

P-Channel Enhancement Mode Power MOSFET

Description

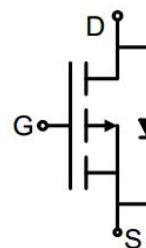
The G3401L uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

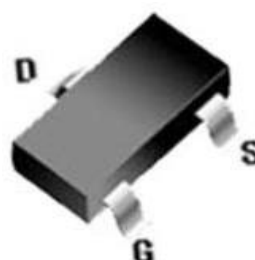
- V_{DS} -30V
- I_D (at $V_{GS} = -10V$) -4.4A
- $R_{DS(ON)}$ (at $V_{GS} = -10V$) < 55m Ω
- $R_{DS(ON)}$ (at $V_{GS} = -4.5V$) < 65m Ω
- $R_{DS(ON)}$ (at $V_{GS} = -2.5V$) < 90m Ω
- 100% Avalanche Tested
- RoHS Compliant

Application

- Power switch
- DC/DC converters



Schematic diagram



SOT-23-3

Ordering Information

Device	Package	Marking	Packaging
G3401L	SOT-23-3	3401	3000pcs/Reel

Absolute Maximum Ratings $T_C = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-30	V
Continuous Drain Current	I_D	-4.4	A
Pulsed Drain Current (note1)	I_{DM}	-17.6	A
Gate-Source Voltage	V_{GS}	± 12	V
Power Dissipation	P_D	1.3	W
Single pulse avalanche energy (note2)	E_{AS}	14	mJ
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 To 150	$^\circ\text{C}$

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	R_{thJA}	96	$^\circ\text{C/W}$

Specifications $T_J = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-30	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -30V, V_{GS} = 0V$	--	--	-1	μA
Gate-Source Leakage	I_{GSS}	$V_{GS} = \pm 12V$	--	--	± 100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-0.6	-0.8	-1.3	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = -10V, I_D = -4A$	--	42	55	m Ω
		$V_{GS} = -4.5V, I_D = -4A$	--	50	65	
		$V_{GS} = -2.5V, I_D = -2A$	--	67	90	
Forward Transconductance	g_{FS}	$V_{DS} = -5V, I_D = -4A$	--	10	--	S
Dynamic Parameters						
Input Capacitance	C_{iss}	$V_{GS} = 0V,$ $V_{DS} = -15V,$ $f = 1.0MHz$	--	652	--	pF
Output Capacitance	C_{oss}		--	74	--	
Reverse Transfer Capacitance	C_{rss}		--	66	--	
Total Gate Charge	Q_g	$V_{DD} = -15V,$ $I_D = -4A,$ $V_{GS} = -4.5V$	--	9.3	--	nC
Gate-Source Charge	Q_{gs}		--	2	--	
Gate-Drain Charge	Q_{gd}		--	2.9	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = -15V,$ $I_D = -4A,$ $R_G = 3\Omega$	--	6.8	--	ns
Turn-on Rise Time	t_r		--	2.9	--	
Turn-off Delay Time	$t_{d(off)}$		--	29	--	
Turn-off Fall Time	t_f		--	12	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	$T_C = 25^\circ C$	--	--	-4.4	A
Body Diode Voltage	V_{SD}	$T_J = 25^\circ C, I_{SD} = -4A, V_{GS} = 0V$	--	--	-1.2	V
Reverse Recovery Charge	Q_{rr}	$I_F = -4A, V_{GS} = 0V$ $di/dt = -100A/us$	--	4.5	--	nC
Reverse Recovery Time	T_{rr}		--	9	--	ns

Notes

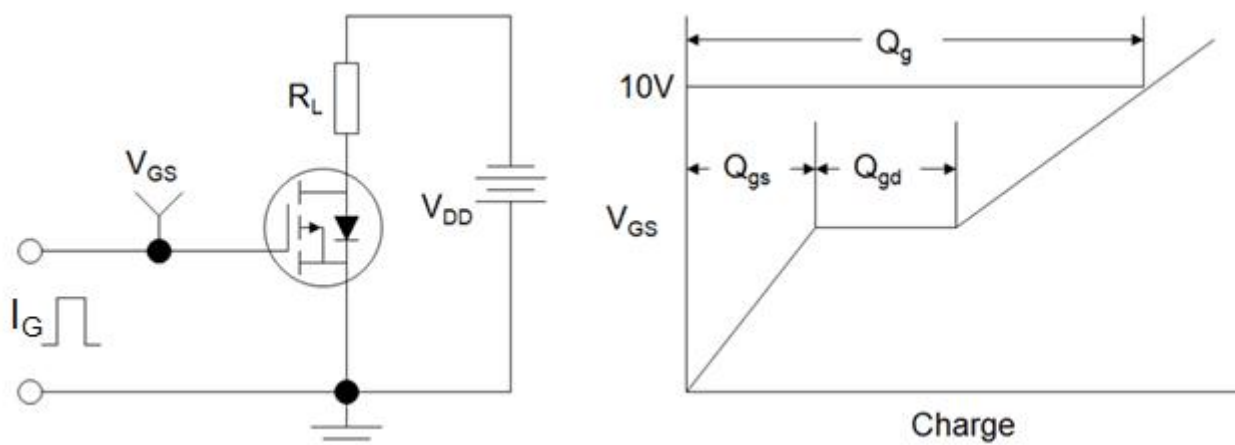
1. Repetitive Rating: Pulse width limited by maximum junction temperature

2. EAS condition : $T_J = 25^\circ\text{C}$, $V_{DD} = -30V$, $V_{GS} = -10V$, $L = 0.5mH$, $R_G = 25\Omega$

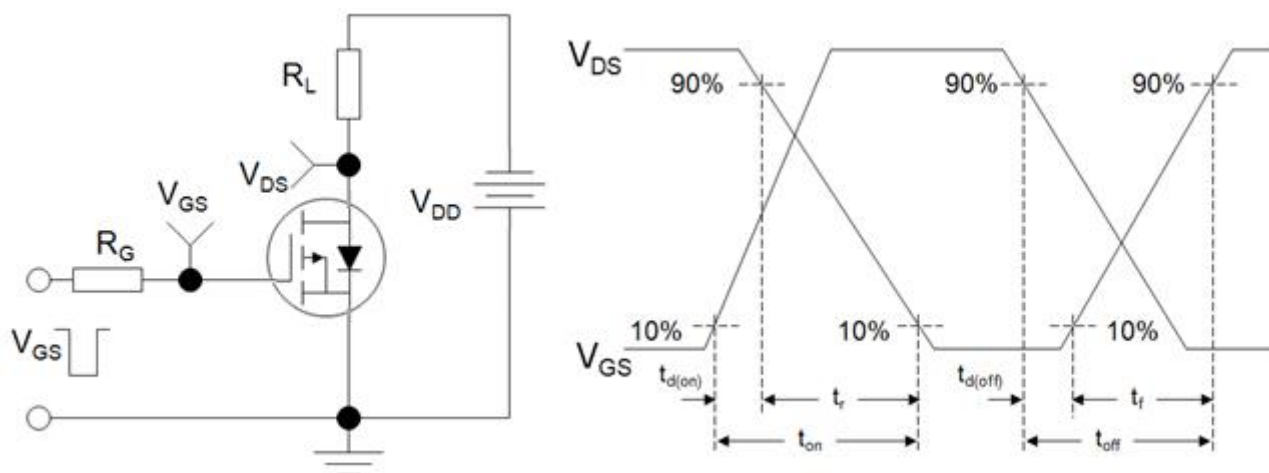
The table shows the minimum avalanche energy, which is 39mJ when the device is tested until failure

3. Identical low side and high side switch with identical R_G

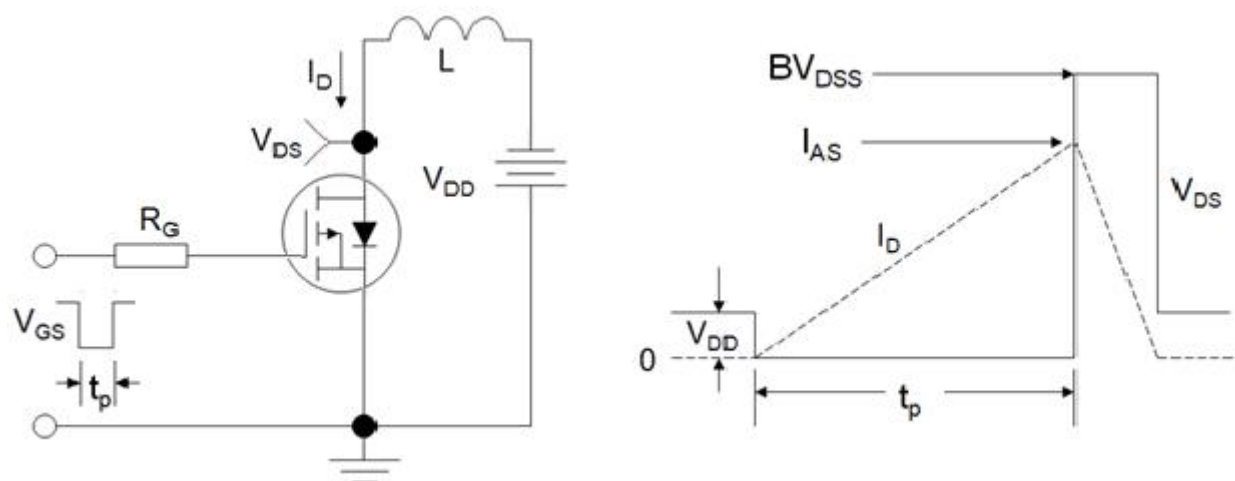
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 1. Output Characteristics

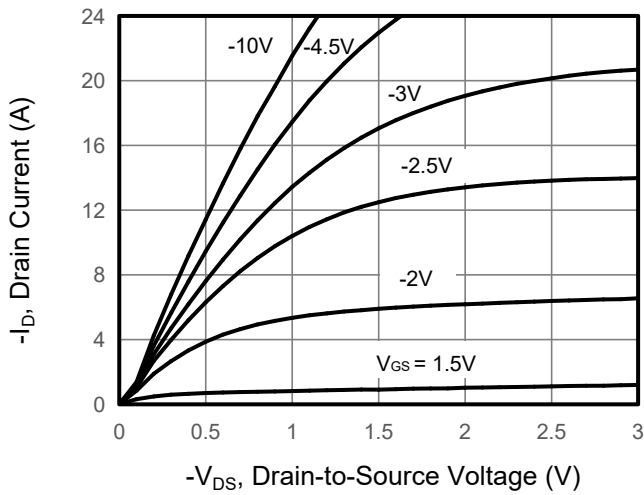


Figure 2. Transfer Characteristics

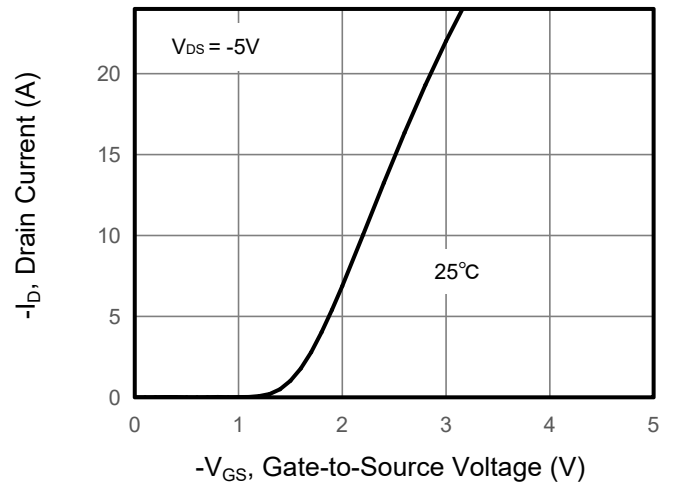


Figure 3. Drain Source On Resistance

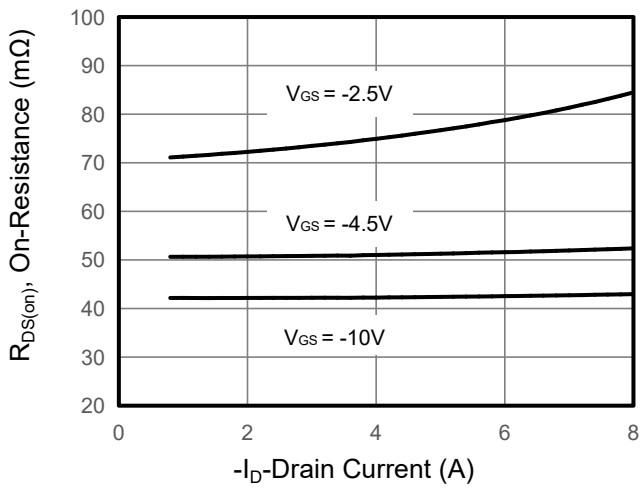


Figure 4. Gate Charge

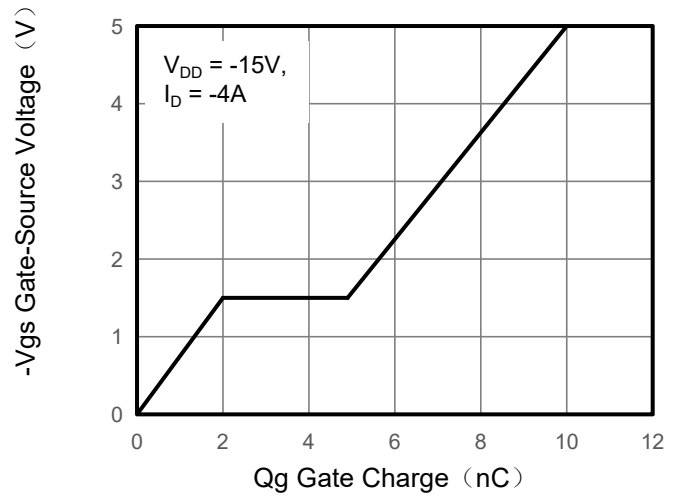


Figure 5. Capacitance

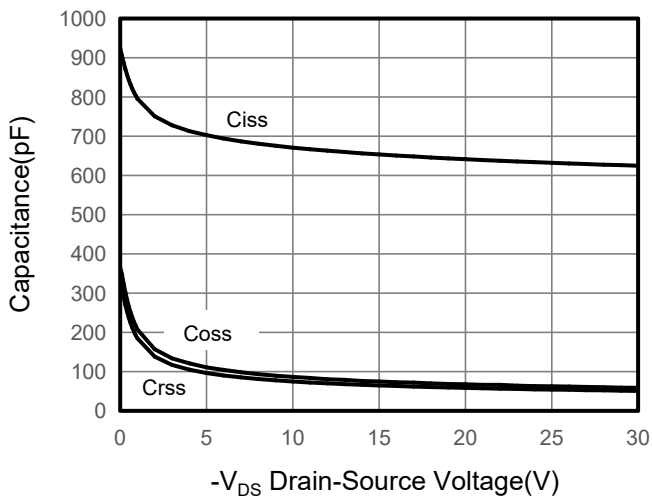
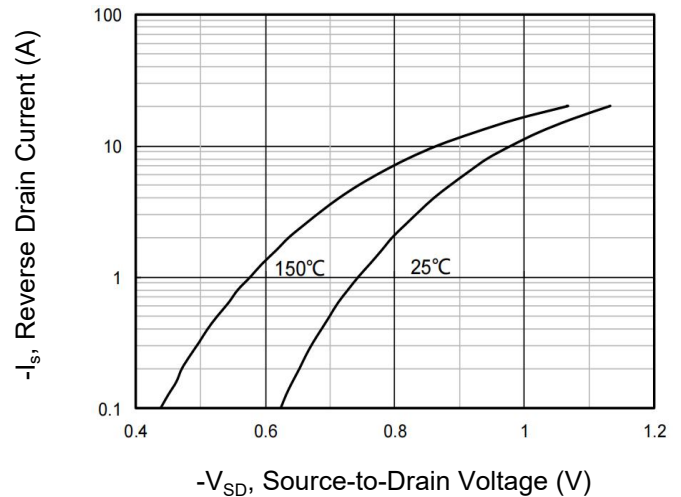


Figure 6. Source-Drain Diode Forward



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 7. Drain-Source On-Resistance

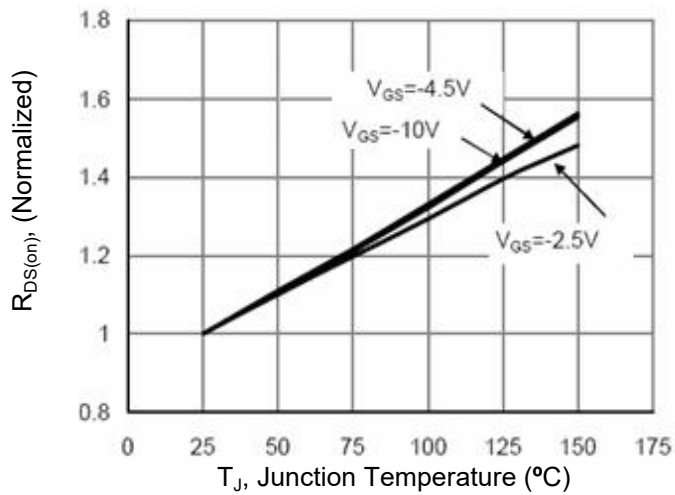


Figure 10. Safe Operation Area

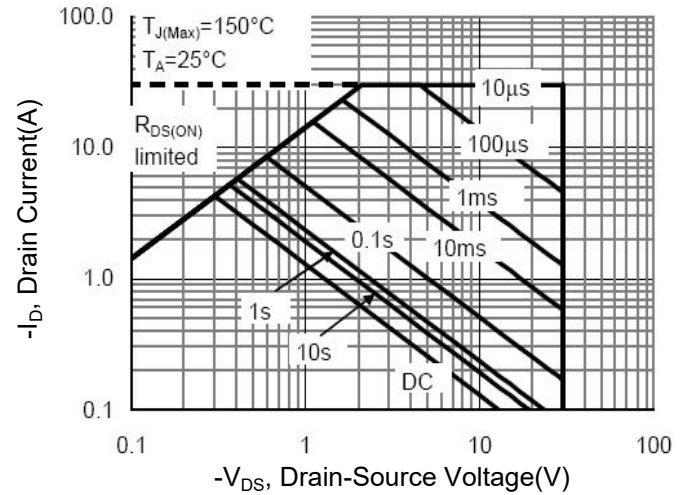
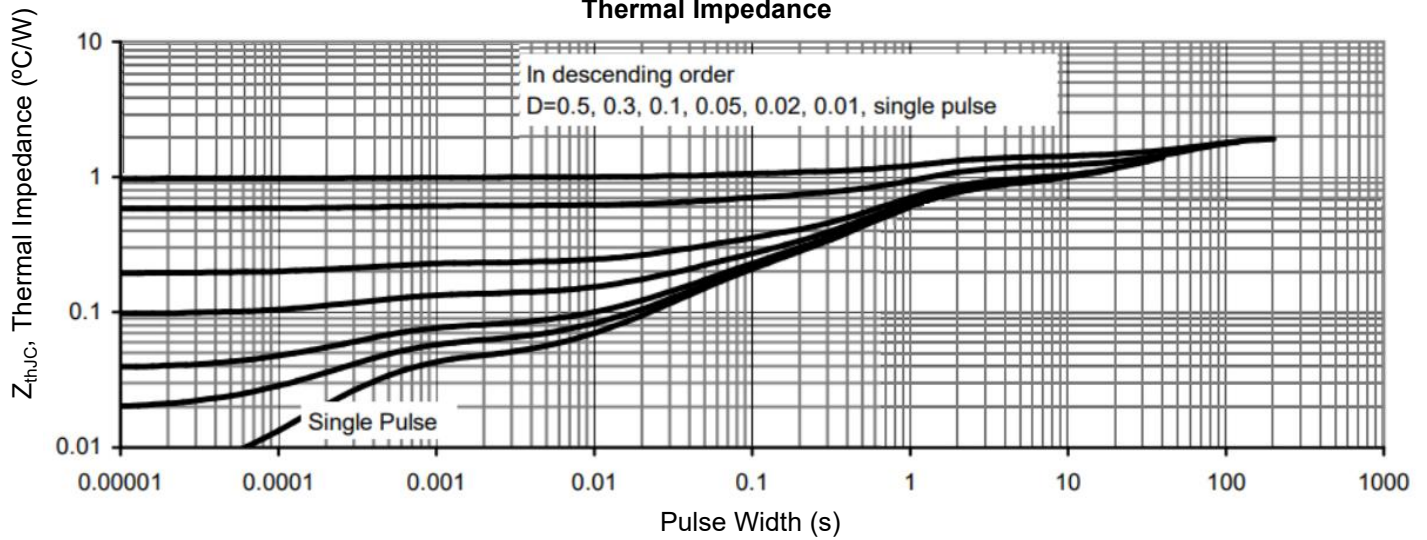
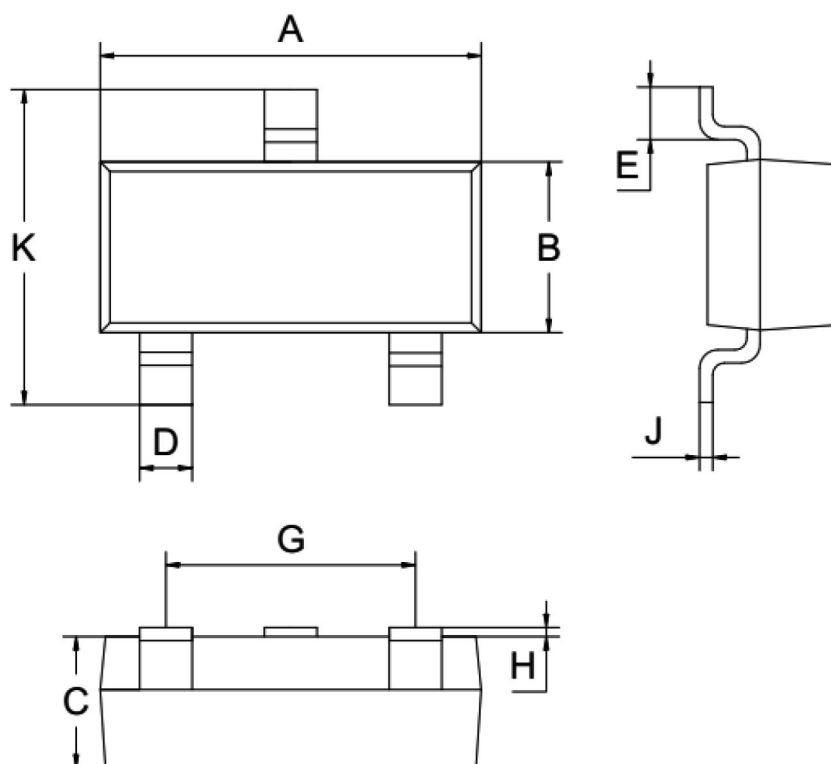


Figure 9. Normalized Maximum Transient Thermal Impedance



SOT-23-3 Package Information



Symbol	Dimensions in Millimeters		
	MIN.	NOM.	MAX.
A	2.80	2.90	3.00
B	1.50	1.60	1.70
C	1.00	1.10	1.20
D	0.30	0.40	0.50
E	0.25	0.40	0.55
G	1.90		
H	0.00	-	0.10
J	0.047	0.127	0.207
K	2.60	2.80	3.00
All Dimensions in mm			