

N-Channel Power MOSFET

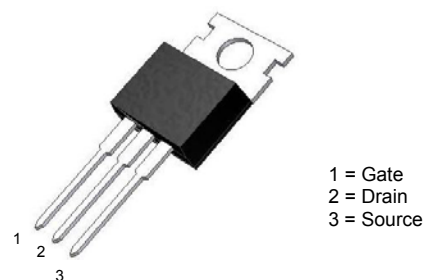
7A, 600V, 1.2Ω

GENERAL DESCRIPTION

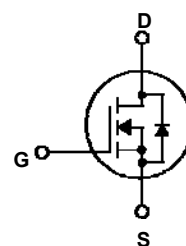
The N-Channel MOSFET is used an advanced termination scheme to provide enhanced voltage-blocking capability without degrading performance over time. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance. This device is well suited 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.



TO-220AB



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	7.0	A
I _{DM}	Drain Current Pulsed	28	A
P _D	Power Dissipation (Note 2)	147	W
	Derating factor above 25°C	1.18	W/°C
E _{AS}	Single Pulsed Avalanche Energy (Note 1)	530	mJ
E _{AR}	Repetitive Avalanche Energy (Note 2)	14.2	mJ
T _J	Operating Junction Temperature	150	°C
T _{stg}	Storage Temperature Range	- 55 to +150	°C

Notes:

1. L=19.5mH, I_{AS}=7.0A, V_{DD}=50V, R_G=25Ω, Starting T_J=25°C
2. Repetitive Rating: Pulse width limited by maximum junction temperature.

THERMAL CHARACTERISTICS

Symbol	Parameter	Value	Unit
R _{θJC}	Thermal Resistance, Junction-to-Case	0.85	°C/W
R _{θJA}	Thermal Resistance, Junction-to-Ambient	62.5	°C/W

ELECTRICAL CHARACTERISTICS

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250uA	600	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 600V, V _{GS} = 0V	--	--	10	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 = 3.5A	--	0.96	1.2	Ω

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
C _{iss}	Input Capacitance	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz	--	1095	1430	pF
C _{oss}	Output Capacitance		--	93	75	pF
C _{rss}	Reverse Transfer Capacitance		--	2	21	pF

Switching Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t _{d(on)}	Turn-On Delay Time	V _{DD} = 300V, I _D = 7.0A, R _G = 25 Ω (Note 3 & 4)	--	39	60	nS
t _r	Turn-On Rise Time		--	29	70	nS
t _{d(off)}	Turn-Off Delay Time		--	248	300	nS
t _r	Turn-Off Fall Time		--	36	90	nS
Q _g	Total Gate Charge	V _{DS} = 480V, I _D = 7.0A, V _{GS} = 10V (Note 3 & 4)	--	26.8	37	nC
Q _{gs}	Gate-Source Charge		--	5.1	--	nC
Q _{gd}	Gate-Drain Charge		--	8.5	--	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		--	--	7.0	A
I _{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	28	A
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} = 0V, I _S = 7.0A	--	--	1.4	V
T _{rr}	Reverse Recovery Time	V _{GS} = 0V, I _S = 7.0A, dI _F / dt = 100A/uS (Note 3)	--	365	--	nS
Q _{rr}	Reverse Recovery Charge		--	3.4	--	uC

Notes:

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

TYPICAL CHARACTERISTICS

图 1、导通电阻

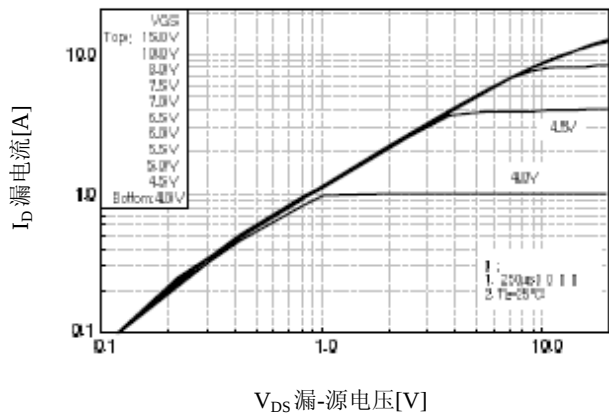


图 2、传输特性

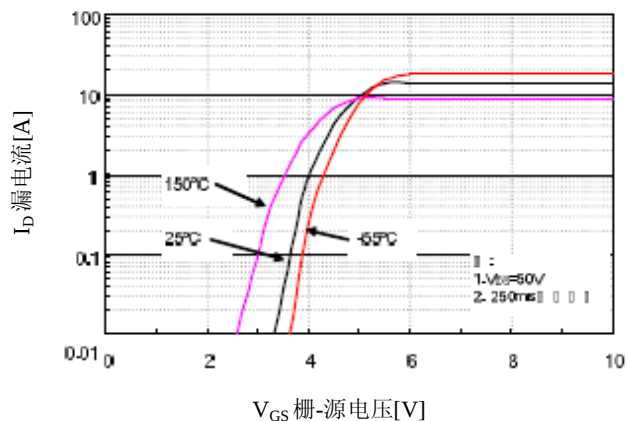


图 3、导通电阻 vs.漏电流和栅极电压

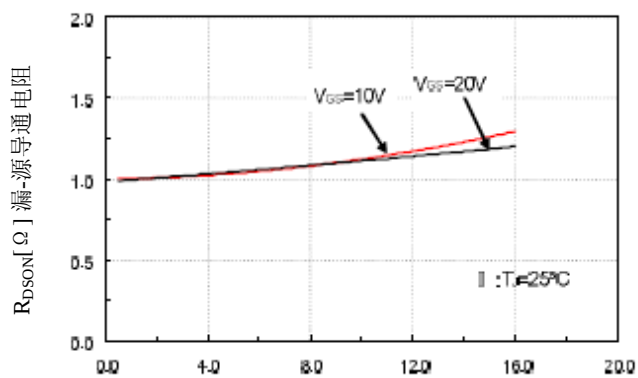


图 3、ID 漏电流[A]

图 4、体二极管正向电压降 vs.源电流和温度

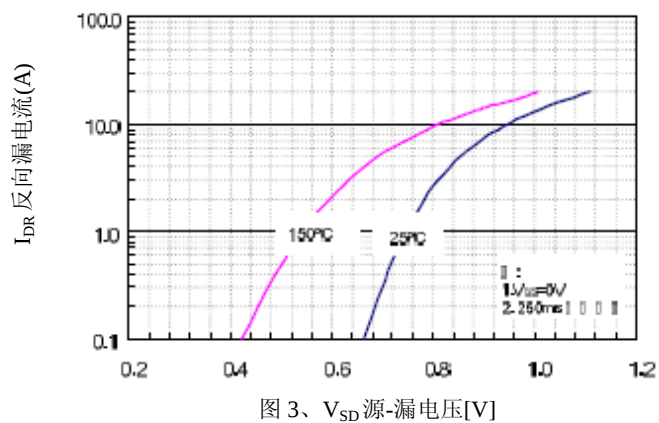


图 3、VSD 源-漏电压[V]

图 5、电容特性

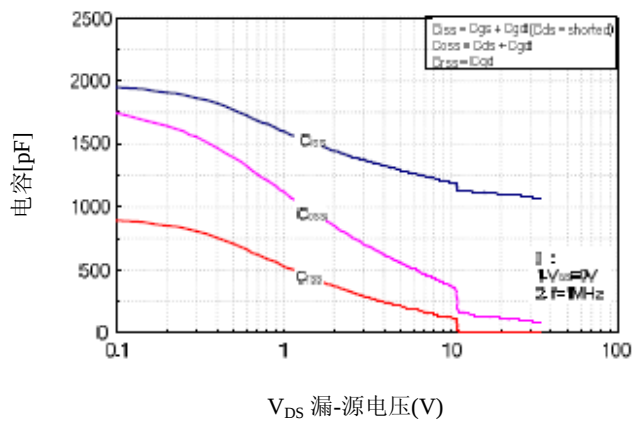


图 6、栅极电荷特性

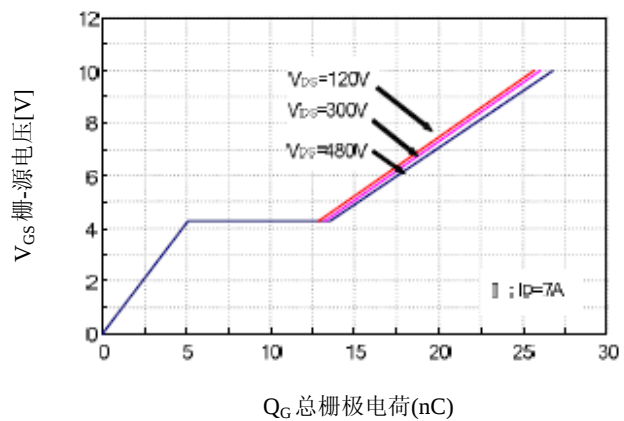


图 7、击穿电压 vs.温度

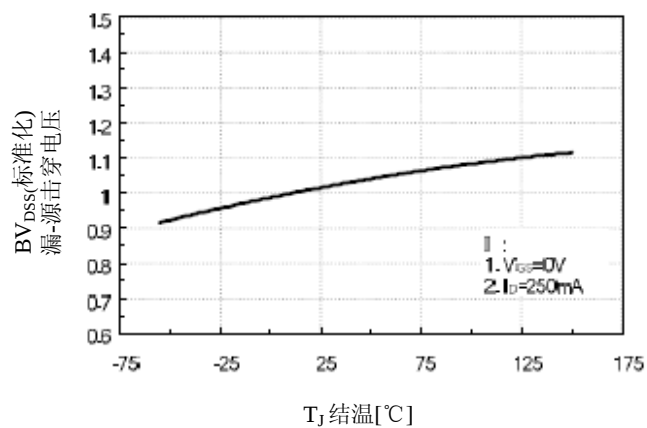
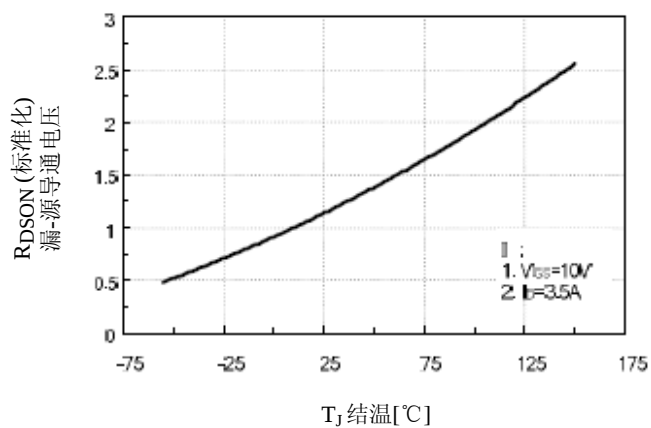
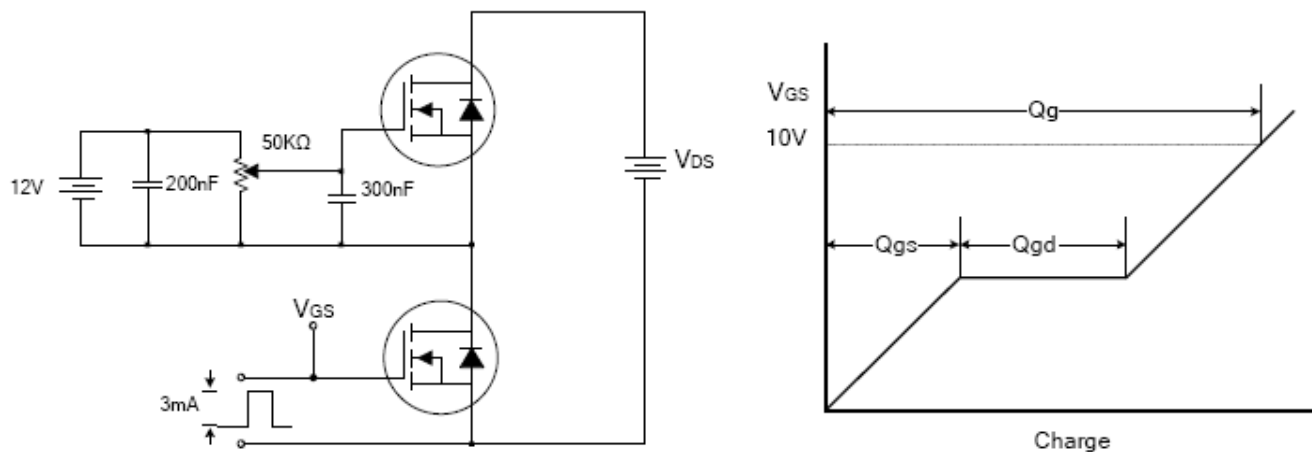
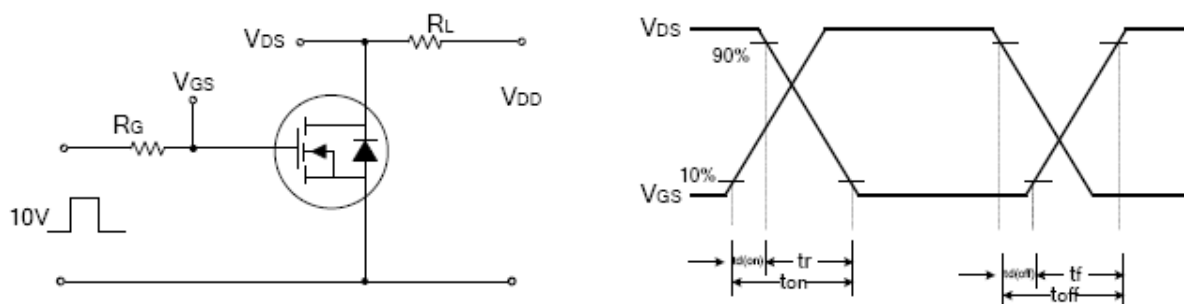
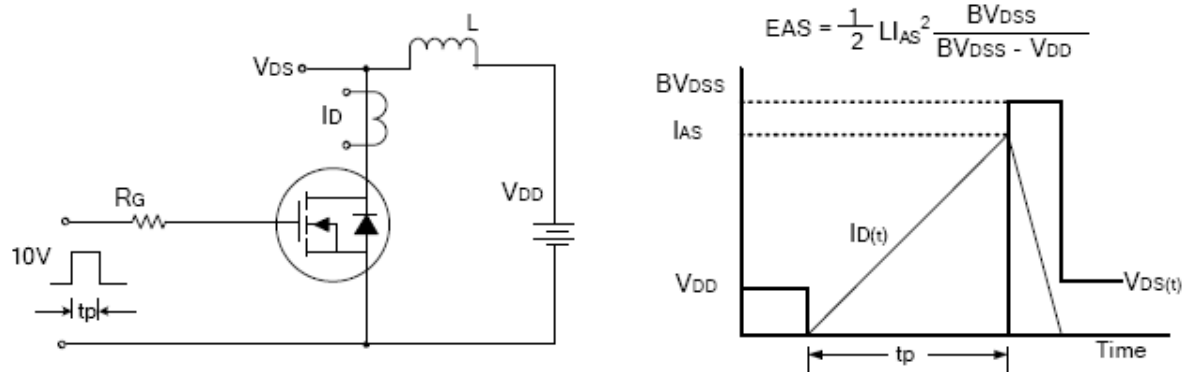
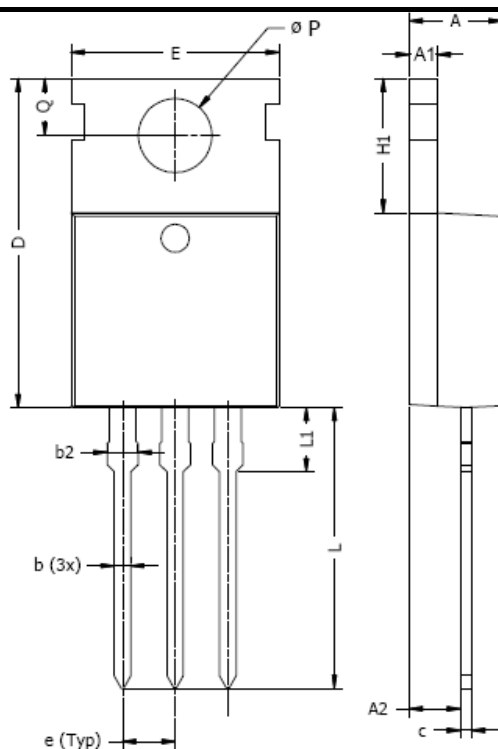


图 8、导通电压 vs.温度



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

 E_{AS} 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
ϕP	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

NOTICE

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