Smart high-current Power Switch

Features

- Ultra low Ron MOSFET only 33mΩ
- Continuous 6A current power switch
- V_{CC} Input voltage from 7V to 30V
- MOSFET input voltage 2V to 20V
- Programmable soft start for MOSFET turn on
- Very low quiescent current only 180μA at V_{CC} = 20V
- Switch off current only 1μA
- Small, 8-Pin SOP Package

Applications

- Desktop and Notebook Computers
- Smart Battery Packs
- LAN Servers
- Industrial Controls
- Central Office Telecom Equipment

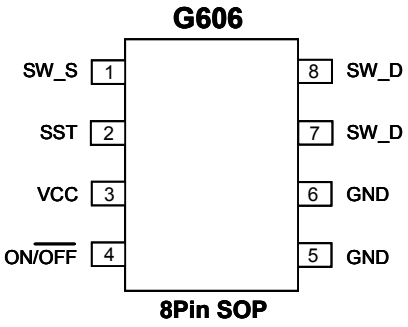
General Description

The G606 is a high-current power switch with logic-level compatible on/off control. The G606 has built in a power N-channel MOSFET, which can handle 6A continuous current, with 33mΩ on-resistance. The drain-to-source voltage rating of the MOSFET is 20V. The MOSFET can be turned on and off with a TTL logic level control signal, which is applied to the ON/OFF pin of G606. The VCC input voltage range of G606 is from 7V to 30V. Thus, it is possible to operate G606 directly from the adaptor or battery for the notebook applications. To tailor the turn-on time of the MOSFET, G606 provides a SST (soft start) pin to limit the surge current. By choosing an appropriate capacitance value, the turn-on surge current can be adjusted The G606 is available in a small, 8-pin SOP surface-mount package.

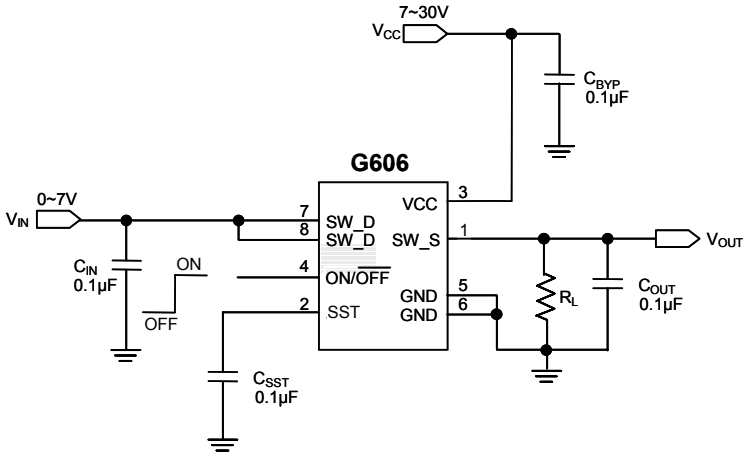
Ordering Information

PART*	TEMP. RANGE	PIN-PACKAGE
G606	-40°C to +85°C	8-SOP

Pin Configuration



Typical Operating Circuit



Absolute Maximum Ratings

V_{CC} to GND.....-0.3V to +40V
V_{SW-D} to V_{SW-S}.....-0.3V to +25V
ON/ $\overline{OFF}$ to GND.....–0.7V to +7V
Output Short-Circuit Duration.....Infinite
V_{SST} to GND.....-0.3V to +15V
Junction Temperature.....+150°C
Continuous Power Dissipation (T_A=+25°C)
SOP-8.....1.0W
θ_{JA} [1].....125°C /Watt

Note [1]: See Recommended Minimum Footprint

Recommend Operating Conditions

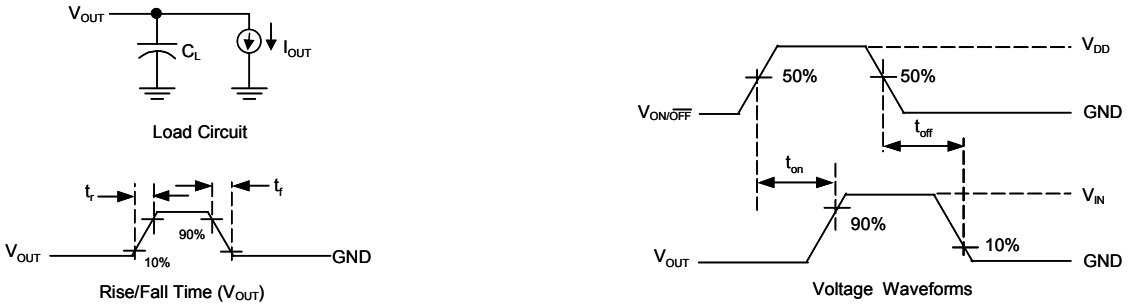
Supply Voltage (V_{CC}).....+7V to +30V
Switch Input Voltage (V_{SW-D}).....+0V to +20V
Operating Temperature Range .....-40°C to +85°C
Storage Temperature Range.....-65°C to +160°C
ESD Rating.....2kV

Electrical Characteristics

(V_{CC}= 15V, C_{BYP}, C_{IN}, C_{SST}, C_{OUT} = 0.1µF, T_A=25°C, unless otherwise noted.) (Note1)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNITS
V_{CC} Input Supply Current	I_{CC_ON}	Switch on, $V_{ON/\overline{OFF}}$ = 5V, No Load			53		µA
	I_{CC_OFF}	Switch off, $V_{ON/\overline{OFF}}$ = 0V, No Load			0.053		
ON/ $\overline{OFF}$ Input Enable Threshold	V_{IH}	Switch into on status		3.1			V
	V_{IL}	Switch into off status				3.0	
ON/ $\overline{OFF}$ Input Enable Current	I_{IH}	V_{CC} = 15V	$V_{ON/\overline{OFF}}$ = 5V		7		nA
	I_{IL}		$V_{ON/\overline{OFF}}$ = 0V		7		
SST Voltage	V_{SST}	$V_{ON/\overline{OFF}}$ = 5V	$V_{CC} \le 14.6V$		V_{CC}-0.06		V
			$V_{CC} > 14.6V$		14.4		
		$V_{ON/\overline{OFF}}$ = 0V	7V ≤ V_{CC} ≤ 30V		0.007	0.1	
Switch Resistance	$R_{DS\ (on)}$	V_{CC} = 15V, V_{SW-D} = 5V, I_{OUT} = 6A			34		mΩ
		V_{CC} = 15V, V_{SW-D} = 3.3V, I_{OUT} = 6A			33		
Output turn-on rise time	t_r	C_{SST} = 0.1µF, C_{OUT} = 0.1µF V_{CC} = 12V, I_{OUT} = 6A (See Note 2)	V_{SW-D} = 5V		2		ms
			V_{SW-D} = 3.3V		1.4		
Output turn-off fall time	t_f		V_{SW-D} = 5V		0.7		
			V_{SW-D} = 3.3V		0.8		
Propagation Delay Time	t_{on}		V_{SW-D} = 5V		2.7		
			V_{SW-D} = 3.3V		2.5		
	t_{off}		V_{SW-D} = 5V		4		µs
			V_{SW-D} = 3.3V		3		

Note 1: Limits is 100% production tested at T_A=25°C. Low duty pulse technique are used during test to maintain junction temperature as close to ambient as possible.
Note 2: Output rise/fall time & propagation delay time test waveform.



Test Circuits and Voltage Waveforms

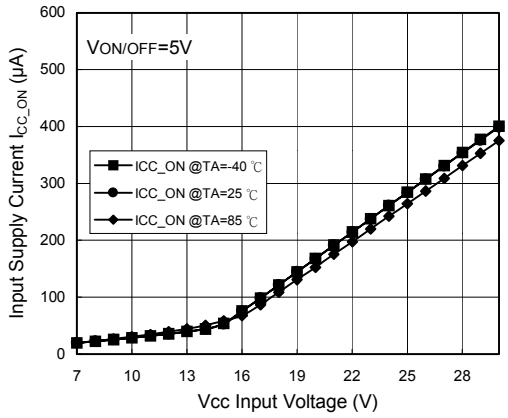
Pin Description

PIN NO.	PIN NAME	PIN FUNCTION
1	SW_S	Switch Output pin.
2	SST	Adjust soft start slope of gate.
3	VCC	Battery voltage input.
4	ON/ $\overline{OFF}$	Control switch on or off.
5,6	GND	Ground pin.
7,8	SW_D	Switch input pin.

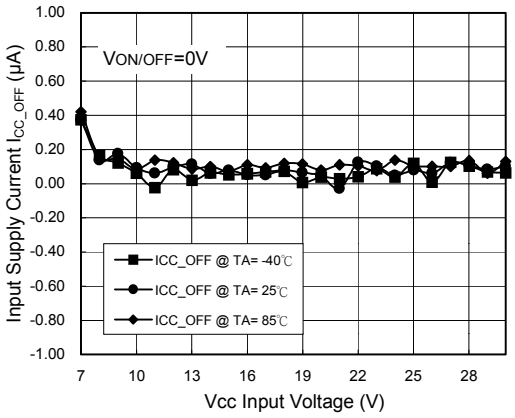
Typical Performance Characteristics

(V_{CC}= +15V, V_{IN}=5V, C_{BYP}, C_{IN}, C_{SST}, C_{OUT} = 0.1µF, T_A=25°C, unless otherwise noted.)

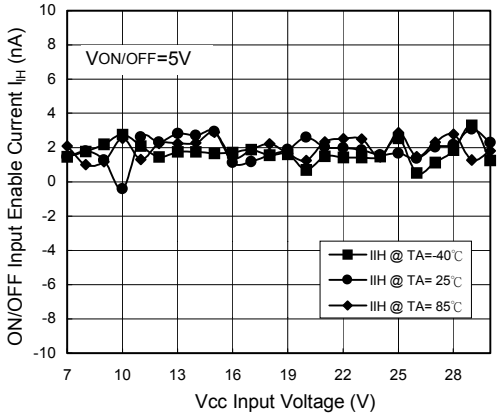
Input Supply Current I_{CC_ON} vs. V_{CC}



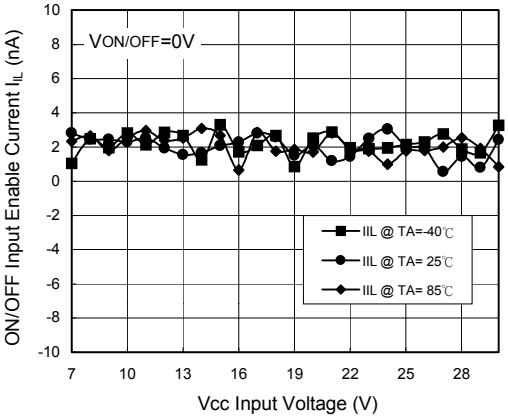
Input Supply Current I_{CC_OFF} vs. V_{CC}



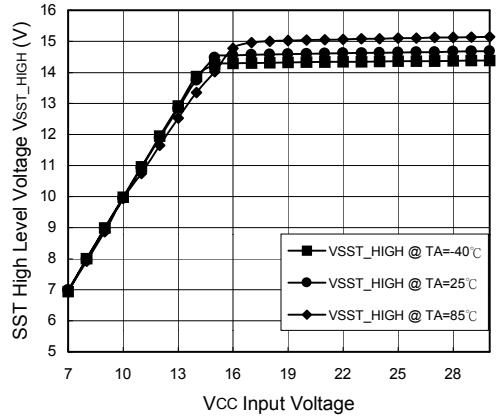
ON/$\overline{OFF}$ Input Enable Current (I_{IH}) vs. V_{CC}



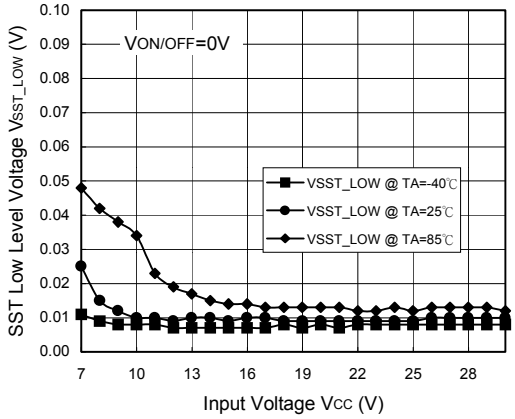
ON/$\overline{OFF}$ Input Enable Current (I_{IL}) vs. V_{CC}



SST High Level (V_{SST_HIGH}) vs. V_{CC}

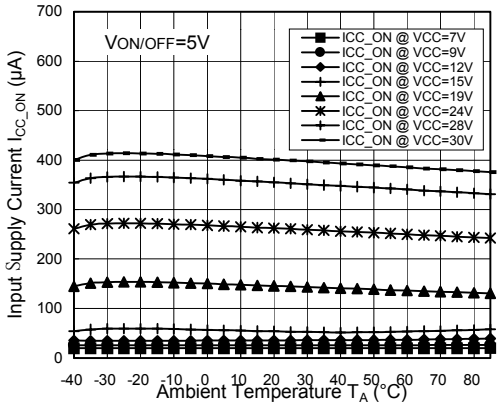


SST Low Level (V_{SST_LOW}) vs. V_{CC}

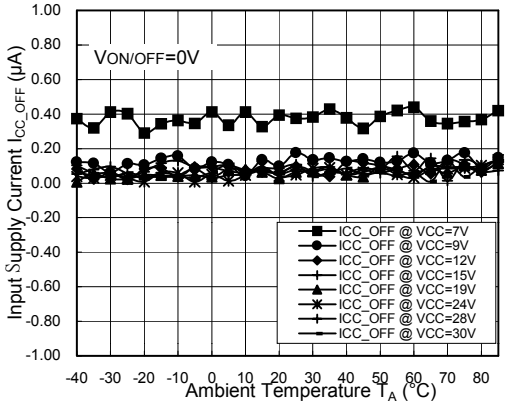


Typical Performance Characteristics (Continued)

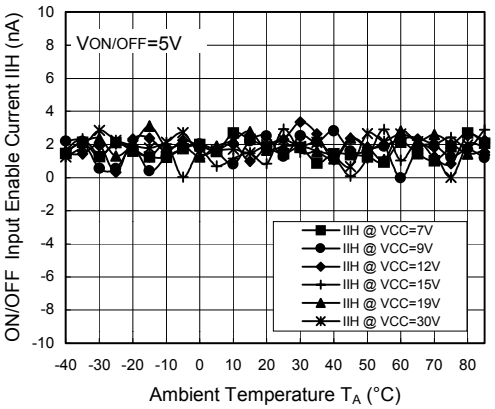
Input Supply Current I_{CC_ON} vs. T_A



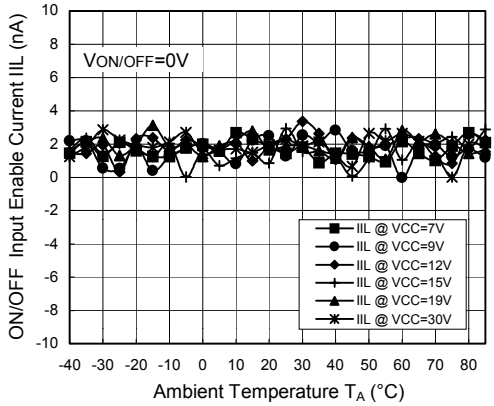
Input Supply Current I_{CC_OFF} vs. T_A



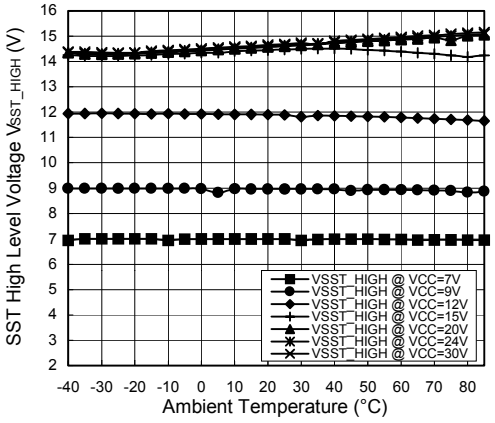
ON/$\overline{OFF}$ Input Enable Current (I_{IH}) vs. T_A



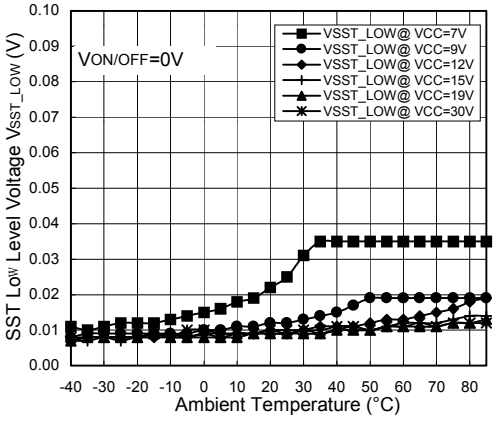
ON/$\overline{OFF}$ Input Enable Current (I_{IL}) vs. T_A



SST High Level (V_{SST_HIGH}) vs. T_A

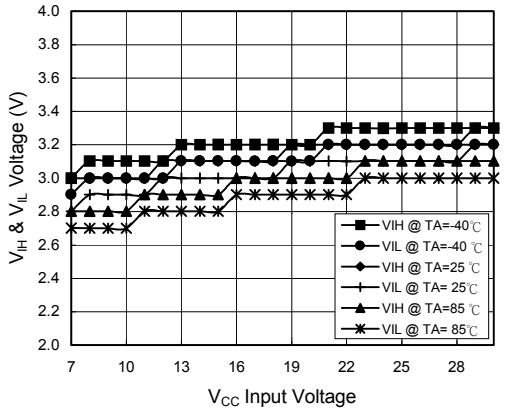


SST Low Level (V_{SST_LOW}) vs. T_A

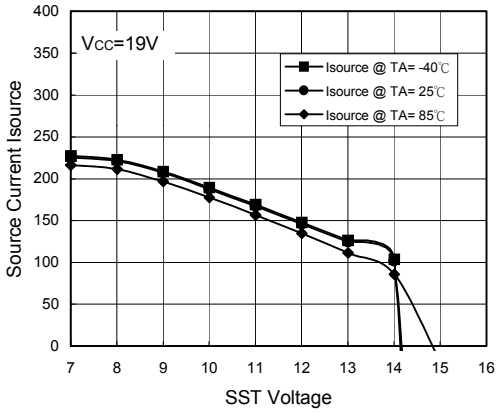


Typical Performance Characteristics (Continued)

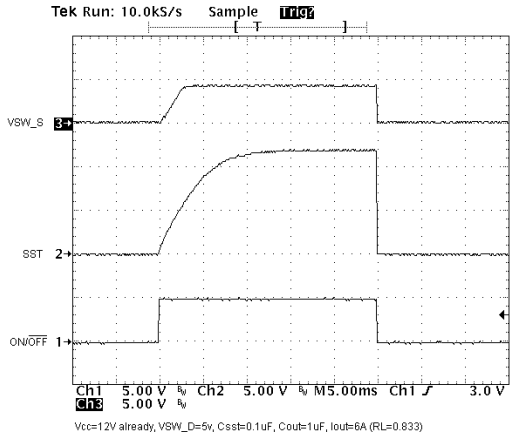
ON/OFF Input Threshold Voltage (V_{IH} & V_{IL}) vs. V_{CC}



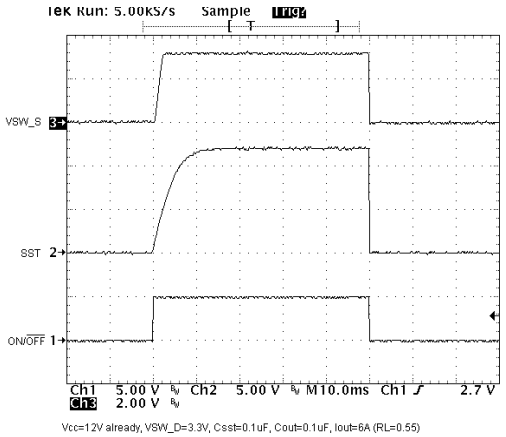
Source Current vs. V_{CC}



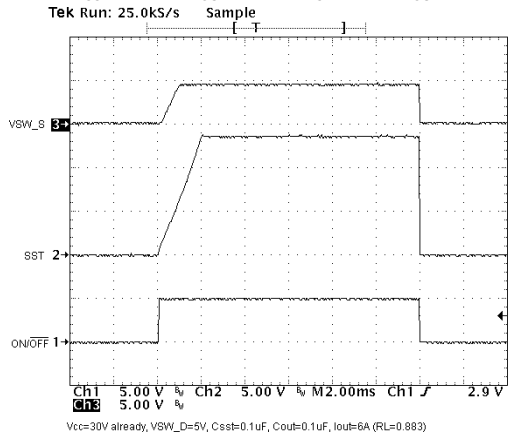
Power ON /OFF Response Time (V_{CC}=12V)
(C_{SST}= 0.1µF, C_{OUT}= 0.1µF, V_{SW} = 5.0V, I_{OUT}= 6A)



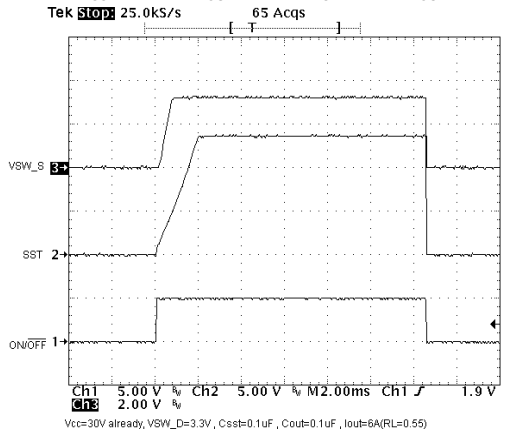
Power ON /OFF Response Time (V_{CC}=12V)
(C_{SST}= 0.1µF, C_{OUT}= 0.1µF, V_{SW} = 3.3V, I_{OUT}= 6A)



Power ON /OFF Response Time (V_{CC}=30V)
(C_{SST}= 0.1µF, C_{OUT}= 0.1µF, V_{SW} = 5.0V, I_{OUT}= 6A)



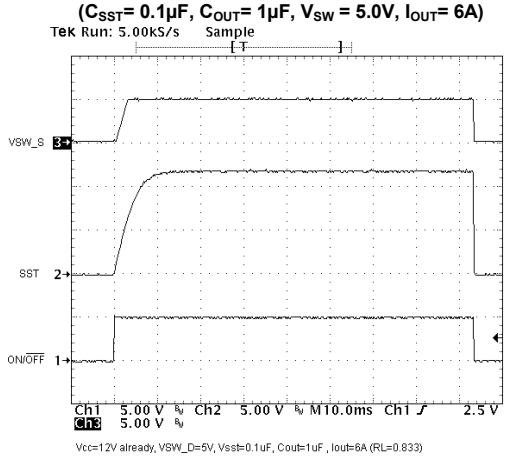
Power ON /OFF Response Time (V_{CC}=30V)
(C_{SST}= 0.1µF, C_{OUT}= 0.1µF, V_{SW} = 3.3V, I_{OUT}= 6A)



Typical Performance Characteristics (Continued)

Power ON /OFF Response Time (V_{CC}=12V)

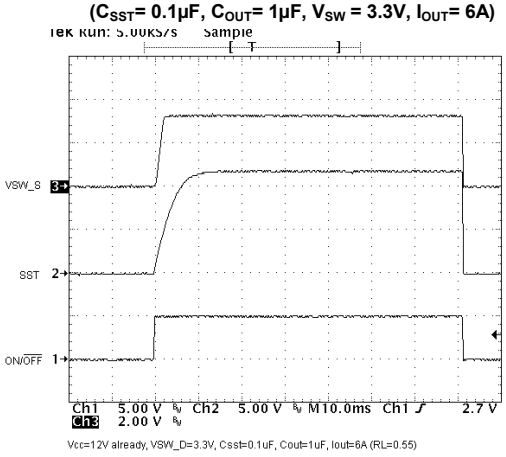
(C_{SST}= 0.1µF, C_{OUT}= 1µF, V_{SW} = 5.0V, I_{OUT}= 6A)



Vcc=12V already, VSW_D=5V, Vsst=0.1uF, Cout=1uF , Iout=6A (RL=0.833)

Power ON /OFF Response Time (V_{CC}=12V)

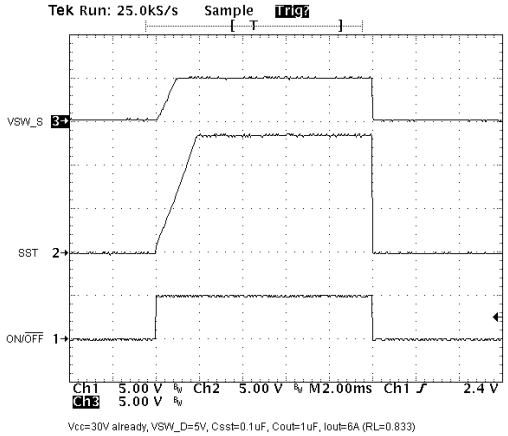
(C_{SST}= 0.1µF, C_{OUT}= 1µF, V_{SW} = 3.3V, I_{OUT}= 6A)



Vcc=12V already, VSW_D=3.3V, Csst=0.1uF, Cout=1uF, Iout=6A (RL=0.55)

Power ON /OFF Response Time (V_{CC}=30V)

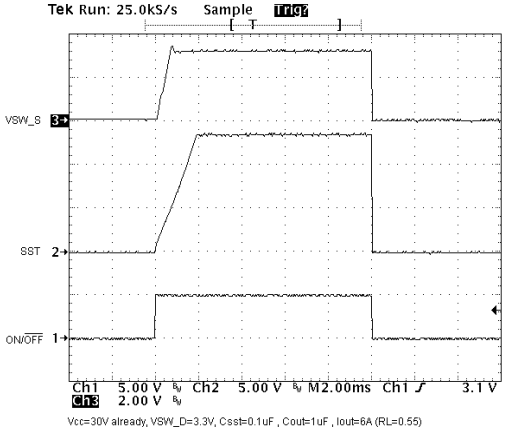
(C_{SST}= 0.1µF, C_{OUT}= 1µF, V_{SW} = 5.0V, I_{OUT}= 6A)



Vcc=30V already, VSW_D=5V, Csst=0.1uF, Cout=1uF, Iout=6A (RL=0.833)

Power ON /OFF Response Time (V_{CC}=30V)

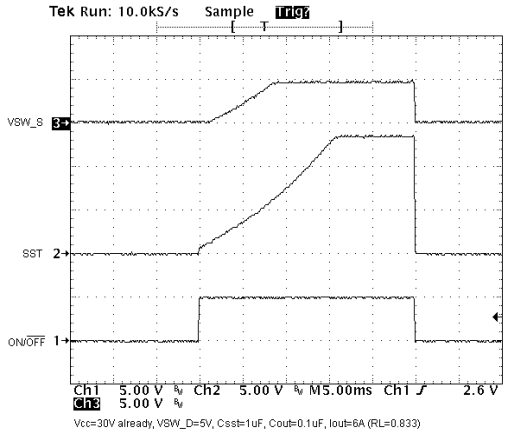
(C_{SST}= 0.1µF, C_{OUT}= 1µF, V_{SW} = 3.3V, I_{OUT}= 6A)



Vcc=30V already, VSW_D=3.3V, Csst=0.1uF , Cout=1uF , Iout=6A (RL=0.55)

Power ON /OFF Response Time (V_{CC}=30V)

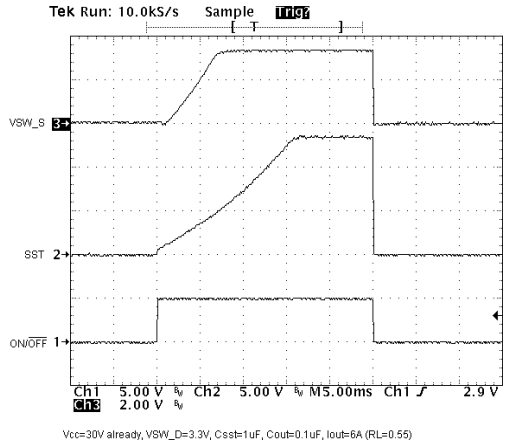
(C_{SST}= 1µF, C_{OUT}= 0.1µF, V_{SW} = 5.0V, I_{OUT}= 6A)



Vcc=30V already, VSW_D=5V, Csst=1uF, Cout=0.1uF, Iout=6A (RL=0.833)

Power ON /OFF Response Time (V_{CC}=30V)

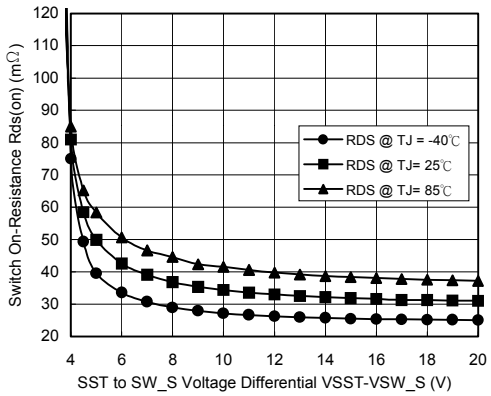
(C_{SST}= 1µF, C_{OUT}= 0.1µF, V_{SW} = 3.3V, I_{OUT}= 6A)



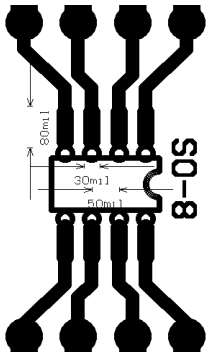
Vcc=30V already, VSW_D=3.3V, Csst=1uF, Cout=0.1uF, Iout=6A (RL=0.55)

Typical Performance Characteristics (Continued)

Switch On-Resistance vs. SST to SW_S Voltage Differential

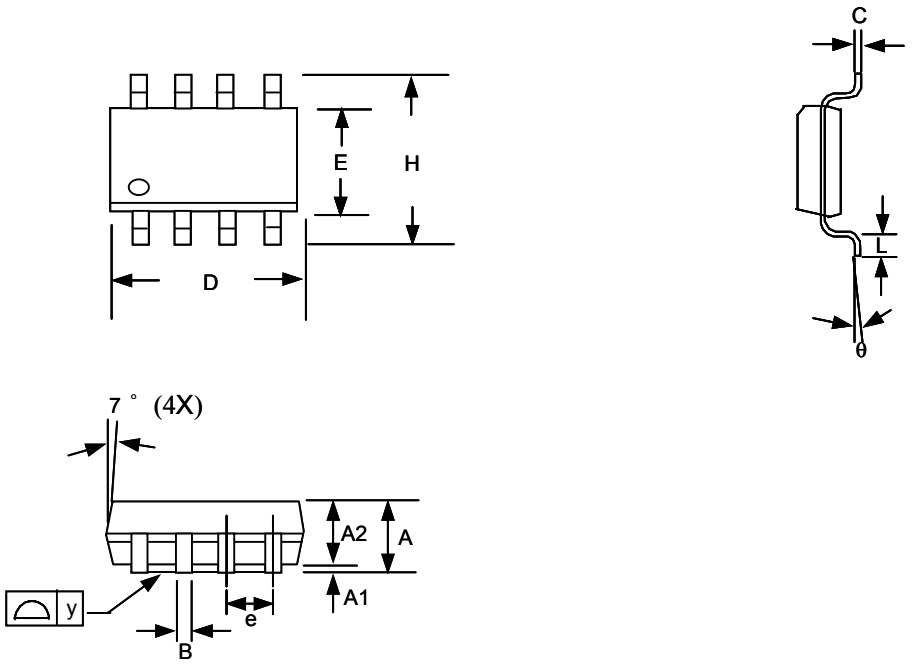


Recommand Minimun Footprint



R_{JA}=125°C/W when mounted on a minimum pad

Package Information

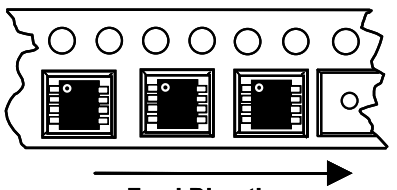


Note:

1. Package body sizes exclude mold flash and gate burrs
2. Dimension L is measured in gage plane
3. Tolerance 0.10mm unless otherwise specified
4. Controlling dimension is millimeter converted inch dimensions are not necessarily exact.

SYMBOL	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	1.35	1.60	1.75	0.053	0.063	0.069
A1	0.10	-----	0.25	0.004	-----	0.010
A2	-----	1.45	-----	-----	0.057	-----
B	0.33	-----	0.51	0.013	-----	0.020
C	0.19	-----	0.25	0.007	-----	0.010
D	4.80	-----	5.00	0.189	-----	0.197
E	3.80	-----	4.00	0.150	-----	0.157
e	-----	1.27	-----	-----	0.050	-----
H	5.80	-----	6.20	0.228	-----	0.244
L	0.40	-----	1.27	0.016	-----	0.050
y	-----	-----	0.10	-----	-----	0.004
θ	0°	-----	8°	0°	-----	8°

Taping Specification



Feed Direction
Typical SOP Package Orientation