Electrical Characteristics

Parameter and Conditions at T_j = 25 °C, V_{bb} = 24V unless otherwise specified	Symbol	Values			Unit
		min	typ	max	
Load Switching Capabilities and Characteristics					
On-state resistance (pin 4 to 1) I_L = 0.5 A, V_{in} = high T_j = 25°C T_j = 125°C	R_{ON}	-- --	0.16 --	0.2 0.38	Ω
Nominal load current (pin 4 to 1)[5] ISO Standard: V_{ON} = V_{bb} - V_{OUT} = 0.5 V T_S = 85 °C	$I_{L(ISO)}$	0.7	--	--	A
Turn-on time to 90% V_{OUT} Turn-off time to 10% V_{OUT} R_L = 47 Ω	t_{on} t_{off}	-- --	60 90	100 150	µs
Slew rate on 10 to 30% V_{OUT}, R_L = 47 Ω	dV/dt_{on}	--	2	4	V/µs
Slew rate off 70 to 40% V_{OUT}, R_L = 47 Ω	$-dV/dt_{off}$	--	2	4	V/µs
Input					
Allowable input voltage range, (pin 3 to 2)	V_{IN}	-3.0	--	V_{bb}	V
Input turn-on threshold voltage V_{bb} = 18...30V T_j = -25...+125°C	$V_{IN(T+)}$	--	--	3.0	V
Input turn-off threshold voltage V_{bb} = 18...30V T_j = -25...+125°C	$V_{IN(T-)}$	1.82	--	--	V
Input threshold hysteresis	$\Delta V_{IN(T)}$	--	0.1	--	V
Off state input current (pin 3) $V_{IN(off)}$ = 1.82 V T_j = -25...+125°C	$I_{IN(off)}$	20	--	--	µA
On state input current (pin 3) $V_{IN(on)}$ = 3.0 V to V_{bb} T_j = -25...+125°C	$I_{IN(on)}$	--	--	110	µA
Input resistance T_j = -25...+125°C	R_{IN}	1.5	2.8	3.5	kΩ

[5] $I_{L(ISO)}$ is limited by the current limitation, see $I_{L(SC)}$

Parameter and Conditions at T_j = 25 °C, V_{bb} = 24V unless otherwise specified	Symbol	Values			Unit
		min	typ	max	
Operating Parameters					
Operating voltage T_j =-25...+125°C	$V_{bb(on)}$	12	--	40	V
Undervoltage shutdown T_j =-25...+125°C	$V_{bb(under)}$	7	--	10.5	V
Undervoltage restart T_j =-25...+125°C:	$V_{bb(u\ rst)}$	--	--	11	V
Undervoltage hysteresis	$\Delta V_{bb(under)}$	--	0.4	--	V
Standby current (pin 4), V_{in} = low T_j =-25...+100°C	$I_{bb(off)}$	--	10	25	µA
T_j =125°C[6)]				50	
Operating current (pin 2), V_{in} = high T_j =-25...+125°C	I_{GND}	--	1	1.6	mA
leakage current (pin 1) V_{in} = low T_j =-25...+125°C	$I_{L(off)}$	--	--	2	µA
Protection Functions					
Current limit (pin 4 to 1) T_j = 25°C	$I_{L(SC)}$	0.7	1.5	2	A
T_j = -25...+125°C		0.7	--	2.4	
Overvoltage protection I_{bb}=4mA T_j =-25...+125°C	$V_{bb(AZ)}$	48	--	--	V
Output clamp (ind. load switch off) at V_{OUT} = V_{bb} - $V_{ON(CL)}$, I_{bb} = 4mA	$V_{ON(CL)}$	--	72	--	V
Thermal overload trip temperature	T_{jt}	135	150	--	°C
Thermal hysteresis	ΔT_{jt}	--	10	--	K
Inductive load switch-off energy dissipation[7)] $T_{j\ Start}$ = 85 °C, single pulse, I_L = 0.5 A, V_{bb} = 12 V	E_{AS}	--	--	0.5	J
Reverse Battery					
Reverse battery voltage[8)]	$-V_{bb}$			30	V
Continious reverse drain current T_A = 25°C	$-I_S$	--	--	1	A
Drain-Source diode voltage I_F = 1 A, V_{in} = low V_{OUT}>V_{bb}	$-V_{ON}$	--	--	1.2	V

6) increase of standby current at T_j = 125°C caused by temperature sense current

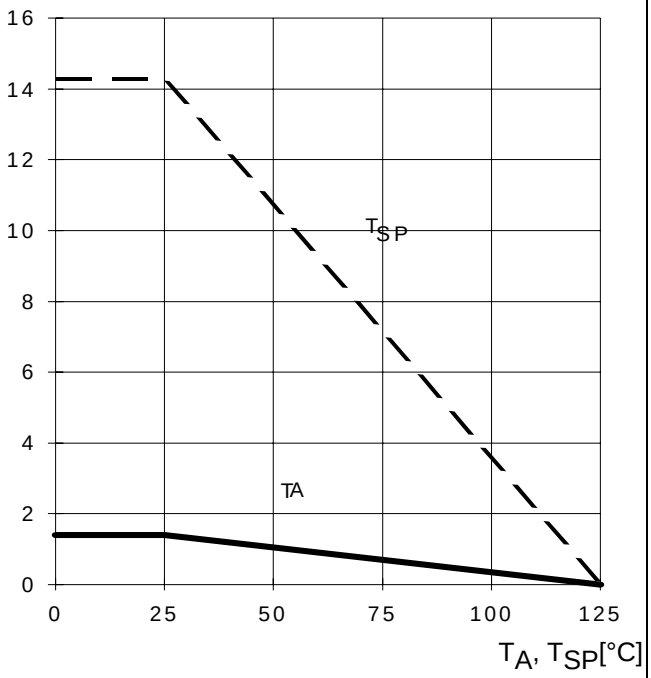
7) while demagnetizing load inductance, dissipated energy is $E_{AS} = \int (V_{ON(CL)} * i_L(t)\ dt$,
approx. $E_{AS} = {}^1/_2 * L * I_L^2 * \left(\frac{V_{ON(CL)}}{V_{ON(CL)} - V_{bb}} \right)$

8) Requires 150 Ω resistor in GND connection. Reverse load current (through intrinsic drain-source diode) is normally limited by the connected load.

Max allowable power dissipation

$P_{tot} = f(T_A, T_{SP})$

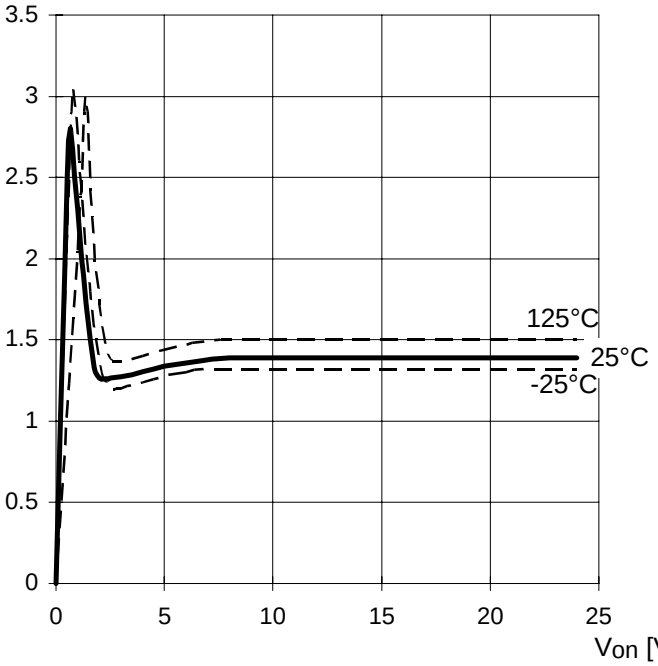
P_{tot} [W]



Current limit characteristic

$I_{L(SC)} = f(V_{on})$ (V_{on} see testcircuit)

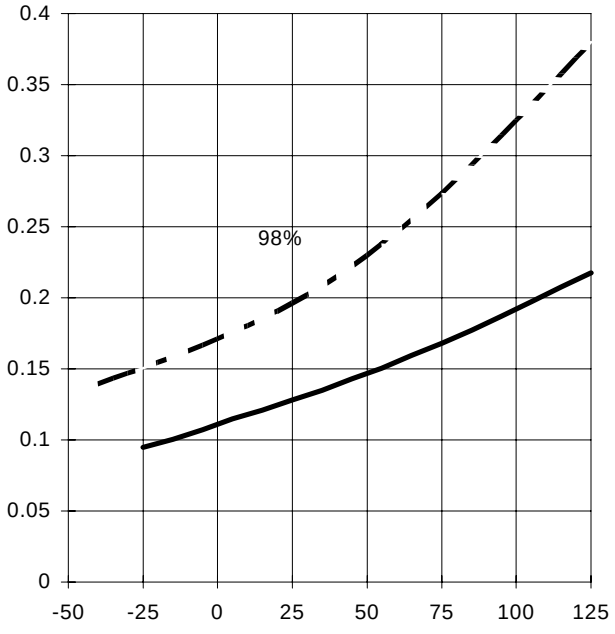
$I_{L(SC)}$ [A]



On state resistance (Vbb-pin to OUT pin)

$R_{ON} = f(T_j)$; V_{bb} = 24 V; I_L = 0.5 A

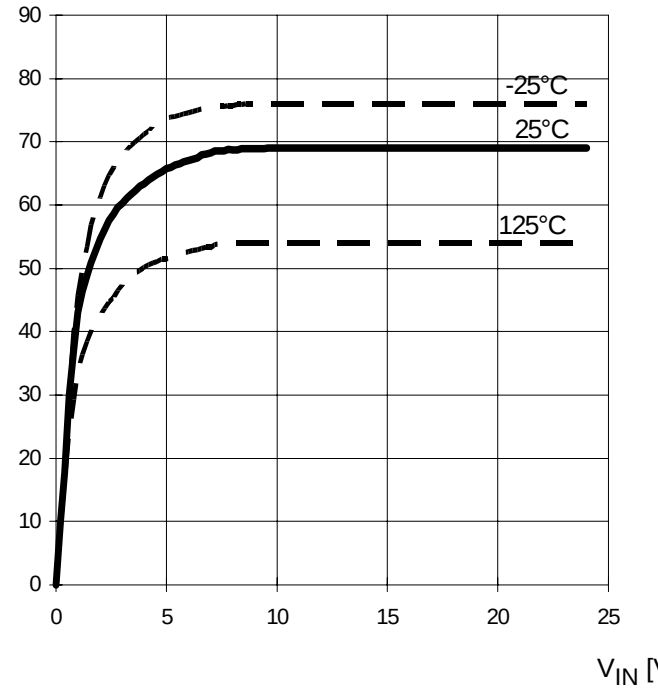
R_{ON} [Ω]



Typ. input current

$I_{IN} = f(V_{IN})$; V_{bb} = 24 V

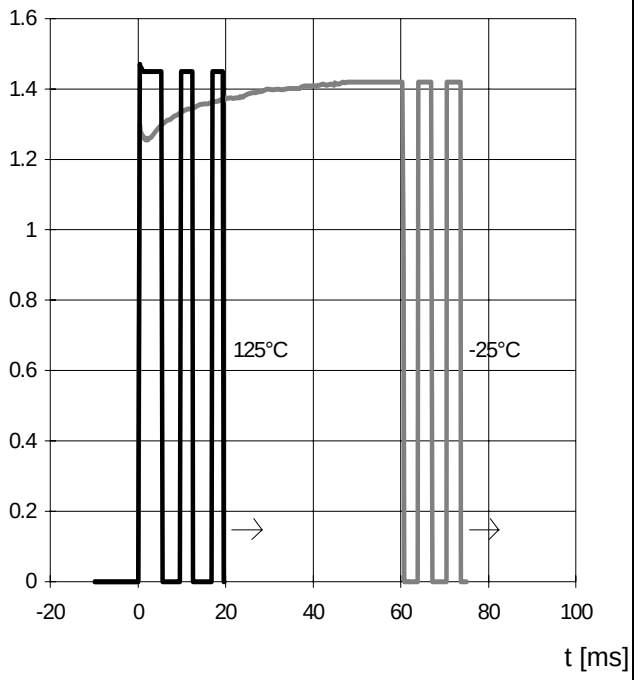
I_{IN} [µA]



Typ. overload current

$I_{L(lim)}$ = f (t), V_{bb}=24V, no heatsink, Param.:T_{jstart}

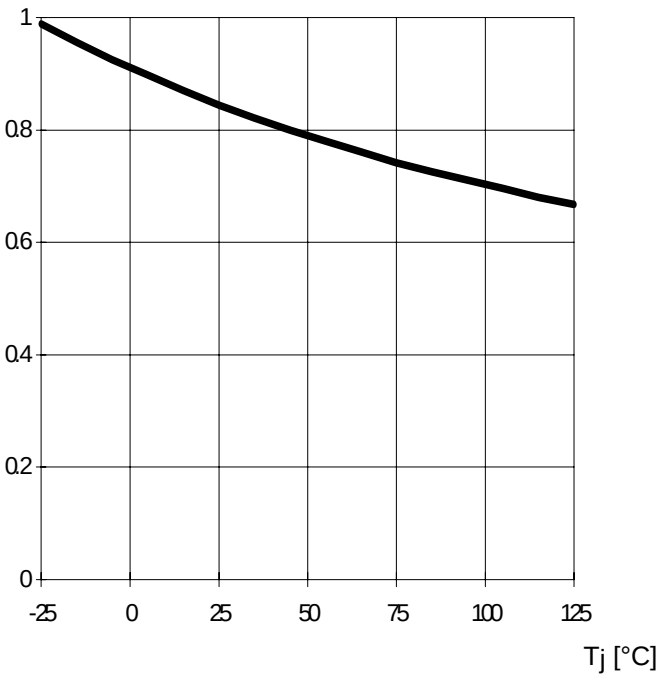
$I_{L(lim)}$ [A]



Typ. operating current

IGND = f (Tj), V_{bb}=30V, V_{IN}=high

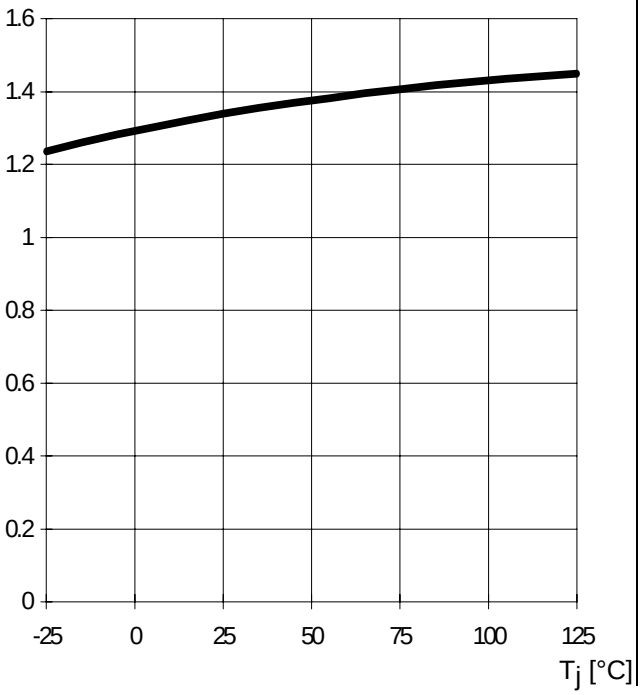
GND [mA]



Short circuit current

$I_{L(SC)}$ = f (T_j); V_{bb} = 30 V;

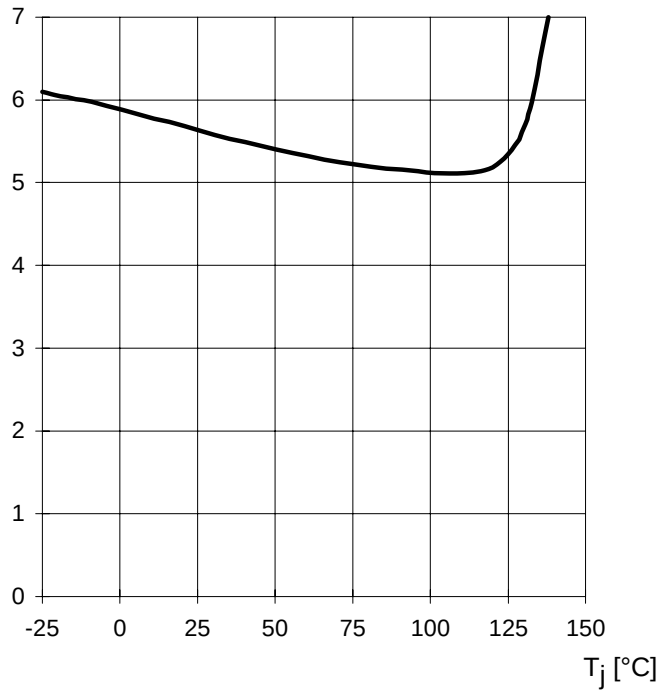
$I_{L(SC)}$ [A]



Typ. standby current

$I_{bb(off)}$ = f(T_j); V_{bb} = 30 V, V_{IN} = low

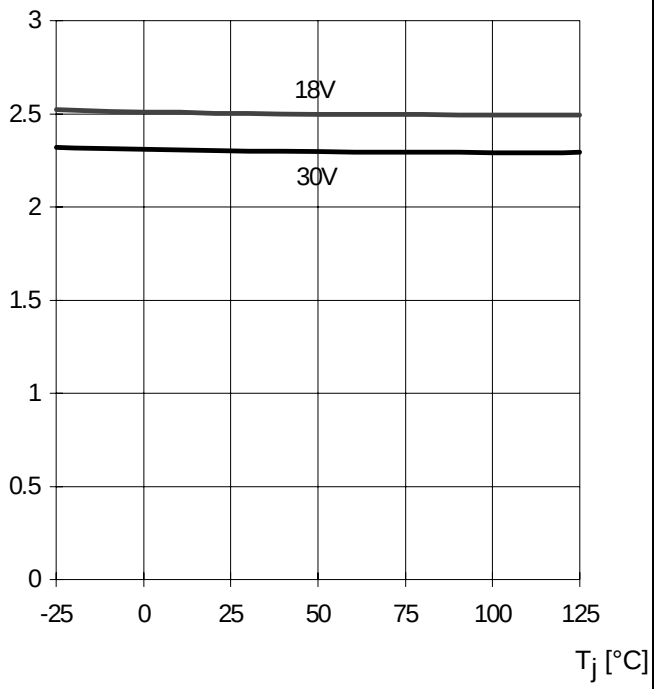
$I_{bb(off)}$ [µA]



Typ. input turn on voltage threshold

$V_{IN(T+)} = f(T_j)$

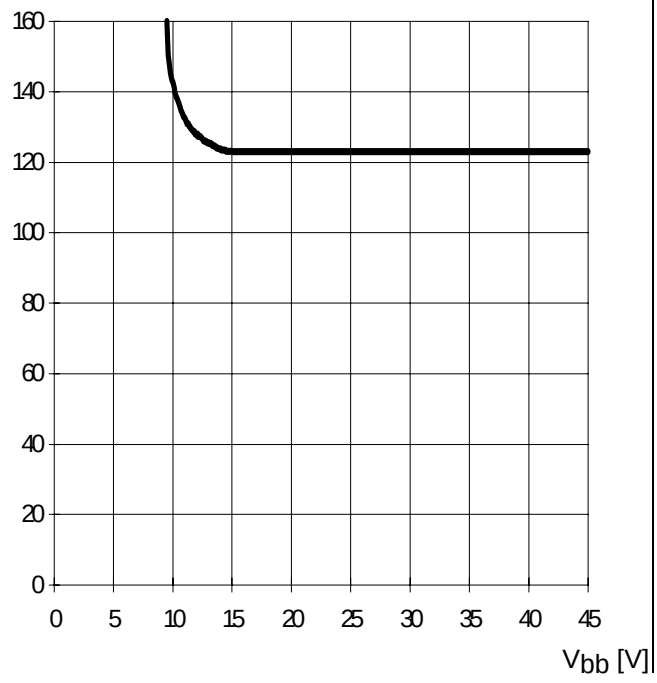
$V_{IN(T+)}$ [V]



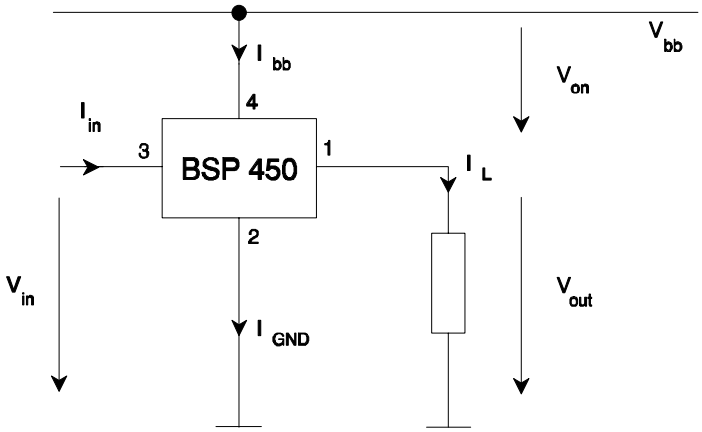
Typ. on-state resistance (Vbb-Pin to OUT-Pin)

$R_{ON} = f(V_{bb}, I_L)$; I_L = 0.5A, T_j = 25 °C;

R_{ON} [mΩ]



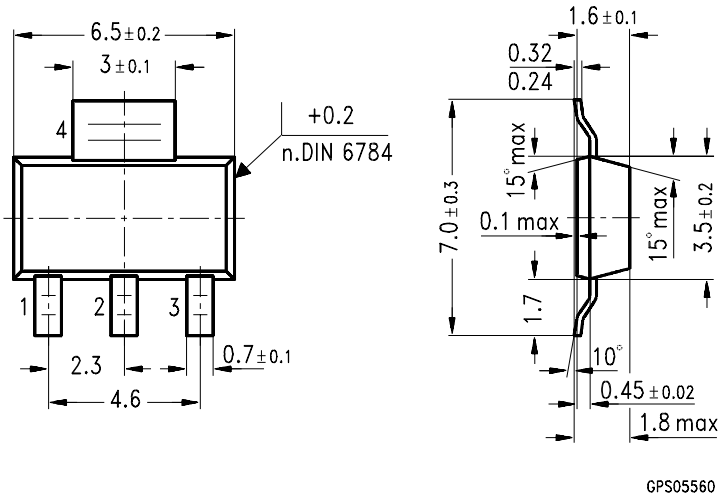
Test circuit



Package:

all dimensions in mm.

SOT 223/4:



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