WANSEMI
万代半导体

WP2040P

Enhancement Mode P-Channel Power MOSFET

TO-252/PMOS/-20V/±12V/-0.8V/-20A/11mΩ

Rev0.6

Enhancement Mode P-Channel Power MOSFET

1.Features

- Fast Switching
- Improved dv/dt Capability

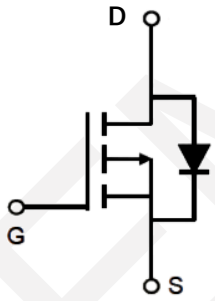
V_{DS}	$R_{DS(on)}$ Typ.	I_D Max.
-20V	11mΩ @ -4.5V	-20A
	15mΩ @ -2.5V	

2.Applications

- Load Switch
- PWM Application
- Power management

Pin Description

TO252



Schematic Diagram

3.Package Marking and Ordering Information

Part no.	Marking	Package	PCS/Reel	PCS/CTN.
WP2040P	WP2040P	TO-252	2,500	25,000

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

Parameter	Symbol	Value	Units
Drain to Source Voltage	V_{DS}	-20	V
Gate to Source Voltage	V_{GS}	±12	V
Drain Current (DC)	I_D	-20	A
Drain Current (Pulse), PW≤300μs	I_{DP}	-80	A
Total Dissipation	P_D	13	W
Avalanche Energy, Single Pulsed	E_{AS}	42.25	mJ
Junction Temperature	T_j	150	℃
Storage Temperature	T_{stg}	-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

Parameter	Symbol	Value	Unit
Junction to ambient	$R_{\theta JA}$	2.1	℃/W

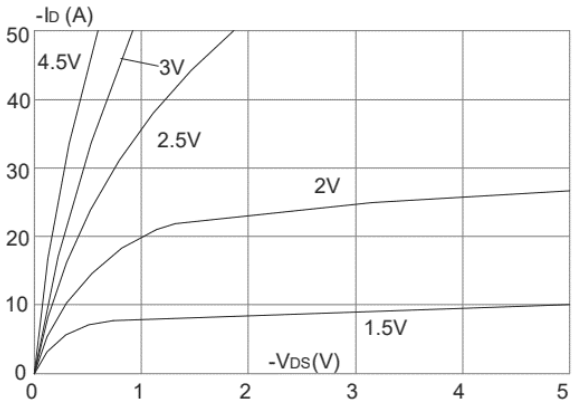
Note 2：When mounted on 1 inch square copper board t ≤ 10sec The value in any given application depends on the user's specific board design.

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

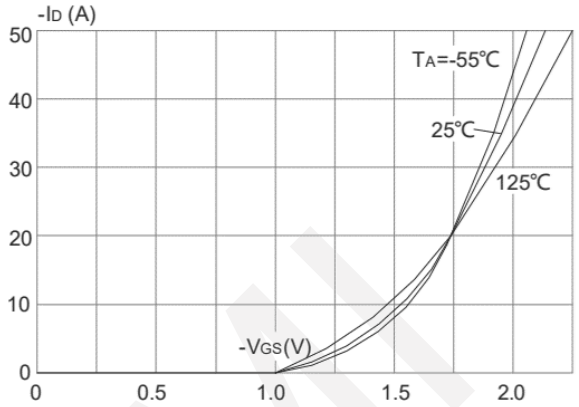
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	I_D = -250μA, V_{GS} = 0V	-20	-	-	V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS} = -20V，V_{GS} = 0V	-	-	-1	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS} = ±12V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_{DS}=-250μA	-0.5	-0.8	-1.1	V
Static Drain to Source On-State Resistance	$R_{DS(on)}$	I_D = -10A, V_{GS} = -4.5V	-	11	15	mΩ
		I_D =-5A, V_{GS} = -2.5V	-	15	20	mΩ
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=-10V, Frequency=1.0MHz	-	1792	-	pF
Output Capacitance	C_{oss}		-	174	-	pF
Reverse Transfer Capacitance	C_{rss}		-	151	-	pF
Turn-ON Delay Time	$t_{d(on)}$	I_D = -12A, V_{DS} =-10V, R_{GEN}=2.4 Ω, V_{GS} =-10V,	-	14	-	ns
Rise Time	t_r		-	79	-	ns
Turn-OFF Delay Time	$t_{d(off)}$		-	76	-	ns
Fall Time	t_f		-	76	-	ns
Total Gate Charge	Q_g	V_{DS} =-10 V, V_{GS} =-4.5V, I_D = -6A	-	16	-	nC
	Q_{gs}		-	3	-	nC
	Q_{gd}		-	4	-	nC
Diode Forward Voltage	V_{FSD}	I_{SD} = -10A,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.

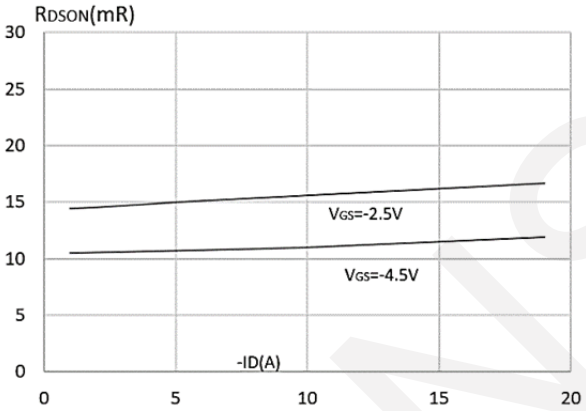
7.Typical electrical and thermal characteristics



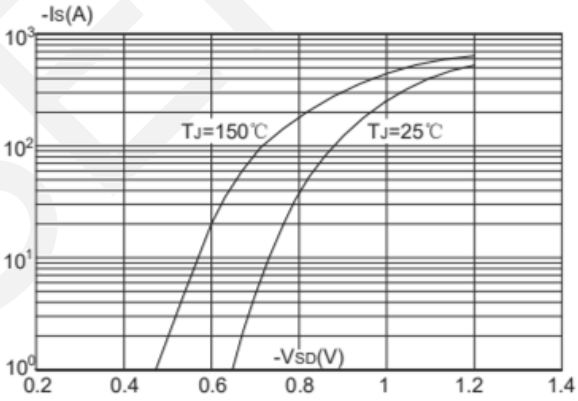
Output Characteristics



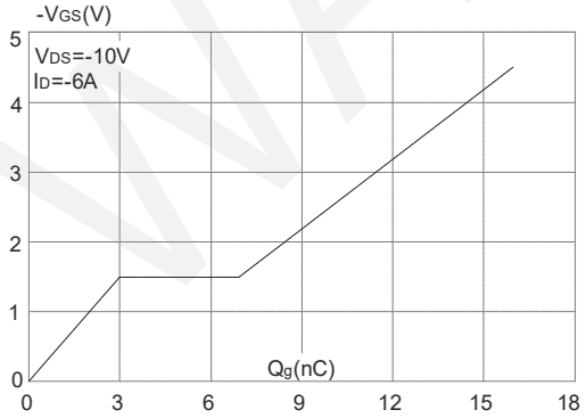
Typical Transfer Characteristics



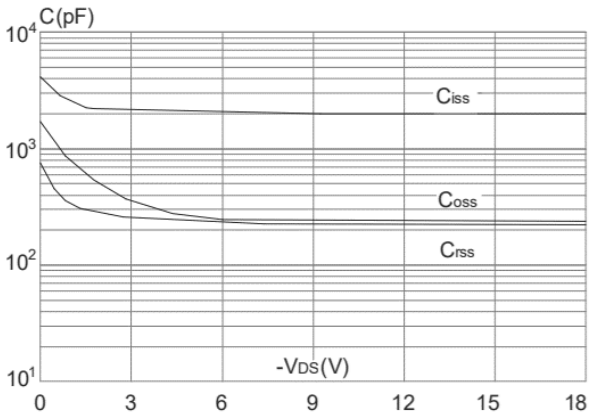
On-Resistance vs. Drain Current and Gate



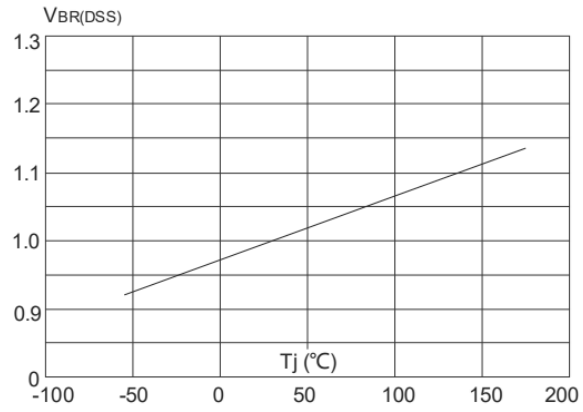
Body Diode Characteristics



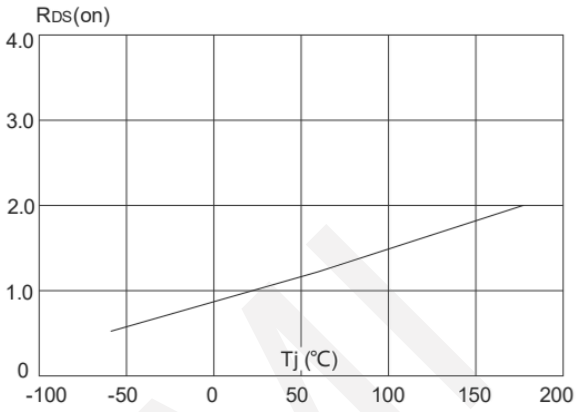
Gate Charge Characteristics



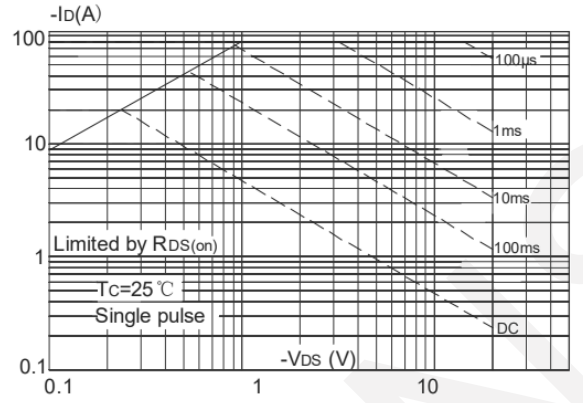
Capacitance Characteristics



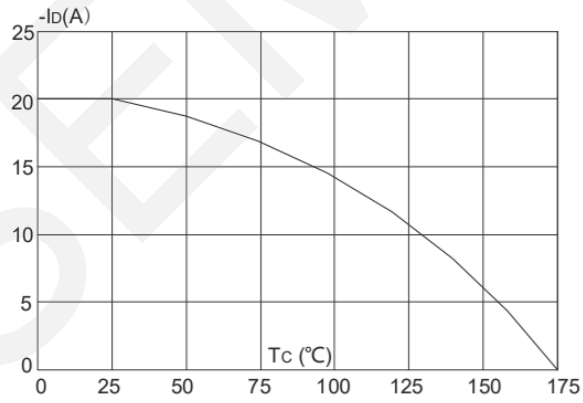
Normalized Breakdown Voltage vs. Junction Temperature



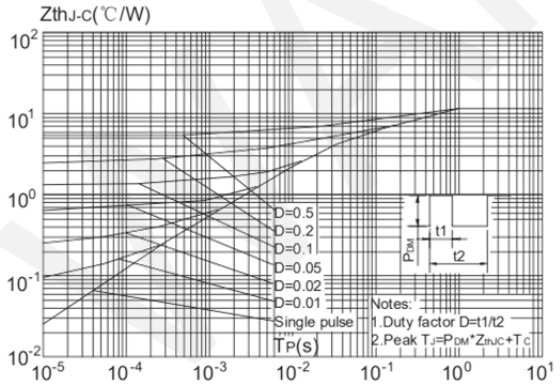
Normalized on Resistance vs. Junction Temperature



Maximum Safe Operating Area

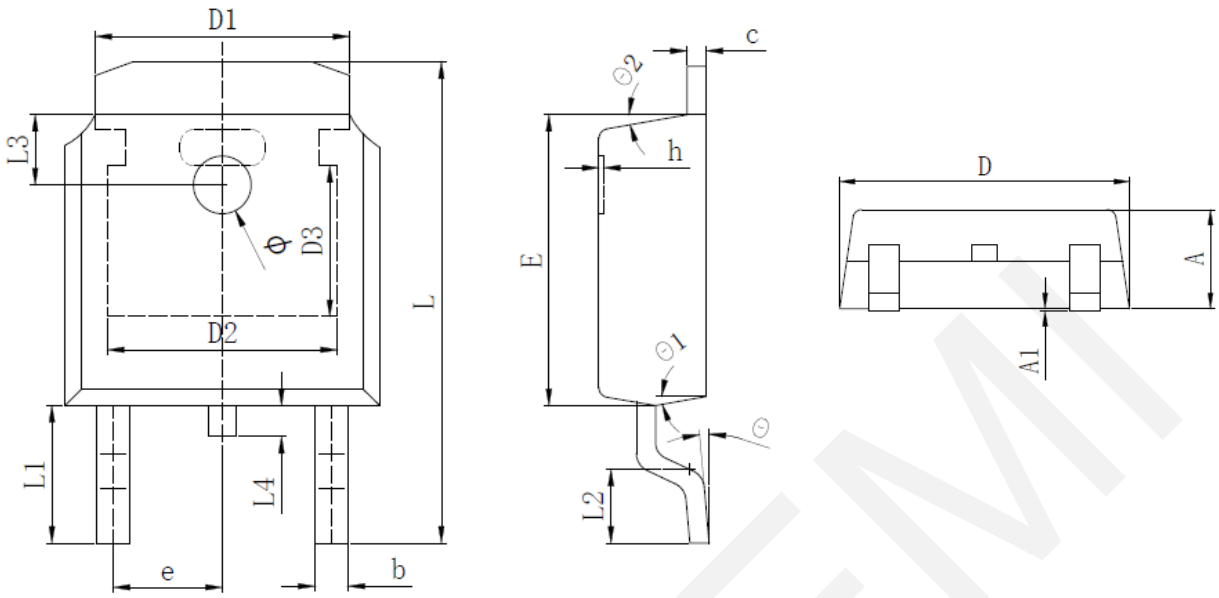


Maximum Continuous Drain Current vs. Case Temperature



Maximum Effective Transient Thermal Impedance, Junction-to Case

8.Package Dimensions



SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	2.200	2.300	2.400
A1	0.000		0.127
b	0.640	0.690	0.740
c(电镀后)	0.460	0.520	0.580
D	6.500	6.600	6.700
D1	5.334 REF		
D2	4.826 REF		
D3	3.166 REF		
E	6.000	6.100	6.200
e	2.286 TYP		
h	0.000	0.100	0.200
L	9.900	10.100	10.300
L1	2.888 REF		
L2	1.400	1.550	1.700
L3	1.600 REF		
L4	0.600	0.800	1.000
Φ	1.100	1.200	1.300
θ	0°		8°
θ1	9° TYP		
θ2	9° TYP		

9. Important Notice

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