佳恩半导体
JIAENSEMI

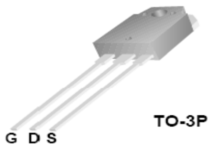
JFAM50N50C

Silicon N-Channel Power MOSFET

$V_{DSS}(T_C=150℃)$	500	V
I_D	50	A
$P_D(T_C=25℃)$	500	W
$R_{DS(ON)}$	0.082	Ω

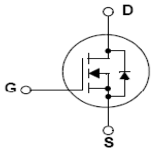
Features:

- Fast Switching
- ESD Improved Capability
- Low Gate Charge (Typical Data: 140nC)
- Low Reverse transfer capacitances(Typical: 80pF)
- 100% Single Pulse avalanche energy Test



Applications:

- Power switch circuit of PC POWER



Absolute (Tc=25℃ unless otherwise specified):

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	500	V
I_D	Continuous Drain Current	50	A
	Continuous Drain Current T_C=100 °C	20	A
$I_{DM}{}^{a1}$	Pulsed Drain Current	120	A
V_{GS}	Gate-to-Source Voltage	±30	V
E_{AS}	Single Pulse Avalanche Energy	3500	mJ
$E_{Ar}{}^{a1}$	Avalanche Energy ,Repetitive	400	mJ
$I_{AR}{}^{a1}$	Avalanche Current	8.9	A
dv/dt^{a2}	Peak Diode Recovery dv/dt	5.0	V/ns
P_D	Power Dissipation	500	W
	Derating Factor above 25°C	2	W/℃
T_J, T_{stg}	Operating Junction and Storage Temperature Range	150, −55 to 150	℃
T_L	Maximum Temperature for Soldering	300	℃

Caution Stresses greater than those in the "Absolute Maximum Ratings" may cause permanent damage to the device

Thermal Characteristics

Symbol	Parameter	Rating	Units
$R_{θJC}$	Thermal Resistance, Junction-to-Case	0.25	℃/ W
$R_{θJA}$	Thermal Resistance, Junction-to-Ambient	40	℃/ W

Electrical Characteristics (Tc= 25℃ unless otherwise specified):

OFF Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V_{DSS}	Drain to Source Breakdown Voltage	V_{GS}=0V,I_D=250μA	500	--	--	V

I_{DSS}	Drain to Source Leakage Current	V_{DS}=500V, V_{GS}=0V,T_a=25℃	--	--	1.0	μA
		V_{DS}=400V, V_{GS}=0V,T_a=125℃	--	--	100	
$I_{GSS(F)}$	Gate to Source Forward Leakage	V_{GS}=+20V	--	--	100	nA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	V_{GS}=-20V	--	--	-100	nA

ON Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$R_{DS(ON)}$	Drain-to-Source On-Resistance	V_{GS}=10V,I_D=25A	--	0.082	0.1	Ω
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	2.0	--	4.0	V
g_{fs}	Forward Trans conductance	V_{DS}=30V,I_D=15A	--	20	--	S
Pulse width<380μs; duty cycle<2%.						

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
C_{iss}	Input Capacitance	V_{GS}=0V V_{DS}=25V f=1.0MHz	--	8260	--	pF
C_{oss}	Output Capacitance		--	730	--	
C_{rss}	Reverse Transfer Capacitance		--	80	--	

Resistive Switching Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	I_D=30A,V_{DD}=250V V_{GS}=10V,R_g=25Ω	--	68	--	ns
t_r	Rise Time		--	120	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	485	--	
t_f	Fall Time		--	145	--	
Q_g	Total Gate Charge	I_D=30A,V_{DD}=250V V_{GS}=10V	--	140	--	nC
Q_{gs}	Gate to Source Charge		--	22	--	
Q_{gd}	Gate to Drain (“Miller”)Charge		--	48	--	

Source-Drain Diode Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_{SD}	Continuous Source Current (Body Diode)		--	--	30	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	120	A
V_{SD}	Diode Forward Voltage	I_S=50A,V_{GS}=0V	--	--	1.5	V
t_{rr}	Reverse Recovery Time	I_S=50A,T_j=25℃ dI_F/dt=100A/μs,V_{GS}=0V	--	485	--	ns
Q_{rr}	Reverse Recovery Charge		--	4.8	--	uC

a1：Repetitive rating; pulse width limited by maximum junction temperature

a2：I_{SD}=30A,di/dt≤100A/us,V_{DD}≤BV_{DS}, Start T_J=25℃

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Characteristics Curve:

Figure 1. Maximum Effective Thermal Impedance, Junction-to-Case

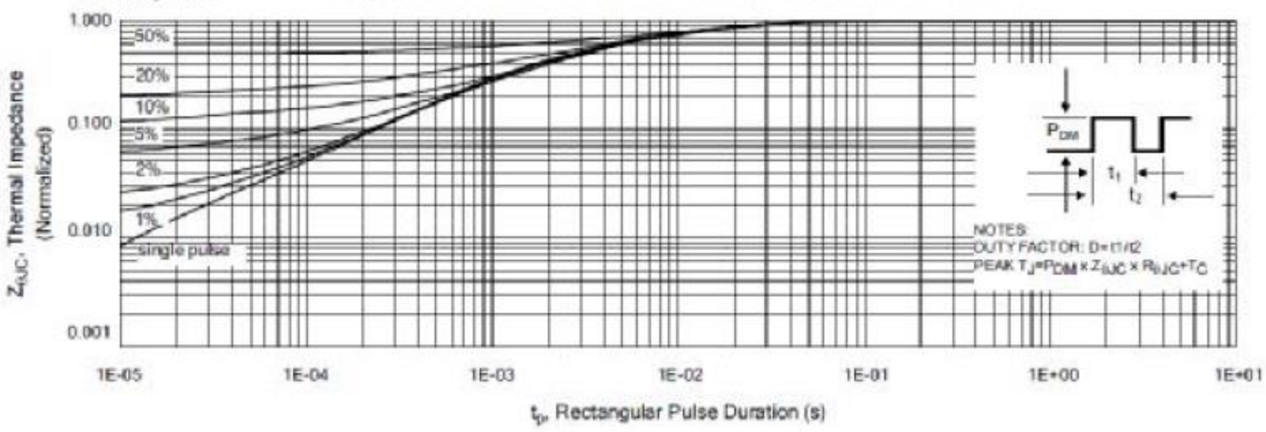


Figure 2. Maximum Power Dissipation vs Case Temperature

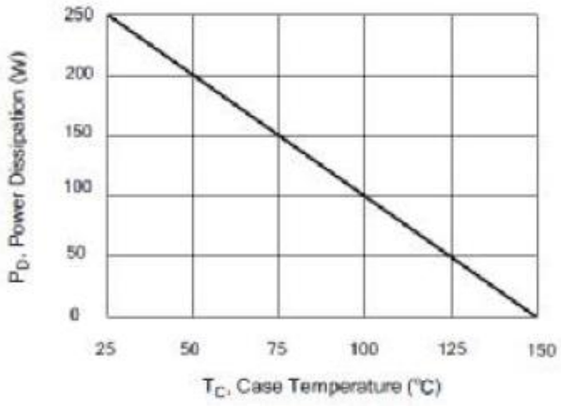


Figure3. Maximum Continuous Drain Current vs Case Temperature

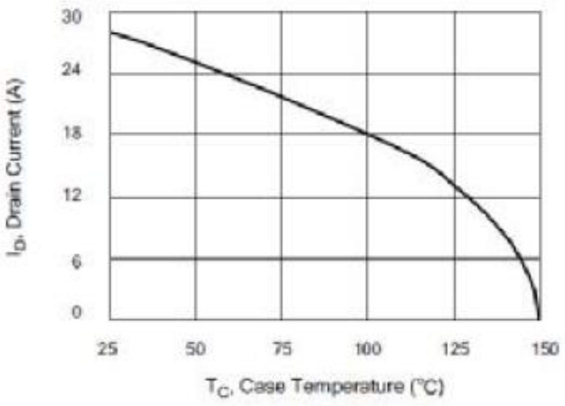


Figure 4. Typical Output Characteristics

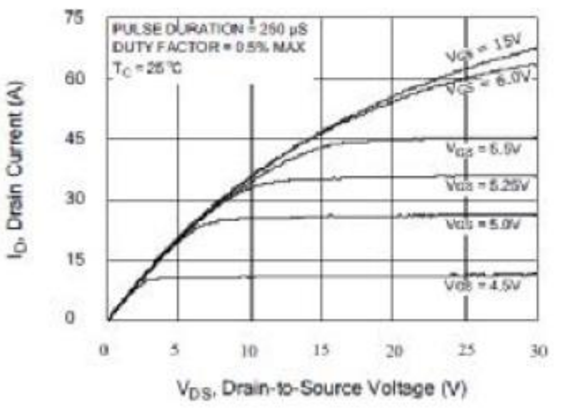


Figure5. Typical Drain-to-Source ON Resistance vs Gate Voltage and Drain Current

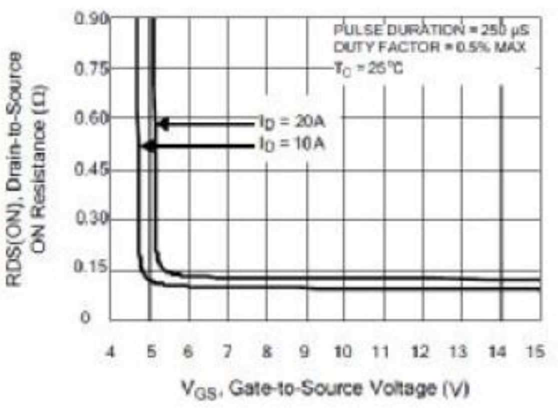


Figure 6. Maximum Peak Current Capability

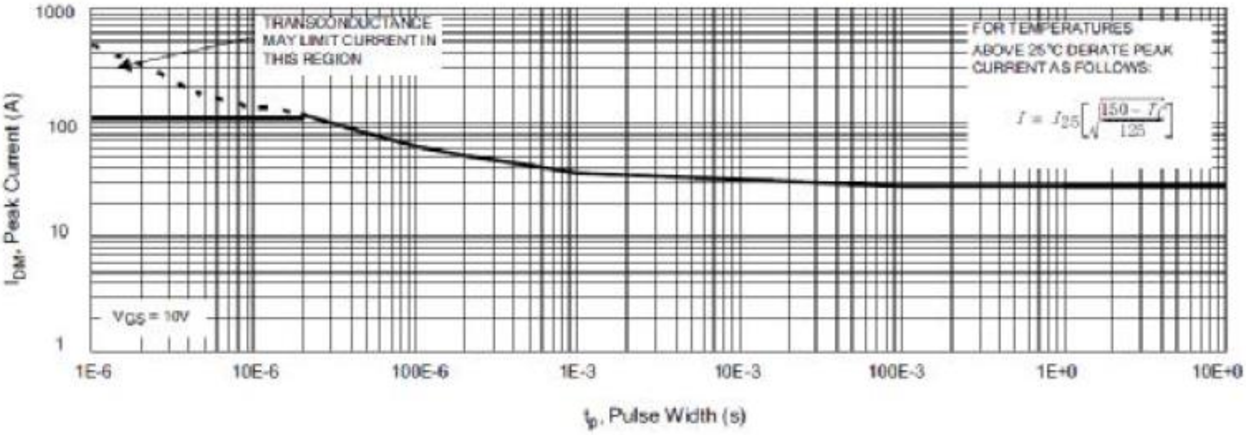


Figure 7. Typical Transfer Characteristics

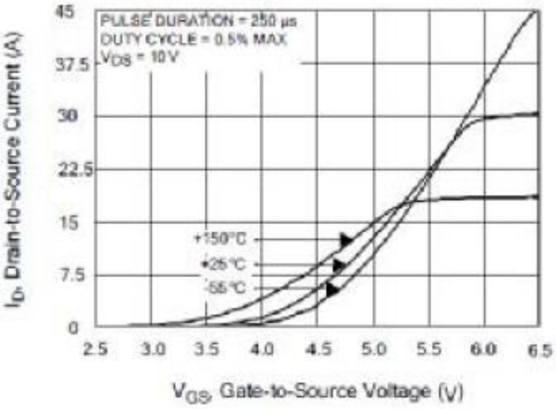


Figure8. Unclamped Inductive Switching Capability

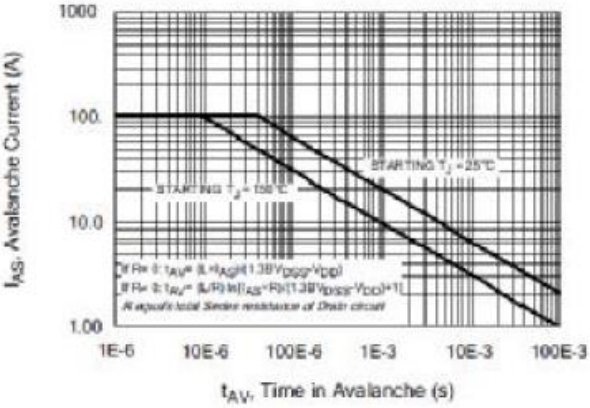


Figure 9. Typical Drain-to-Source ON Resistance vs Drain Current

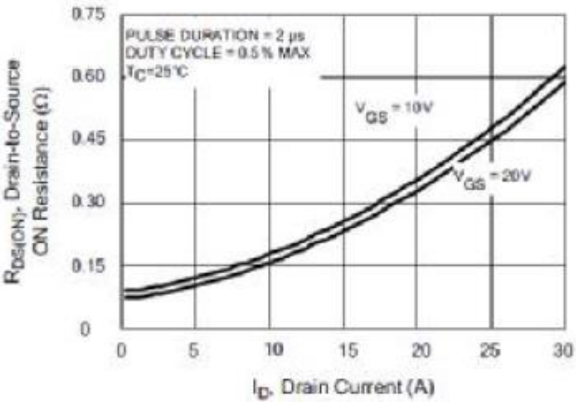


Figure 10. Typical Drain-to-Source ON Resistance vs Junction Temperature

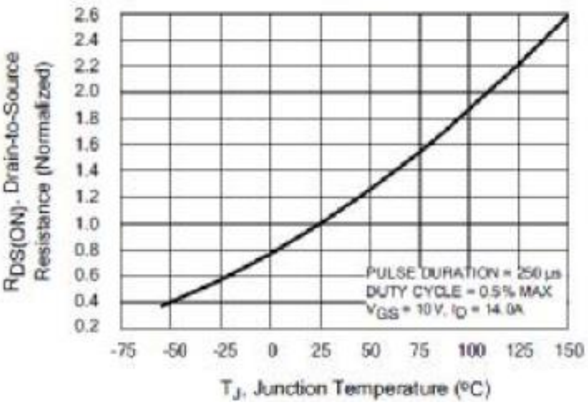


Figure 11. Typical Breakdown Voltage vs Junction Temperature

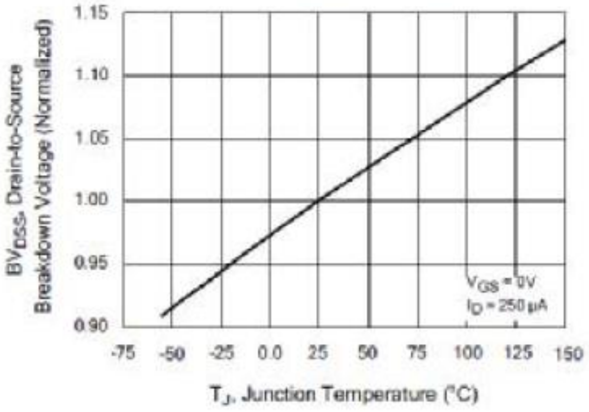


Figure 12. Typical Threshold Voltage vs Junction Temperature

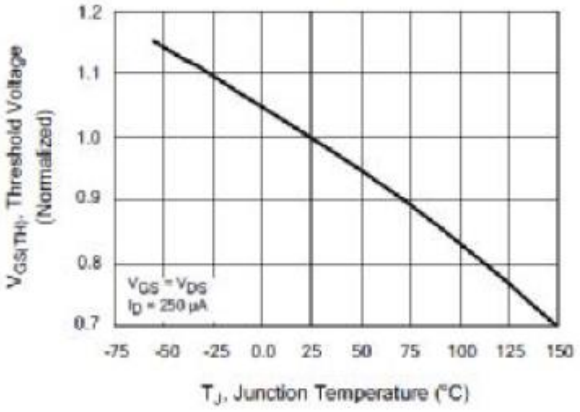


Figure 13. Maximum Forward Bias Safe Operating Area

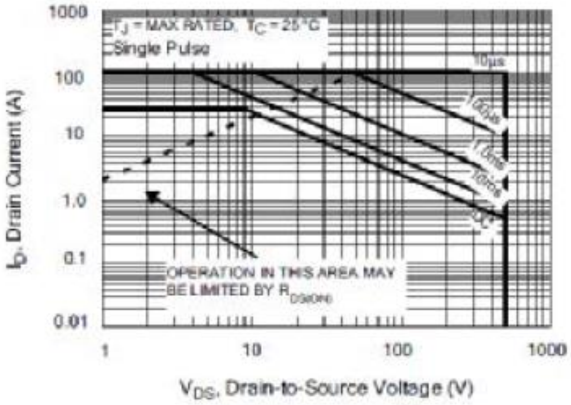


Figure 14. Typical Capacitance vs

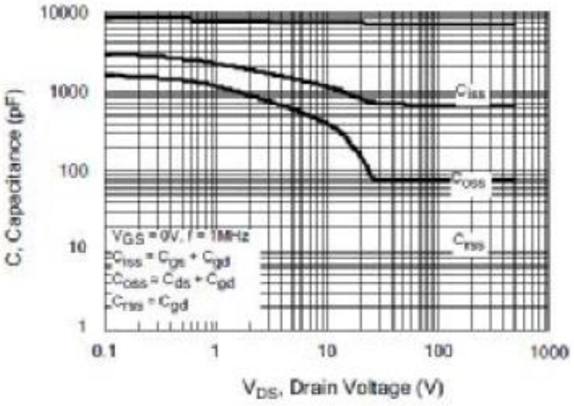


Figure 15. Typical Gate Charge vs Gate-to-Source Voltage

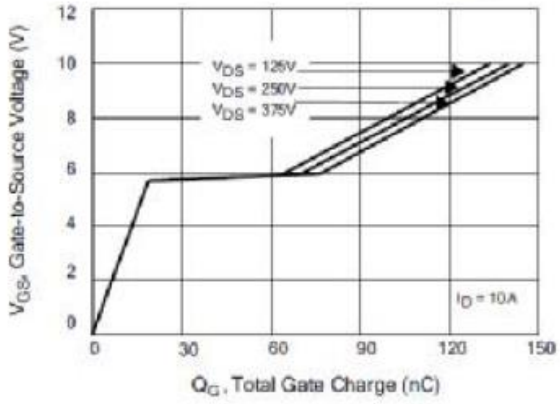
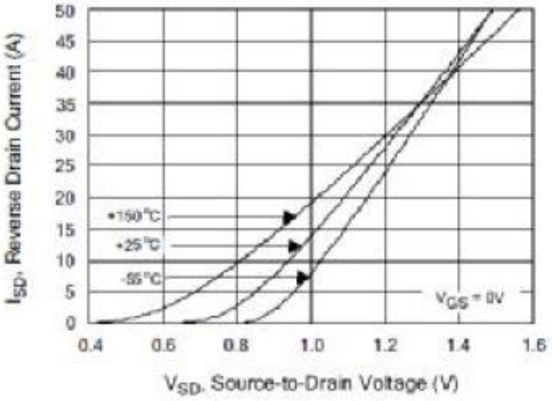
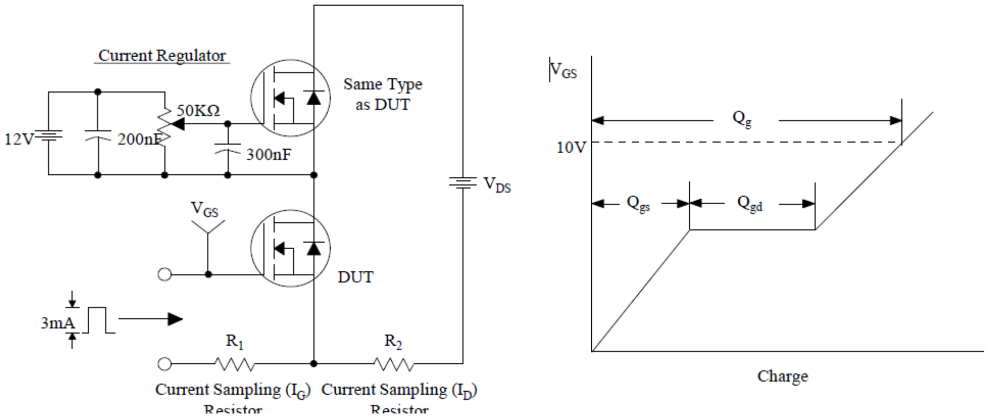


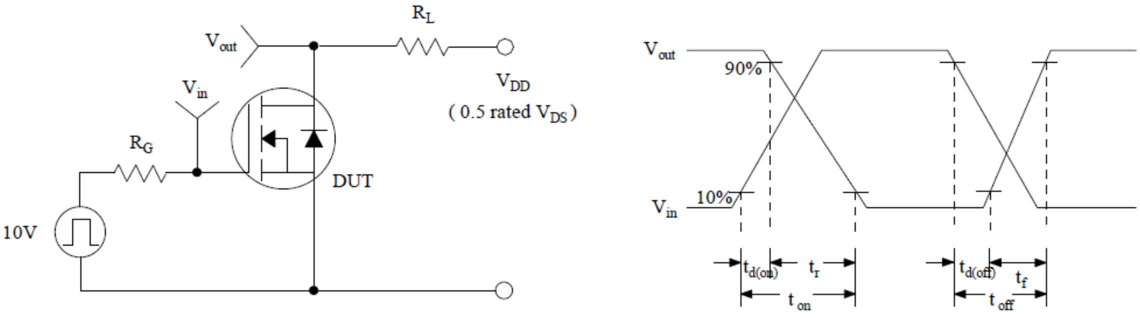
Figure 16. Typical Body Diode Transfer Characteristics



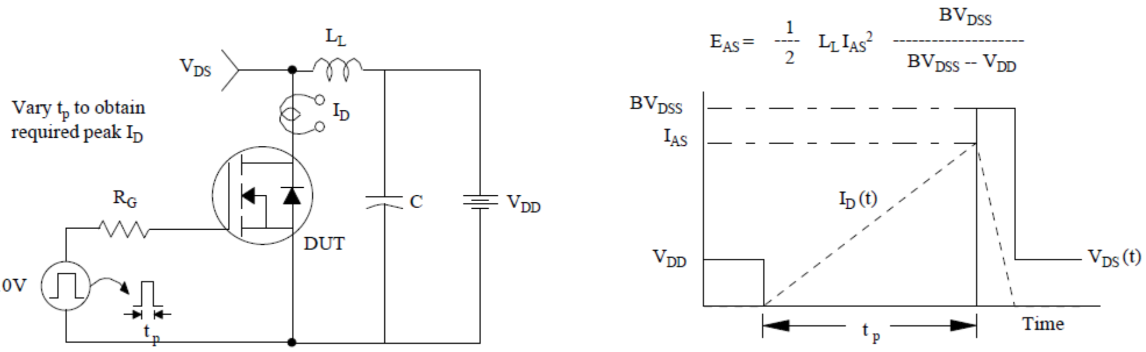
Test Circuit & Waveform



Gate Charge Test Circuit & Waveform



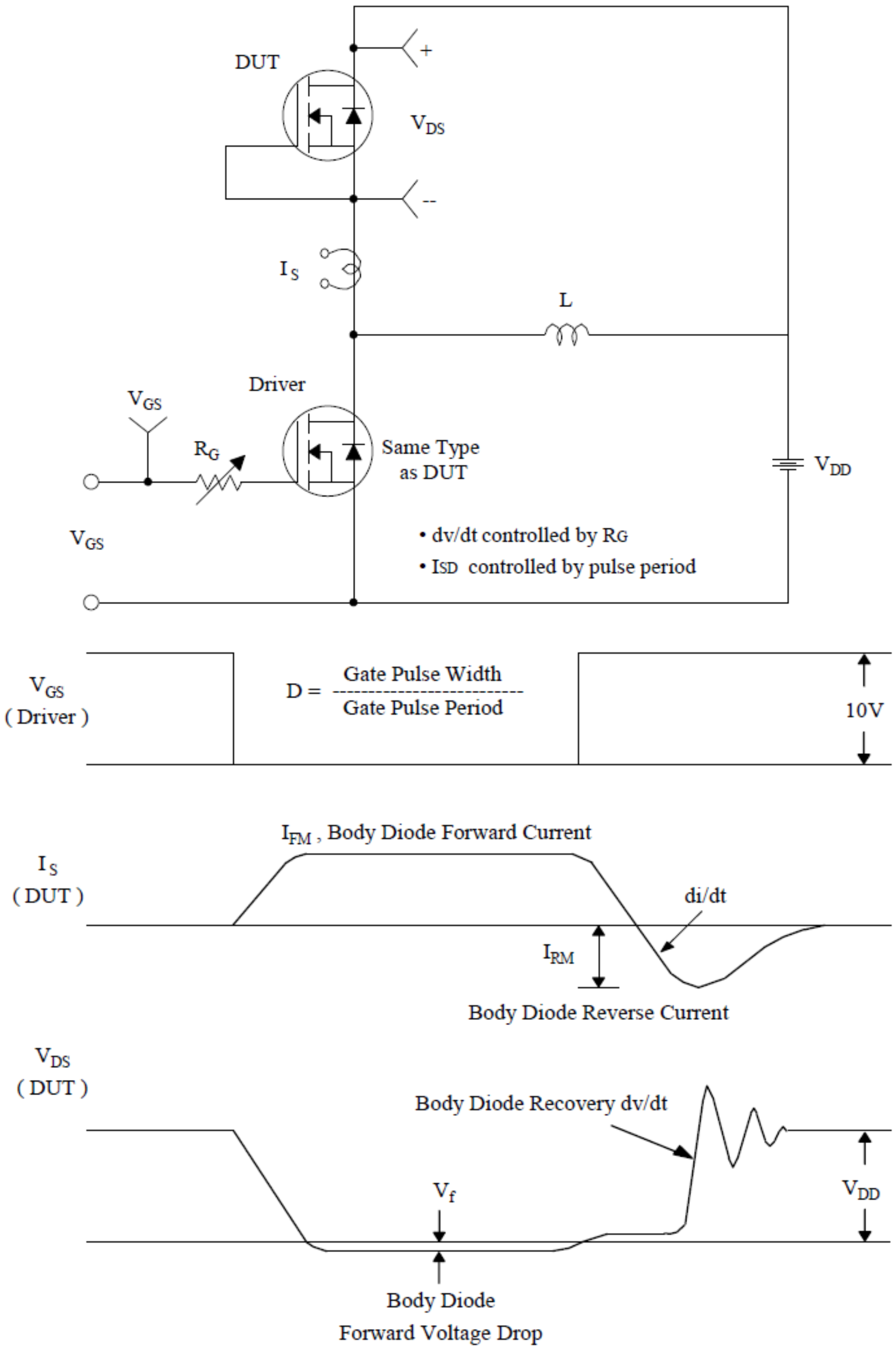
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

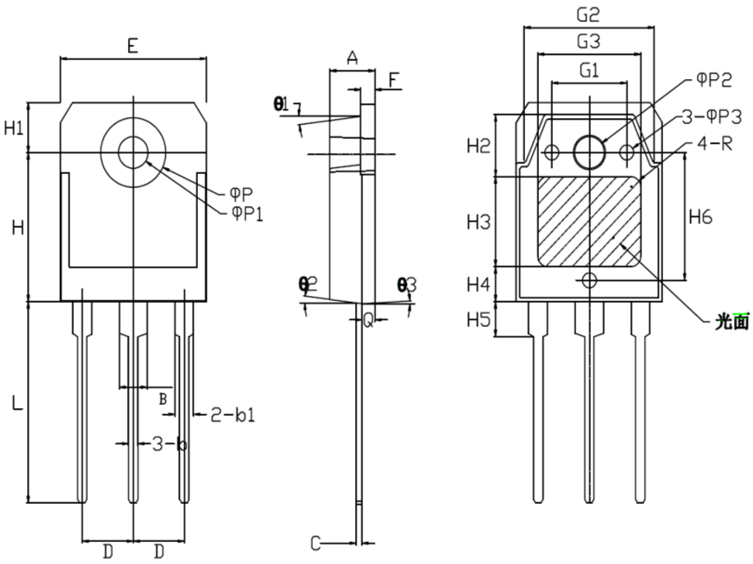
Silicon N-Channel Power MOSFET

Test Circuit & Waveform



Peak Diode Recovery dv/dt Test Circuit & Waveforms

TO-3P PACKAGE OUTLINE



符号	单位：mm		
	Min	Nor	Max
*A	4.75	4.80	4.85
*B	2.95	3.00	3.05
*C	0.585	0.600	0.615
*D	5.35	5.45	5.55
*E	15.55	15.60	15.65
*F	1.508	1.500	1.492
G1	7.90	8.00	8.10
G2	13.50	13.60	13.70
G3	10.90	11.00	11.10
b		1.00	
*b1		2.00	
*L	20.00	20.10	20.20
*H	14.80	14.90	15.00
*H1	4.90	5.00	5.10
H2	6.10	6.20	6.30
H3	8.90	9.00	9.10
H4	3.40	3.50	3.60
H5	2.90	3.00	3.10
H6	12.66	12.76	12.86
ΦP		7.00	
*ΦP1		3.20	
*ΦP2		3.50	
ΦP3		1.50	
θ1	6°	7°	8°
θ2	6°	7°	8°
θ3	2°	3°	4°
*Q	1.33	1.38	1.43
R		1.00	

注：1.带*的为检验尺寸。
　　2.未注公差为0.1mm

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