



# CHENMKO ENTERPRISE CO.,LTD

## SURFACE MOUNT

### Dual Enhancement Mode Field Effect Transistor

N-channel: VOLTAGE 60 Volts CURRENT 4.5 Ampere

P-channel: VOLTAGE 60 Volts CURRENT 3.5 Ampere

**CHM4559JPT**

Lead free devices

#### APPLICATION

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

#### FEATURE

- \* Small flat package. (SO-8 )
- \* Super high dense cell design for extremely low  $R_{DS(ON)}$ .
- \* Lead free product is acquired.
- \* High power and current handling capability.

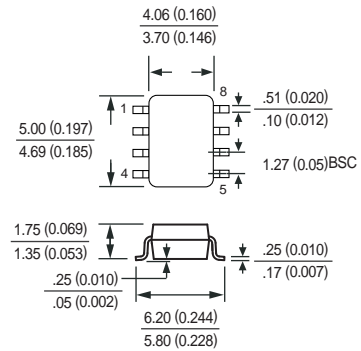
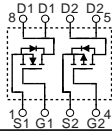
#### CONSTRUCTION

- \* N-Channel & P-Channel Enhancement in the package



SO-8

#### CIRCUIT



SO-8

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

Symbol	Parameter	N-Channel	P-Channel	Units
$V_{DSS}$	Drain-Source Voltage	60	-60	V
$V_{GSS}$	Gate-Source Voltage	$\pm 20$	$\pm 20$	V
$I_D$	Maximum Drain Current - Continuous	4.5	-3.5	A
	- Pulsed (Note 3)	20	-20	
$P_D$	Maximum Power Dissipation	2000		mW
$T_J$	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 testing

#### Thermal characteristics

$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 1)	62.5	$^\circ\text{C/W}$
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2006-02

## RATING CHARACTERISTIC CURVES ( CHM4559JPT )

### N-Channel 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	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	60			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 48\text{ V}, V_{GS} = 0\text{ V}$			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		3	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}, I_D=4.5\text{A}$		42	55	m $\Omega$
		$V_{GS}=4.5\text{V}, I_D=4.0\text{A}$		55	75	
$g_{FS}$	Forward Transconductance	$V_{DS} = 10\text{V}, I_D = 4.5\text{A}$		8		S

#### SWITCHING CHARACTERISTICS (Note 4)

$Q_g$	Total Gate Charge	$V_{DS}=30\text{V}, I_D=4.5\text{A}$ $V_{GS}=10\text{V}$		19	24	nC
$Q_{gs}$	Gate-Source Charge			2.8		
$Q_{gd}$	Gate-Drain Charge			3.6		
$t_{on}$	Turn-On Time	$V_{DD}= 30\text{V}$ $I_D = 1.0\text{A}, V_{GS} = 10\text{ V}$ $R_{GEN} = 6\ \Omega$		11	25	nS
$t_r$	Rise Time			8	18	
$t_{off}$	Turn-Off Time			34	65	
$t_f$	Fall Time			9	22	

#### DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS

$I_S$	Drain-Source Diode Forward Current	(Note 1)			1.3	A
$V_{SD}$	Drain-Source Diode Forward Voltage	$I_S = 1.3\text{A}, V_{GS} = 0\text{ V}$ (Note 2)			1.2	V

## RATING CHARACTERISTIC CURVES ( CHM4559JPT )

### P-Channel 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	$V_{GS} = 0\text{ V}, I_D = -250\ \mu\text{A}$	-60			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = -48\text{ V}, V_{GS} = 0\text{ V}$			-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		-3	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS} = -10\text{ V}, I_D = -3.5\text{ A}$		88	105	m $\Omega$
		$V_{GS} = -4.5\text{ V}, I_D = -3.1\text{ A}$		130	160	
$g_{FS}$	Forward Transconductance	$V_{DS} = -5\text{ V}, I_D = -3.5\text{ A}$		7		S

#### SWITCHING CHARACTERISTICS (Note 4)

$Q_g$	Total Gate Charge	$V_{DS} = -30\text{ V}, I_D = -3.5\text{ A}$ $V_{GS} = -10\text{ V}$		21	29	nC
$Q_{gs}$	Gate-Source Charge			3		
$Q_{gd}$	Gate-Drain Charge			4		
$t_{on}$	Turn-On Time	$V_{DD} = -30\text{ V}$ $I_D = -1.0\text{ A}, V_{GS} = -10\text{ V}$ $R_{GEN} = 6\ \Omega$		13	45	nS
$t_r$	Rise Time			9	30	
$t_{off}$	Turn-Off Time			48	150	
$t_f$	Fall Time			22	75	

#### DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS

$I_S$	Drain-Source Diode Forward Current	(Note 1)			-1.3	A
$V_{SD}$	Drain-Source Diode Forward Voltage	$I_S = -1.3\text{ A}, V_{GS} = 0\text{ V}$ (Note 2)			-1.2	V