



WANSEMI
万芯半导体

WP4406D

Enhancement Mode N-Channel Power MOSFET

SOP8/NMOS/30V/ ± 20 V/1.75V/12A/6.5m Ω

Rev1.0

30V, 6.5mΩ, 12A, Single N-Channel

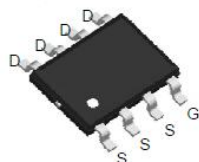
1.Features

- ◆ 30V MOSFET technology
- ◆ Low on-state resistance
- ◆ Fast switching
- ◆ $V_{GS} \pm 20V$

V_{DS}	$R_{DS(on)}$ Typ.	I_D
30V	6.5mΩ @ 10V	12A
	9.5mΩ @ 4.5V	

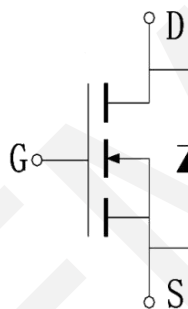
2.Applications

- ◆ Power Switching Application
- ◆ Load Switching



SOP8

Pin Description



Schematic Diagram

3.Package Marking and Ordering Information

Part no.	Marking	Package	PCS/Reel	PCS/CTN.
WP4406D	4406D	SOP8	4,000	48,000

4.Absolute Max Ratings at $T_a=25^{\circ}C$ (Note1)

Parameter	Symbol	Maximum	Units
Drain to Source Voltage	V_{DSS}	30	V
Gate to Source Voltage	V_{GSS}	± 20	V
Drain Current (DC)	I_D	12	A
Drain Current (Pulse), $PW \leq 300\mu s$	I_{DM}	32	A
Avalanche Energy, Single Pulsed	E_{AS}	81	mJ
Total Dissipation	P_D	2.3	W
Junction Temperature	T_j	150	$^{\circ}C$
Storage Temperature	T_{stg}	-55 to +150	$^{\circ}C$

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	Max.	Unit
Maximum Junction-to-Ambient	$R_{\theta JA}$	85	$^{\circ}\text{C/W}$

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

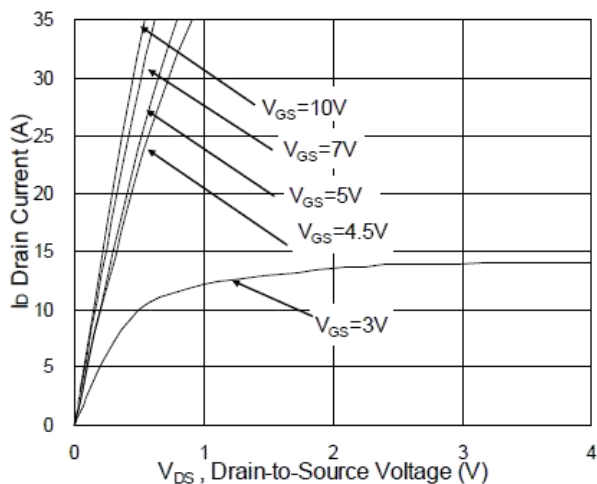
6. Electrical Characteristics at $T_a=25^{\circ}\text{C}$ (Note 3)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = 250\mu\text{A}$, $V_{GS} = 0\text{V}$	30			V
Zero-Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30\text{V}$, $V_{GS} = 0\text{V}$			1	μA
Gate to Source Leakage Current	I_{GSS}	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$			± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_{DS}=250\mu\text{A}$	1.0	1.75	2.5	V
Static Drain to Source On-State Resistance	$R_{DS(on)}$	$I_D = 7\text{A}$, $V_{GS} = 10\text{V}$		6.5	10	m Ω
		$I_D = 4\text{A}$, $V_{GS} = 4.5\text{V}$		9.5	15	m Ω
Input Capacitance	C_{iss}	$V_{GS}=0\text{V}$, $V_{DS}=15\text{V}$, Frequency=1.0MHz		583	816.2	pF
Output Capacitance	C_{oss}			77	107.8	pF
Reverse Transfer Capacitance	C_{rss}			59	82.6	pF
Turn-ON Delay Time	$t_{d(on)}$			1.2	2.4	ns
Rise Time	t_r	$V_{DD} = 15\text{V}$ $V_{GS} = 10\text{V}$ $R_{GEN} = 3.3\Omega$ $I_D = 7\text{A}$		40	72	ns
Turn-OFF Delay Time	$t_{d(off)}$			18	36	ns
Fall Time	t_f			7.2	14.4	ns
Total Gate Charge	Q_g	$V_{DS} = 15\text{V}$, $V_{GS} = 4.5\text{V}$, $I_D = 7\text{A}$		6	8.4	nC
	Q_{gs}			2.2	3.1	nC
	Q_{gd}			2	2.8	nC
Diode Forward Voltage	V_{FSD}	$I_S = 1\text{A}$, $V_{GS} = 0\text{V}$		0.6	1.2	V

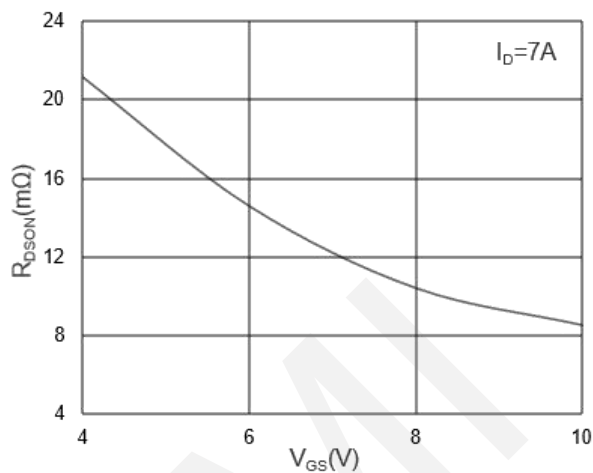
Note 3: Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.



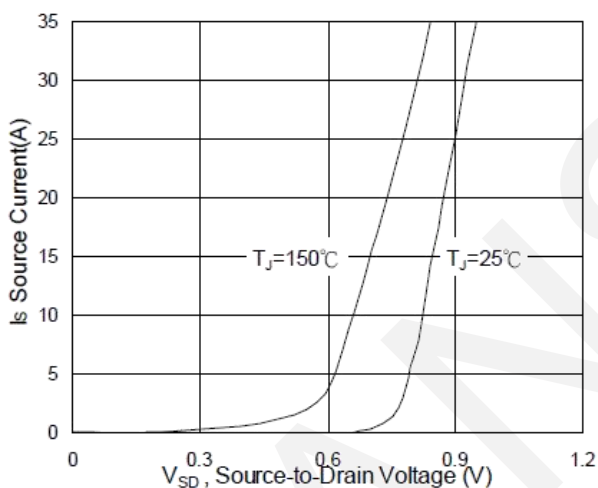
7. Typical electrical and thermal characteristics



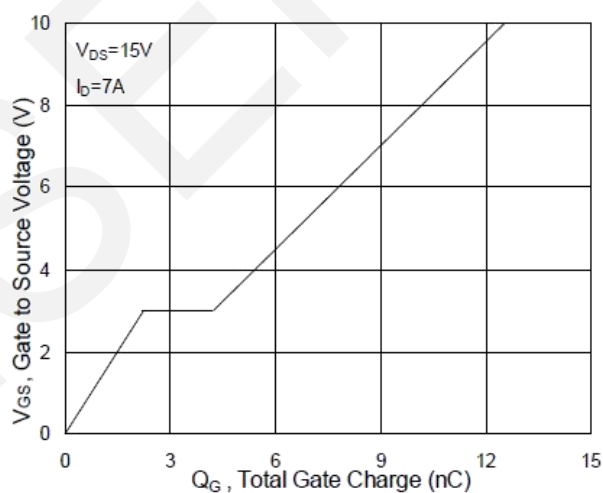
Typical Output Characteristics



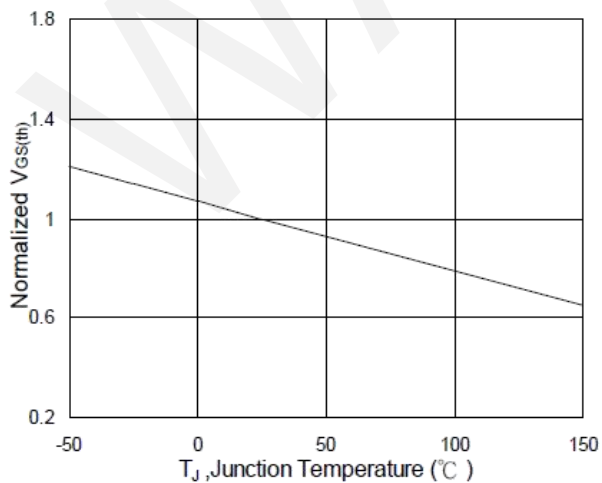
On-Resistance vs. Gate-Source



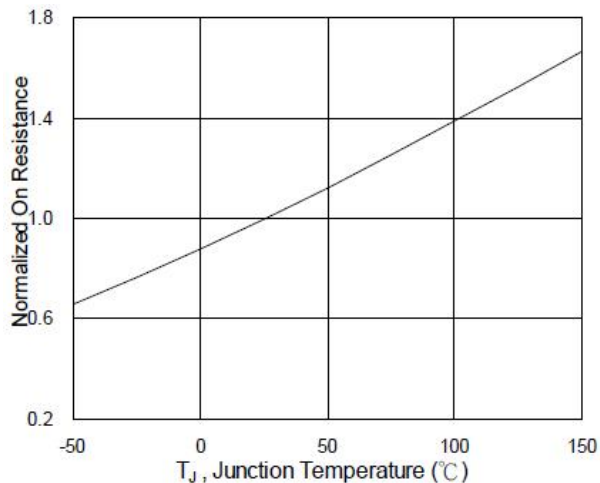
Forward Characteristics Of Reverse



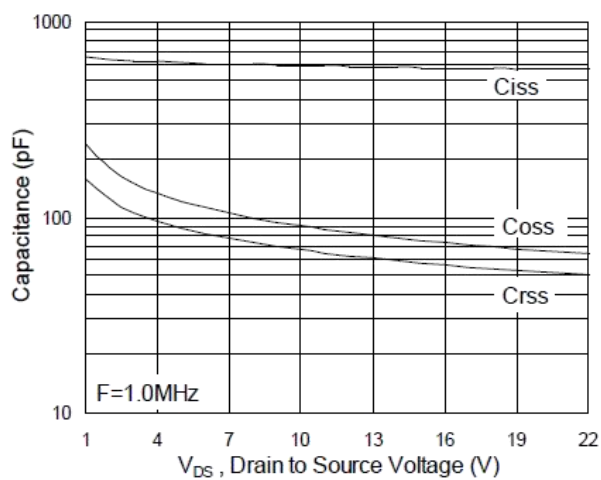
Gate-Charge Characteristics



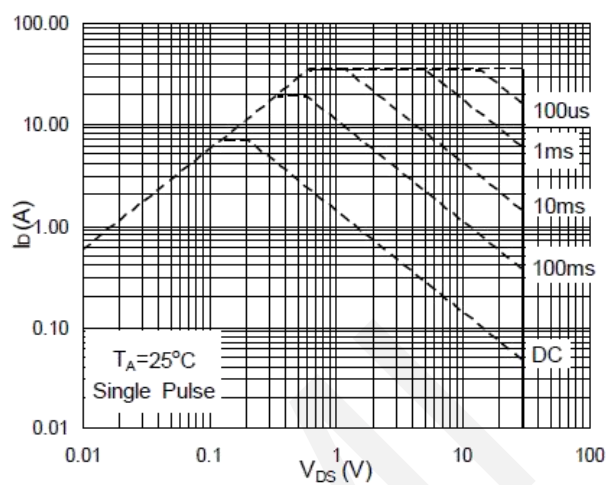
Normalized $V_{GS(th)}$ vs. T_J



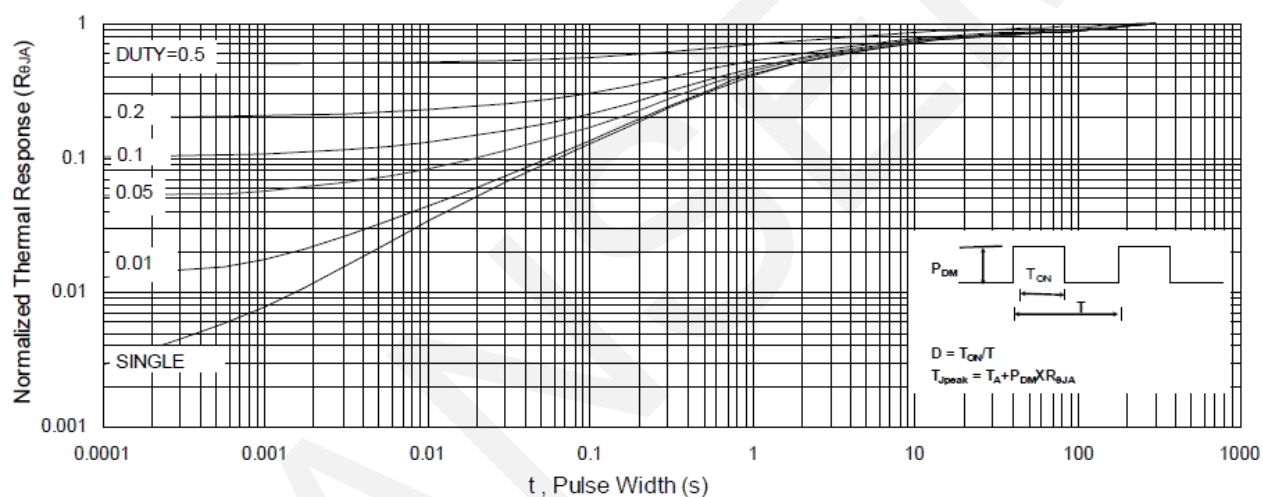
Normalized $R_{DS(on)}$ vs. T_J



Capacitance

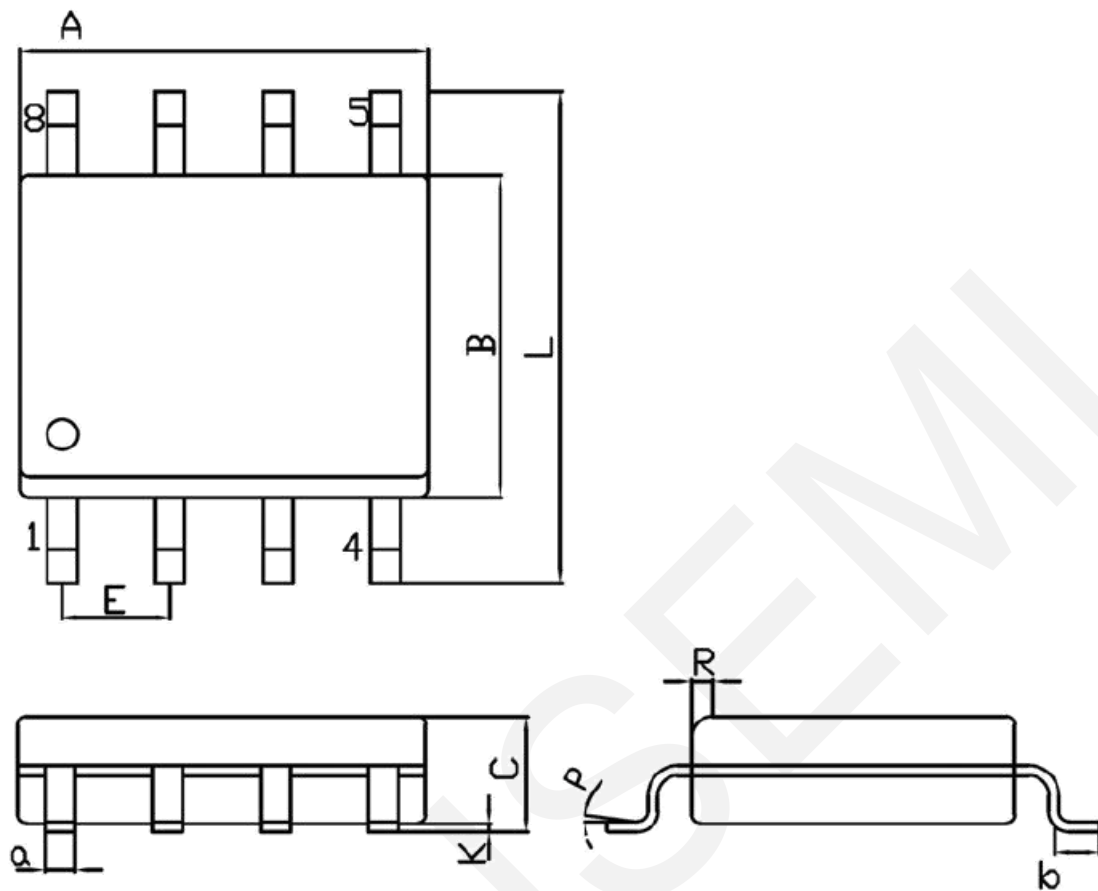


Safe Operating Area



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

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