



CTH3004PS-T52

P-Channel Enhancement MOSFET

Features

- Drain-Source Breakdown Voltage V_{DSS} -40V
- Drain-Source On-Resistance
 $R_{DS(ON)}$ 15m Ω , at $V_{GS} = -10V$, $I_D = -12A$
 $R_{DS(ON)}$ 18m Ω , at $V_{GS} = -4.5V$, $I_D = -6A$
- Continuous Drain Current at $T_C=25^\circ C$ $I_D = -30A$
- Advanced high cell density Trench Technology
- RoHS Compliance & Halogen Free

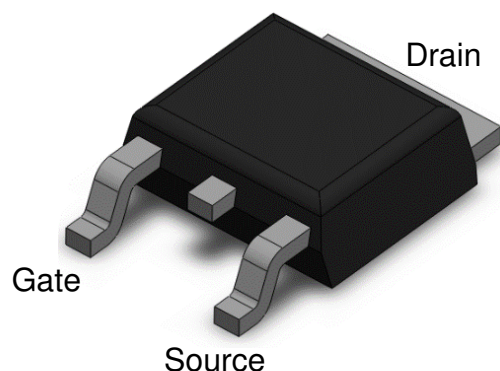
Applications

- Load Switch
- DC/DC Converter
- LCD Display inverter

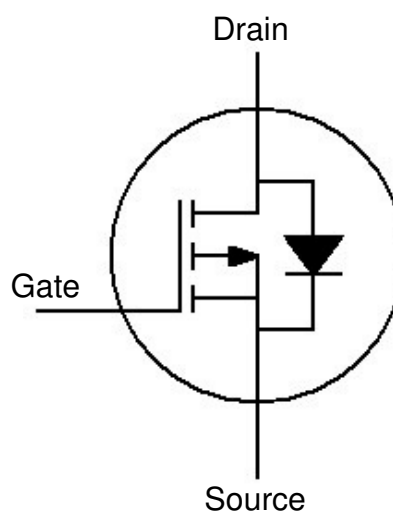
Description

The CTH3004PS-T52 is the P-Channel logic enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology. This high density process is especially tailored to minimize on-state resistance.

Package Outline



Schematic





Absolute Maximum Rating at 25°C

Symbol	Parameters	Test Conditions	Min	Note
V _{DS}	Drain-Source Voltage	-40	V	
V _{GS}	Gate-Source Voltage	±20	V	
I _D	Continuous Drain Current @T _C =25°C	-30	A	1
I _{DM}	Pulsed Drain Current	-100	A	1
P _D	Total Power Dissipation @T _C =25°C	25	W	2
T _{STG}	Storage Temperature Range	-55 to 150	°C	
T _J	Operating Junction Temperature Range	-55 to 150	°C	

Thermal Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
R _{θJC}	Thermal Resistance Junction-Case		--	--	5	°C /W	1,4



Electrical Characteristics $T_A = 25^\circ\text{C}$ (unless otherwise specified)

Static Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
B _{VDS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = -250μA	-40	-	-	V	
I _{DSS}	Drain-Source Leakage Current	V _{DS} = -40V, V _{GS} = 0V	-	-	-1	μA	
I _{GSS}	Gate-Source Leakage Current	V _{GS} = ±20V, V _{DS} = 0V	-	-	±100	nA	

On Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
R _{DS(ON)}	Drain-Source On-Resistance	V _{GS} = -10V, I _D = -12A	-	15	18	mΩ	3
		V _{GS} = -4.5V, I _D = -6A	-	18	25	mΩ	3
V _{GS(th)}	Gate-Source Threshold Voltage	V _{GS} = V _{DS} , I _D = -250μA	-1.5	-1.8	-3.0	V	3

Dynamic Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
C _{ISS}	Input Capacitance	V _{GS} = 0V, V _{DS} = -20V f = 1MHz	-	2760	3726	pF	
C _{OSS}	Output Capacitance		-	260	-		
C _{RSS}	Reverse Transfer Capacitance		-	85	-		

Switching Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
T _{D(ON)}	Turn-On Delay Time	V _{DS} = -15V, R _L = 15Ω, V _{GS} = -10V, R _G = 6Ω, I _D = -1A	-	48	64	ns	
T _R	Rise Time		-	24	32		
T _{D(OFF)}	Turn-Off Delay Time		-	88	118		
T _F	Fall Time		-	34	45		
Q _G	Total Gate Charge	V _{DS} = -20V, V _{GS} = -4.5V, I _D = -12A	-	25	33	nC	
Q _{GS}	Gate-Source Charge		-	11	-		
Q _{GD}	Gate-Drain (Miller) Charge		-	9.5	-		



Drain-Source Diode Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
V _{SD}	Body Diode Forward Voltage	V _{GS} = 0V, I _{SD} = -1.7A	-	-0.78	-1.2	V	1
I _{SD}	Body Diode Continuous Current		-	-	-1.7	A	1

Note:

1. The power dissipation is limited by 150°C junction temperature.
2. The data tested by pulsed , pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$
3. Thermal Resistance follow JESD51-3.



Typical Characteristic Curves

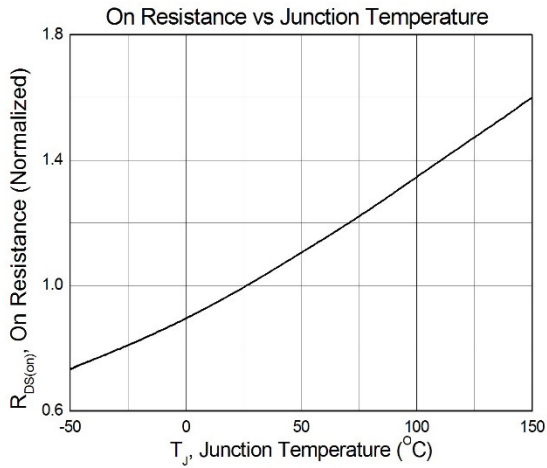


Figure 1

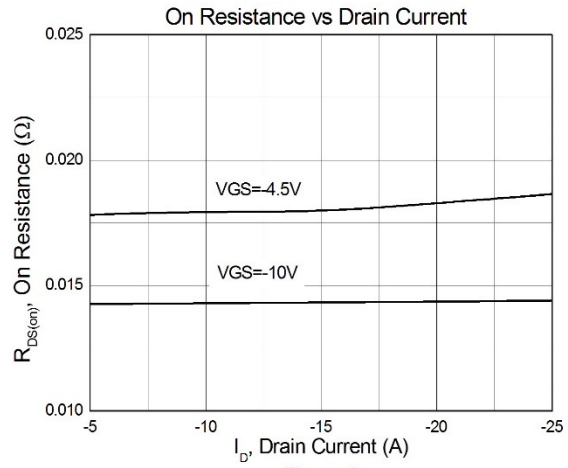


Figure 2

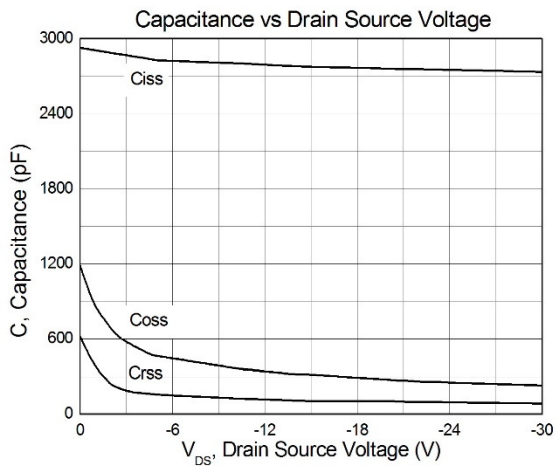


Figure 3

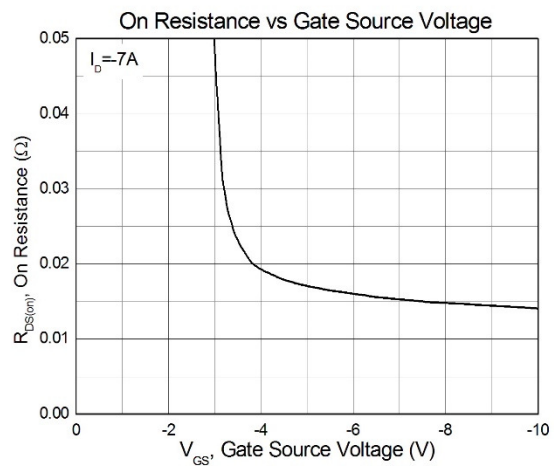


Figure 4

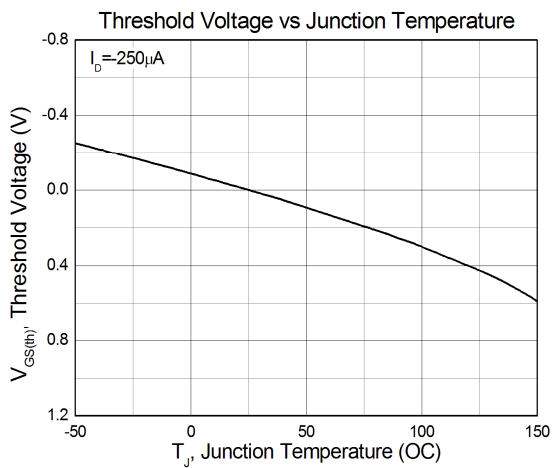


Figure 5

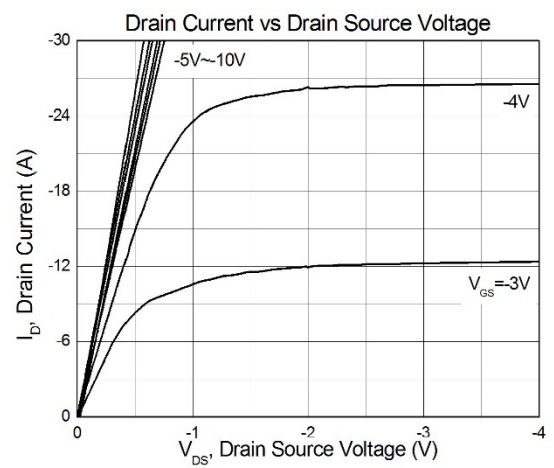


Figure 6

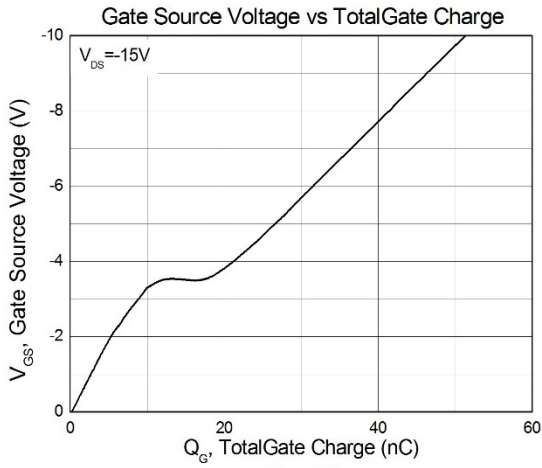


Figure 7

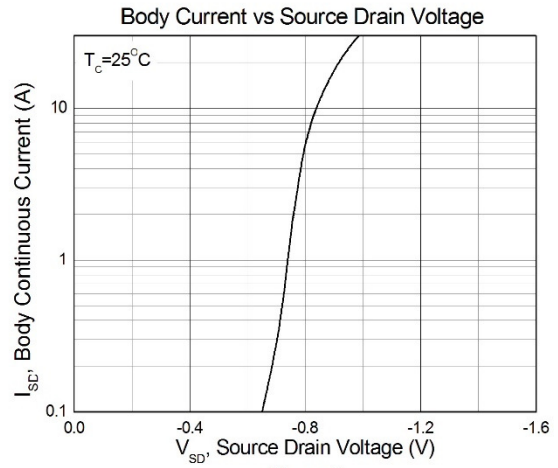


Figure 8



Test Circuits & Waveforms

Figure 9: Gate Charge Test Circuit

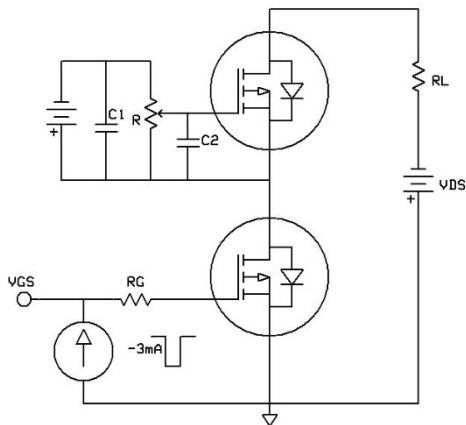


Figure 10: Gate Charge Waveform

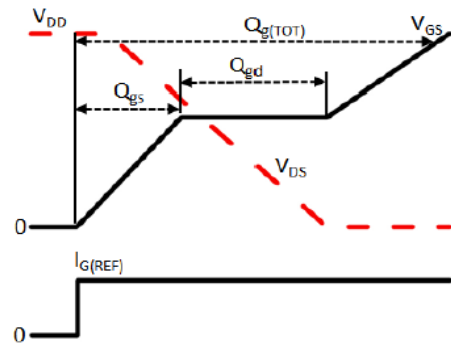


Figure 11: Switching Time Test Circuit

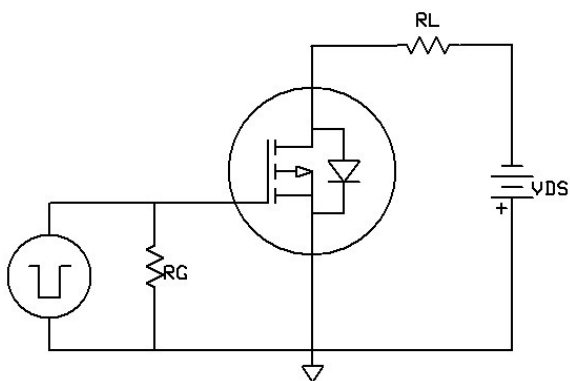
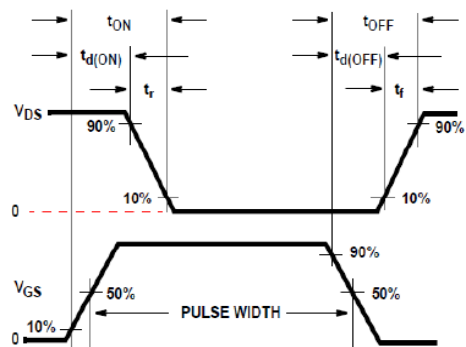
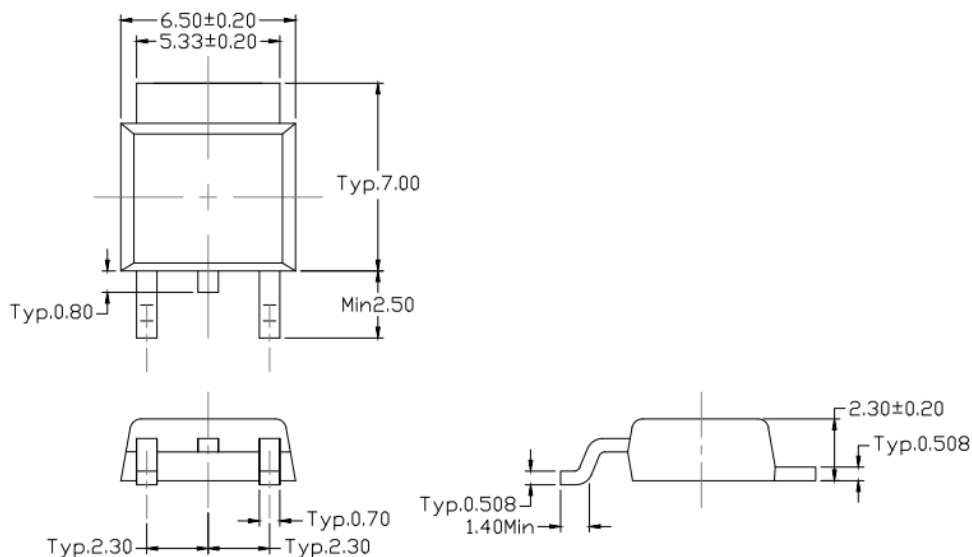


Figure 12: Switching Time Waveform



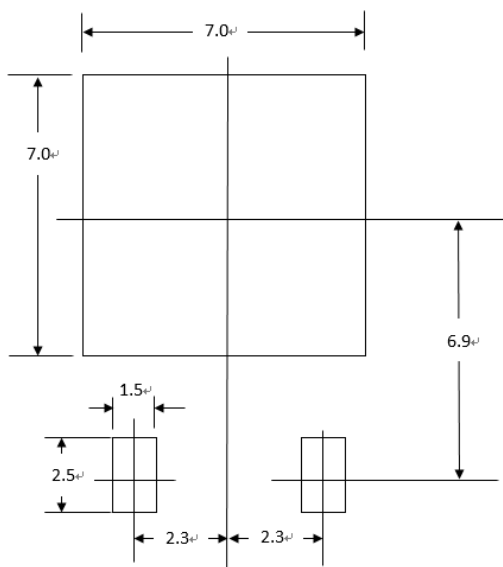


Package Dimension (TO-252)

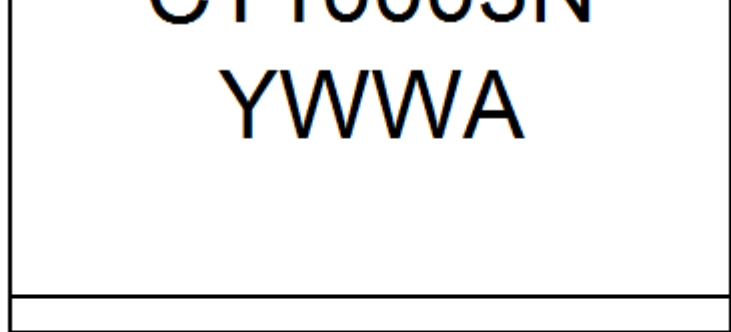


Dimensions in mm unless otherwise stated

Recommended pad layout for surface mount leadform

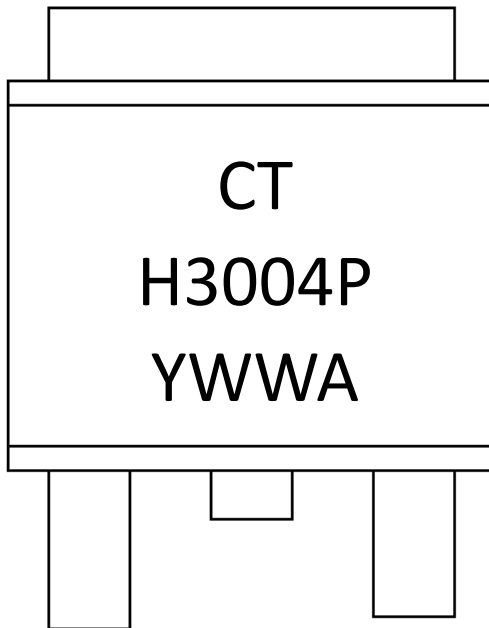


Dimensions in mm unless otherwise stated



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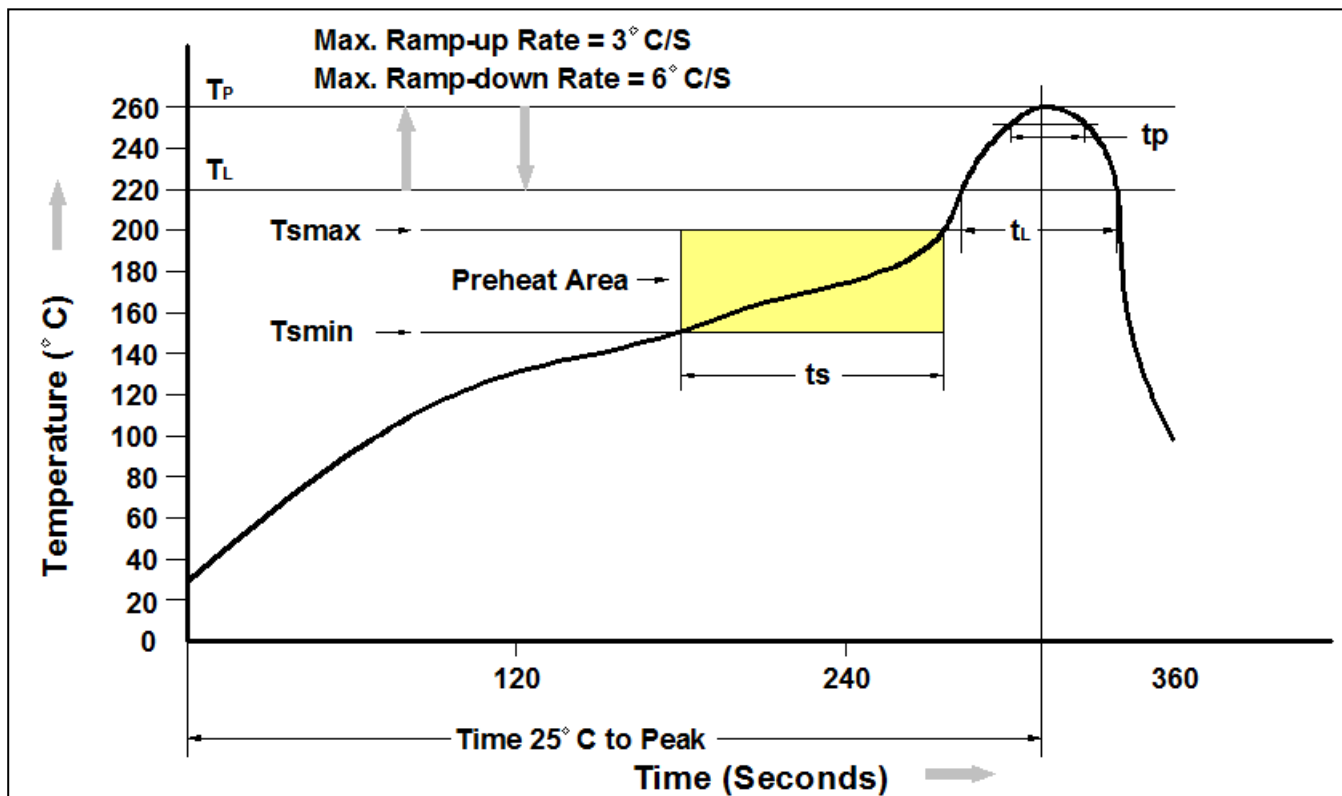
CT : Denotes " CT M
H3004P : Device Number
Y : Fiscal Year
WW : Work Week
A : Production Code

Ordering Information

Part Number	Description	Quantity
CTH3004PS-T52	TO-252 Reel	2500 pcs



Reflow Profile



Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T _{smin})	150 °C
Temperature Max. (T _{smax})	200 °C
Time (t _s) from (T _{smin} to T _{smax})	60-120 seconds
Ramp-up Rate (t _L to t _P)	3°C/second max.
Liquidous Temperature (T _L)	217 °C
Time (t _L) Maintained Above (T _L)	60 – 150 seconds
Peak Body Package Temperature	260 °C +0 °C / -5 °C
Time (t _P) within 5 °C of 260 °C	30 seconds
Ramp-down Rate (T _P to T _L)	6°C/second max
Time 25 °C to Peak Temperature	8 minutes max.



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