WANSEMI
万代半导体

WP4606

Enhancement Mode N+P-Channel Power MOSFET

SOP8/N+PMOS/30V/±20V/1.7V/5.5A/15mΩ/

-30V/±20V/-1.8V/-4.2A/32mΩ

Rev0.9

30V N+P-Channel MOSFET

1.Features

- Advanced trench technology
- Super low gate charge
- High density cell design for ultra low Rdson

- N-Channel

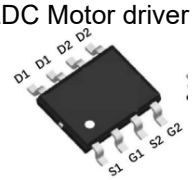
V_{DS}	$R_{DS(on)}$ Typ.	I_D
30V	15mΩ @ 10V	5.5A
	22mΩ @ 4.5V	

- P-Channel

V_{DS}	$R_{DS(on)}$ Typ.	I_D
-30V	32mΩ @ -10V	-4.2A
	46mΩ @ -4.5V	

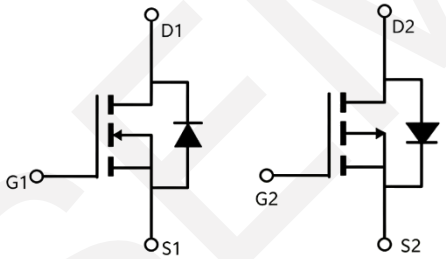
2.Applications

- DC/DC Converter
- PWM
- Load Switching
- BLDC Motor driver



SOP8

Pin Description



N-Channel P-Channel

Schematic Diagram

3.Package Marking and Ordering Information

Part no.	Marking	Package	PCS/Tube	PCS/CTN.
WP4606	4606	SOP8	4,000	48,000

4.Absolute Max Ratings at Ta=25℃ (Note1)

Parameter	Symbol	N-channel	P-channel	Units
Drain to Source Voltage	V_{DSS}	30	-30	V
Gate to Source Voltage	V_{GSS}	±20	±20	V
Drain Current (DC)	I_D	5.5	-4.2	A
Drain Current (Pulse), PW≤300μs	I_{DM}	30	-30	A
Total Dissipation	P_D	2.0	2.0	W
Avalanche Energy, Single Pulsed	EAS	30	25	mJ
Junction Temperature	T_j	150	150	℃
Storage Temperature	T_{stg}	-55 to +150	-55 to +150	℃

Note 1: Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

5.Thermal Resistance Ratings (Note 2)

Parameter	Symbol	Value	Unit
Maximum Junction-to-Ambient	$R_{\theta JA}$	63.2	℃/W

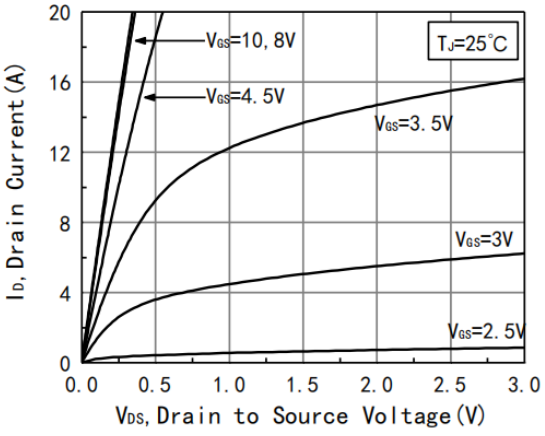
Note 2: When mounted on 1 inch square copper board t ≤ 10sec The value in any given application depends on the user's specific board design.

6.NMOS Electrical Characteristics at Ta=25℃ (Note 3)

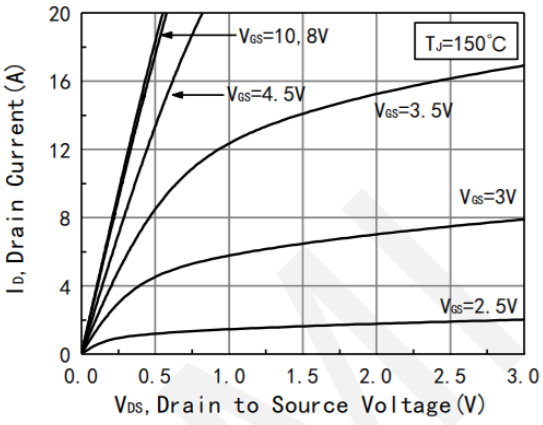
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	I_D = 250μA, V_{GS} = 0V	30	34	-	V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS} = 30V, V_{GS} = 0V	-	-	1	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_{DS}=250μA	1.1	1.7	2.5	V
Static Drain to Source On-State Resistance	$R_{DS(on)}$	I_D = 5.5A, V_{GS} = 10V	-	15	25	mΩ
		I_D = 5.5A, V_{GS} = 4.5V	-	22	39	mΩ
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=15V, Frequency=1.0MHz	-	457	-	pF
Output Capacitance	C_{oss}		-	74	-	pF
Reverse Transfer Capacitance	C_{rss}		-	63	-	pF
Turn-ON Delay Time	$t_{d(on)}$	V_{DD} = 15V, V_{GS} = 10V, R_{GEN} = 3Ω, I_D = 3A	-	10	-	ns
Rise Time	t_r		-	15	-	ns
Turn-OFF Delay Time	$t_{d(off)}$		-	30	-	ns
Fall Time	t_f		-	6	-	ns
Total Gate Charge	Q_g	V_{DS} =15V, V_{GS} = 10V, I_D = 1A	-	10	-	nC
	Q_{gs}		-	1	-	nC
	Q_{gd}		-	2.3	-	nC
Diode Forward Voltage	V_{FSD}	I_S = 5.5A, V_{GS} = 0V	0.5	0.8	1.1	V

Note 3: Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

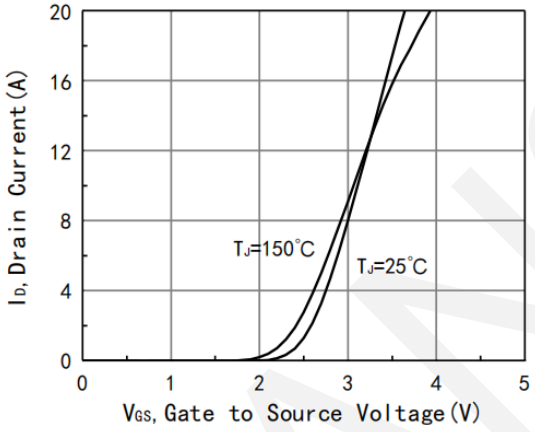
NMOS Typical electrical and thermal characteristics



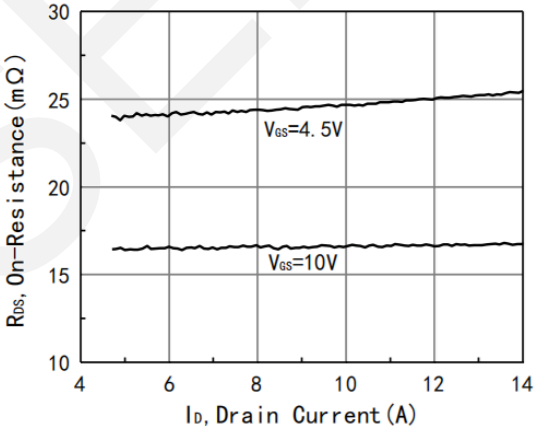
Typical Output Characteristics



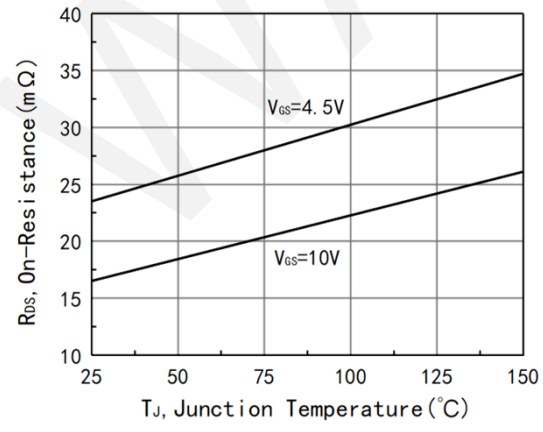
Typical Transfer Characteristics



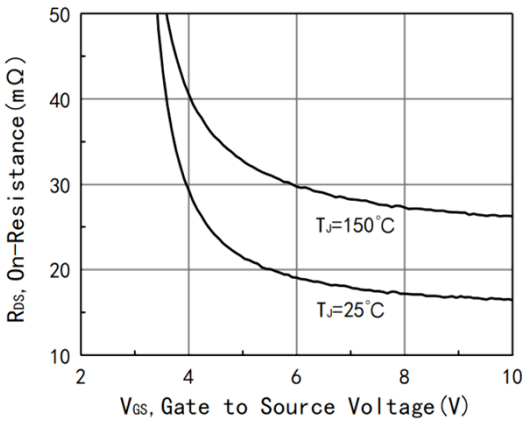
Typical Transfer Characteristics



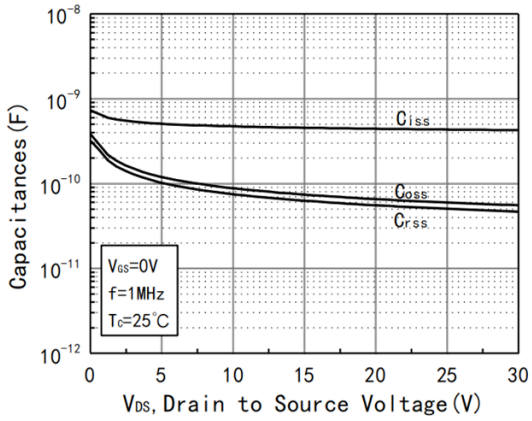
Rdson vs Id



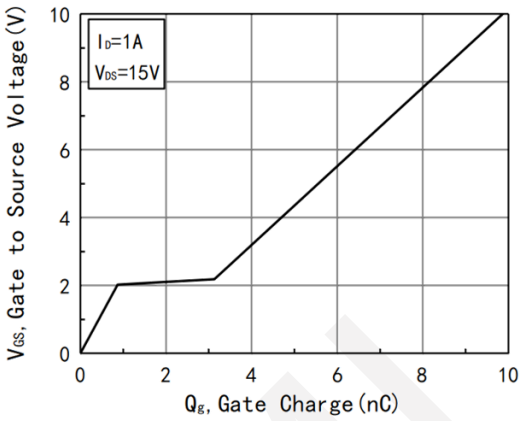
Rdson vs Tj



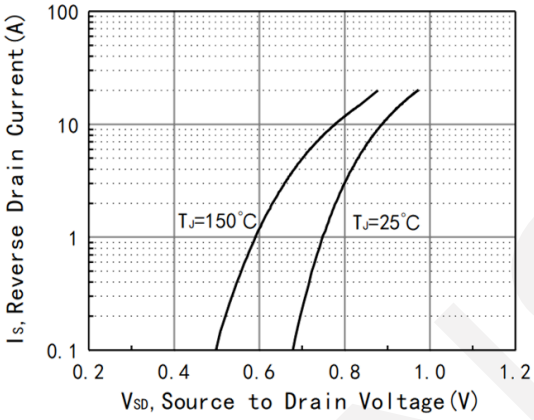
Rdson vs Vgs



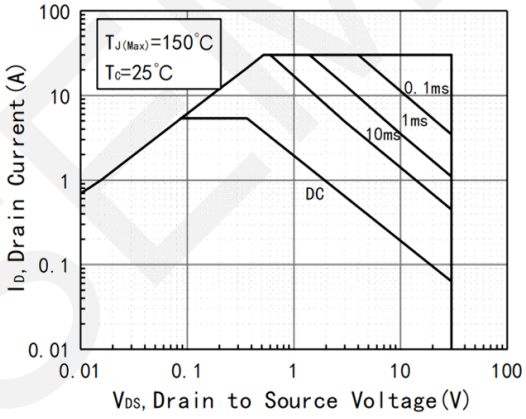
Capacitance vs Vds



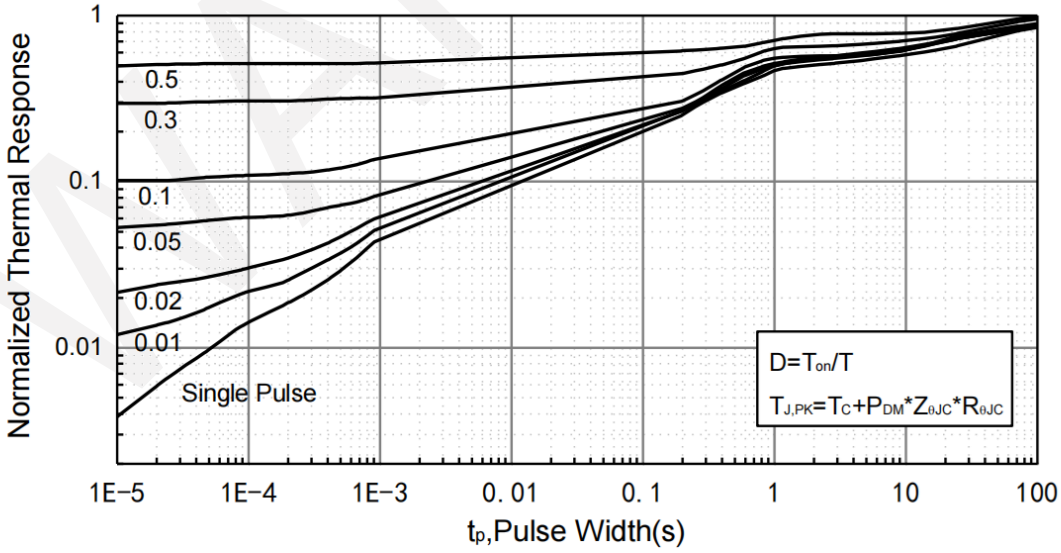
Gate Charge Characteristic



Diode Forward Characteristic



Safe Operating Area

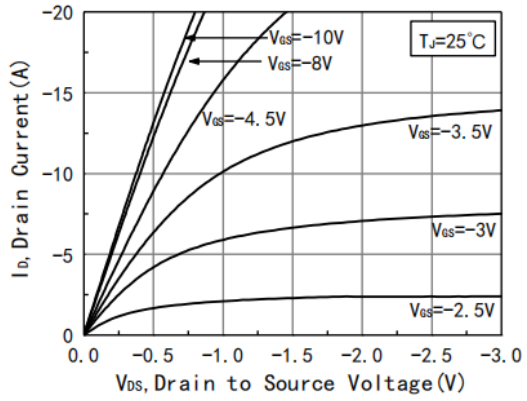


Normalized Maximum Transient Thermal Impedance

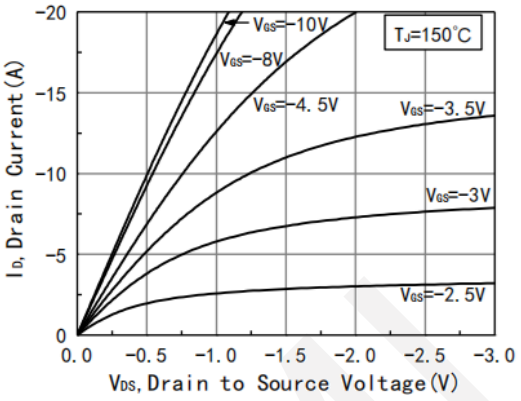
7.PMOS Electrical Characteristics at Ta=25℃

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	I_D = -250μA, V_{GS} = 0V	-30	-36	-	V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS} = -30V, V_{GS} = 0V	-	-	-1	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_{DS}=-250μA	-1.0	-1.8	-2.5	V
Static Drain to Source On-State Resistance	$R_{DS(on)}$	I_D = -4.2A, V_{GS} =-10V	-	32	39	mΩ
		I_D =-4.2A, V_{GS} =-4.5V	-	46	60	mΩ
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=-15V, Frequency=1.0MHz	-	550	-	pF
Output Capacitance	C_{oss}		-	85	-	pF
Reverse Transfer Capacitance	C_{rss}		-	75	-	pF
Turn-ON Delay Time	$t_{d(on)}$	V_{DD} = -15V, V_{GS} = -10V, R_{GEN} =3Ω, I_D = -3A	-	9.5	-	ns
Rise Time	t_r		-	5.5	-	ns
Turn-OFF Delay Time	$t_{d(off)}$		-	42.5	-	ns
Fall Time	t_f		-	13.6	-	ns
Total Gate Charge	Q_g	V_{DS} = -15V, V_{GS} = -10V, I_D = -1A	-	11	-	nC
	Q_{gs}		-	2.5	-	nC
	Q_{gd}		-	3	-	nC
Diode Forward Voltage	V_{FSD}	I_S = -4.2A, V_{GS} = 0V	-0.5	-0.9	-1.1	V

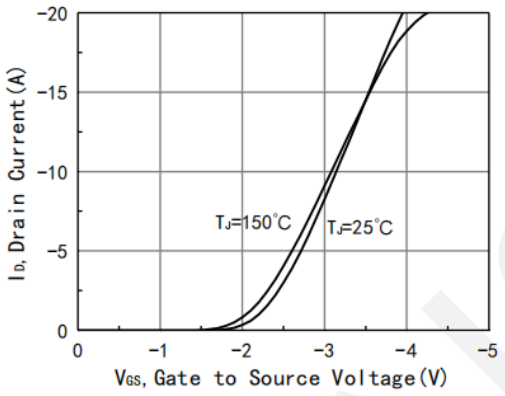
PMOS Typical electrical and thermal characteristics



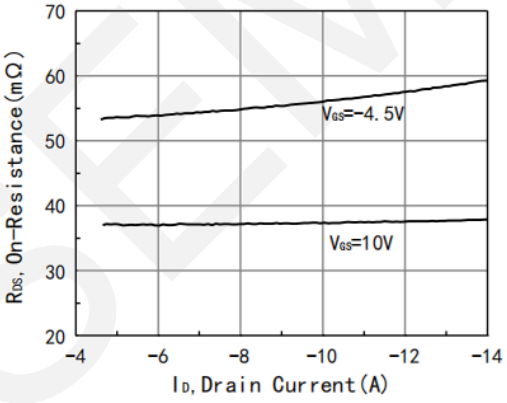
Typical Output Characteristics



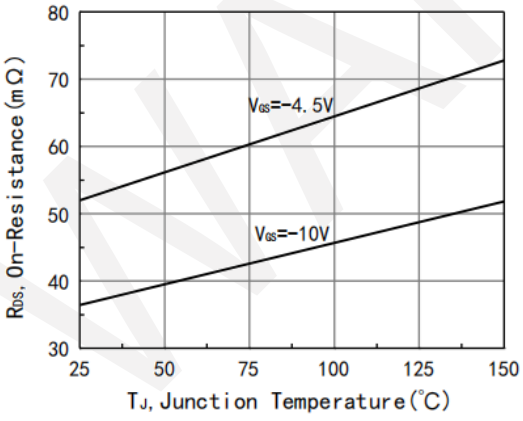
Typical Transfer Characteristics



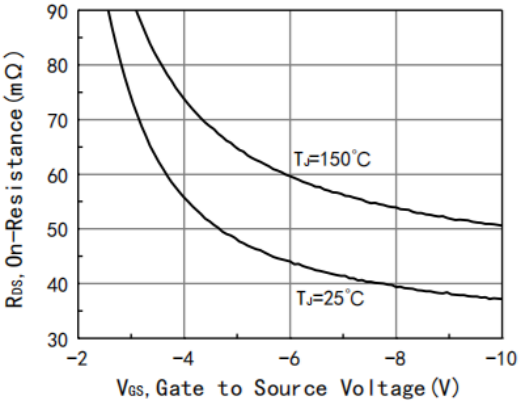
Typical Transfer Characteristics



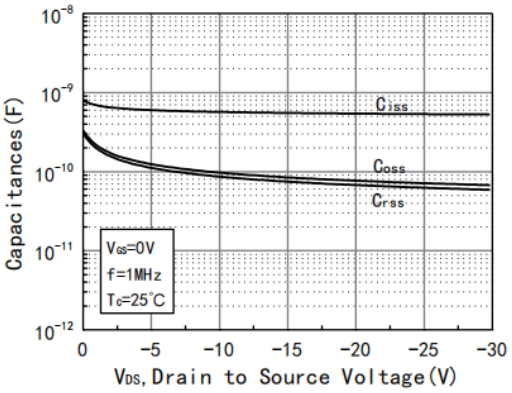
Rdson vs Id



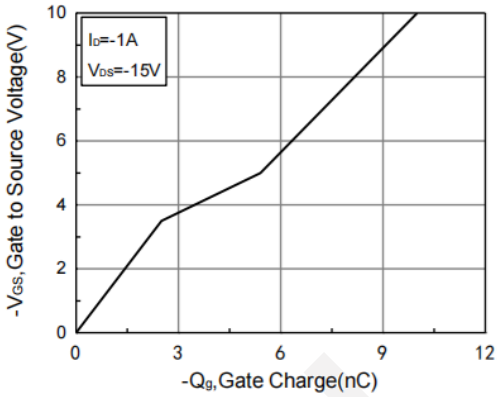
Rdson vs Tj



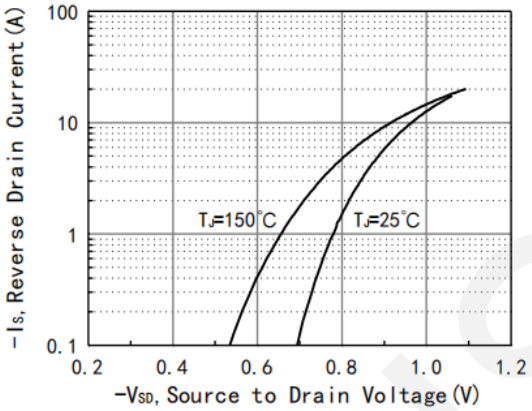
Rdson vs Vgs



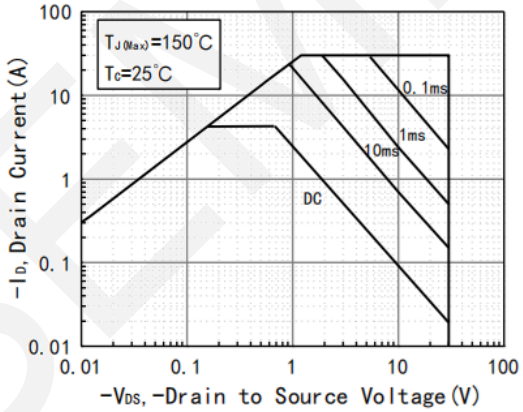
Capacitance vs Vds



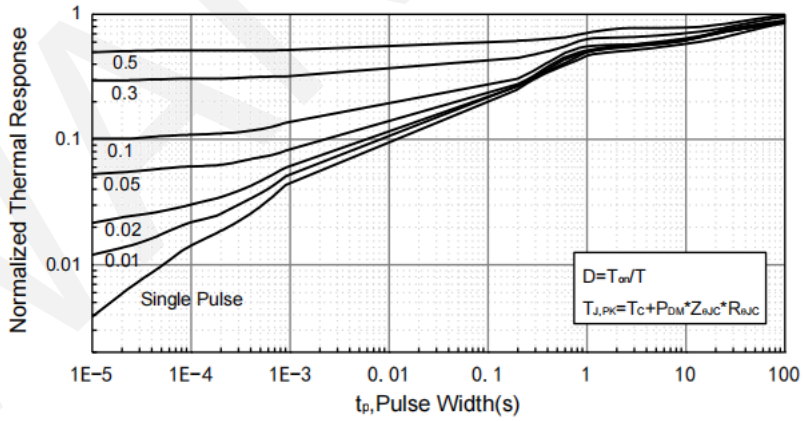
Gate Charge Characteristic



Diode Forward Characteristic

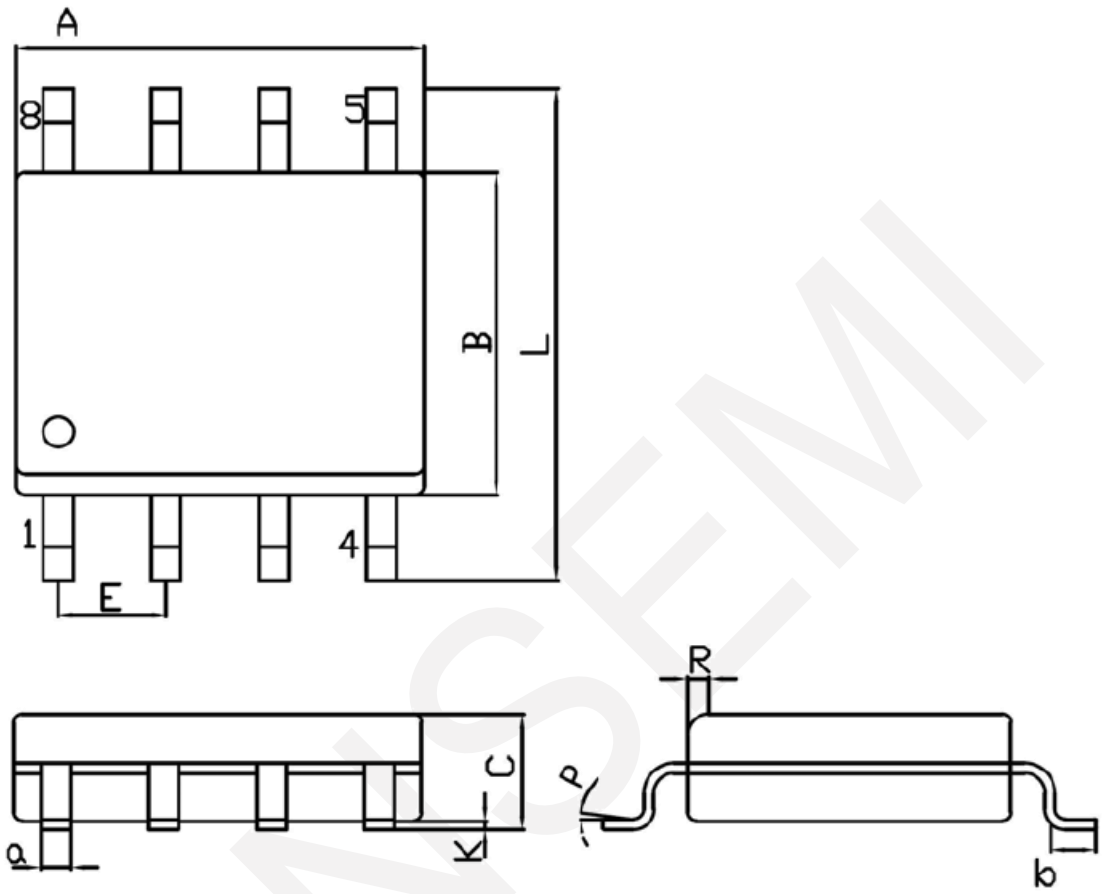


Safe Operating Area



Normalized Maximum Transient Thermal Impedance

8.Package Dimensions



Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
A	4.70	5.10	C	1.35	1.75
B	3.70	4.10	a	0.35	0.49
L	5.80	6.20	R	0.30	0.60
E	1.27BSC		P	0°	7°
K	0.12	0.22	b	0.40	1.25

9. Important Notice

WAN SEMICONDUCTOR (NINGBO) CO.,LTD reserves the right to make corrections, enhancements, improvements and other changes to its semiconductor products and services and to discontinue any product or service. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All semiconductor products (also referred to herein as “components”) are sold subject to WANSEMI’s terms and conditions of sale supplied at the time of order acknowledgment.

WANSEMI warrants performance of its components to the specifications applicable at the time of sale, in accordance with the warranty in WANSEMI’s terms and conditions of sale of semiconductor products. Testing and other quality control techniques are used to the extent WANSEMI deems necessary to support this warranty. Except where mandated by applicable law, testing of all parameters of each component is not necessarily performed.

WANSEMI assumes no liability for applications assistance or the design of Buyers’ products. Buyers are responsible for their products and applications using WANSEMI components. To minimize the risks associated with Buyers’ products and applications, Buyers should provide adequate design and operating safeguards.

No WANSEMI components are authorized for use in FDA Class III (or similar life-critical medical equipment) unless authorized officers of the parties have executed a special agreement specifically governing such use.

Unless WANSEMI has specifically designated certain components which meet ISO/TS16949 requirements, mainly for automotive use, WANSEMI will not be responsible for any failure of such components to meet such requirements.