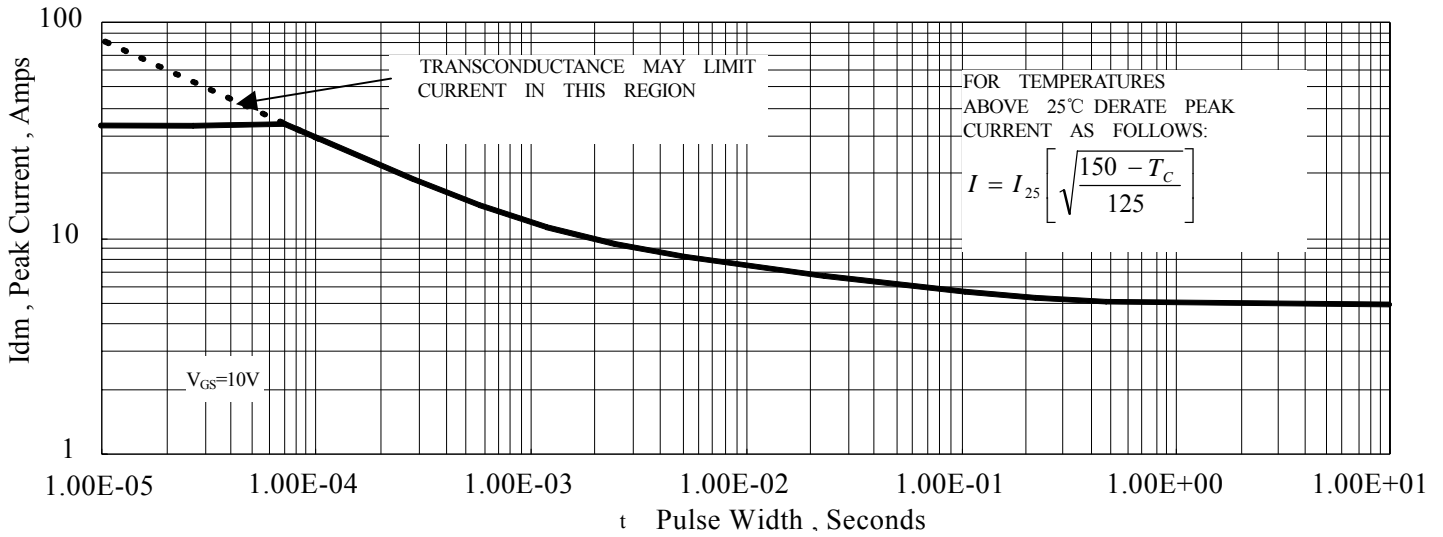


Figure 6 Maximum Peak Current Capability

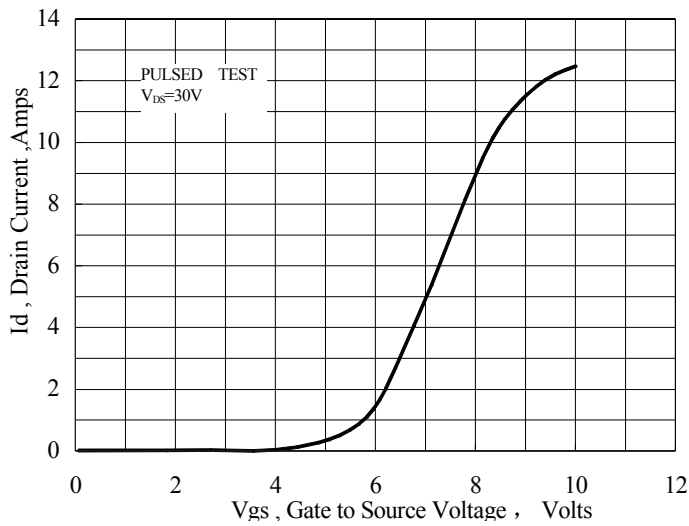


Figure 7 Typical Transfer Characteristics

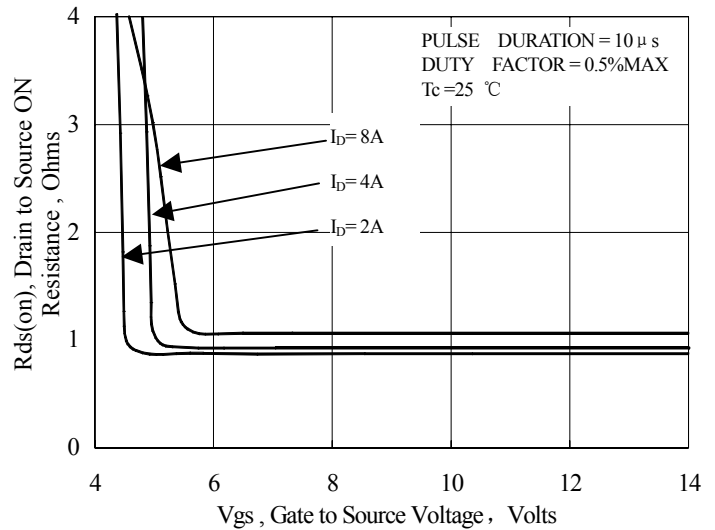


Figure 8 Typical Drain to Source ON Resistance vs Gate Voltage and Drain Current

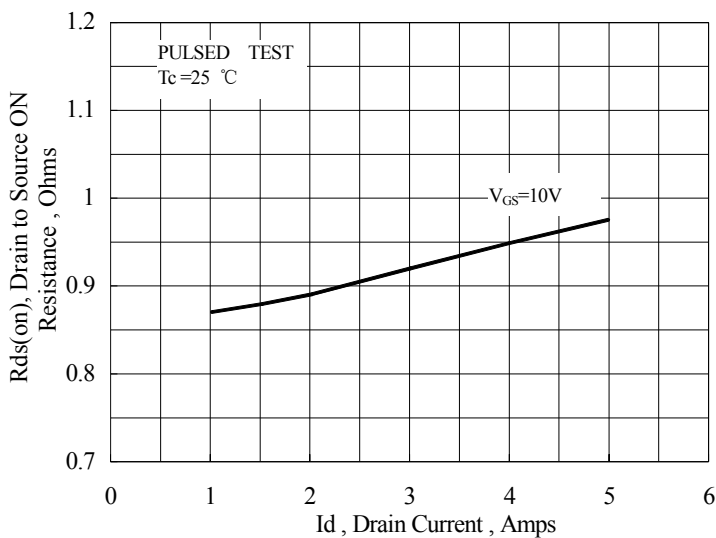


Figure 9 Typical Drain to Source ON Resistance vs Drain Current

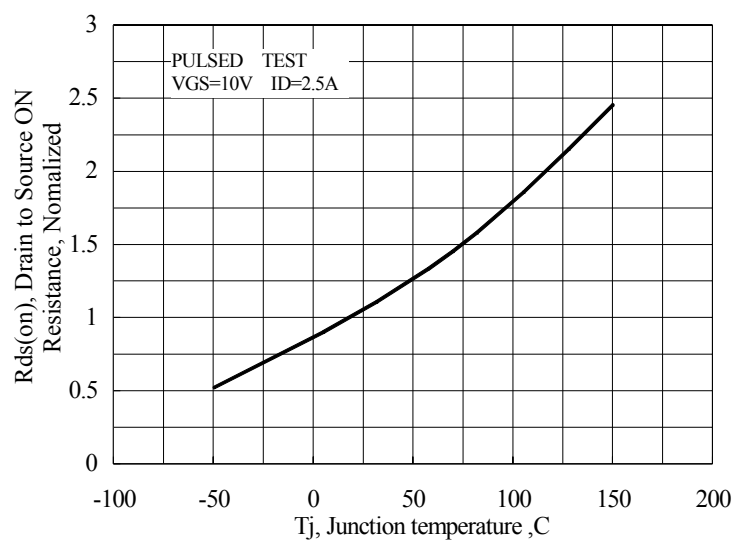


Figure 10 Typical Drain to Source on Resistance vs Junction Temperature

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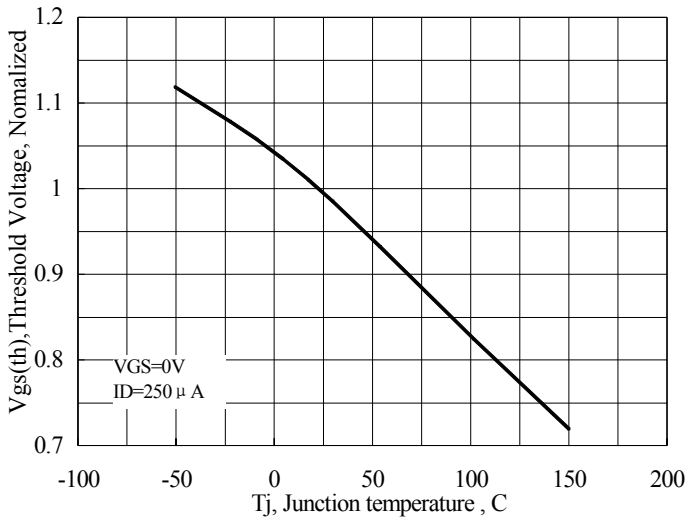


Figure 11 Typical Theshold Voltage vs Junction Temperature

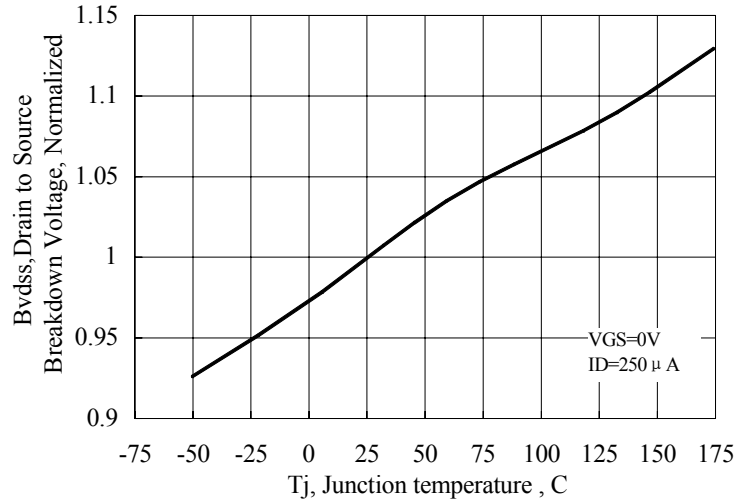


Figure 12 Typical Breakdown Voltage vs Junction Temperature

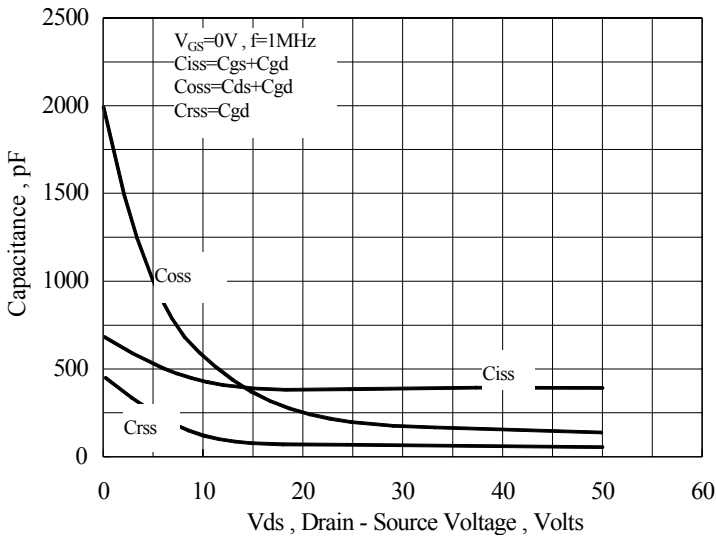


Figure 13 Typical Capacitance vs Drain to Source Voltage

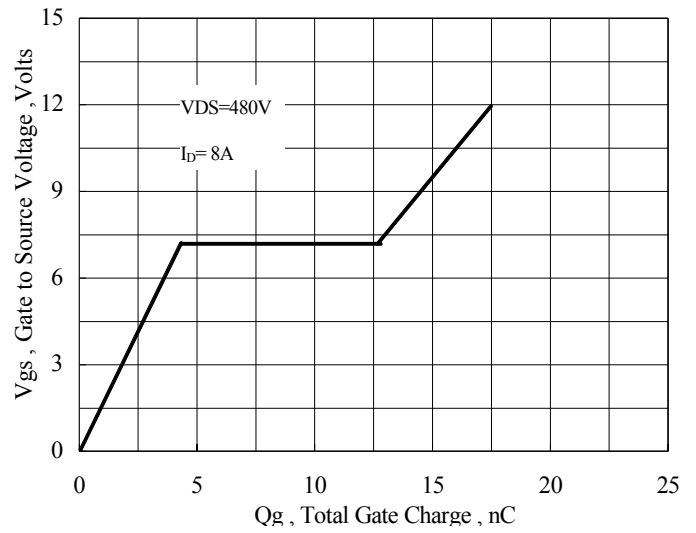


Figure 14 Typical Gate Charge vs Gate to Source Voltage

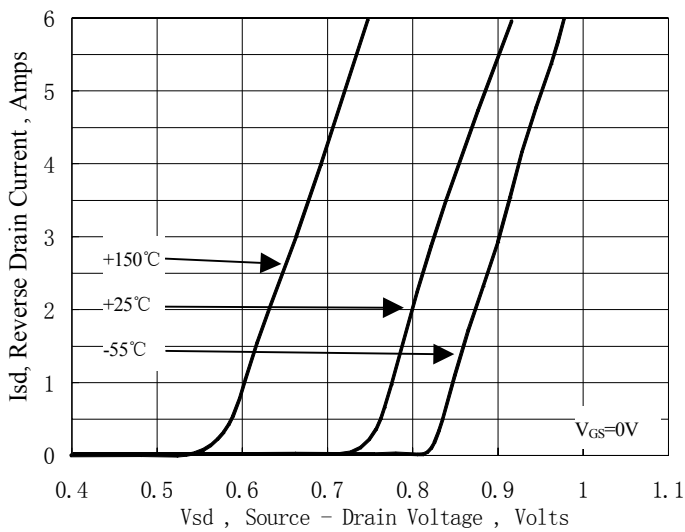


Figure 15 Typical Body Diode Transfer Characteristics

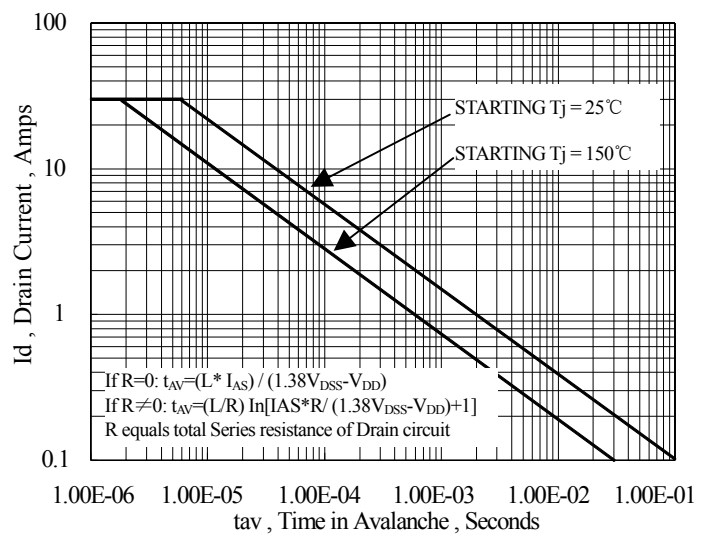
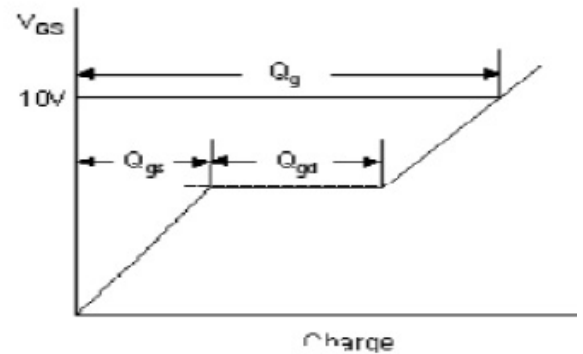
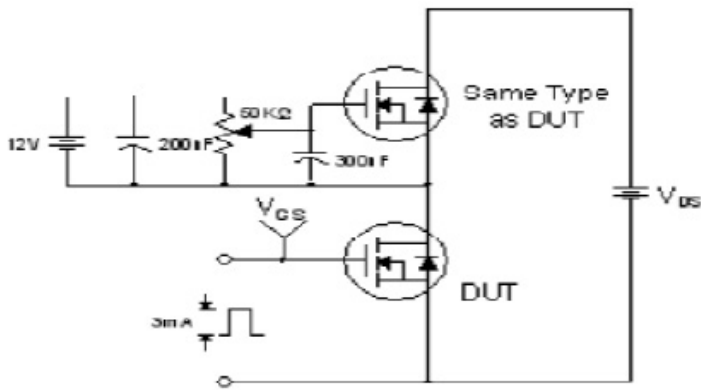
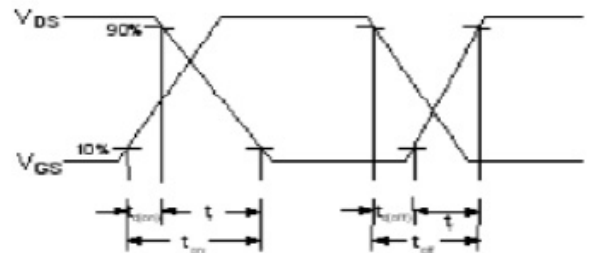
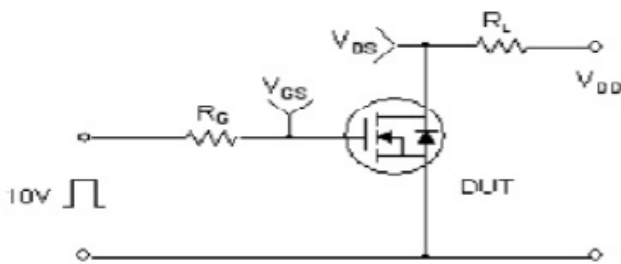


Figure 16 Unclamped Inductive Switching Capability

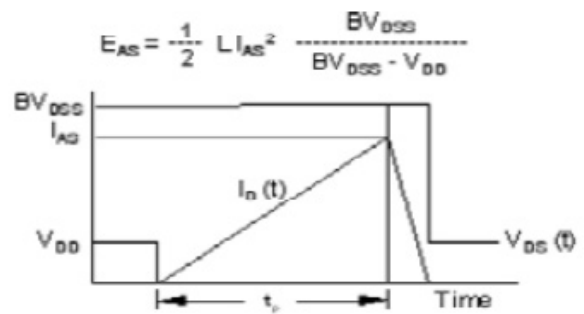
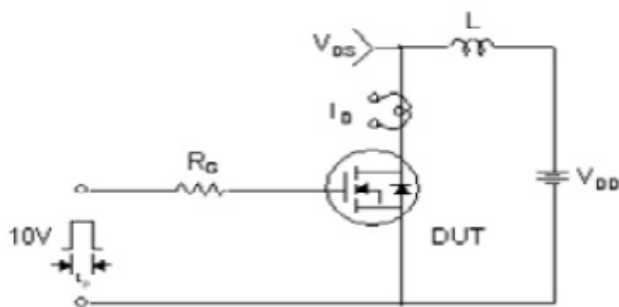
TestCircuitandWaveform



Gate Charge Test Circuit and Waveform

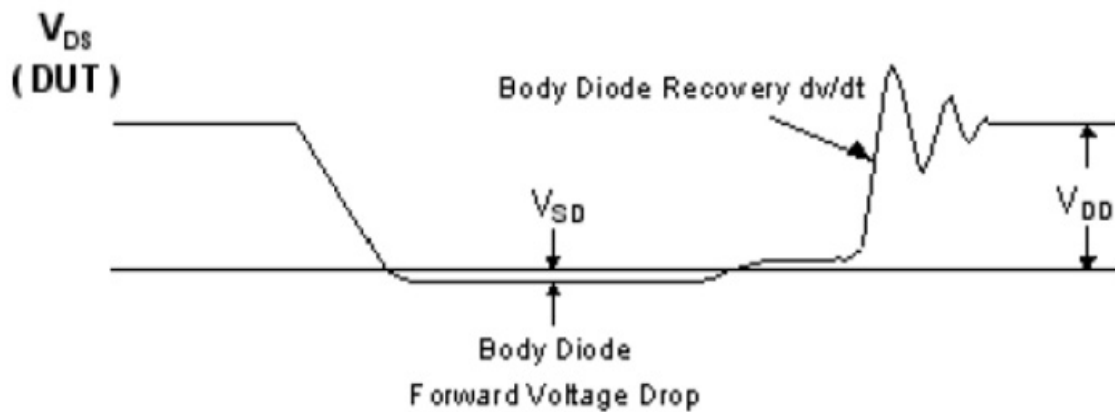
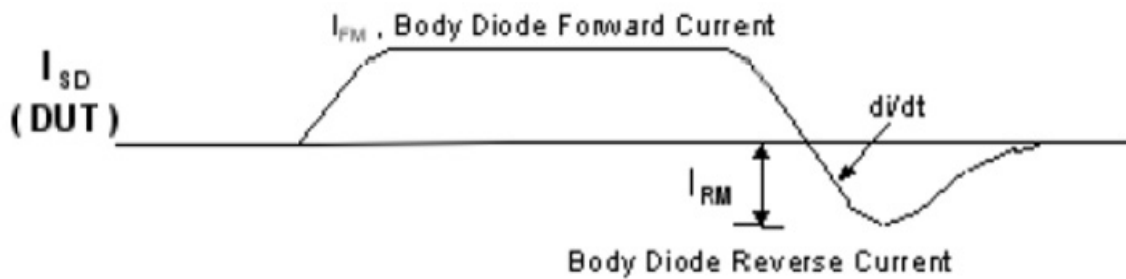
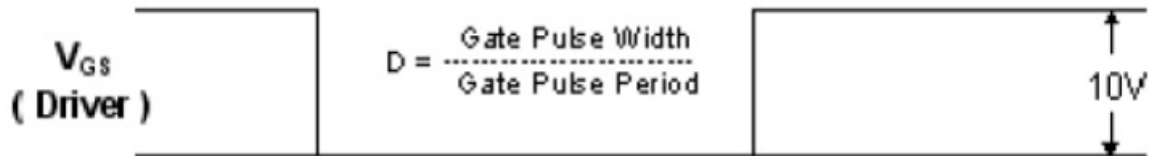
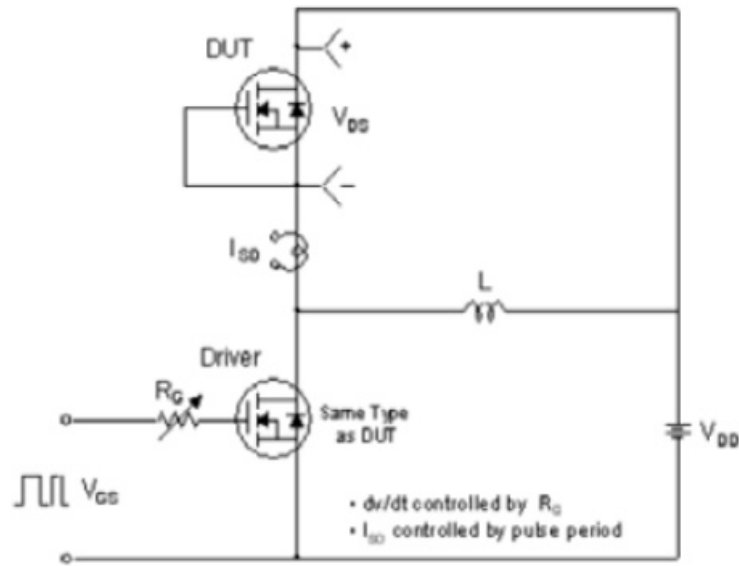


Resistive Switching Test Circuit and Waveform



Unclamped Inductive Switching Test Circuit and Waveform

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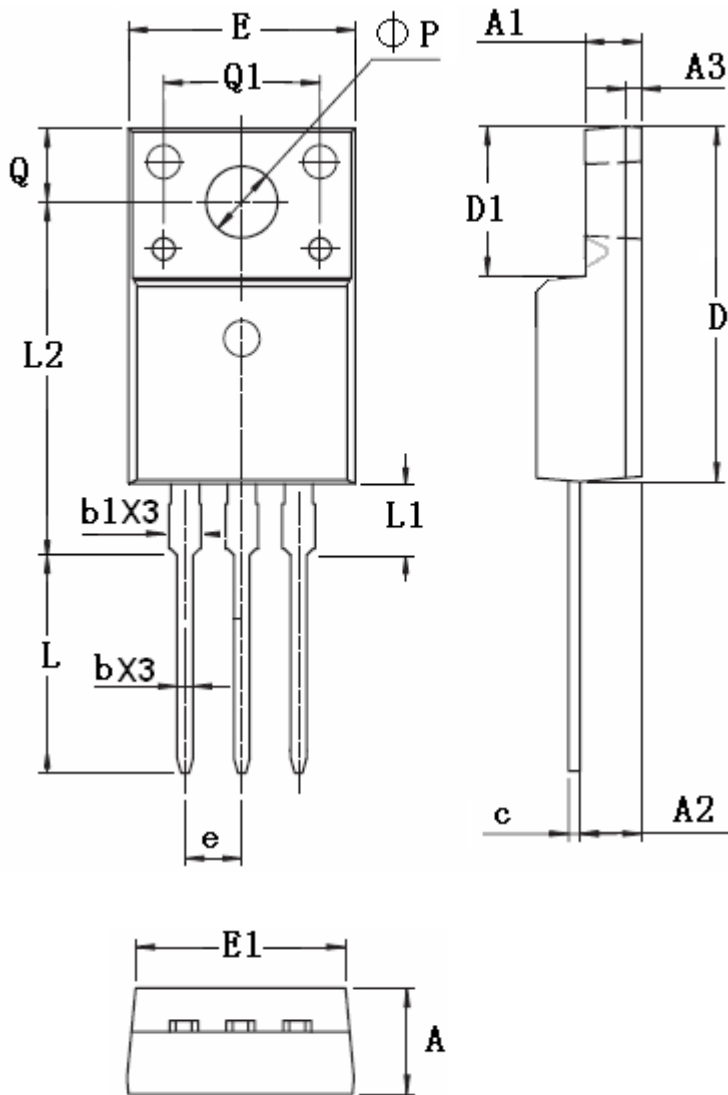
Diode Reverse Recovery Test Circuit and Waveform

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TO-220F PACKAGE OUTLINE DIMENSIONS

TO-220F 封装外形尺寸

Unit : mm



Item	Min.	Max.
A	4.500	4.900
A1	2.350	2.750
A2	2.520	2.920
A3	0.600	0.800
b	0.700	0.900
b1	1.220	1.420
c	0.450	0.600
D	15.800	16.000
D1	6.670	6.770
E	9.920	10.320
E1	9.200	9.400
e	2.540REF	
L	9.450	10.050
L1	2.790	3.300
L2	15.600	16.000
Q	3.200	3.400
Q1	6.900	7.100
ΦP	3.150	3.550