

## QUAD 100 V, DMOS SWITCH

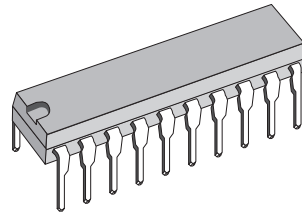
- OUTPUT VOLTAGE TO 100 V
- $0.7 \Omega R_{DS(ON)}$
- SUPPLY VOLTAGE UP TO 60 V
- LOW INPUT CURRENT
- TTL/CMOS COMPATIBLE INPUTS
- HIGH SWITCHING FREQUENCY (200 KHz)

### DESCRIPTION

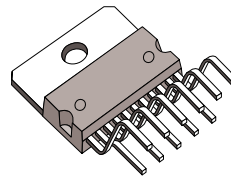
Realized with the Multipower-BCD mixed bipolar/CMOS/DMOS process, the L6114/15 monolithic quad DMOS switch is designed for high current, high voltage switching applications. Each of the four switches is controlled by a logic input and all four are controlled by a common enable input. All inputs are TTL/CMOS compatible for direct connection to logic circuits. Each source is available for the insertion of the sense resistors in current control applications.

Two versions are available : the L6114 mounted in a Powerdip 14+3+3 package and the L6115 in a 15-lead Multiwatt package.

### MULTIPOWER BCD TECHNOLOGY



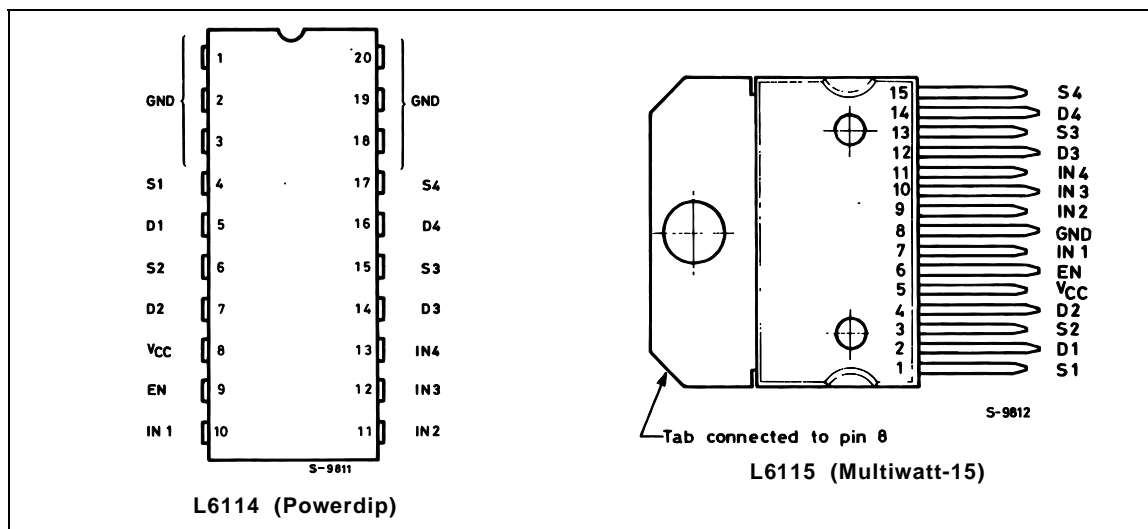
Powerdip 14 + 3 + 3



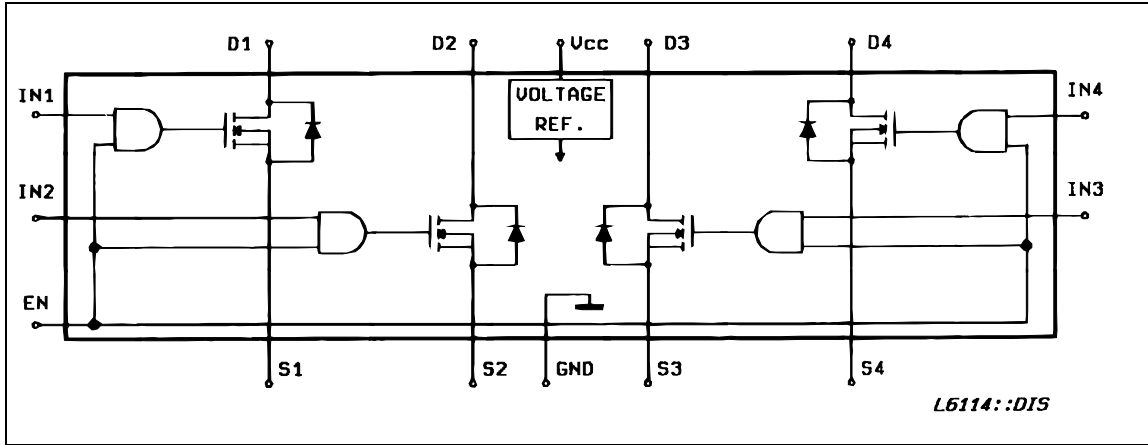
Multiwatt-15

**ORDERING NUMBERS :** L6114 (Powerdip)  
 L6115 (Multiwatt-15)

### PIN CONNECTIONS (top view)



**BLOCK DIAGRAM**



**ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Value	Unit	
$V_{DS}$	Drain-source Voltage	100	V	
$V_{CC}$	Supply Voltage	60	V	
$I_D$	Continuous Drain Current	@ <math>\langle 0 \rangle T_{pins} = 90\text{ }^\circ\text{C}</math> Powerdip @ <math>\langle 0 \rangle T_{case} = 90\text{ }^\circ\text{C}</math> Multiwatt -15	1.5 3	A A
$I_{DM} (*)$	Pulsed Drain Current	Powerdip Multiwatt -15	5 8	A A
$I_{SD}$	Continuous Source-drain Diode Current	@ <math>\langle 0 \rangle T_{pins} = 90\text{ }^\circ\text{C}</math> Powerdip @ <math>\langle 0 \rangle T_{case} = 90\text{ }^\circ\text{C}</math> Multiwatt -15	1.5 3	A A
$I_{SDM}$	Pulsed Source Drain Diode Current	Powerdip Multiwatt -15	5 8	A A
$V_{IN}$	Input Voltage	7	V	
$V_{EN}$	Enable Voltage	7	V	
$V_S$	Source Voltage	- 1 to + 4	V	
$P_{tot}$	Total Power Dissipation	@ $T_{pins} = 90\text{ }^\circ\text{C}$ Powerdip @ $T_{case} = 90\text{ }^\circ\text{C}$ Multiwatt -15 @ $T_{amb} = 70\text{ }^\circ\text{C}$ Powerdip @ $T_{amb} = 70\text{ }^\circ\text{C}$ Multiwatt -15	4.3 20 1.3 2.3	W W W W
$T_{stg}, T_j$	Storage and Junction Temperature Range	- 40 to + 150	$^\circ\text{C}$	

(\*) Pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 10\%$ .  
**Note :**  $I_D, I_{DM}, I_{SD}, I_{SDM}$  are given per channel.

**THERMAL DATA**

Symbol	Parameter	Powerdip	Multiwatt-15	Unit
$R_{th\ j-pins}$	Thermal Resistance Junction-pins	Max. 14	-	$^\circ\text{C/W}$
$R_{th\ j-case}$	Thermal Resistance Junction-case	Max. -	3	$^\circ\text{C/W}$
$R_{th\ j-amb}$	Thermal Resistance Junction-ambient	Max. 65	35	$^\circ\text{C/W}$

**ELECTRICAL CHARACTERISTICS** ( $T_j = 25^\circ\text{C}$ ,  $V_{CC} = 40\text{V}$ , unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{CC}$	Supply Voltage		14		48	V
$I_{CC}$	Supply Current	All $V_{IN} = H$ $V_{EN} = \text{Square Wave}$ (200kHz, 50 % DC)		9		mA
$I_Q$	Quiescent Current	$V_{EN} = L$		2	3	mA
$BV_{DSS}$	Drain Source Breakdown Voltage	$I_D = 1\text{mA}$ , $V_{EN} = L$	100			V
$I_{DSS}$	Output Leakage Current	$V_{EN} = L$ $V_{DS} = 100\text{V}$ $V_{DS} = 80\text{V}$ , $T_j = 125^\circ\text{C}$		1	1	mA
$R_{DS(on)}^*$	Static Drain-source on Resistance	$V_{CC} \geq 14\text{V}$ , $I_D = 1.5\text{A}$ $V_{EN}$ , $V_{IN} = H$		0.7		$\Omega$
$V_{IN L}$ , $V_{EN L}$	Input Low Voltage		- 0.3		0.8	V
$V_{IN H}$ , $V_{EN H}$	Input High Voltage		2		7	V
$I_{IN L}$ , $I_{EN L}$	Input Low Current	$V_{IN}$ , $V_{EN} = L$			- 100	$\mu\text{A}$
$I_{IN H}$ , $I_{EN H}$	Input High Current	$V_{IN}$ , $V_{EN} = H$			10	$\mu\text{A}$
$t_{d(on)}$	Turn on Delay Time	$I_D = 1.5\text{A}$ See Test Circuit and Waveforms		300		ns
$t_r$	Rise Time			100		ns
$t_{d(off)}$	Turn off Delay Time			400		ns
$t_f$	Fall Time			100		ns
$V_{SD}^*$	Source Drain Diode Forward Voltage	$I_{SD} = 1.5\text{A}$ , $V_{EN} = L$			1.5	V
$V_{SD(on)}^*$	Source Drain Forward Voltage	$I_{SD} = 1.5\text{A} - V_{IN}$ , $V_{EN} = H$			1.2	V

(\*) Pulse test : pulse width = 300  $\mu\text{s}$ , duty cycle = 2 %.

SWITCHING TIMES RESISTIVE LOAD

Figure 1 : Test Circuit  
(Pins x = Powerdip ; Pins (x) = Multiwatt).

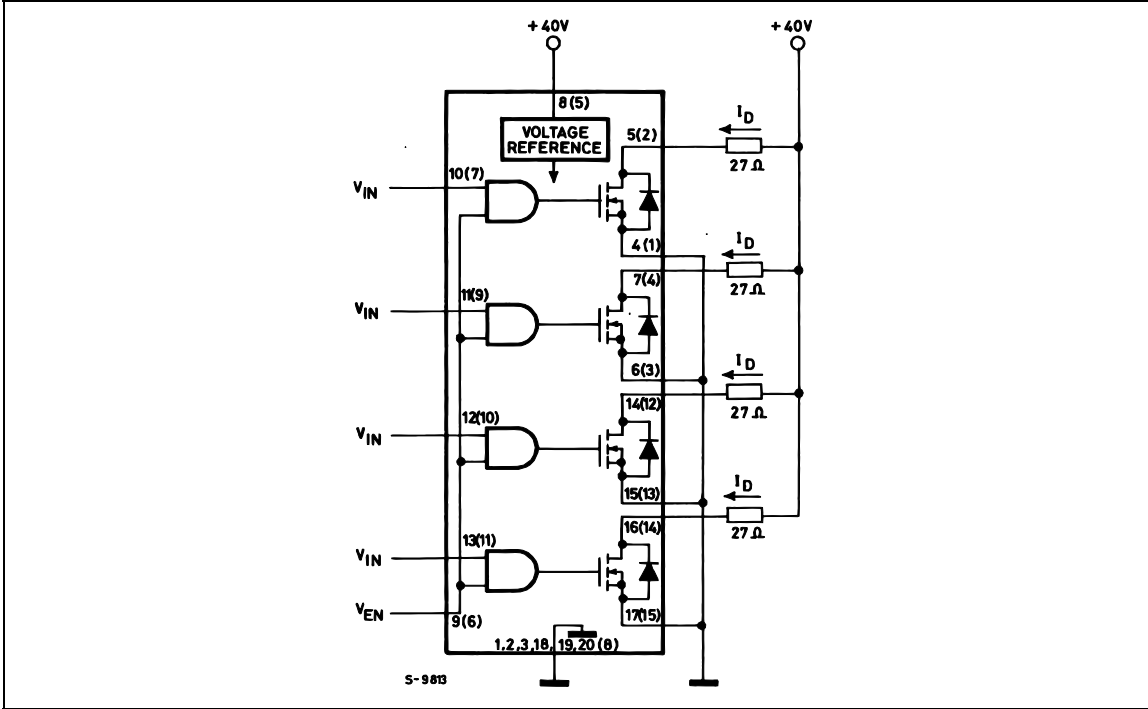
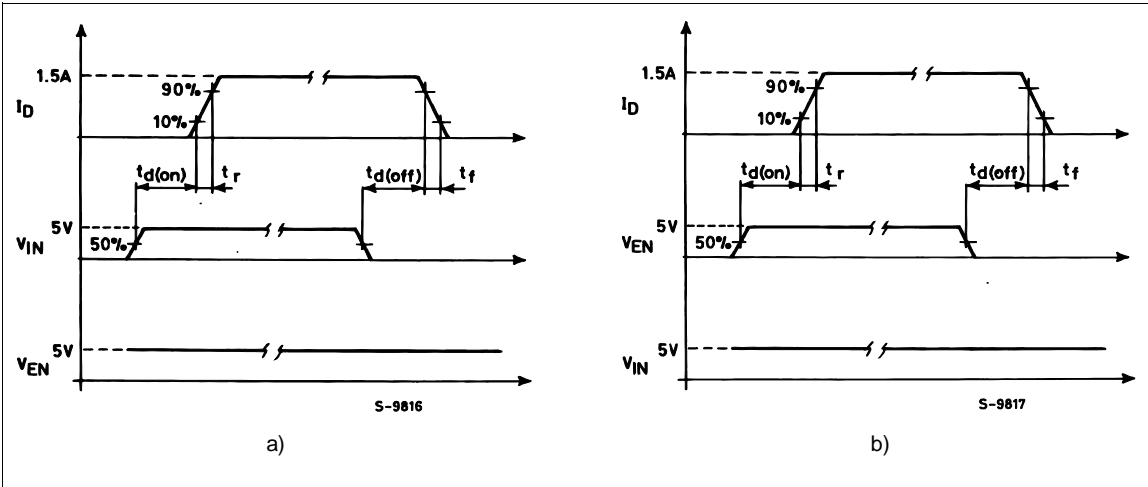


Figure 2 : Waveforms.



TEST CIRCUIT (Pins x = Powerdip ; Pins (x) = Multiwatt)

Figure 3 : Quiescent Current and Output Leakage Current..

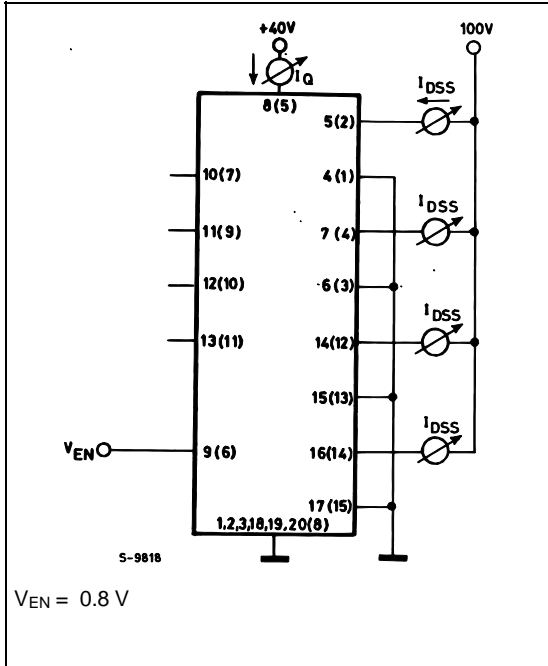


Figure 4 : Supply Current.

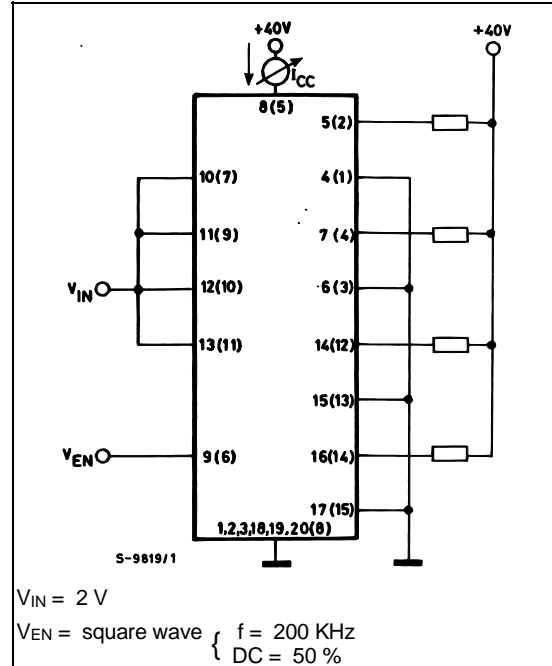


Figure 5 :  $R_{DS(on)}$ .

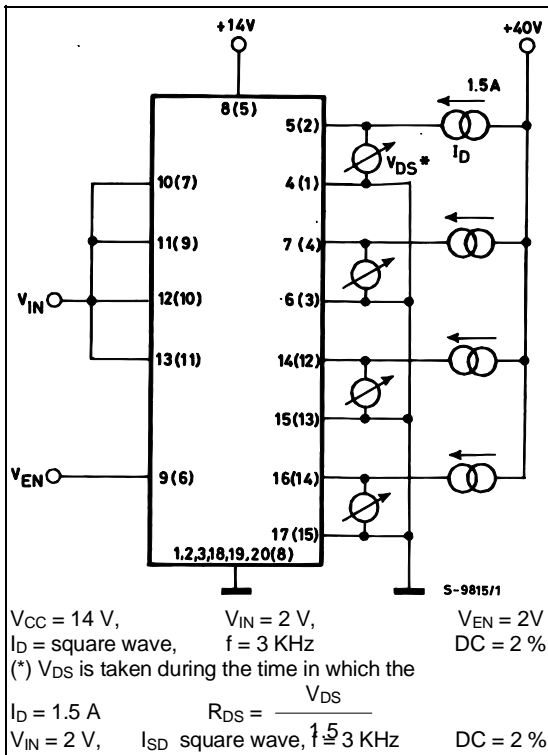


Figure 6 : Source-drain Diode Forward Voltage.

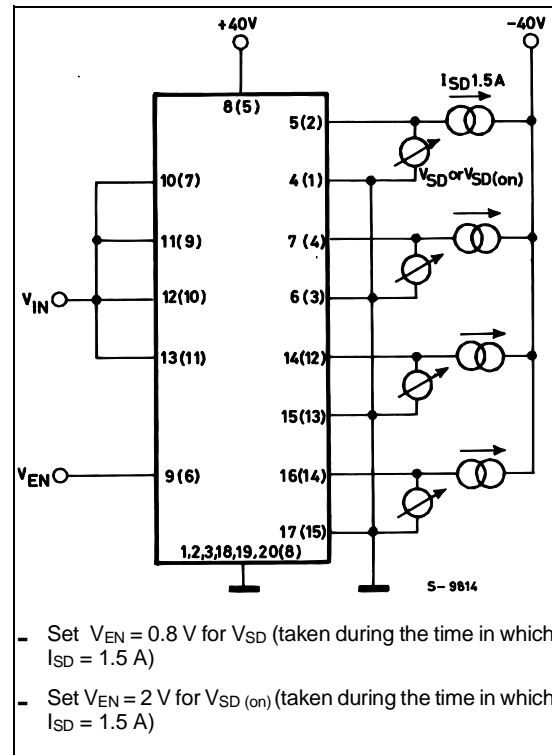


Figure 7 : Input Logic Levels

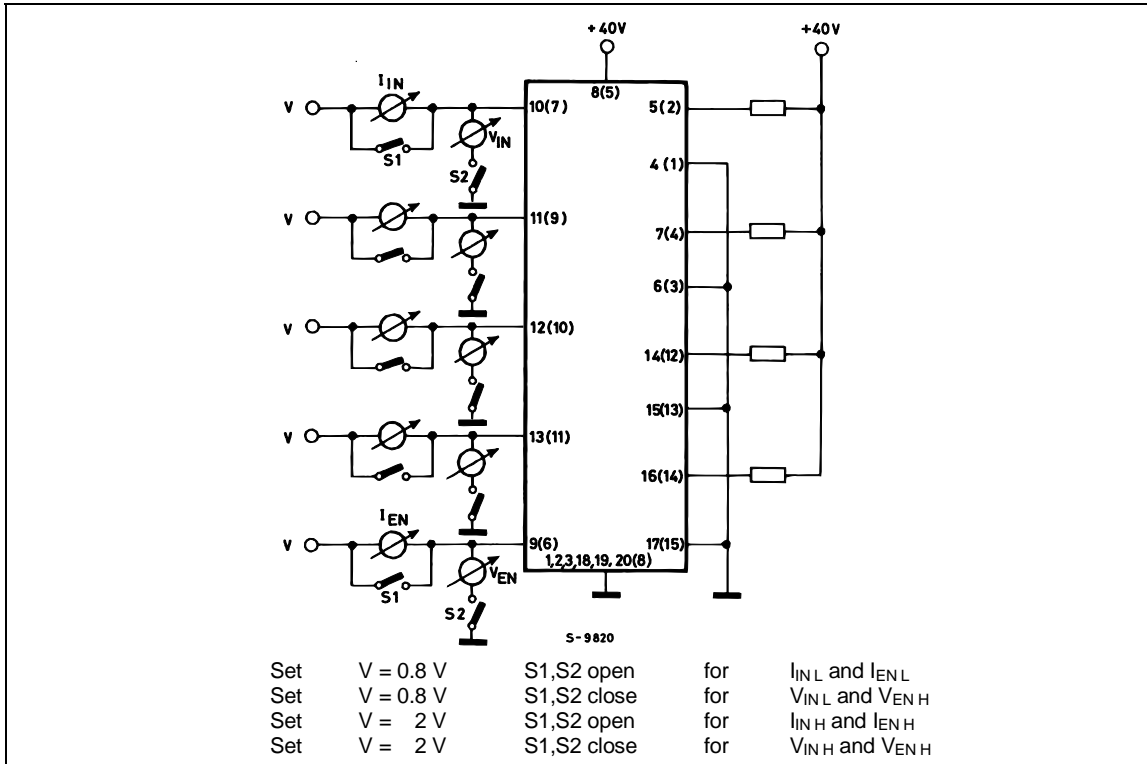


Figure 8 : Static Drain-source on Resistance.

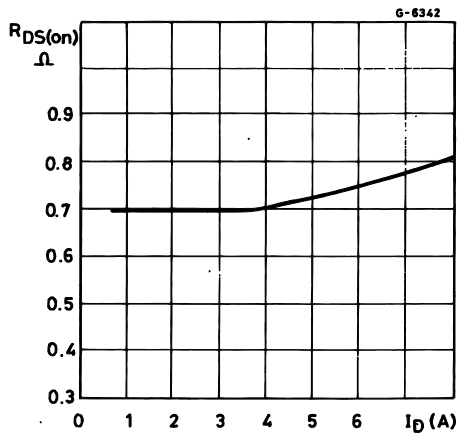


Figure 9 : Normalized Break-down Voltage vs. Temperature.

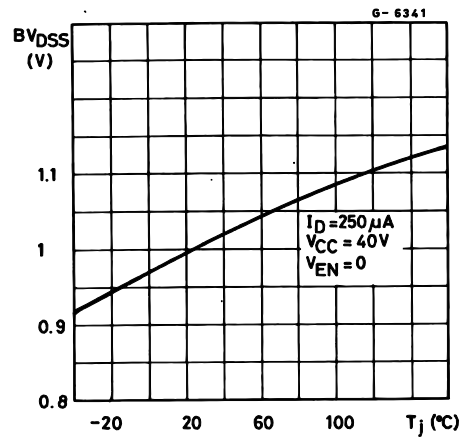


Figure 10 : Normalized on Resistance vs. Temperature.

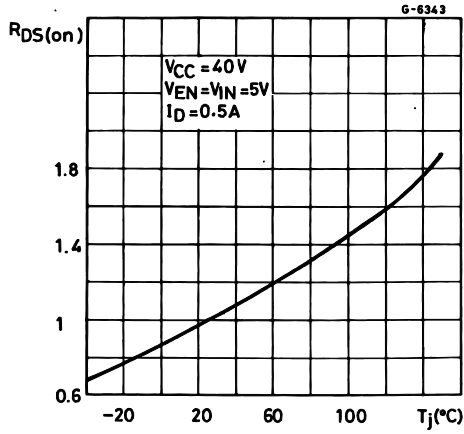


Figure 11 : Typical Source-drain Diode Forward Voltage.

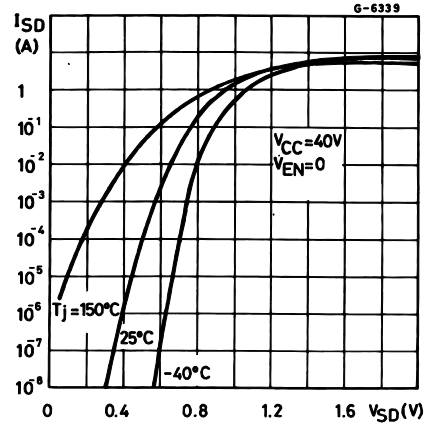
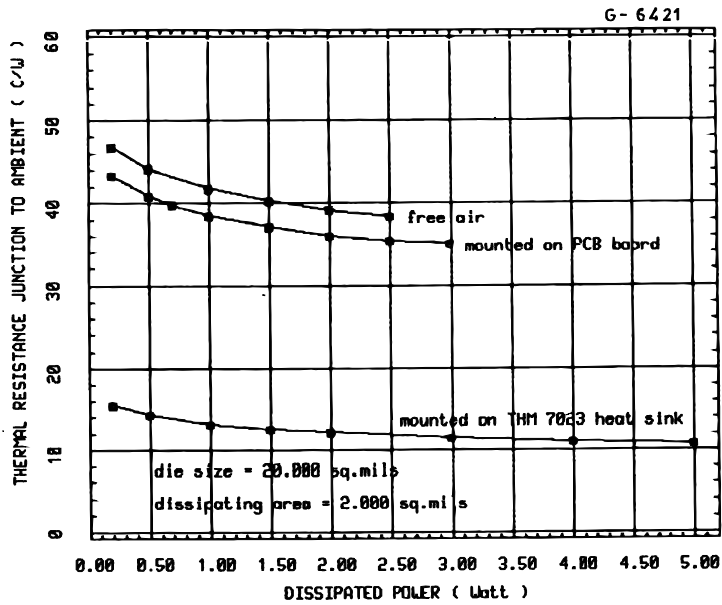


Figure 12 :  $R_{th\ j-amb}$  vs. Dissipated Power (Multiwatt).



(\*)  $R_{th} \approx 9^\circ C/W$ .

Figure 13 : Transient Thermal Resistance for Single Pulses (Multiwatt).

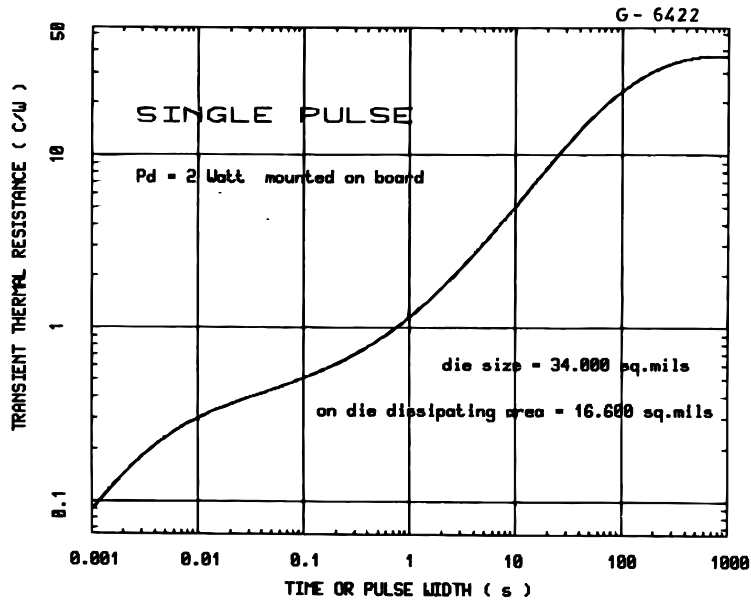
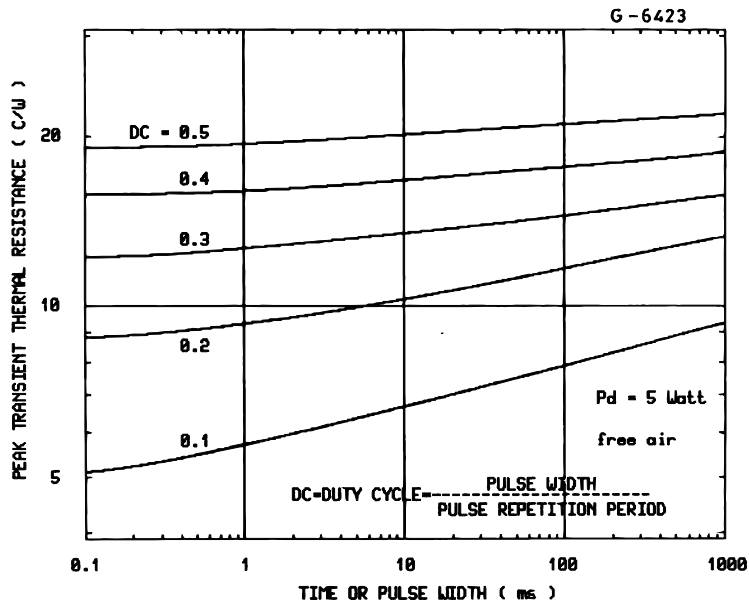


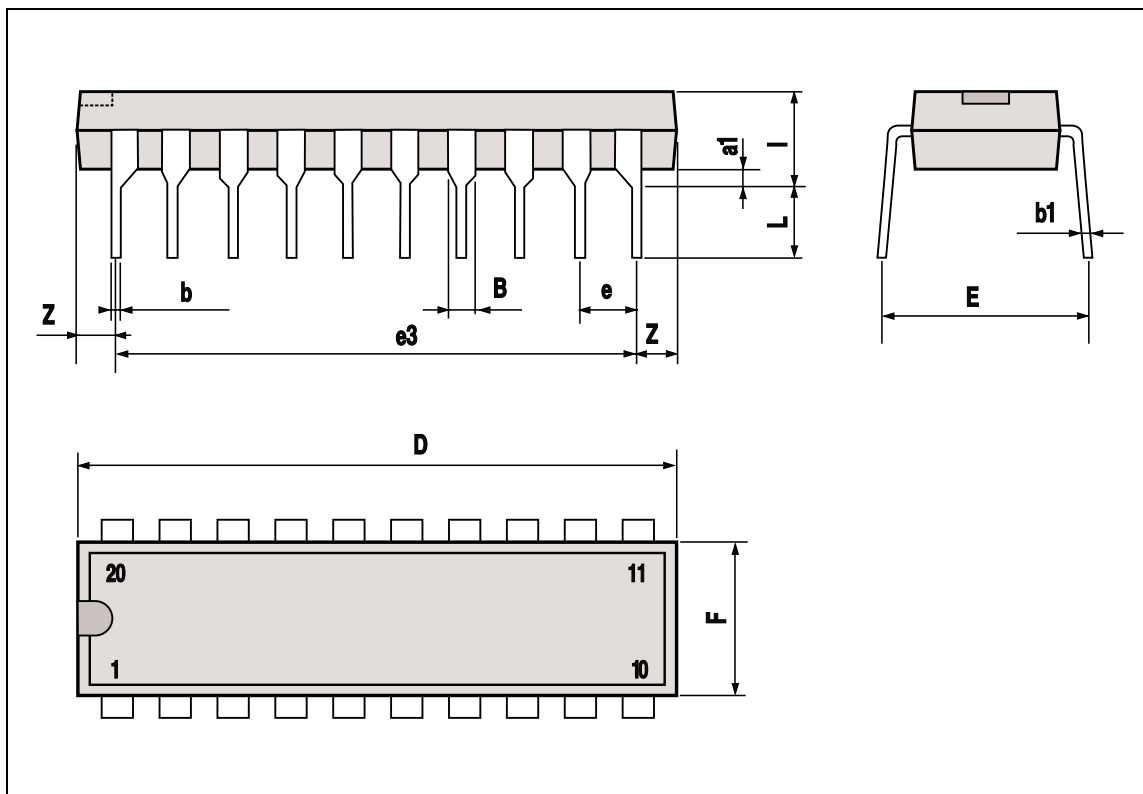
Figure 14 : Peak Transient Thermal Resistance vs. Pulse width and duty cycle (Multiwatt).





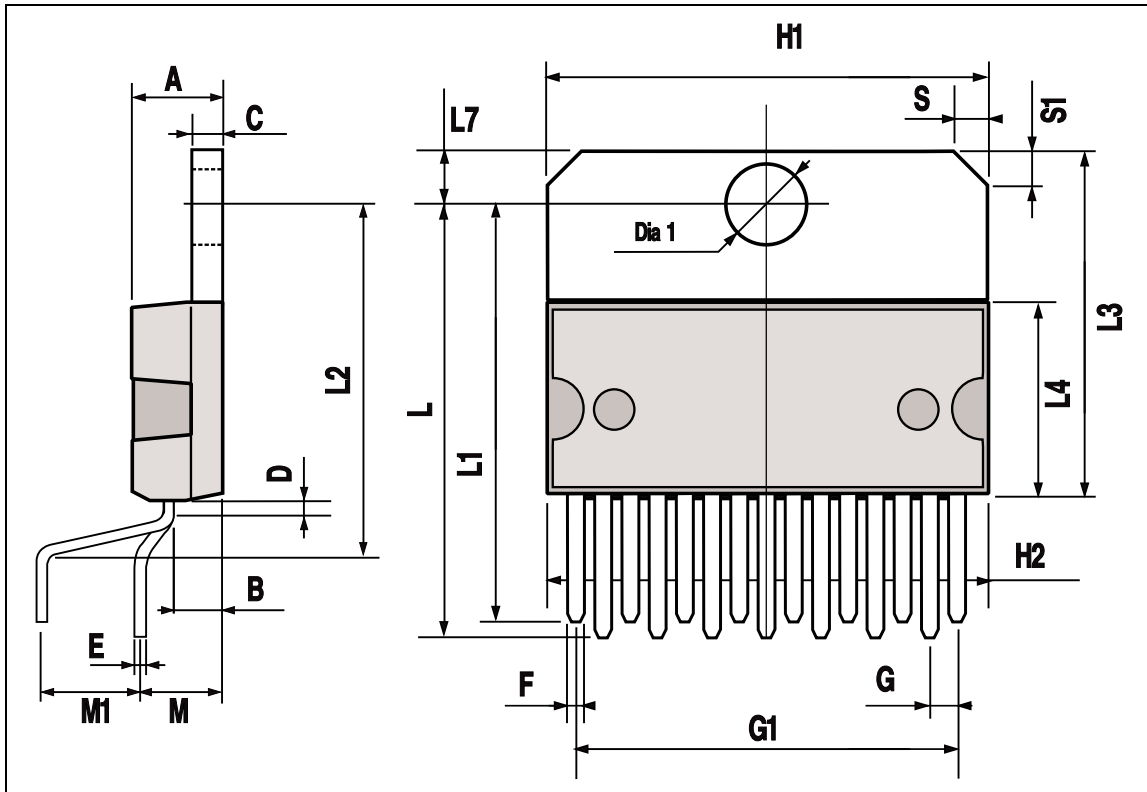
## POWERDIP20 PACKAGE MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
a1	0.51			0.020		
B	0.85		1.40	0.033		0.055
b		0.50			0.020	
b1	0.38		0.50	0.015		0.020
D			24.80			0.976
E		8.80			0.346	
e		2.54			0.100	
e3		22.86			0.900	
F			7.10			0.280
l			5.10			0.201
L		3.30			0.130	
Z			1.27			0.050



MULTIWATT15 PACKAGE MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			5			0.197
B			2.65			0.104
C			1.6			0.063
D		1			0.039	
E	0.49		0.55	0.019		0.022
F	0.66		0.75	0.026		0.030
G	1.14	1.27	1.4	0.045	0.050	0.055
G1	17.57	17.78	17.91	0.692	0.700	0.705
H1	19.6			0.772		
H2			20.2			0.795
L	22.1		22.6	0.870		0.890
L1	22		22.5	0.866		0.886
L2	17.65		18.1	0.695		0.713
L3	17.25	17.5	17.75	0.679	0.689	0.699
L4	10.3	10.7	10.9	0.406	0.421	0.429
L7	2.65		2.9	0.104		0.114
M	4.2	4.3	4.6	0.165	0.169	0.181
M1	4.5	5.08	5.3	0.177	0.200	0.209
S	1.9		2.6	0.075		0.102
S1	1.9		2.6	0.075		0.102
Dia1	3.65		3.85	0.144		0.152



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