

General Description

The SA52733 is a 500mA, 3.3V~5V, push-pull transformer driver, designed to provide a simple solution for isolation power supplies. The IC contains the carefully designed oscillation and driving circuit to provide precise complementary signals for two N channel MOSFETs. The IC includes a soft-start feature that prevents high inrush current during power up. Its internal protection features include under-voltage lockout and thermal shutdown. The SA52733 is available in a small 5-pin SOT-23 package and qualified with AEC-Q100.

Ordering Information

SA52733 □(□□□)
 └─ Package Code
 └─ Optional Spec Code

Ordering Number	Package Type	Note
SA52733AAT	SOT23-5	--

Features

- Single 3.3V or 5V Supply
- Push-Pull Driver for Small Transformers
- High Primary-side Current Drive: 500mA
- Spread Spectrum Clocking
- Thermal Shutdown
- Soft Start
- Small 5-Pin SOT-23 Package
- AEC-Q100 Qualified

Applications

- Isolated Interface Power Supply for CAN, RS-485, RS-422, RS-232, SPI, I2C, Low-Power LAN
- Industrial Equipment
- Automobile
- Medical Equipment

Typical Application

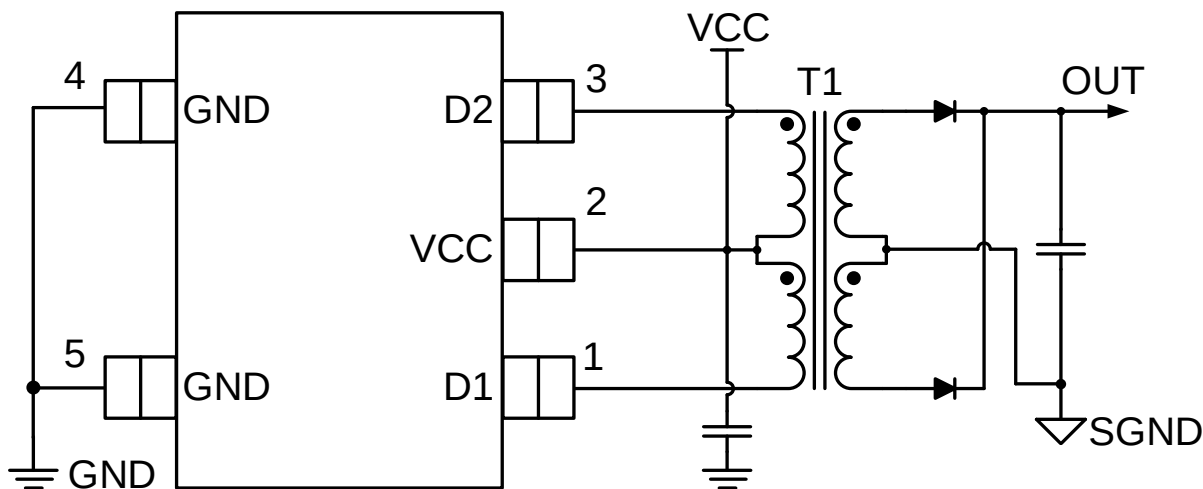
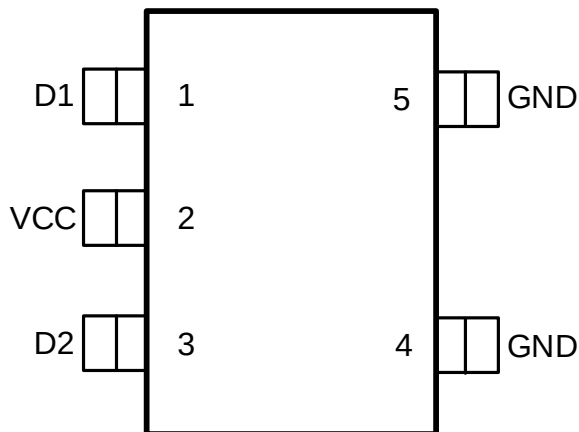


Figure 1. Typical Application Circuit

Pin out (Top View)



(SOT23-5)

Top Mark: GRK_{xyz} (device code: **GRK**, *x*=year code, *y*=week code, *z*= lot number code)

Pin No.	Pin Name	Description
1	D1	Open Drain output 1. Connect this pin to one end of the transformer primary side.
2	VCC	Supply voltage input. Connect this pin to the center-tap of the transformer primary side. Buffer this voltage with a 1 μ F to 10 μ F ceramic capacitor.
3	D2	Open Drain output 2. Connect this pin to another end of the transformer's primary side.
4, 5	GND	Ground.

Block Diagram

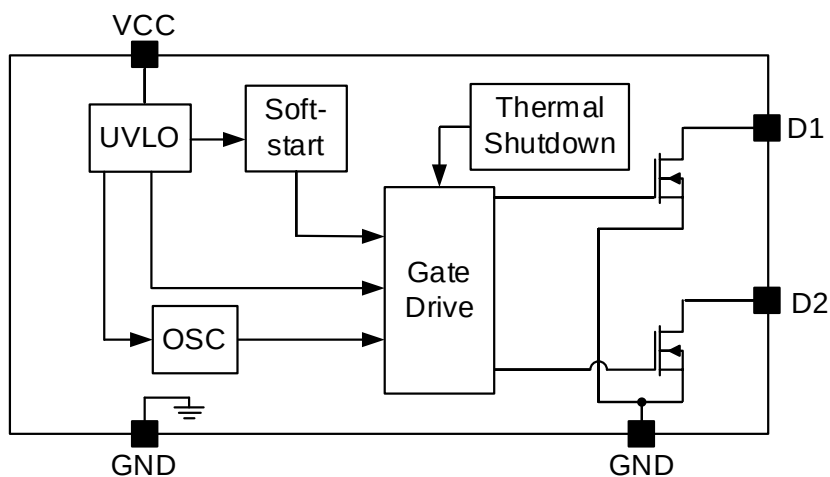


Figure 2. Block Diagram



Absolute Maximum Ratings (Note 1)

Supply Voltage (VCC)	-----	-0.3V to 6V
Output Switching Voltage (V_{Dx})	-----	-0.3V to 14V
Peak Output Switching Current (I_{D1} , I_{D2})	-----	800mA
Electrostatic Discharge		
HBM (Human Body Model)	-----	2kV
CDM (Charge Device Model)	-----	1kV
Package Thermal Resistance (Note 2)		
θ_{JA}	-----	240°C/W
θ_{JC}	-----	45°C/W
Junction Temperature (T_J)	-----	-40°C to +150°C
Storage Temperature	-----	-65°C to +150°C

Recommended Operating Conditions

VCC	-----	3V to 5.5V
$V_{Dx}(VCC=5V\pm10\%)$	-----	-0.3V to 11V
$V_{Dx}(VCC=3.3V\pm10\%)$	-----	-0.3V to 7.2V
I_{Dx}	-----	less than 500mA
Ambient Temperature Range (T_A)	-----	-40°C to 125°C

Electrical Characteristics

(-40°C < T_A < 125°C, 3V < VCC < 5.5V unless otherwise specified. All typical values are at T_A = 25°C, VCC = 5V)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Voltage Supply						
Supply Current	I _{VCC}	R _L = 50Ω; 3V < VCC < 5.5V		0.8	1.2	mA
Leakage Current on D1, D2	I _{lk}	Voltage of D1, D2 = 14V		0.1		μA
Output Status						
Average ON Time Mismatch between D1 and D2	t _{DMM}	VCC = 5V, R _L = 50Ω		0	50	ns
Highest spread Spectrum Oscillator Frequency	f _{C_H}	R _L = 50Ω; Refer to Figure 3	314	390	467	kHz
Lowest Spread Spectrum Oscillator Frequency	f _{C_L}	R _L = 50Ω; Refer to Figure 3	286	358	427	kHz
Switch on Resistance	R _{DS(on)}	VCC = 5V, I _{D1} = I _{D2} = 100mA		0.6	1.1	Ω
D1, D2 Output Rise Time	t _r	VCC = 5V, R _L = 50Ω; Refer to Figure 3		75		ns
D1, D2 Output Fall Time	t _f	VCC = 5V, R _L = 50Ω; Refer to Figure 3		125		ns
Break-before-make time	t _{BBM}	Refer to Figure 3		120		ns
Protection						
VCC UVLO Rising Threshold	V _{CC_uvlo_r}	VCC rising		2.7	2.9	V
VCC UVLO Failing Threshold	V _{CC_uvlo_f}	VCC falling	2.2	2.4		V
VCC UVLO Threshold Hysteresis	V _{CC_uvlo_hys}			300		mV
Thermal Shutdown Temperature	T _{SD}		150	165		°C
Thermal Shutdown Hysteresis	T _{SD_HYS}			17		°C
Soft-start Time	t _{ss}	Refer to Figure 4	1			ms

Note 1: Stresses listed as the above “Absolute Maximum Ratings” may cause permanent damage to the device. These are for stress ratings. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied.

Note 2: θ_{JA} and θ_{JC} are measured in the natural convection at T_A = 25°C, mounted on low effective single layer PCB in accordance with JESD51-3.

Note 3: Power dissipation and thermal limits must be observed.

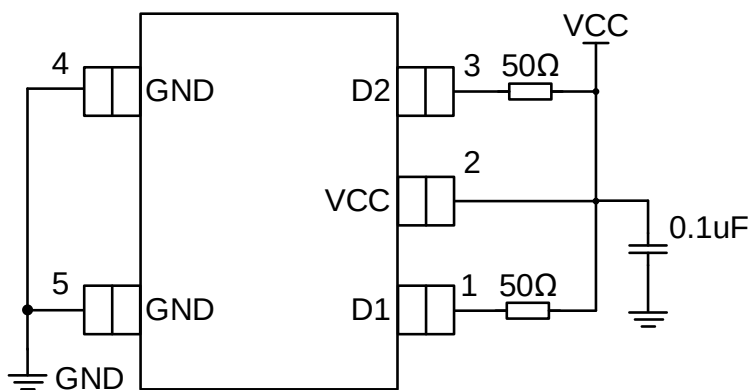


Figure 3. Test Circuit for t_{BBM} , t_r , t_f , f_{C_H} , f_{C_L}

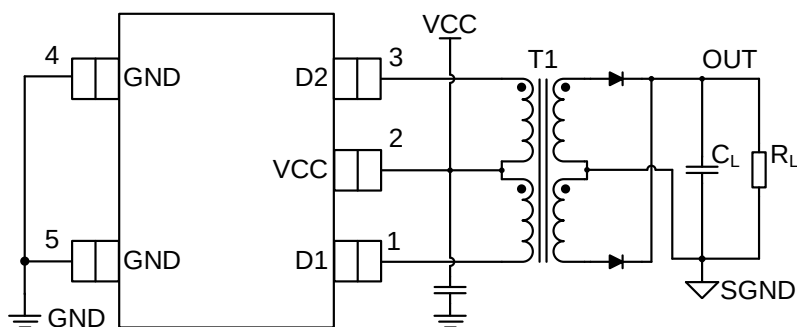


Figure 4. Test Circuit for t_{ss}

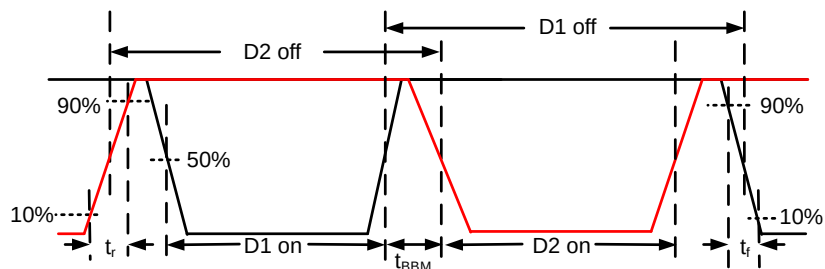
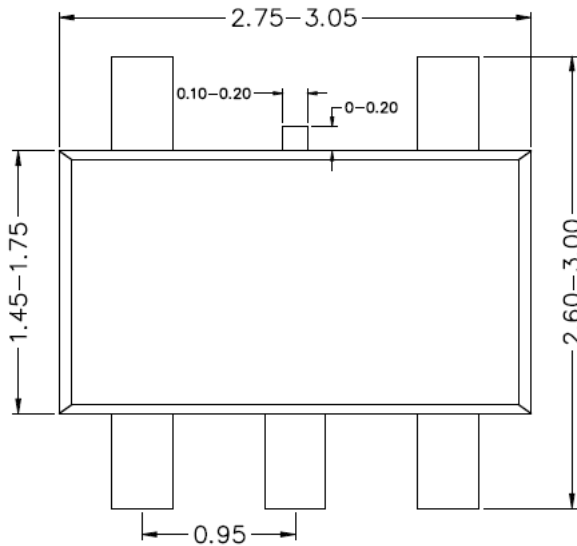
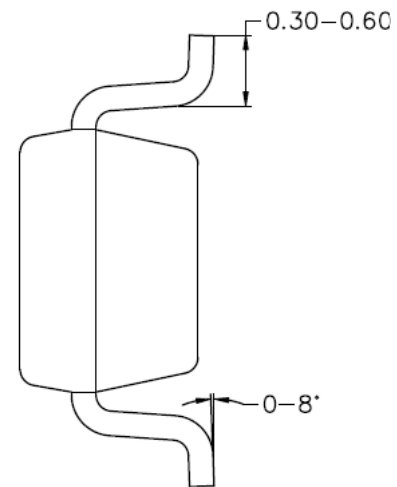


Figure 5. Timing Diagram

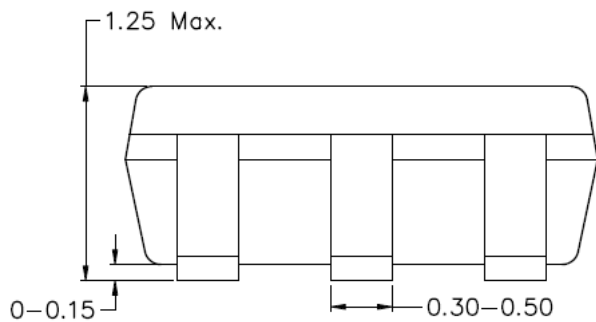
SOT23-5 Package Outline & PCB Layout



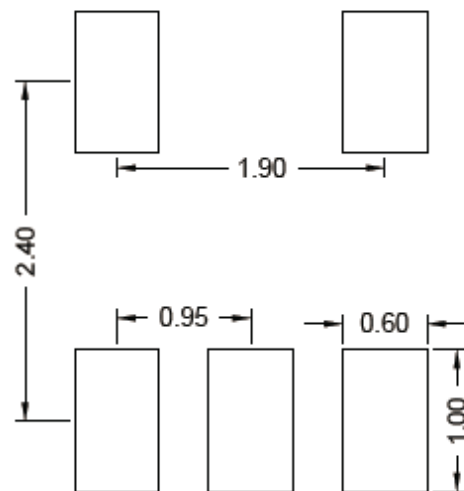
Top View



Side View



Front View



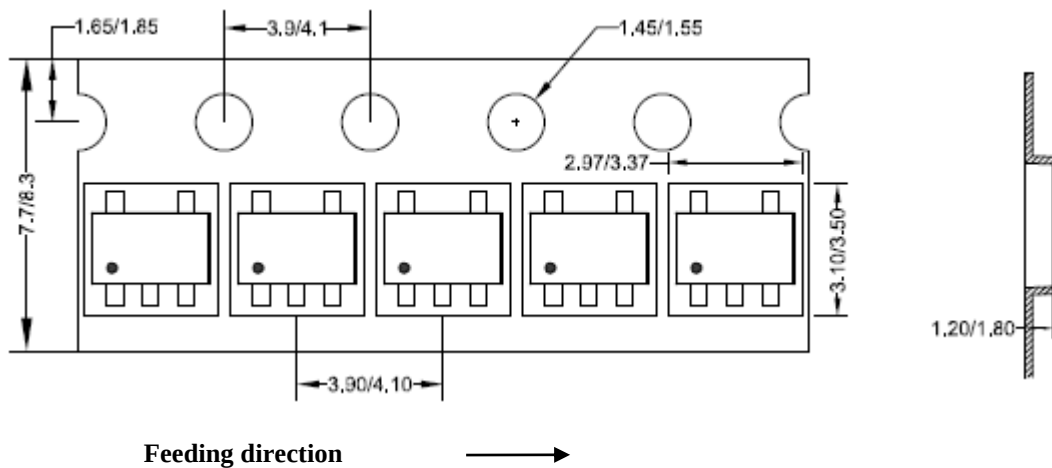
**Recommended PCB Pad Layout
(Reference only)**

Note: All dimension in millimeter and exclude mold flash & metal burr.

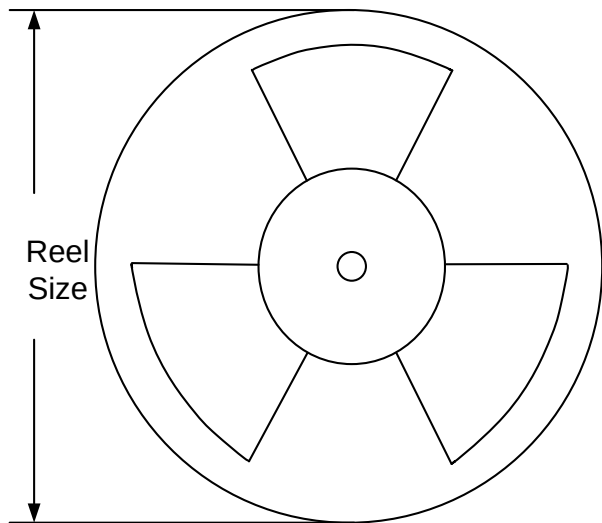
Taping & Reel Specification

1. Taping Orientation

SOT23-5



2. Carrier Tape & Reel Specification for Packages



Package Type	Tape Width (mm)	Pocket Pitch(mm)	Reel Size (Inch)	Trailer Length(mm)	Leader Length (mm)	Qty per Reel
SOT23-5	8	4	7"	280	160	3000

3. Others: NA



Revision History

The revision history provided is for informational purpose only and is believed to be accurate, however, not warranted. Please make sure that you have the latest revision.

Revision Number	Revision Date	Description
1.0	Nov 30, 2023	Initial Release

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