



**CHENMKO ENTERPRISE CO.,LTD**

**CHM4204PAPT**

**SURFACE MOUNT**

**N-Channel Enhancement Mode Field Effect Transistor**

VOLTAGE 40 Volts CURRENT 24 Ampere

Lead free devices

**APPLICATION**

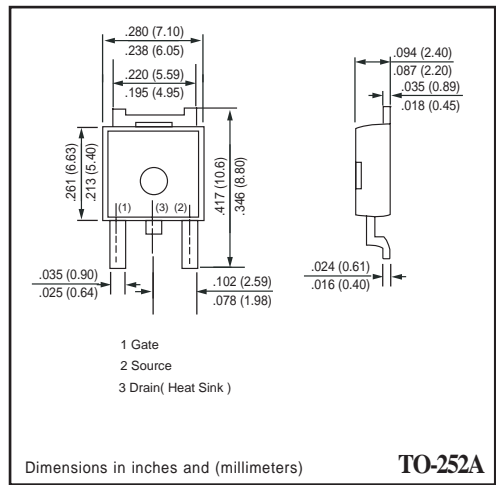
- \* Servo motor control.
- \* Power MOSFET gate drivers.
- \* Other switching applications.

**FEATURE**

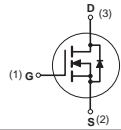
- \* Small package. (TO-252A)
- \* Super high dense cell design for extremely low  $R_{DS(ON)}$ .
- \* High power and current handling capability.

**CONSTRUCTION**

- \* N-Channel Enhancement



**CIRCUIT**



**Absolute Maximum Ratings**  $T_A = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	CHM4204PAPT	Units
$V_{DSS}$	Drain-Source Voltage	40	V
$V_{GSS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Maximum Drain Current - Continuous	24	A
	- Pulsed (Note 3)	90	
$P_D$	Maximum Power Dissipation at $T_c = 25^\circ\text{C}$	31	W
$T_J$	Operating Temperature Range	-55 to 150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$

- Note : 1. Surface Mounted on FR4 Board ,  $t \leq 10\text{sec}$   
 2. Pulse Test , Pulse width  $\leq 300\mu\text{s}$  , Duty Cycle  $\leq 2\%$   
 3. Repetitive Rating , Pulse width limited by maximum junction temperature  
 4. Guaranteed by design , not subject to production trsting

**Thermal characteristics**

$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 1)	50	$^\circ\text{C/W}$
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2007-06

## RATING CHARACTERISTIC CURVES ( CHM4204PAPT )

**Electrical Characteristics**  $T_A = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Units
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### OFF CHARACTERISTICS

$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	40			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 32\text{ V}, V_{GS} = 0\text{ V}$			1	$\mu\text{A}$
$I_{GSSF}$	Gate-Body Leakage	$V_{GS} = 20\text{ V}, V_{DS} = 0\text{ V}$			+100	nA
$I_{GSSR}$	Gate-Body Leakage	$V_{GS} = -20\text{ V}, V_{DS} = 0\text{ V}$			-100	nA

### ON CHARACTERISTICS (Note 2)

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	1		4	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}, I_D=6\text{A}$ $V_{GS}=4.5\text{V}, I_D=5\text{A}$		24 34	30 45	$\text{m}\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS} = 5\text{ V}, I_D = 6\text{ A}$		10		S

### Dynamic Characteristics

$C_{iss}$	Input Capacitance	$V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$		1050		pF
$C_{oss}$	Output Capacitance			155		
$C_{rss}$	Reverse Transfer Capacitance			95		

### SWITCHING CHARACTERISTICS (Note 4)

$Q_g$	Total Gate Charge	$V_{DS}=20\text{V}, I_D=6\text{A}$ $V_{GS}=10\text{V}$		20.5	27	nC
$Q_{gs}$	Gate-Source Charge			3.5		
$Q_{gd}$	Gate-Drain Charge			4.0		
$t_{on}$	Turn-On Time	$V_{DD} = 20\text{ V}$ $I_D = 6\text{ A}, V_{GS} = 10\text{ V}$ $R_{GEN} = 3\ \Omega$		14	30	nS
$t_r$	Rise Time			10	20	
$t_{off}$	Turn-Off Time			17	35	
$t_f$	Fall Time			18	35	

### DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS

$I_S$	Drain-Source Diode Forward Current			24	A
$V_{SD}$	Drain-Source Diode Forward Voltage	$I_S = 1\text{ A}, V_{GS} = 0\text{ V}$		1.2	V

# RATING CHARACTERISTIC CURVES ( CHM4204PAPT )

## Typical Electrical Characteristics

Figure 1. Output Characteristics

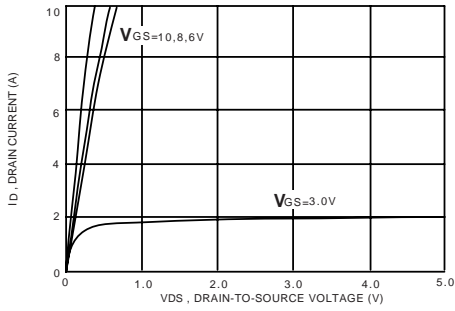


Figure 2. Transfer Characteristics

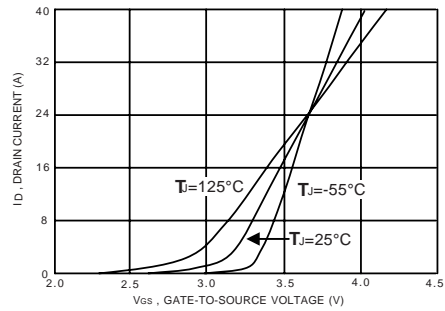


Figure 3. Gate Charge

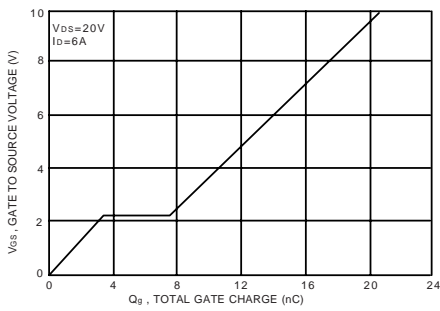


Figure 4. On-Resistance Variation with Temperature

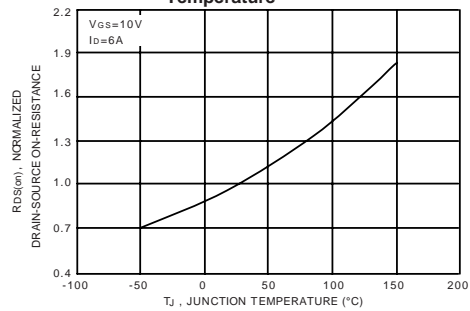


Figure 5. Gate Threshold Variation with Temperature

