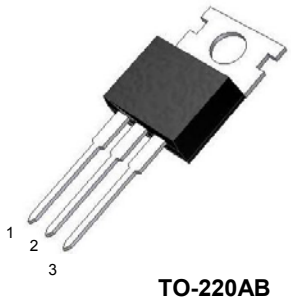
TAK CHEONG®

Preliminary Data Sheet

TFP2N60

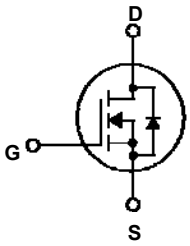
N-Channel Power MOSFET

2.0A, 600V, 4.6Ω



1 = Gate
2 = Drain
3 = Source

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.

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.

DEVICE MARKING DESIGNATION:
Line 1 = TC Brand
Line 2 = Device Type

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

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

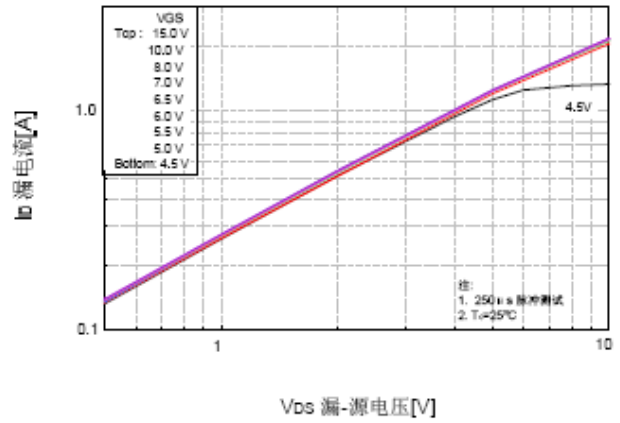


图2、传输特性

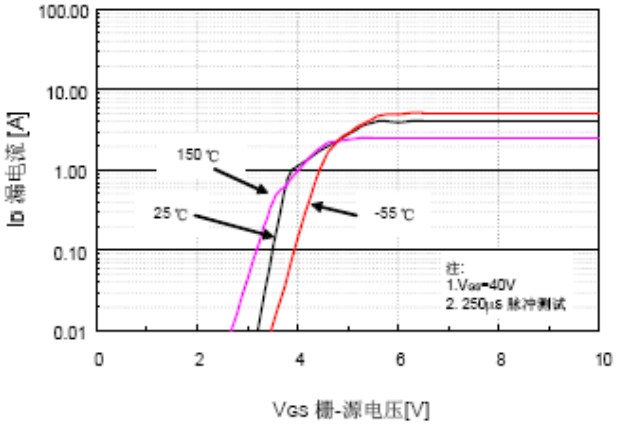


图3、导通电阻vs.漏电流和栅极电压

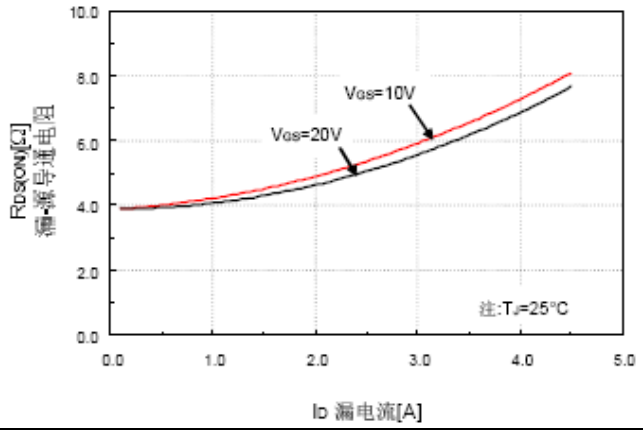


图4、体二极管正向压降vs.源电流和温度

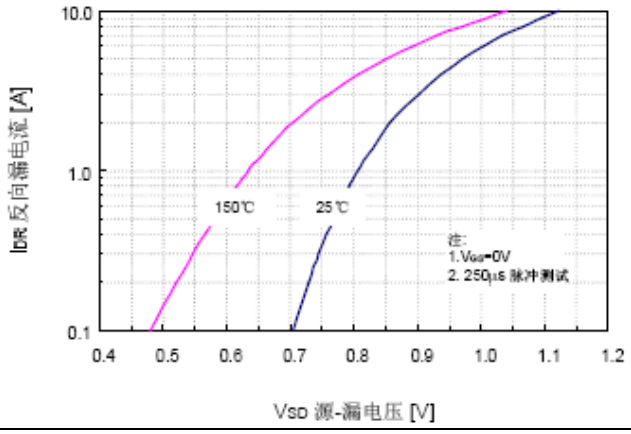


图5、电容特性

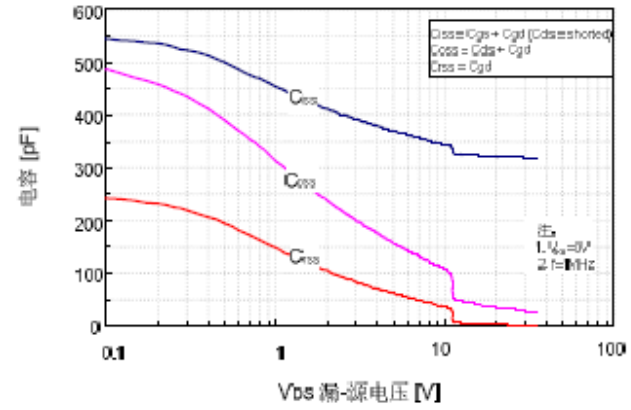


图6、栅极电荷特性

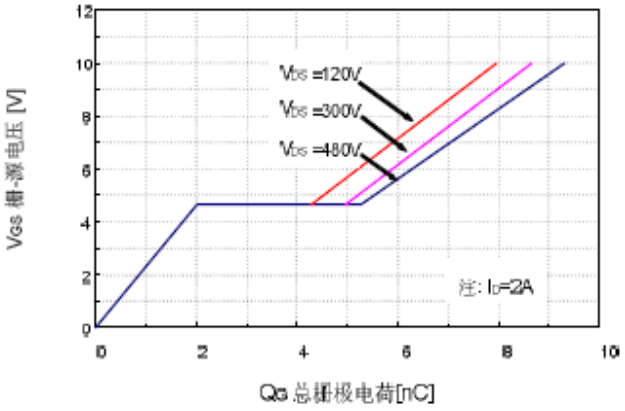


图7、击穿电压vs.温度

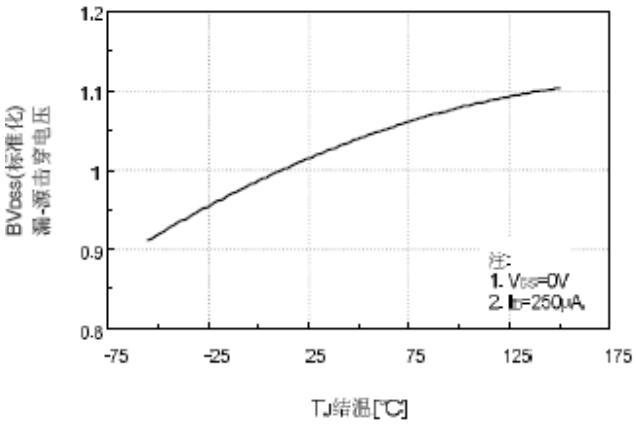
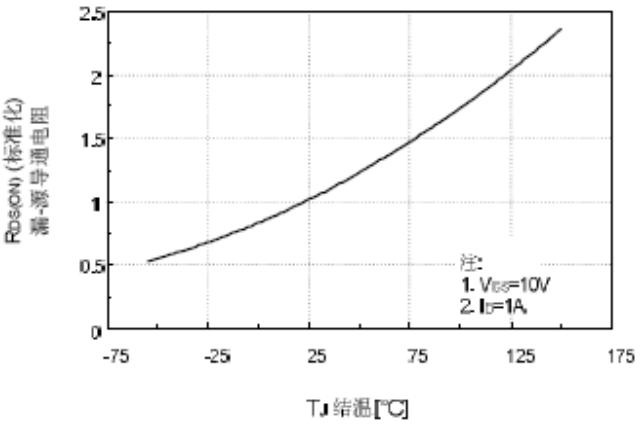
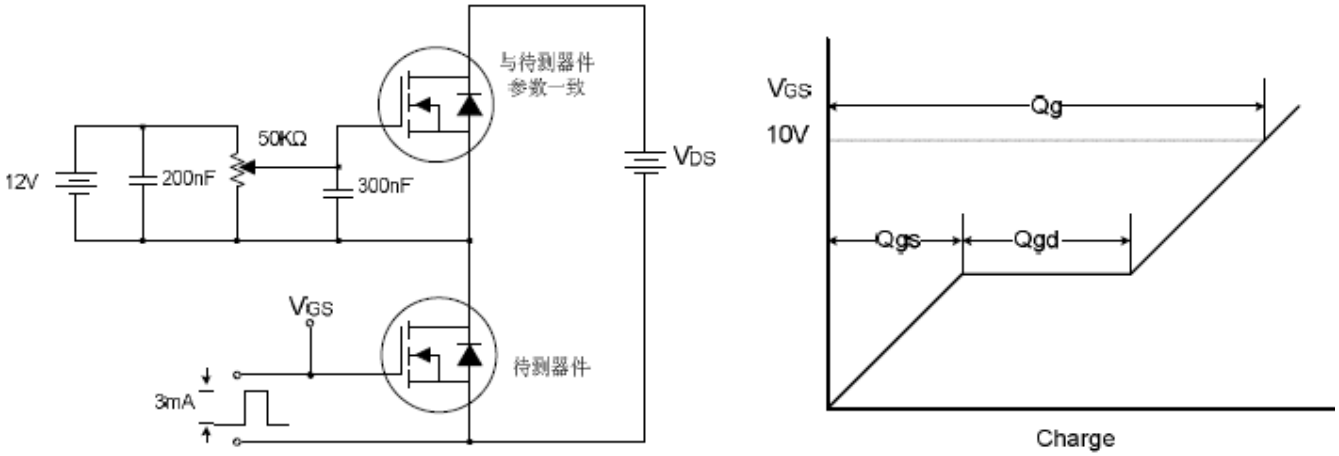


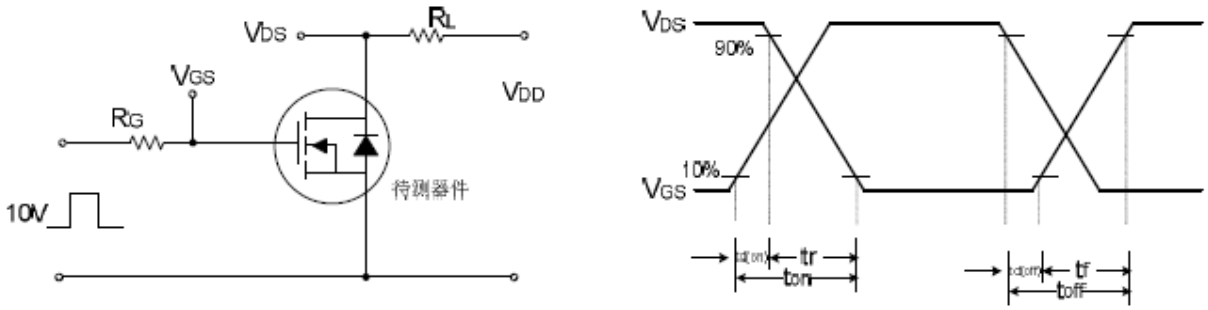
图8、导通电阻vs.温度



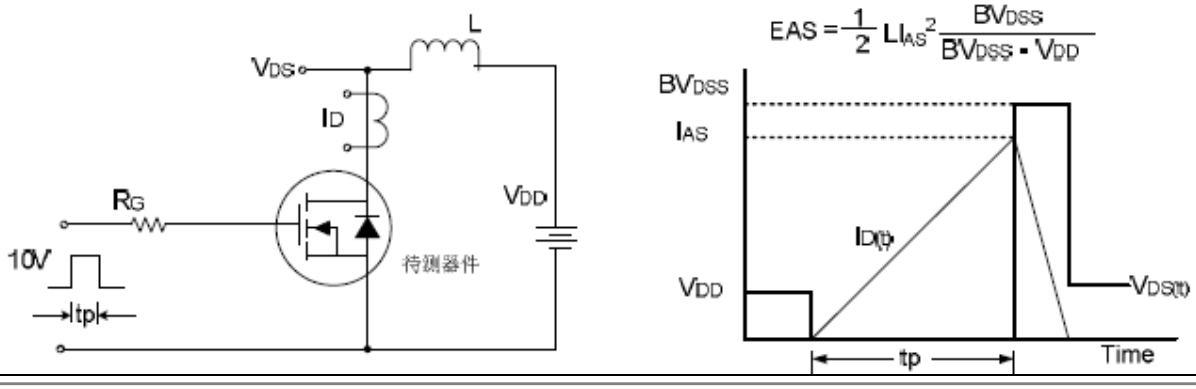
栅极电荷量测试电路及波形图



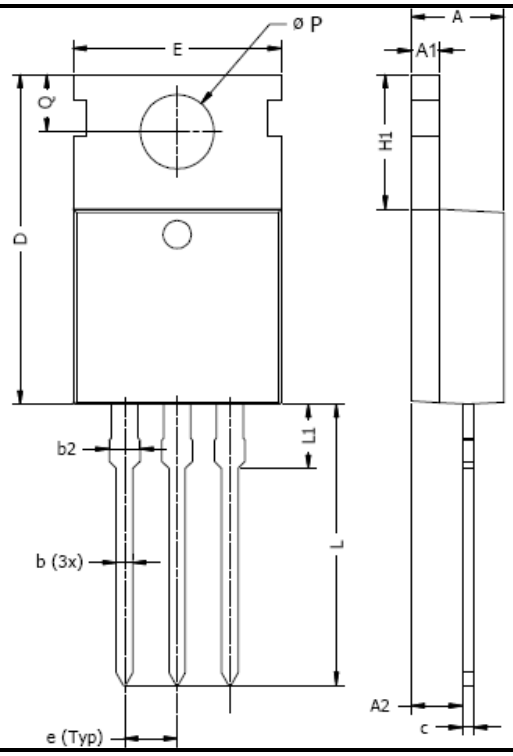
开关时间测试电路及波形图



EAS测试电路及波形图



TO220AB PACKAGE OUTLINE



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	3.6	4.8	0.142	0.189
A1	1.2	1.4	0.047	0.055
A2	2.0	2.9	0.079	0.114
b	0.4	1.0	0.016	0.039
b2	1.2	1.8	0.047	0.071
c	0.36	0.6	0.014	0.024
D	14.2	16.5	0.559	0.650
e	2.34	2.74	0.092	0.108
E	9.7	10.6	0.382	0.417
H1	5.8	6.85	0.228	0.270
L	12.7	14.7	0.500	0.579
L1	2.7	3.3	0.106	0.130
ØP	3.5	4.0	0.138	0.157
Q	2.54	3.4	0.100	0.134

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

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