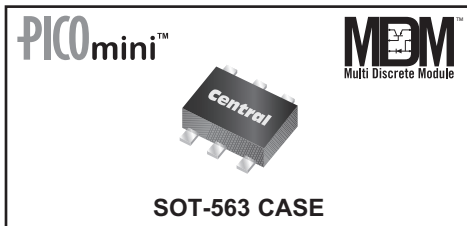


**CMLM7388**  
**MULTI DISCRETE MODULE™**  
**SURFACE MOUNT**  
**N-CHANNEL MOSFET AND**  
**LOW NOISE NPN TRANSISTOR**



www.centrasemi.com



**DESCRIPTION:**

The CENTRAL SEMICONDUCTOR CMLM7388 is a Multi Discrete Module™ consisting of a single N-Channel Enhancement-mode MOSFET and a Low Noise NPN transistor packaged in a space saving PICOmini™ SOT-563 surface mount case. This device is designed for small signal general purpose applications where size and operational efficiency are prime requirements.

**MARKING CODE: 7C8**

**FEATURES:**

- ESD protection up to 2kV
- Low  $r_{DS(on)}$  MOSFET
- Low  $V_{CE(SAT)}$  NPN Transistor

• Devices are **Halogen Free** by design

**APPLICATIONS:**

- DC / DC Converters
- Battery Powered Portable Equipment

**MAXIMUM RATINGS (SOT-563 Package):** ( $T_A=25^\circ\text{C}$ )

	SYMBOL		UNITS
Power Dissipation (Note 1)	$P_D$	350	mW
Power Dissipation (Note 2)	$P_D$	300	mW
Power Dissipation (Note 3)	$P_D$	150	mW
Operating and Storage Junction Temperature	$T_J, T_{stg}$	-65 to +150	$^\circ\text{C}$
Thermal Resistance	$\theta_{JA}$	357	$^\circ\text{C/W}$

**MAXIMUM RATINGS Q1:** ( $T_A=25^\circ\text{C}$ )

	SYMBOL		UNITS
Drain-Source Voltage	$V_{DS}$	50	V
Gate-Source Voltage	$V_{GS}$	12	V
Continuous Drain Current	$I_D$	160	mA
Maximum Pulsed Drain Current	$I_{DM}$	560	mA

**MAXIMUM RATINGS Q2:** ( $T_A=25^\circ\text{C}$ )

	SYMBOL		UNITS
Collector-Base Voltage	$V_{CBO}$	50	V
Collector-Emitter Voltage	$V_{CEO}$	45	V
Emitter-Base Voltage	$V_{EBO}$	6.0	V
Collector Current	$I_C$	100	mA

**ELECTRICAL CHARACTERISTICS Q1:** ( $T_A=25^\circ\text{C}$  unless otherwise noted)

SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
$I_{GSSF}, I_{GSSR}$	$V_{GS}=8.0V, V_{DS}=0V$			1.0	$\mu\text{A}$
$I_{GSSF}, I_{GSSR}$	$V_{GS}=12V, V_{DS}=0V$			5.0	$\mu\text{A}$
$I_{DSS}$	$V_{DS}=50V, V_{GS}=0V$			10	$\mu\text{A}$
$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu\text{A}$	50			V
$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	0.7		1.0	V
$r_{DS(ON)}$	$V_{GS}=4.0V, I_D=100\text{mA}$			4.0	$\Omega$
$r_{DS(ON)}$	$V_{GS}=2.5V, I_D=80\text{mA}$			5.0	$\Omega$
$g_{FS}$	$V_{DS}=10V, I_D=100\text{mA}$	180			mS

- Notes: (1) Ceramic or aluminum core PC Board with copper mounting pad area of 4.0 mm<sup>2</sup>  
(2) FR-4 Epoxy PC Board with copper mounting pad area of 4.0 mm<sup>2</sup>  
(3) FR-4 Epoxy PC Board with copper mounting pad area of 1.4 mm<sup>2</sup>

R0 (1-December 2009)

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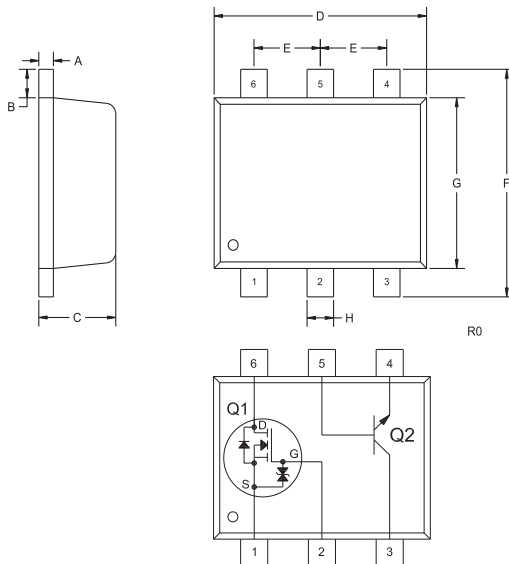
**ELECTRICAL CHARACTERISTICS Q1 - Continued:**

SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
$C_{rss}$	$V_{DS}=10V, V_{GS}=0, f=1.0MHz$		2.1		pF
$C_{iss}$	$V_{DS}=10V, V_{GS}=0, f=1.0MHz$		25		pF
$C_{oss}$	$V_{DS}=10V, V_{GS}=0, f=1.0MHz$		5.0		pF

**ELECTRICAL CHARACTERISTICS Q2: ( $T_A=25^\circ C$ )**

$I_{CBO}$	$V_{CB}=30V$			15	nA
$BV_{CBO}$	$I_C=10\mu A$	50			V
$BV_{CEO}$	$I_C=10mA$	45			V
$BV_{EBO}$	$I_E=1.0\mu A$	6.0			V
$V_{CE(SAT)}$	$I_C=10mA, I_B=0.5mA$			100	mV
$V_{CE(SAT)}$	$I_C=100mA, I_B=5.0mA$			300	mV
$V_{BE(SAT)}$	$I_C=10mA, I_B=0.5mA$		700		mV
$V_{BE(SAT)}$	$I_C=100mA, I_B=5.0mA$		900		mV
$V_{BE(on)}$	$V_{CE}=5.0V, I_C=2.0mA$	580		700	mV
$V_{BE(on)}$	$V_{CE}=5.0V, I_C=10mA$			770	mV
$h_{FE}$	$V_{CE}=5.0V, I_C=2.0mA$	200		450	
$f_T$	$V_{CE}=5.0V, I_C=10mA, f=100MHz$	100			MHz
$C_{ob}$	$V_{CB}=10V, I_E=0, f=1.0MHz$			4.5	pF
$N_F$	$V_{CE}=5.0V, R_S=2k\Omega, f=1.0kHz, BW=200Hz$			10	dB

**SOT-563 - MECHANICAL OUTLINE**



SYMBOL	DIMENSIONS			
	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.004	0.007	0.10	0.18
B	0.008		0.20	
C	0.022	0.024	0.56	0.60
D	0.059	0.067	1.50	1.70
E	0.020		0.50	
F	0.061	0.067	1.55	1.70
G	0.047		1.20	
H	0.006	0.012	0.15	0.30

SOT-563 (REV: R0)

**LEAD CODE:**

- 1) SOURCE Q1
- 2) GATE Q1
- 3) COLLECTOR Q2
- 4) EMITTER Q2
- 5) BASE Q2
- 6) DRAIN Q1

**MARKING CODE: 7C8**

R0 (1-December 2009)