



Bay Linear

Inspire the Linear Power

N-CHANNEL DMOS FET SWITCH

High Gain Level Shifter

B3520/B3540

Series

Description

The B3520 series consists of enhancement-mode MOSFETs designed for high speed low-glitch switching in audio, video, and high-frequency wireless applications. The CT3520 is optimized as a high speed driver. With a source feedback resistor it can be used as a high speed LED Driver.

The B3520 series uses Bay Linear ULTRA REL DMOS Process for reliability and robust performance.

These MOSFETs utilize lateral construction to achieve low capacitance and ultra-fast switching speeds. An integrated Zener diode provides ESD protection.

Features

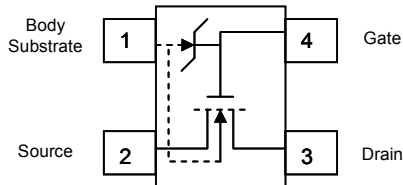
- Low capacitance – 0.3pF typical
- Low threshold – <1.5V max
- Fast switching – $t_{on} < 1ns$
- CMOS and TTL Compatible Input

Application

- LED Drivers
- Level Shifting
- Switch Drivers
- VHF/UHF Amplifiers

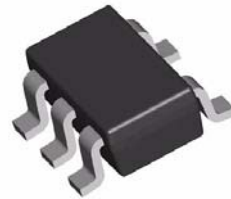
Pin Connection

**SOT-143 Package
Lead Code Identification
(top view)**



Ordering Information

Package	Part No.
SOT-143	B3520K4 -X.X
SOT-143	B3540K4-XX

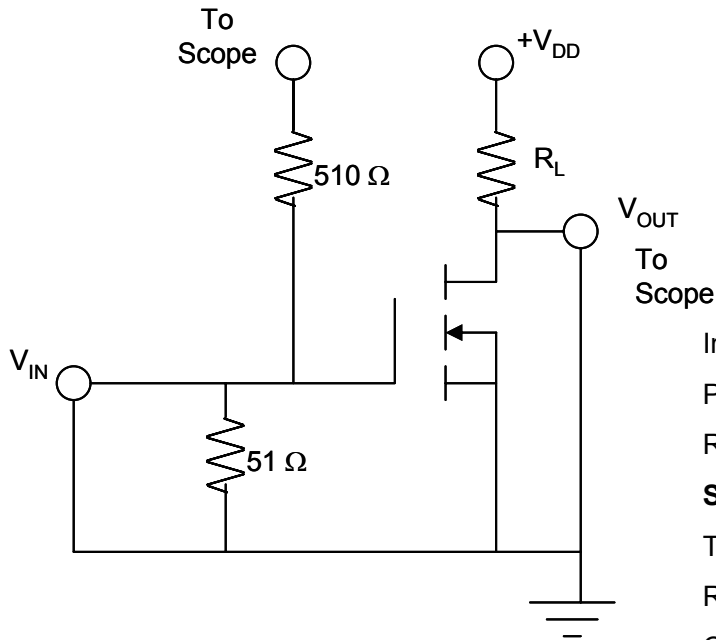


Electrical Specifications (TC = +25°C unless otherwise noted)

Parameter	Symbol	Test Conditions	B3520			B3540			Units			
			Min	Typ	Max	Min	Typ	Max				
STATIC	Drain-Source Breakdown Voltage	BVDS	ID=1 μA VGS=VBS=0		15	25		15	25		V	
	Source-Drain Breakdown Voltage	BVSD	IS=50 nA VGD=VBD=-5		10	15					V	
	Drain-Substrate Breakdown Voltage	BVDB	ID=50 nA, VGB=0 Source Open		10	15					V	
	Source-Substrate Breakdown Voltage	B _{VSB}	ID=10 μA, VGB=0 Drain Open		10	15					V	
	Drain-Source Leakage	ID (OFF)	VGS/BS=-5 VGS/BS=0	VDS=10V		1	50				nA	
				VDS=15V				0.1	1		μA	
	Source - Drain Leakage	IS (OFF)	VGD/BS=-5 VGS/BS=0	VDS=10V		1	50				nA	
				VDS=15V				0.1	1		μA	
	Gate Leakage	IGBS	VDB/SB= 0	VGS=20V		1	10		1	10		μA
	Gate Threshold Voltage	VGS (th)	VDS=VGS ID=1 μA VSB=0		0.3	0.7	1.5	0.3	0.7	1.5		V
Drain-Source ON Resistance	IDS (ON)	ID=1 mA VSB= 0V	VGS=2.4V		140	175		140	175		Ohm	
			VGS=4.5V		40	60		40	60		Ohm	

Parameter	Symbol	Test Conditions	B3520			B3540			Units		
			Min	Typ	Max	Min	Typ	Max			
DYNAMIC	Common-Source Forward Transconductance	gfS	VDS= 10V ID= 20mA f = 1MHz, VSB=0 Pulsed		14	18		14	18		V
	Gate Node Capacitance	C(gs+gd+gb)	VDS= 10V VGS=VBS= -15V f = 1MHz			4.5	6.0		4.5	6.0	pF
	Drain Node Capacitance	C(gd+db)				2.0	3.0		2.0	3.0	pF
	Source Node Capacitance	C(gs+sb)				5.5	7.0		5.5	7.0	pF
	Reverse Transfer Capacitance	C(dg)				0.3	0.5		0.3	0.5	pF
	Turn On Delay Time	td(on)			V∞= 10V VG(on)= 10V			0.7	1.0		0.7
	Rise Time	tr	RL= 680 Ω			0.8	1.0		0.8	1.0	ns
	Turn Off Delay Time	Td(off)	RG= 51Ω CL= 1.5pF			1.5			1.5		ns

Switching Time Test Circuit



Input Pulse: $t_d, t_r < 1\text{ ns}$

Pulse width: 100 ns

Rep rate: 1 MHz

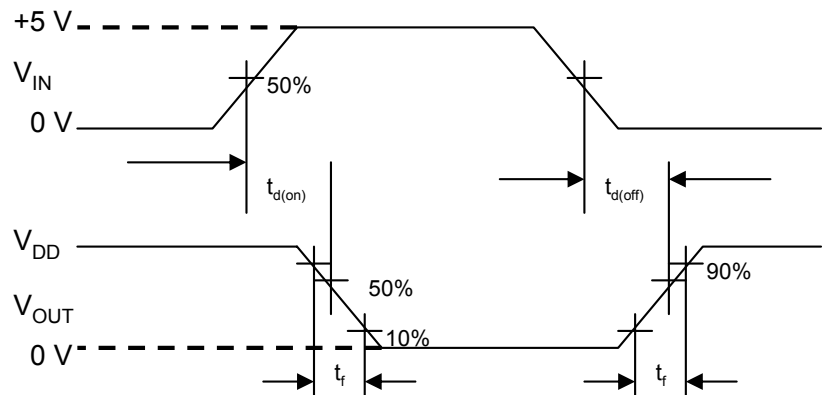
Sampling Scope

$T_r < 360\text{ ps}$

$R_{IN} = 1\text{ M}\Omega$

$C_{IN} = 2\text{ pF}$

BW = 500 MHz



Absolute Maximum Ratings, $T_c = +25^\circ\text{C}$

Parameter	Unit	Absolute Maximum ^[1]
		SOT-143
Drain-Source Voltage	V	+15
Gate-Source Voltage	V	-0.3 / +20
Gate-Drain Voltage	V	-0.3 / +20
Continuous Drain Current	mA	50
Power dissipation $T_c=25$	mW	300
Linear Derating Factor	mW/C	3
Junction Temperature	$^\circ\text{C}$	-55 to +125
Storage Temperature	$^\circ\text{C}$	-55 to +125

Notes:

1. Operation in excess of any one of these conditions may result in permanent damage to the device
2. $T_c = +25^\circ\text{C}$, where T_c is defined to be the temperature at the package pins where contact is made to the circuit board.

ESD WARNING: Handling Precautions Should Be Taken To Avoid Static Discharge.

Advance Information- These data sheets contain descriptions of products that are in development. The specifications are based on the engineering calculations, computer simulations and/ or initial prototype evaluation.

Preliminary Information- These data sheets contain minimum and maximum specifications that are based on the initial device characterizations. These limits are subject to change upon the completion of the full characterization over the specified temperature and supply voltage ranges.

The application circuit examples are only to explain the representative applications of the devices and are not intended to guarantee any circuit design or permit any industrial property right to other rights to execute. Bay Linear takes no responsibility for any problems related to any industrial property right resulting from the use of the contents shown in the data book. Typical parameters can and do vary in different applications. Customer's technical experts must validate all operating parameters including "Typical" for each customer application.

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