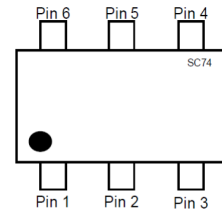


Feature

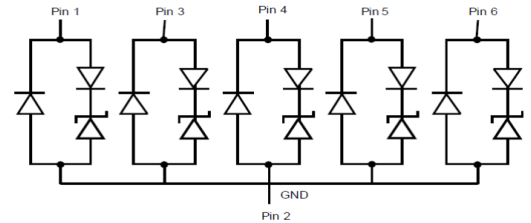
- ESD/transient protection of high speed data lines exceeding:
 - IEC61000-4-2 (ESD): ± 25 kV (air/contact)
 - IEC61000-4-4 (EFT): ± 2.5 kV/ ± 50 A (5/50 ns)
 - IEC61000-4-5 (Surge): ± 6 A (8/20 μ s)
- Maximum working voltage: $V_{RWM} = 5.5$ V
- Extremely low capacitance: $C_L = 0.45$ pF I/O to GND (typical)
- Very low dynamic resistance: $R_{DYN} = 0.2$ Ω (typical) I/O to GND
- Very low reverse clamping voltage: $V_{CL} = 9$ V (typical) at $I_{PP} = 16$ A
- Protection of V_{BUS} with one line freely selectable



a) Pin configuration

Potential applications

- Protection of all I/O and V_{BUS} lines in dual USB2.0 ports
- 10/100/1000 Ethernet
- DVI, HDMI, FireWire



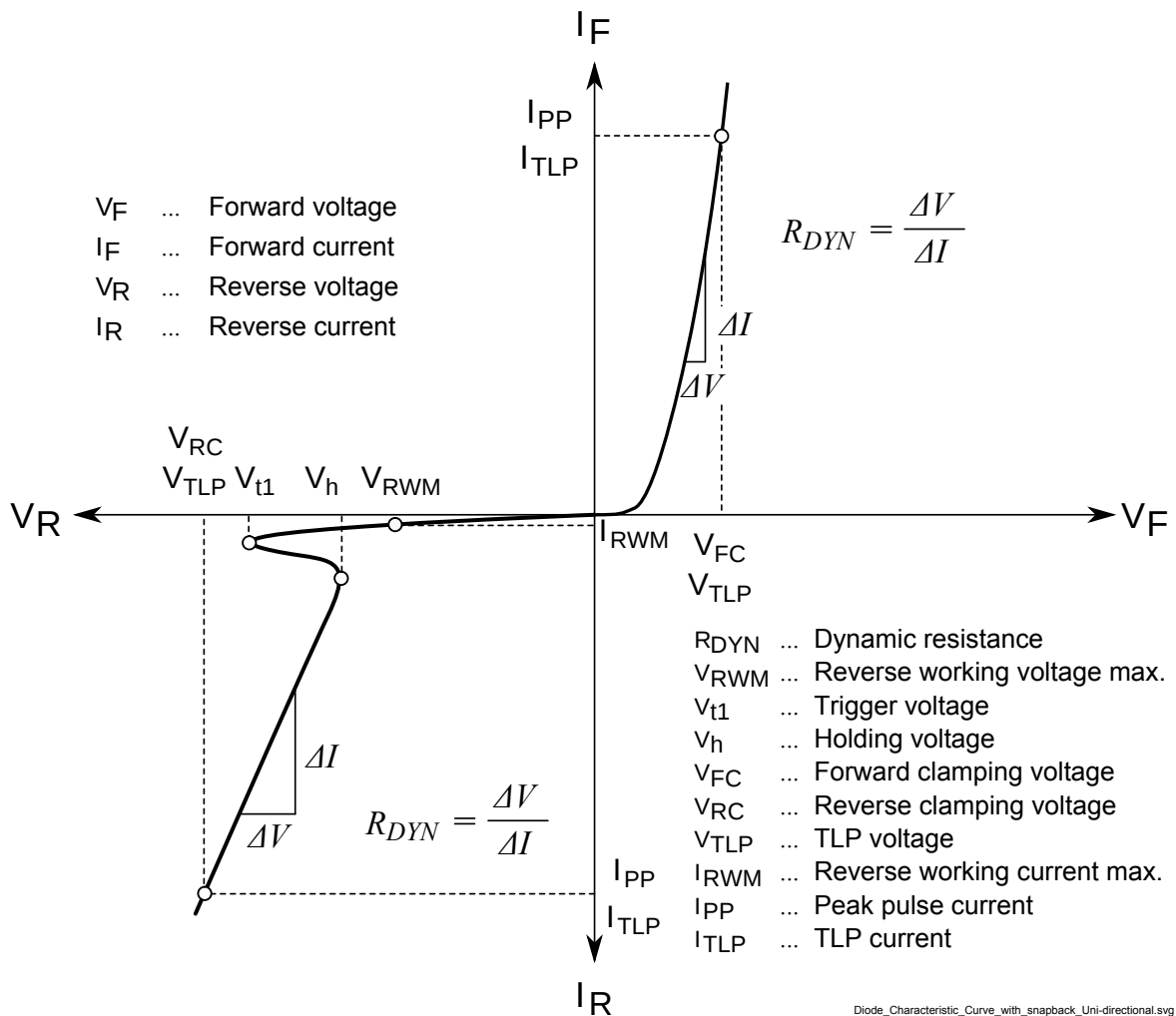
b) Schematic diagram

Maximum ratings $T_A = 25$ °C, unless otherwise specified.

Parameter	Symbol	Values	Unit	Note or test condition
ESD contact discharge ¹⁾	V_{ESD}	± 25	kV	
Peak pulse current ²⁾	I_{PP}	± 6	A	$t_p = 8/20$ μ s
Operating temperature range	T_{OP}	-40 to 125	°C	
Storage temperature	T_{stg}	-65 to 150	°C	

Attention : Stresses above the maximum values listed here may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect device reliability. Maximum ratings are absolute ratings. Exceeding only one of these values may cause irreversible damage to the component.

Electrical characteristics $T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise specified.



DC characteristics

Parameter	Symbol	Values			Unit	Note or test condition
		Min.	Typ.	Max.		
Reverse working voltage	V_{RWM}			5.5	V	I/O to GND
Reverse current	I_R	<1	100		nA	$V_R = 5.5\text{ V}$, I/O to GND

Electrical characteristics

Parameter	Symbol	Values			Unit	Note or test condition
		Min.	Typ.	Max.		
Line capacitance	C_L		0.45 0.23	1 0.5	pF	$V_R = 0\text{ V}, f = 1\text{ MHz}$, I/O to GND $V_R = 0\text{ V}, f = 1\text{ MHz}$, I/O to I/O
Line capacitance	C_L		0.25 0.13		pF	$V_R = 0\text{ V}, f = 825\text{ MHz}$, I/O to GND $V_R = 0\text{ V}, f = 825\text{ MHz}$, I/O to I/O
Capacitance variation between I/O and GND	$\Delta C_{I/O-GND}$		0.02		pF	$V_R = 0\text{ V}, f = 1\text{ MHz}$, I/O to GND
Capacitance variation between I/O	$\Delta C_{I/O-I/O}$		0.01		pF	$V_R = 0\text{ V}, f = 1\text{ MHz}$, I/O to I/O
Reverse clamping voltage ¹⁾	V_{CL}		9		V	$I_{PP} = 1\text{ A}, t_p = 8/20\text{ }\mu\text{s}$, I/O pin to GND
			12			$I_{PP} = 3\text{ A}, t_p = 8/20\text{ }\mu\text{s}$, I/O pin to GND
Reverse clamping voltage ²⁾	V_{CL}		8.9		V	$I_{TLP} = 16\text{ A}, t_p = 100\text{ ns}$, I/O pin to GND
			11.5			$I_{TLP} = 30\text{ A}, t_p = 100\text{ ns}$, I/O pin to GND
Forward clamping voltage ¹⁾	V_{FC}		1.75		V	$I_{PP} = 1\text{ A}, t_p = 8/20\text{ }\mu\text{s}$, GND pin to I/O
			2.5			$I_{PP} = 3\text{ A}, t_p = 8/20\text{ }\mu\text{s}$, GND pin to I/O
Forward clamping voltage ²⁾	V_{FC}		5.4		V	$I_{TLP} = 16\text{ A}, t_p = 100\text{ ns}$, GND pin to I/O
			9.2			$I_{TLP} = 30\text{ A}, t_p = 100\text{ ns}$, GND pin to I/O
Dynamic resistance ²⁾	R_{DYN}		0.2		Ω	I/O to GND
Dynamic resistance ²⁾	R_{DYN}		0.3		Ω	GND to I/O

Typical characteristic diagrams $T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise specified.

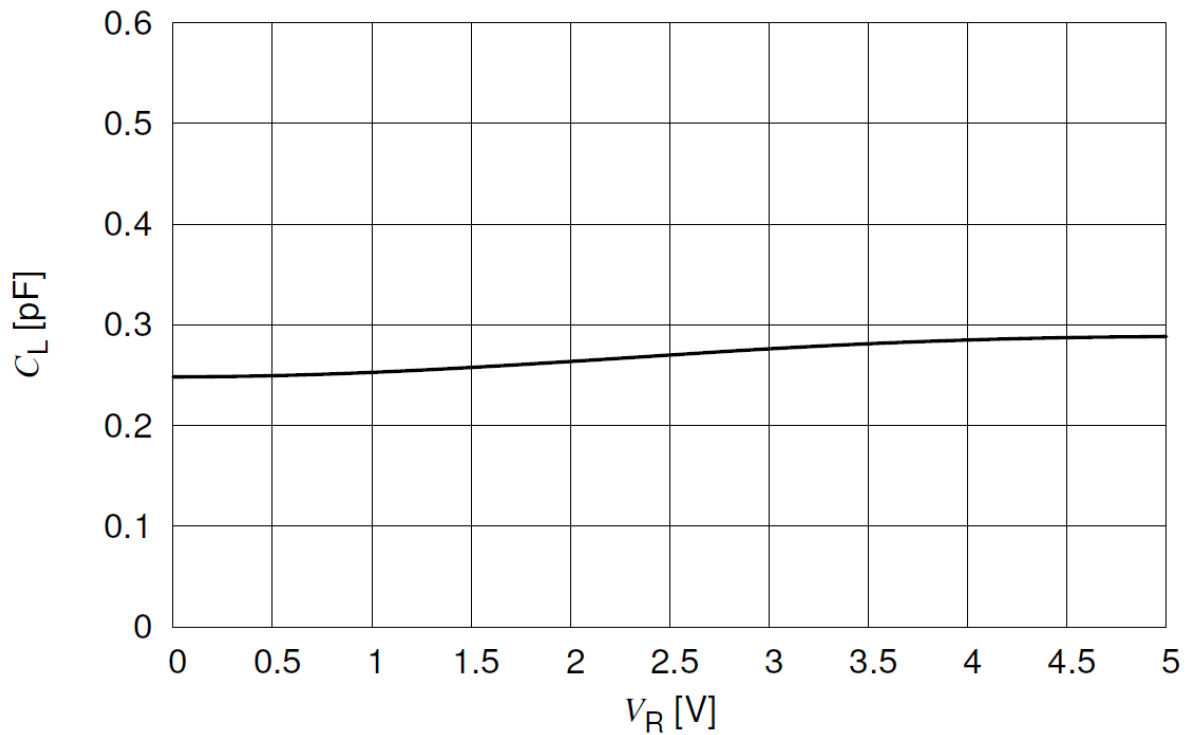


Figure 3 Line capacitance $C_L = f(V_R)$ at $f = 825\text{ MHz}$

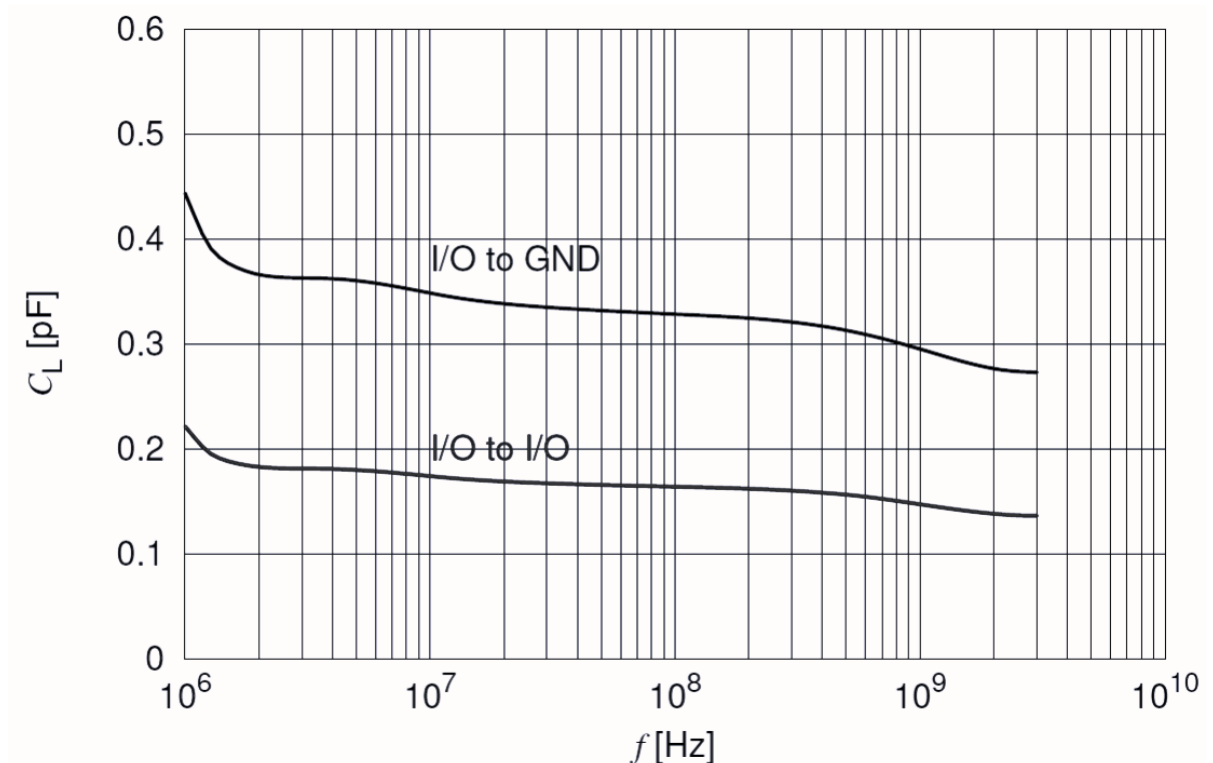


Figure 4 Line capacitance $C_L = f(f)$, $V_R = 0\text{ V}$

Typical characteristic diagrams

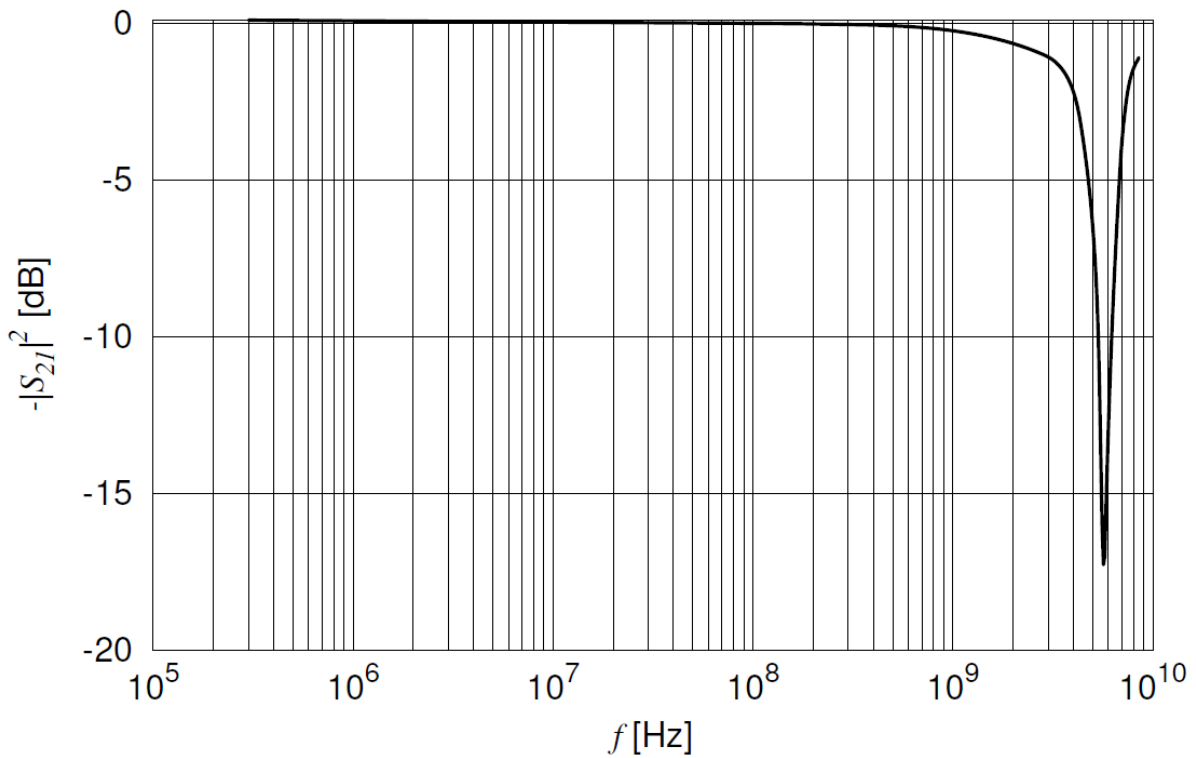


Figure 5 Insertion loss $I_L = f(f)$, $V_R = 0$ V

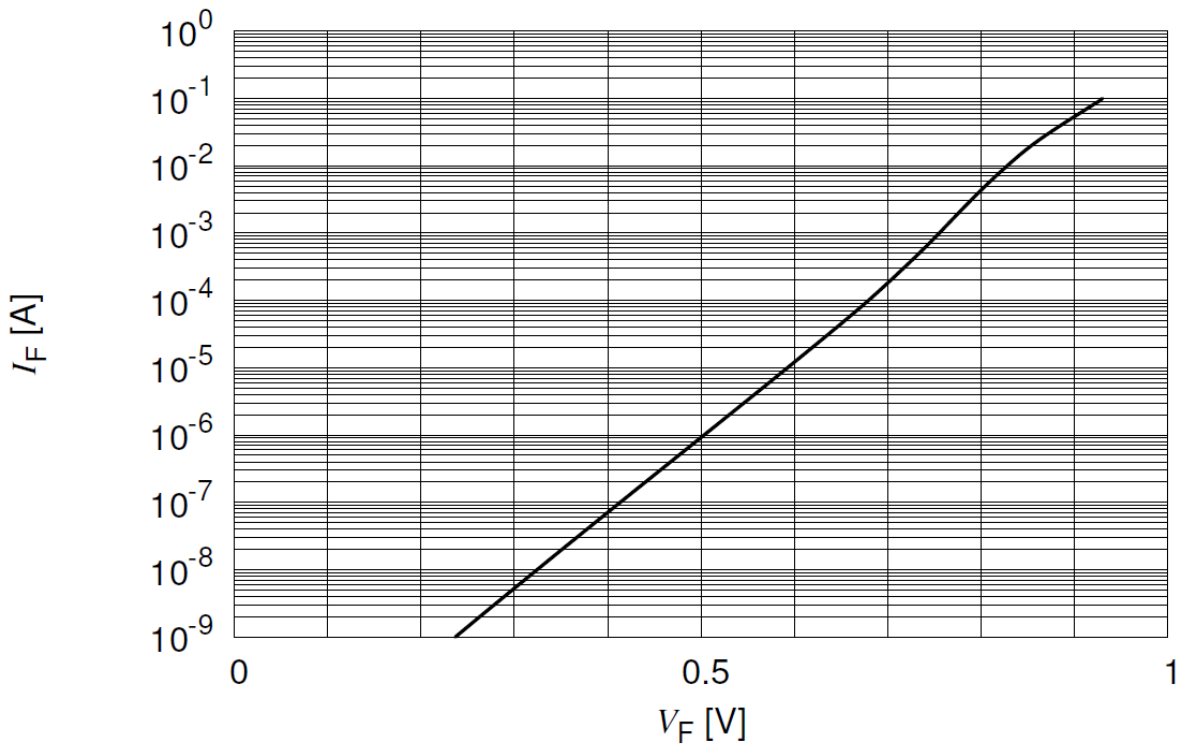


Figure 6 Forward characteristic, $I_F = f(V_F)$, current forced

Typical characteristic diagrams

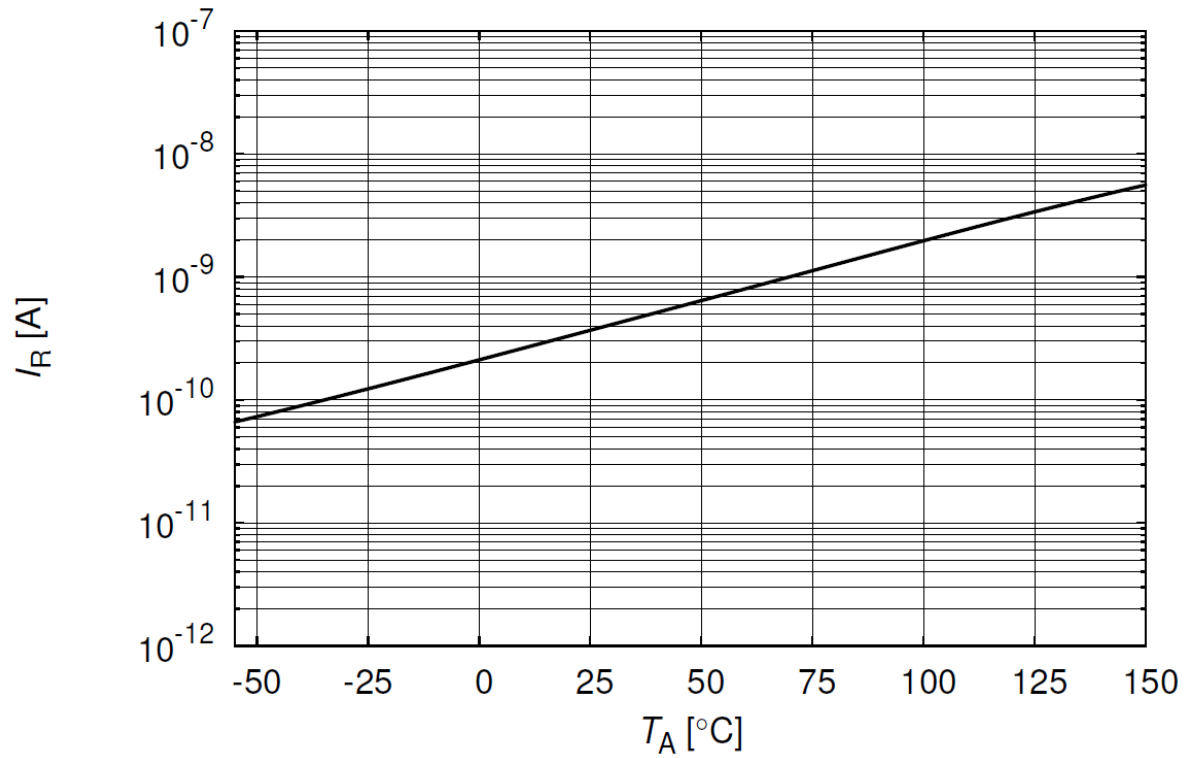


Figure 7 Reverse current $I_R = f(T_A)$, $V_R = 5.5$ V (typical)

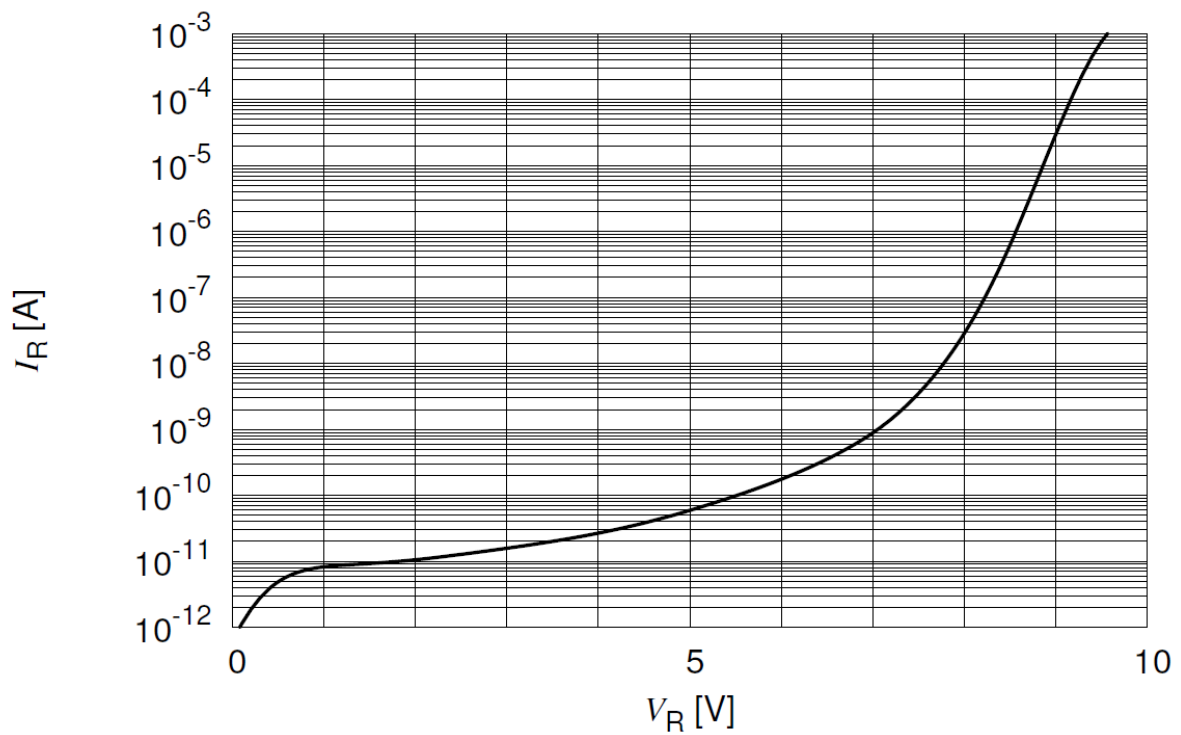


Figure 8 Reverse characteristic, $I_R = f(V_R)$, voltage forced

Typical characteristic diagrams

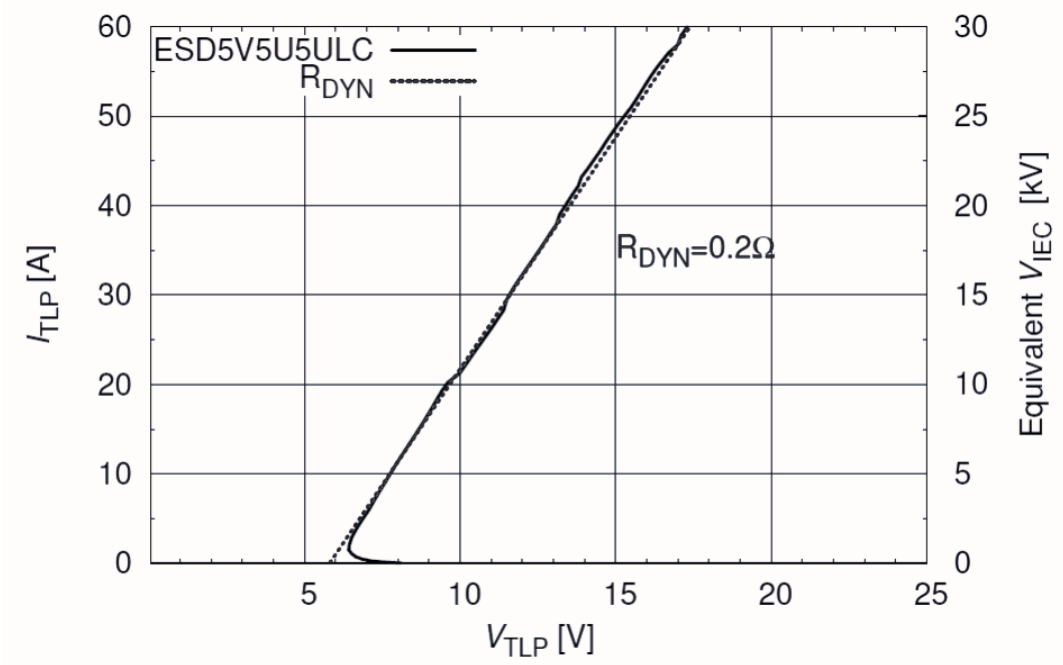


Figure 9 TLP characteristic I/O to GND ¹⁾ [1]

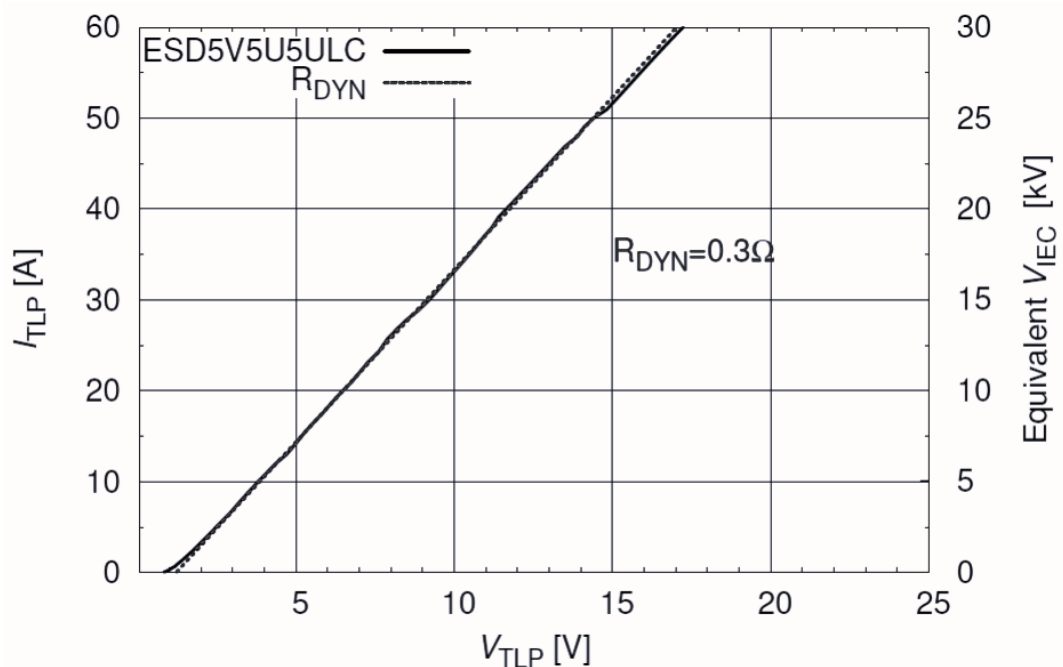
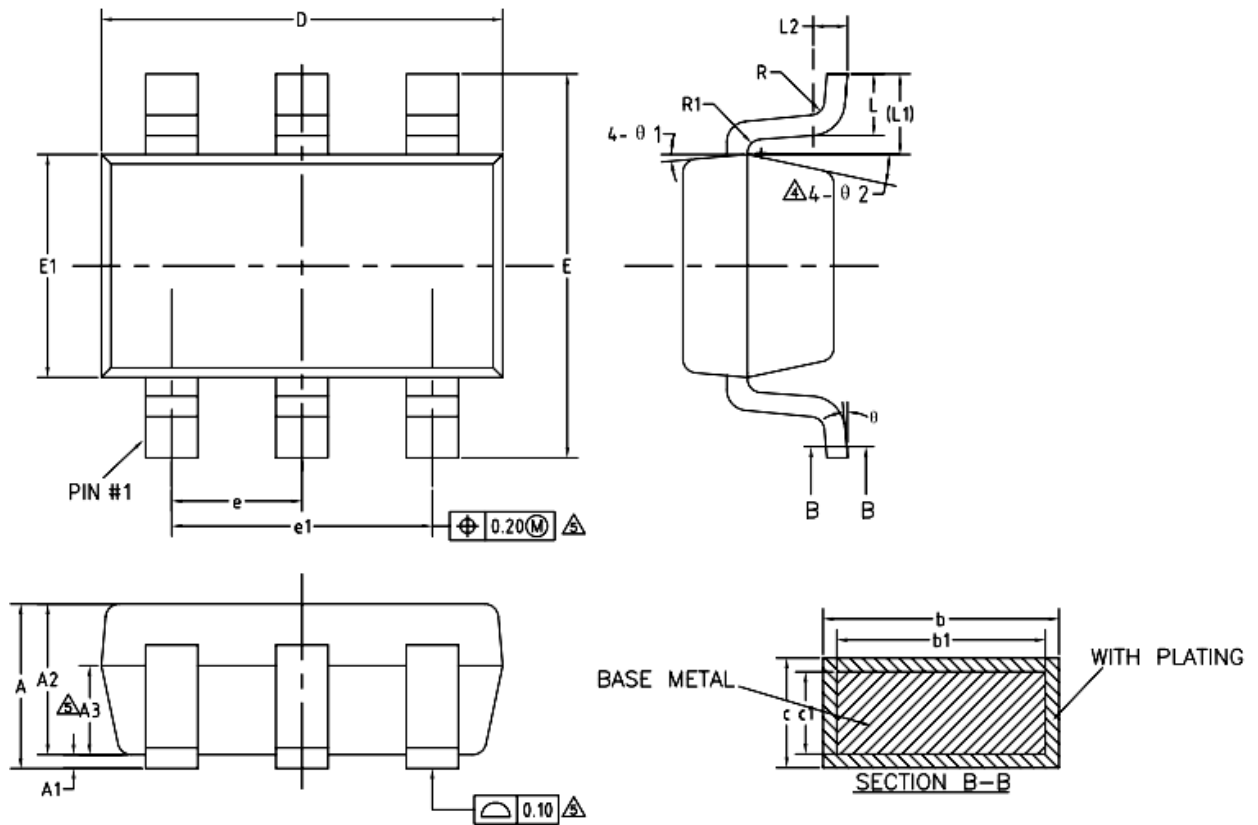


Figure 10 TLP characteristic GND to I/O ¹⁾ [1]

SOT23-6



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	—	—	1.25
A1	0	—	0.15
A2	1.00	1.10	1.20
A3	0.60	0.65	0.70
b	0.36	—	0.50
b1	0.36	0.38	0.45
c	0.14	—	0.20
c1	0.14	0.15	0.16
D	2.826	2.926	3.026
E	2.60	2.80	3.00
E1	1.526	1.626	1.726
e	0.90	0.95	1.00
e1	1.80	1.90	2.00
L	0.35	0.45	0.60
L1	0.59REF		
L2	0.25BSC		
R	0.10	—	—
R1	0.10	—	0.20
θ	0°	—	8°
θ 1	3°	5°	7°
θ 2	6°	—	14°

Marking



Ordering information

Order code	Package	Base qty	Delivery mode
UMW ESD5V5U5ULC	SOT23-6	3000	Tape and reel