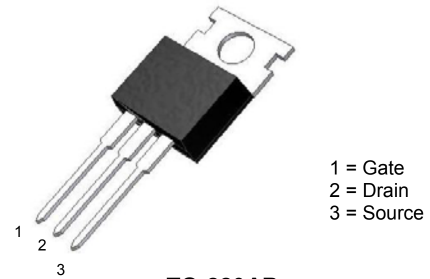
N-Channel Power MOSFET

2.0A, 600V, 4.6Ω

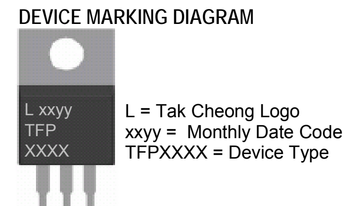


TO-220AB

General Description

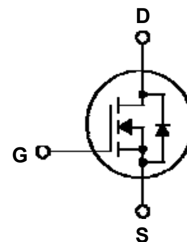
The N-Channel MOSFET is used an advanced termination scheme to provide enhanced voltage-blocking capability without degrading performance over time. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance. This device is well suited for high efficiency switched mode power suppliers, active power factor correction, electronic lamp ballasts based half bridge topology.

DEVICE MARKING DIAGRAM



Features

- Robust high voltage termination
- Avalanche energy specified
- Diode is characterized for use in bridge circuits
- Source to Drain diode recovery time comparable to a discrete fast recovery diode.



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

Symbol	Parameter	Value	Units
V_{DSS}	Drain- Source Voltage	600	V
V_{GSS}	Gate-Source Voltage	±30	V
I_D	Drain Current	2.0	A
I_{DM}	Drain Current Pulsed	8.0	A
P_D	Power Dissipation (Note 2)	44	W
	Derating factor above 25℃	0.22	W/℃
E_{AS}	Single Pulsed Avalanche Energy (Note 1)	120	mJ
E_{AR}	Repetitive Avalanche Energy (Note 2)	5.4	mJ
T_J	Operating Junction Temperature	150	℃
T_{stg}	Storage Temperature Range	- 55 to +150	℃

Notes:

1. L=56mH, I_{AS}=2.0A, V_{DD}=50V, R_G=25Ω, Starting T_J=25℃
2. Repetitive Rating: Pulse width limited by maximum junction temperature.

THERMAL CHARACTERISTICS

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.95	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	℃/W

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ELECTRICAL CHARACTERISTICS

Off Characteristics (T_A = 25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Sounce Breakdown Voltage	V_{GS} = 0V, I_D = 250uA	600	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 600V, V_{GS} = 0V	--	--	1	uA
I_{GSSF}	Gate-Body Leakage Current, Forward	V_{GS} = 30V, V_{DS} = 0V	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	V_{GS} = -30V, V_{DS} = 0V	--	--	-100	nA

On Characteristics (T_A = 25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS\ (th)}$	Gate Threshold Voltage	V_{DS} = V_{GS} , I_D = 250uA	2.0	--	4.0	V
$R_{DS(ON)}$	On-Resistance	V_{GS} = 10V, I_D = 1.0A	--	4.0	4.6	Ω

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Ciss	Input Capacitance	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz	--	320	380	pF
Coss	Output Capacitance		--	30	45	pF
Crss	Reverse Transfer Capacitance		--	3	5.6	pF

Switching Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 300V, I_D = 2.0A, R_G = 25 Ω (Note 3 & 4)	--	13	30	nS
tr	Turn-On Rise Time		--	12	60	nS
$t_{d(off)}$	Turn-Off Delay Time		--	73	100	nS
tr	Turn-Off Fall Time		--	14.3	70	nS
Qg	Total Gate Charge	V_{DS} = 480V, I_D = 2.0A, V_{GS} = 10V (Note 3 & 4)	--	9.3	13	nC
Qgs	Gate-Source Charge		--	2.0	--	nC
Qgd	Gate-Drain Charge		--	3.3	--	nC

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Test Conditions	Min.	Typ,	Max.	Unit
I_S	Maximum Continuous Drain-Source Diode Forward Current		--	--	2.0	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	8.0	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0V, I_S = 2.0A	--	--	1.4	V
Trr	Reverse Recovery Time	V_{GS} = 0V, I_S = 2.0A, dI_F / dt = 100A/uS (Note 3)	--	230	--	nS
Qrr	Reverse Recovery Charge		--	1.0	--	uC

Notes:
3. Pulse Test: Pulse width < 300us, Duty cycle ≤ 2%.
4. Basically not affected by working temperature.

TYPICAL CHARACTERISTICS

图1、导通特性

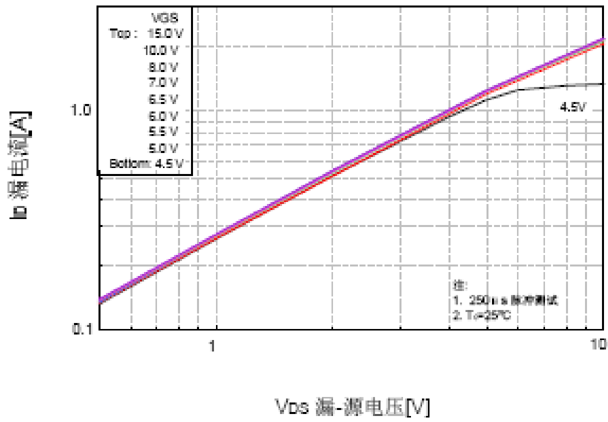


图2、传输特性

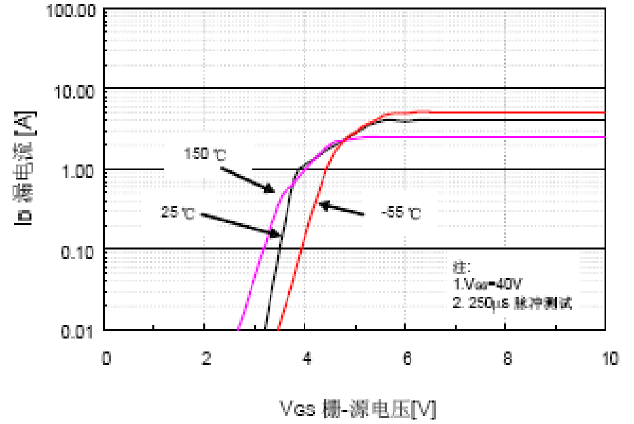


图3、导通电阻vs.漏电流和栅极电压

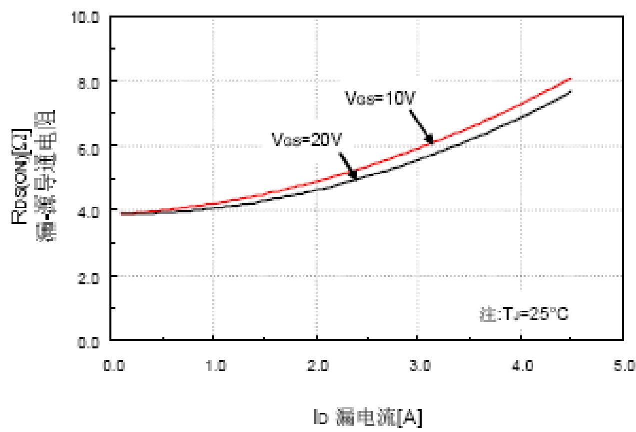


图4、体二极管正向压降vs.源电流和温度

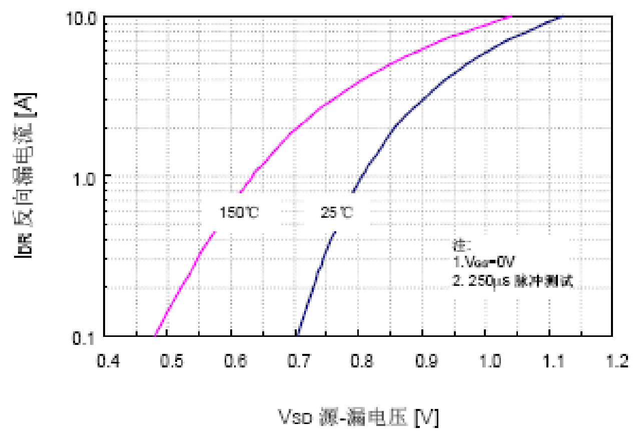


图5、电容特性

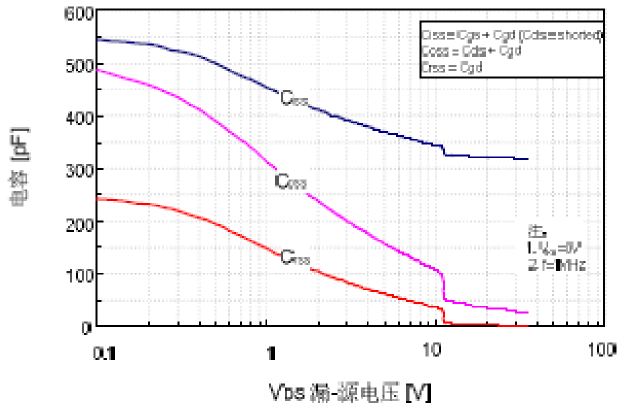


图6、栅极电荷特性

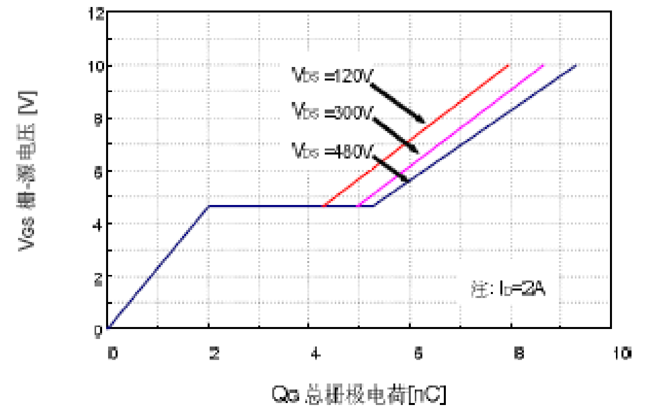


图7、击穿电压vs.温度

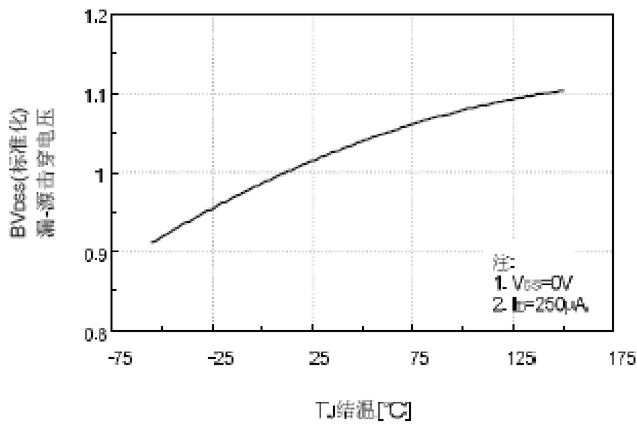
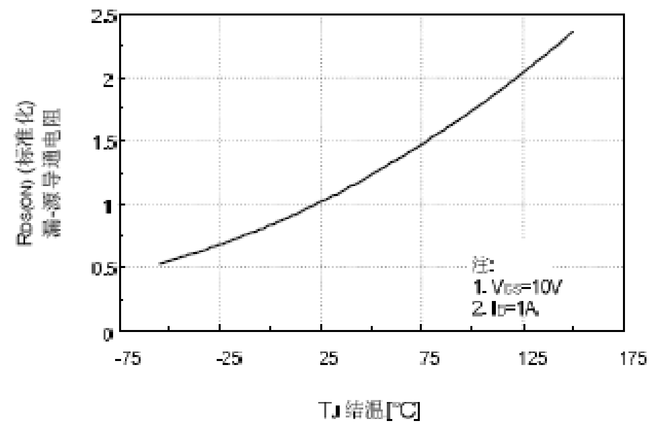
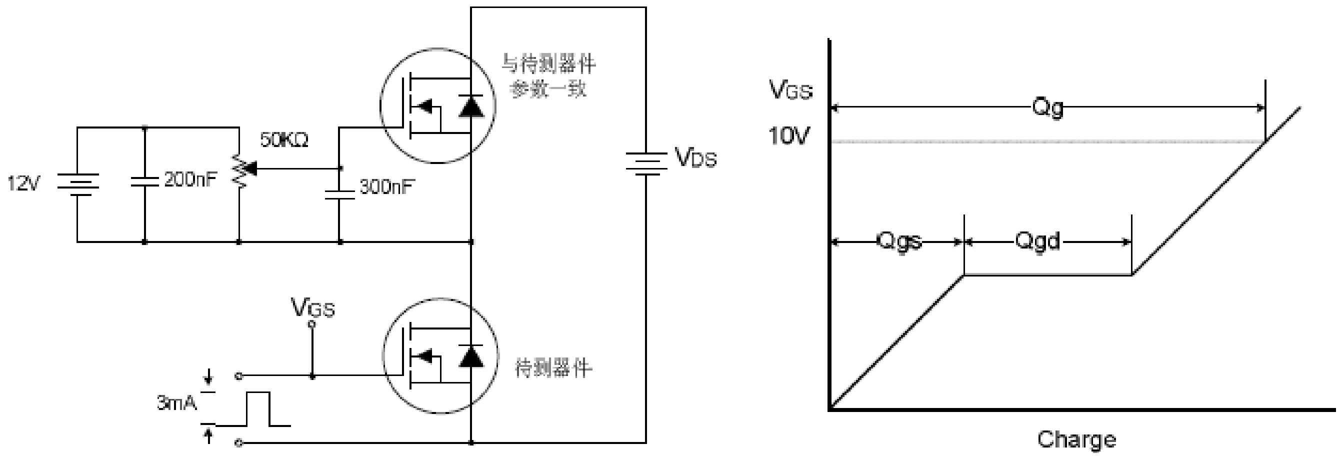


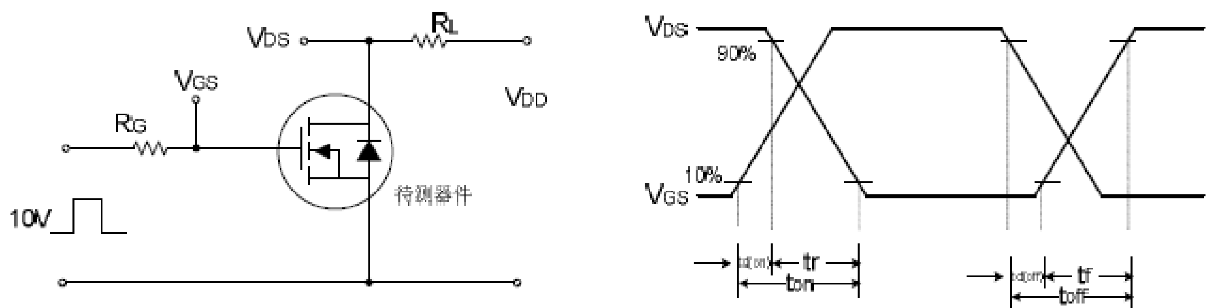
图8、导通电阻vs.温度



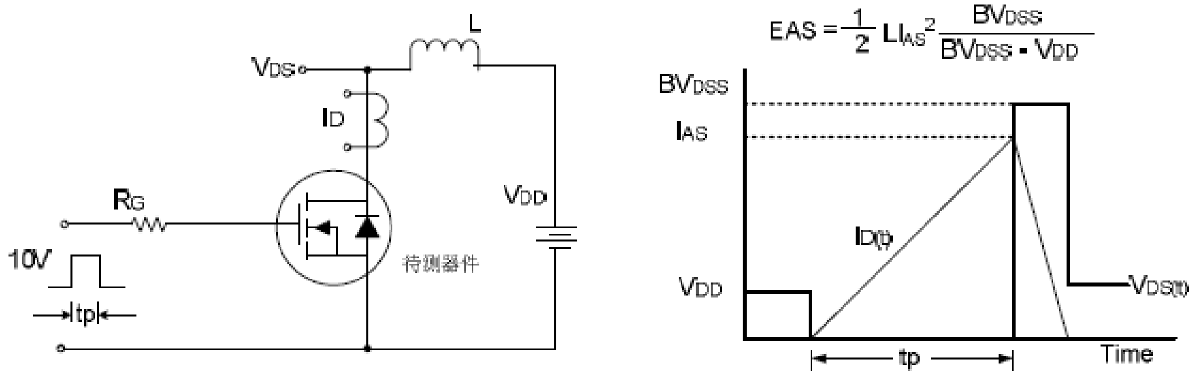
栅极电荷量测试电路及波形图



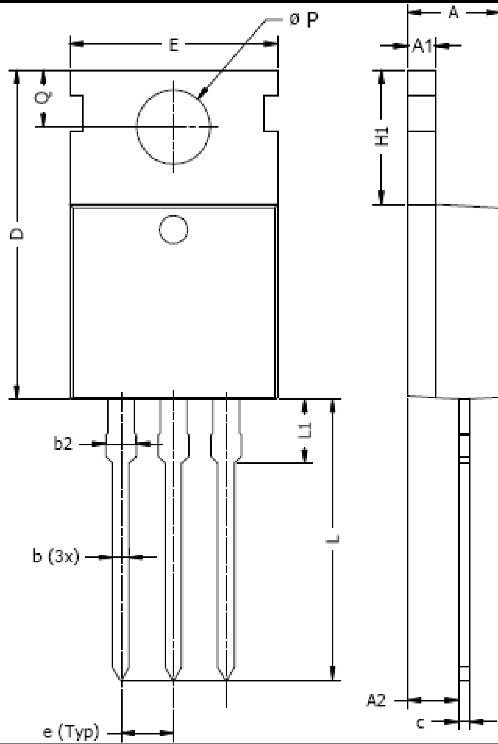
开关时间测试电路及波形图



EAS测试电路及波形图



TO220AB PACKAGE OUTLINE



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	3.60	4.80	0.142	0.189
A1	1.20	1.40	0.047	0.055
A2	2.03	2.90	0.080	0.114
b	0.40	1.00	0.016	0.039
b2	1.20	1.78	0.047	0.070
c	0.36	0.60	0.014	0.024
D	14.22	16.50	0.560	0.650
e	2.34	2.74	0.092	0.108
E	9.70	10.60	0.382	0.417
H1	5.84	6.85	0.230	0.270
L	12.70	14.70	0.500	0.579
L1	2.70	3.30	0.106	0.130
ØP	3.50	4.00	0.138	0.157
Q	2.54	3.40	0.100	0.134

NOTE: Above package outline conforms to JEDEC TO-220AB

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