

CMLM0405
MULTI DISCRETE MODULE™
SURFACE MOUNT
LOW $V_{CE(SAT)}$ SILICON NPN TRANSISTOR
AND
LOW V_F SILICON SCHOTTKY DIODE



Central™

Semiconductor Corp.

DESCRIPTION:

The Central Semiconductor CMLM0405 is a single NPN Transistor and Schottky Diode packaged in a space saving SOT-563 case and designed for small signal general purpose applications where size and operational efficiency are prime requirements.

- Complementary Device: **CMLM0605**
- Combination Low $V_{CE(SAT)}$ Transistor and Low V_F Schottky Diode.

MARKING CODE: C45

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

Power Dissipation
Operating and Storage
Junction Temperature
Thermal Resistance

SYMBOL		UNITS
P_D	350	mW
T_J, T_{stg}	-65 to +150	$^\circ\text{C}$
θ_{JA}	357	$^\circ\text{C/W}$

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

Collector-Base Voltage
Collector-Emitter Voltage
Emitter-Base Voltage
Collector Current

SYMBOL		UNITS
V_{CBO}	60	V
V_{CEO}	40	V
V_{EBO}	6.0	V
I_C	200	mA

MAXIMUM RATINGS D1: ($T_A=25^\circ\text{C}$)

Peak Repetitive Reverse Voltage
Continuous Forward Current
Peak Repetitive Forward Current, $t_p \leq 1\text{ms}$
Forward Surge Current, $t_p=8\text{ms}$

SYMBOL		UNITS
V_{RRM}	40	V
I_F	500	mA
I_{FRM}	3.5	A
I_{FSM}	10	A

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

SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
I_{CEV}	$V_{CE}=30\text{V}, V_{EB}=3.0\text{V}$	-	-	50	nA
BV_{CBO}	$I_C=10\mu\text{A}$	60	120	-	V
BV_{CEO}	$I_C=1.0\text{mA}$	40	60	-	V
BV_{EBO}	$I_E=10\mu\text{A}$	6.0	7.5	-	V
$V_{CE(SAT)}$	$I_C=10\text{mA}, I_B=1.0\text{mA}$		0.057	0.100	V
$V_{CE(SAT)}$	$I_C=50\text{mA}, I_B=5.0\text{mA}$		0.090	0.200	V
$V_{BE(SAT)}$	$I_C=10\text{mA}, I_B=1.0\text{mA}$	0.65	0.75	0.85	V
$V_{BE(SAT)}$	$I_C=50\text{mA}, I_B=5.0\text{mA}$		0.85	0.95	V
h_{FE}	$V_{CE}=1.0\text{V}, I_C=0.1\text{mA}$	90	180		
h_{FE}	$V_{CE}=1.0\text{V}, I_C=1.0\text{mA}$	100	185		
h_{FE}	$V_{CE}=1.0\text{V}, I_C=10\text{mA}$	100	180	300	
h_{FE}	$V_{CE}=1.0\text{V}, I_C=50\text{mA}$	70	150		
h_{FE}	$V_{CE}=1.0\text{V}, I_C=100\text{mA}$	30	90		
f_T	$V_{CE}=20\text{V}, I_C=10\text{mA}, f=100\text{MHz}$	300			MHz
C_{ob}	$V_{CB}=5.0\text{V}, I_E=0, f=1.0\text{MHz}$			4.0	pF
C_{ib}	$V_{BE}=0.5\text{V}, I_C=0, f=1.0\text{MHz}$			8.0	pF
h_{ie}	$V_{CE}=10\text{V}, I_C=1.0\text{mA}, f=1.0\text{kHz}$		1.0	12	$\text{k}\Omega$
h_{re}	$V_{CE}=10\text{V}, I_C=1.0\text{mA}, f=1.0\text{kHz}$		0.1	10	$\times 10^{-4}$

R1 (22-February 2005)

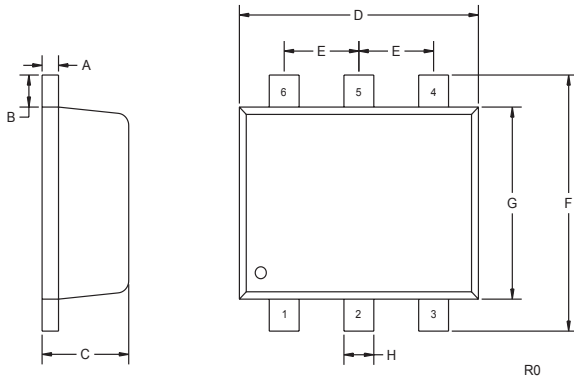
ELECTRICAL CHARACTERISTICS Q1 (continued)

SYMBOL	TEST CONDITIONS	MIN	MAX	UNITS
h_{fe}	$V_{CE}=10V, I_C=1.0mA, f=1.0kHz$	100	400	
h_{oe}	$V_{CE}=10V, I_C=1.0mA, f=1.0kHz$	1.0	60	$\mu mhos$
NF	$V_{CE}=5.0V, I_C=100\mu A, R_S=1.0K\Omega, f=10Hz$ to 15.7kHz		4.0	dB
t_d	$V_{CC}=3.0V, V_{BE}=0.5V, I_C=10mA, I_{B1}=1.0mA$		35	ns
t_r	$V_{CC}=3.0V, V_{BE}=0.5V, I_C=10mA, I_{B1}=1.0mA$		35	ns
t_s	$V_{CC}=3.0V, I_C=10mA, I_{B1}=I_{B2}=1.0mA$		200	ns
t_f	$V_{CC}=3.0V, I_C=10mA, I_{B1}=I_{B2}=1.0mA$		50	ns

ELECTRICAL CHARACTERISTICS D1 ($T_A=25^\circ C$)

I_R	$V_R=10V$		20	μA
I_R	$V_R=30V$		100	μA
BV_R	$I_R=500\mu A$	40		V
V_F	$I_F=100\mu A$		0.13	V
V_F	$I_F=1.0mA$		0.21	V
V_F	$I_F=10mA$		0.27	V
V_F	$I_F=100mA$		0.35	V
V_F	$I_F=500mA$		0.47	V
C_T	$V_R=1.0V, f=1.0MHz$		50	pF

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)

MARKING CODE: C45

LEAD CODE:

- 1) EMITTER Q1
- 2) BASE Q1
- 3) CATHODE D1
- 4) ANODE D1
- 5) ANODE D1
- 6) COLLECTOR Q1

R1 (22-February 2005)