

P-Channel MOSFET with 0.12V Schottky Diode

DESCRIPTION

BL8593 is designed for battery charging controller, which features P-channel MOSFET characteristics and a 0.12V Schottky diode for reverse current blocking. Such reverse current blocking feature cut off the current when source voltage is removed, or lower than drain voltage, no matter the gate voltage indicating the P-MOSFET on or off.

BL8593 is also suitable for high side switch in a system with multi power supplies, when isolating different power supplies becomes essential.

BL8593 can block reverse voltage as high as 10V. So it is safe enough for mobile phone system or other portable device powered by 1 cell Li-ion battery.

BL8593 is available in DFN2x2-6L (2 type of PIN configuration), SC70-5 and DFN1x1-5. Especially with the package DFN1x1-5, BL8593 make itself the smallest package available in the world.

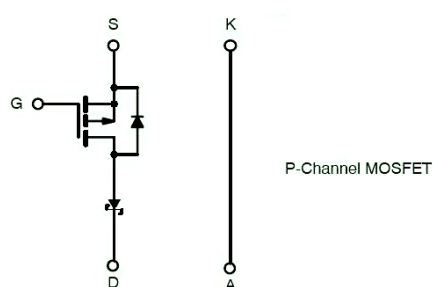
FEATURES

- PMOSFET with SBD for reverse current blocking
- 0.12V Schottky diode forward voltage
- Range of operation input voltage: Max 12V
- Charging current up to 650mA
- Environment Temperature: -20°C~85°C

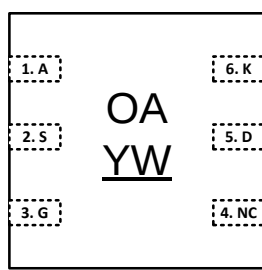
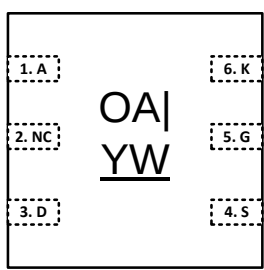
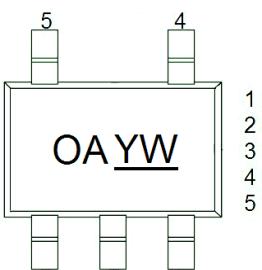
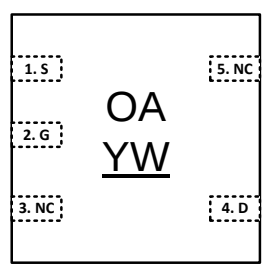
APPLICATIONS

- Cell phone and other portable device

FUNCTION DIAGRAM



ORDERING INFORMATION / PIN CONFIGURATION / MARKING

BL8593CKCTR DFN2x2-6L (compatible to DFN2x3 pin out)	BL8593CBKCTR DFN2x2-6L (compatible to DFN2x2 pin out)	BL8593CA5TR SC70-5	BL8593CKDTR DFN1x1-5L
			

Notice: YW means the year and week parts being manufactured, subjected to change. OA is the code of the product, it will not be changed on any part.

ABSOLUTE MAXIMUM RATING

Parameter	Symbol	5 sec	Steady State	Unit
Forward Voltage(Source-Drain)	V _{SD}	12		V
Gate-Source Voltage (MOSFET)	V _{GS}	-8~+0.3	-8~+0.3	
Continuous Drain Current	I _D	0.8	0.5	mA
Pulsed Drain Current (MOSFET)	I _{DM}	1		A
Maximum Power Dissipation	P _D	1	0.5	W
Operating Junction Temperature Range	T _J	-20 to 125		°C
Storage Temperature Range	T _{stg}	-40 to 150		
Soldering Recommendations (Peak Temperature)		260°C, 10s		

THERMAL RESISTANCE RATING

Parameter		Device	Symbol	Typical	Maximum	Unit
junction-to-Ambient	t ≤ 5 sec	DFN2x2	R_{thJA}	50	60	°C /W
		DFN1x1		77	95	
		SC70-5		250	280	
	Steady State	DFN2x2		105	120	
		DFN1x1		160	200	
		SC70-5		330	400	
Junction to Case	Steady State	DFN2x2	R_{thJC}	20	30	
		DFN1x1		33	40	
		SC70-5		150	175	

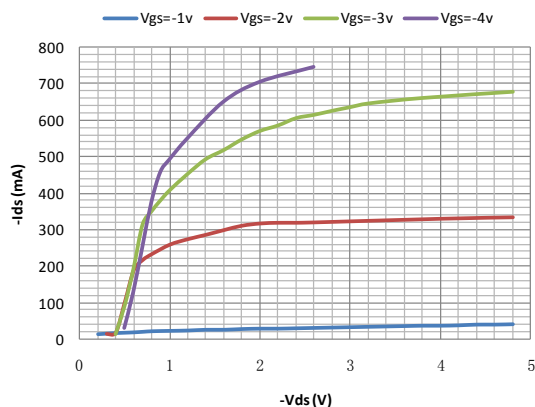
ELECTRICAL CHARACTERISTICST_J=25°C

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _{th}	Threshold Voltage	I _{ds} =-10uA, V _{ds} =V _{gs}	-1.0	-0.7	-0.4	V
I _{gs}	Gate-Source Leakage current	V _{gs} =8V	0	12	20	uA
IDss1	PMOS off-state leakage	V _{gs} =0, V _s =9V, V _d =0V		0.5	5	uA
IDss2	PMOS reverse block leakage	V _g =0, V _s =0V, V _d =4.5V		2	10	uA
I _{dson}	On-state drain current	V _s =5V, V _g =1V, V _d =4V	-800	-650	-500	mA
R _{dson}	V _{ds} /I _{dson}	V _s =5V, V _g =1V, V _d =4V	1.25	1.5	2	ohm
V _{fsbd}	Forward voltage of schottky	V _s =4V, V _g =0V, I _{ds} =0,	0.08	0.12	0.16	V

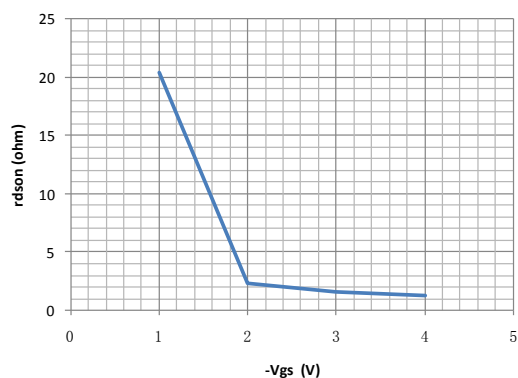
TYPICAL PERFORMANCE CHARACTERISTICS

$T=25^{\circ}\text{C}$ unless specified.

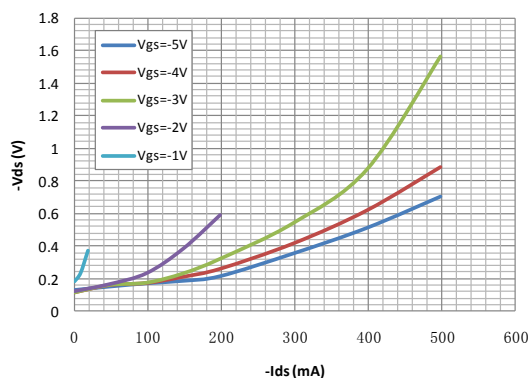
Output Characteristics



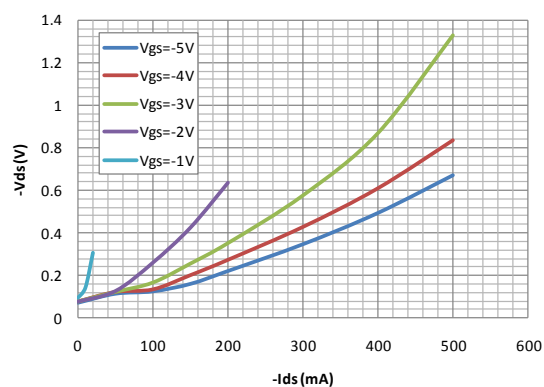
On Resistance Vs V_{gs}



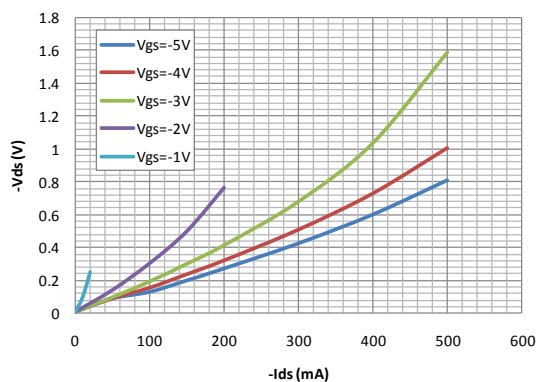
Dropout Voltage (V_{ds}) Vs. Charge current (I_{ds}), $T = 25^{\circ}\text{C}$



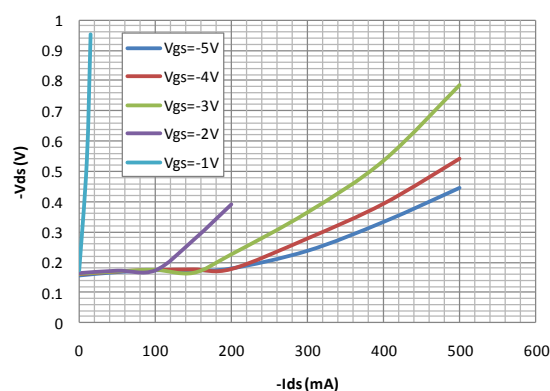
Dropout Voltage (V_{ds}) Vs. Charge current (I_{ds}), $T = 80^{\circ}\text{C}$



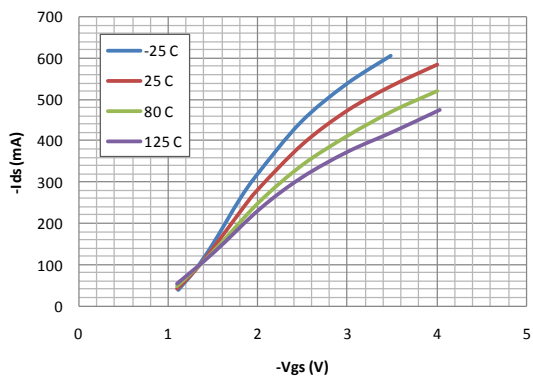
Dropout Voltage (V_{ds}) Vs. Charge current (I_{ds}), $T = 125^{\circ}\text{C}$



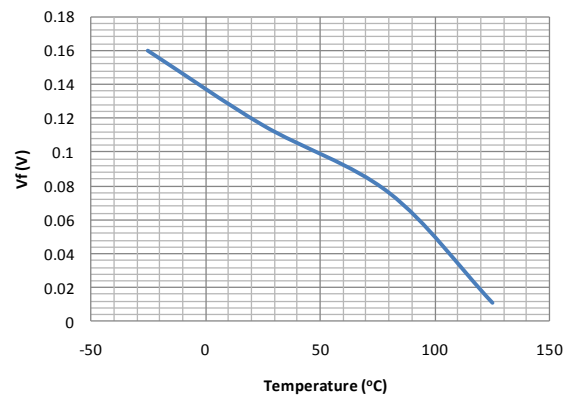
Dropout Voltage (V_{ds}) Vs. Charge current (I_{ds}), $T = -25^{\circ}\text{C}$



Charge Current (Ids) Vs. Gate Voltage

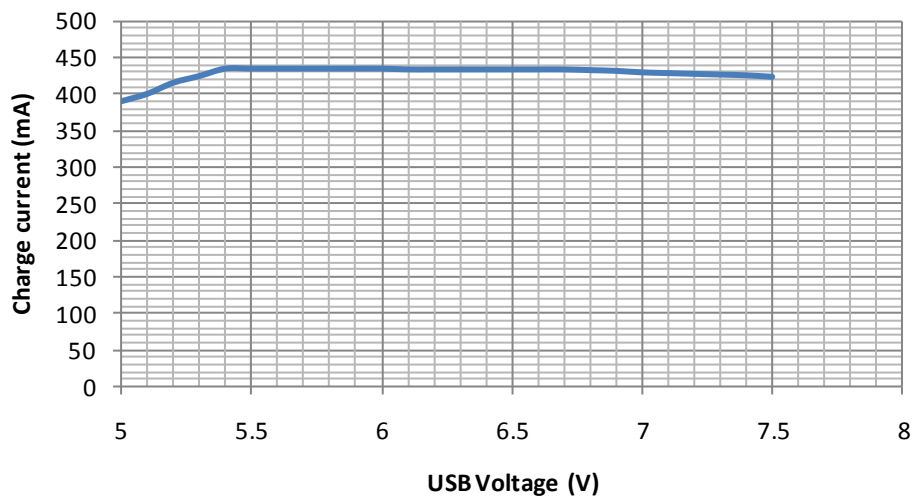


Schottky Diode Forward Voltage

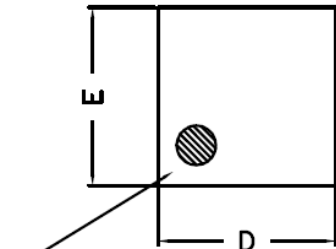
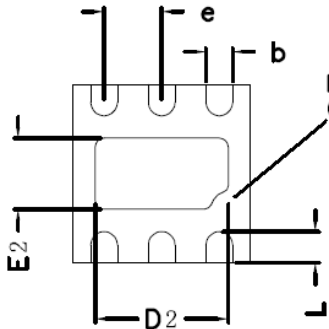
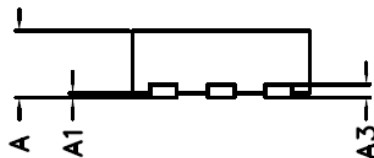


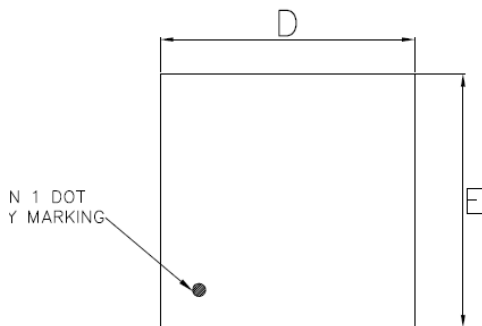
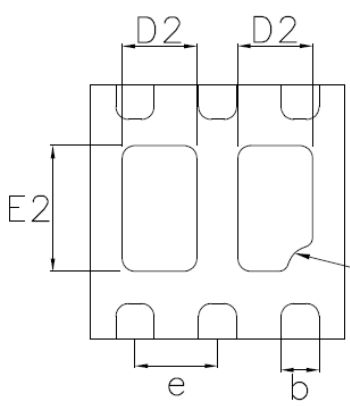
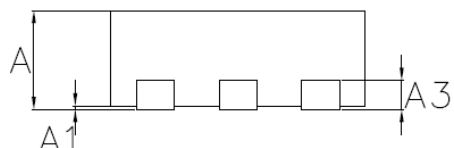
Charge current Vs USB voltage tested on actual cell phone powered by MTK chipset

Icharge



PACKAGE OUTLINE

Package	DFN2x2-6 single pad	Devices per reel	3000	Unit	mm																																																			
Package specification:																																																								
 PIN 1 DOT BY MARKING TOP VIEW		 PIN #1 IDENTIFICATION CHAMFER BOTTOM VIEW																																																						
 SIDE VIEW		<table><tr><th colspan="4">COMMON DIMENSIONS(MM)</th></tr><tr><th rowspan="2">PKG. REF.</th><th colspan="3">W: VERY VERY THIN</th></tr><tr><th>MIN.</th><th>NOM.</th><th>MAX.</th></tr><tr><td>A</td><td>0.70</td><td>0.75</td><td>0.80</td></tr><tr><td>A1</td><td>0.00</td><td>—</td><td>0.05</td></tr><tr><td>A3</td><td colspan="3">0.2 REF.</td></tr><tr><td>D</td><td>1.95</td><td>2.00</td><td>2.05</td></tr><tr><td>E</td><td>1.95</td><td>2.00</td><td>2.05</td></tr><tr><td>b</td><td>0.25</td><td>0.30</td><td>0.35</td></tr><tr><td>L</td><td>0.25</td><td>0.35</td><td>0.45</td></tr><tr><td>D2</td><td>1.35</td><td>1.50</td><td>1.60</td></tr><tr><td>E2</td><td>0.65</td><td>0.80</td><td>0.90</td></tr><tr><td>e</td><td colspan="3">0.65 BSC</td></tr></table>				COMMON DIMENSIONS(MM)				PKG. REF.	W: VERY VERY THIN			MIN.	NOM.	MAX.	A	0.70	0.75	0.80	A1	0.00	—	0.05	A3	0.2 REF.			D	1.95	2.00	2.05	E	1.95	2.00	2.05	b	0.25	0.30	0.35	L	0.25	0.35	0.45	D2	1.35	1.50	1.60	E2	0.65	0.80	0.90	e	0.65 BSC		
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