

N-Channel Enhancement Mode Power MOSFET

Description

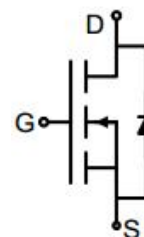
The 3400L uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

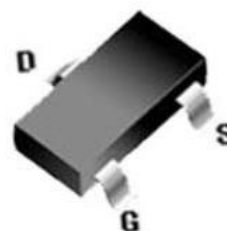
- V_{DS} 30V
- I_D (at $V_{GS} = 10V$) 5.6A
- $R_{DS(ON)}$ (at $V_{GS} = 10V$) < 27m Ω
- $R_{DS(ON)}$ (at $V_{GS} = 4.5V$) < 33m Ω
- $R_{DS(ON)}$ (at $V_{GS} = 2.5V$) < 59m Ω
- 100% Avalanche Tested
- RoHS Compliant

Application

- Power switch
- DC/DC converters



Schematic diagram



SOT-23-3

Ordering Information

Device	Package	Marking	Packaging
3400L	SOT-23-3	3400L	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	5.6	A
		3.5	
Pulsed Drain Current (note1)	I_{DM}	22.4	A
Gate-Source Voltage	V_{GS}	± 12	V
Power Dissipation	P_D	1.4	W
Single pulse avalanche energy (note2)	E_{AS}	10	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, $t \leq 10s$	R_{thJA}	89	$^\circ\text{C/W}$

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	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	0.7	0.9	1.4	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 2.8A$	--	20	27	m Ω
		$V_{GS} = 4.5V, I_D = 2.8A$	--	21	33	
		$V_{GS} = 2.5V, I_D = 2.8A$	--	26	59	
Forward Transconductance	g_{FS}	$V_{GS} = 5V, I_D = 2.8A$	--	9	--	S
Dynamic Parameters						
Input Capacitance	C_{iss}	$V_{GS} = 0V,$ $V_{DS} = 15V,$ $f = 1.0MHz$	--	600	--	pF
Output Capacitance	C_{oss}		--	55	--	
Reverse Transfer Capacitance	C_{rss}		--	53	--	
Total Gate Charge	Q_g	$V_{DD} = 15V,$ $I_D = 2.8A,$ $V_{GS} = 4.5V$	--	9.9	--	nC
Gate-Source Charge	Q_{gs}		--	1.7	--	
Gate-Drain Charge	Q_{gd}		--	2.2	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 15V,$ $I_D = 2.8A,$ $R_G = 3\Omega$	--	3.2	--	ns
Turn-on Rise Time	t_r		--	4.8	--	
Turn-off Delay Time	$t_{d(off)}$		--	26	--	
Turn-off Fall Time	t_f		--	4	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	$T_C = 25^{\circ}C$	--	--	5.6	A
Body Diode Voltage	V_{SD}	$T_J = 25^{\circ}C, I_{SD} = 2.8A, V_{GS} = 0V$	--	--	1.2	V
Reverse Recovery Charge	Q_{rr}	$I_F = 2.8A, V_{GS} = 0V$ $di/dt=100A/us$	--	11	--	nC
Reverse Recovery Time	T_{rr}		--	3	--	ns

Notes

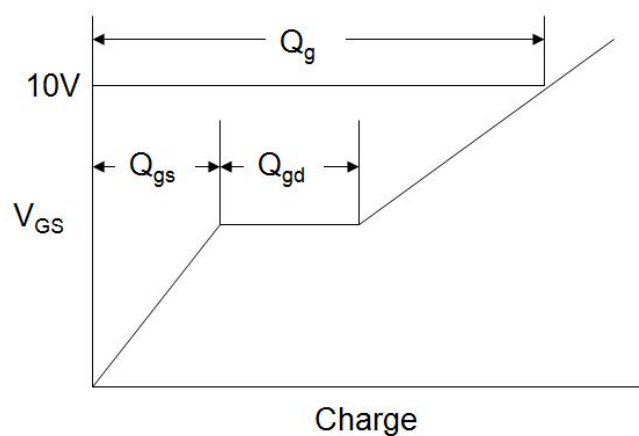
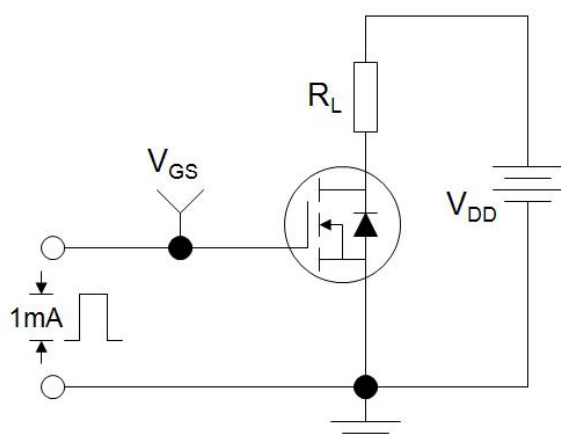
1. Repetitive Rating: Pulse width limited by maximum junction temperature

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

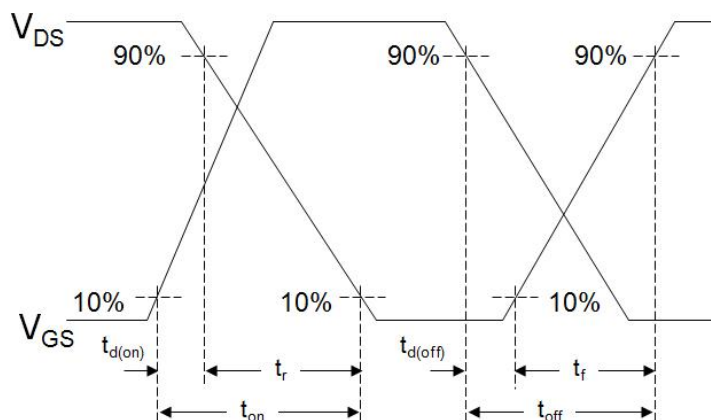
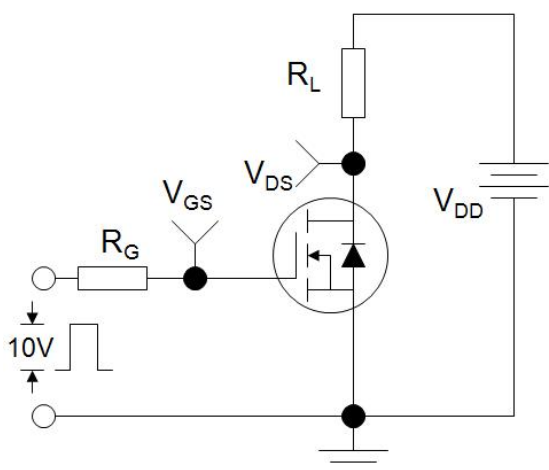
The table shows the minimum avalanche energy, which is 29mJ when the device is tested until failure

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

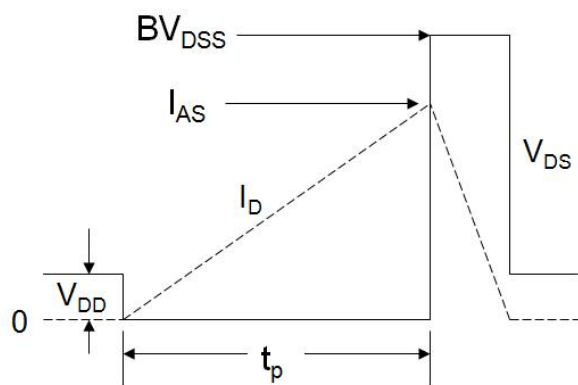
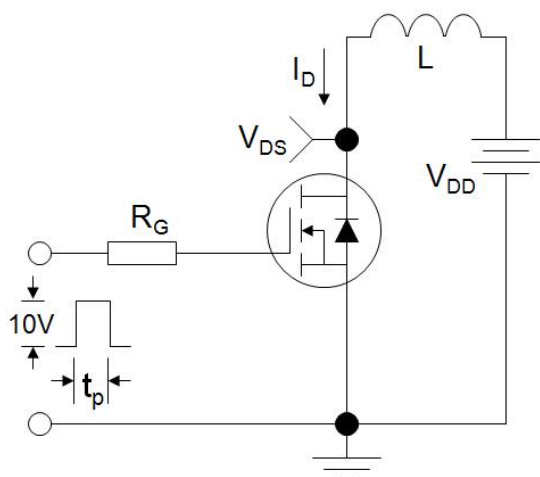
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



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

Figure 1. Output Characteristics

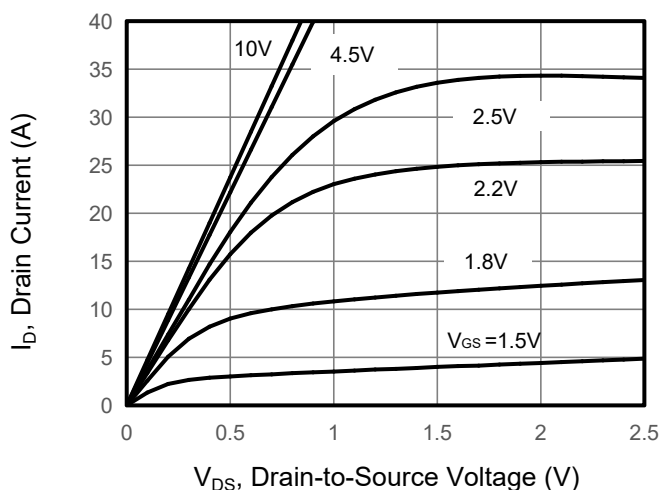


Figure 2. Transfer Characteristics

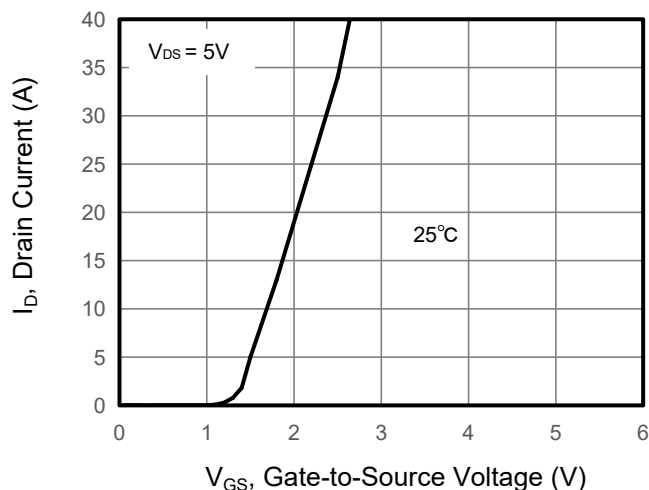


Figure 3. Drain Source On Resistance

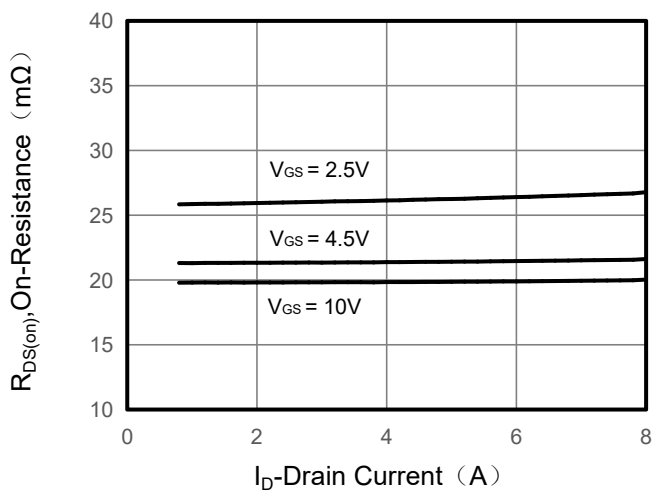


Figure 4. Gate Charge

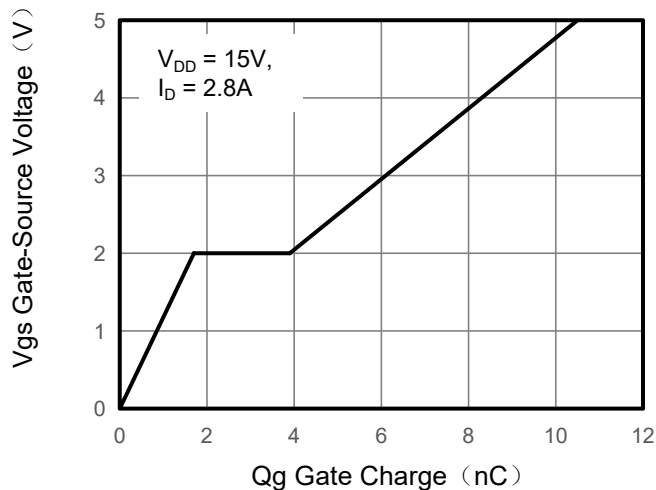


Figure 5. Capacitance

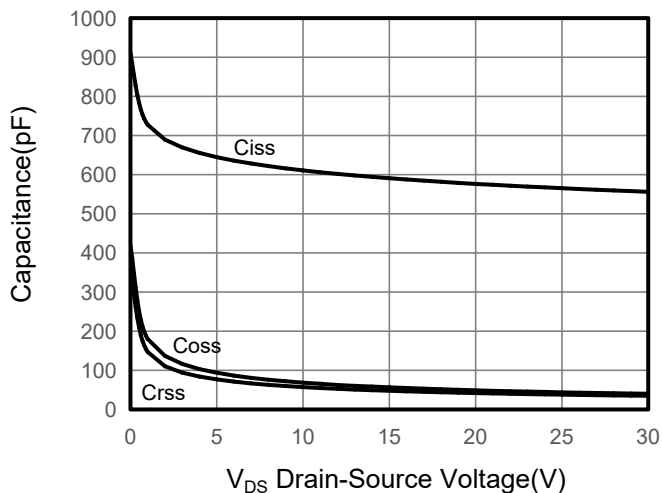
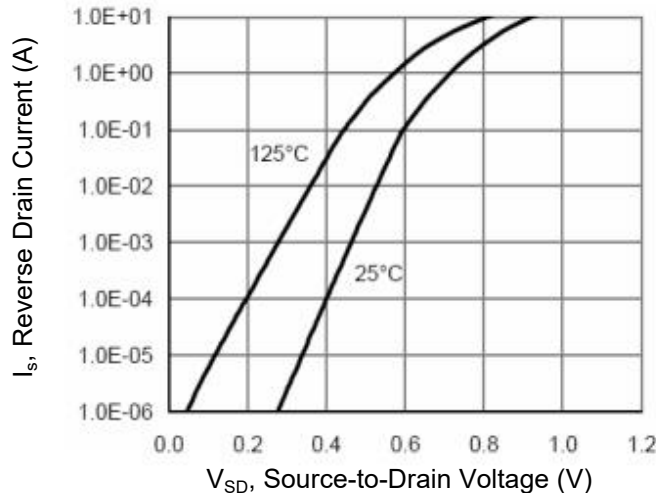


Figure 6. Source-Drain Diode Forward



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

Figure 7. Drain-Source On-Resistance

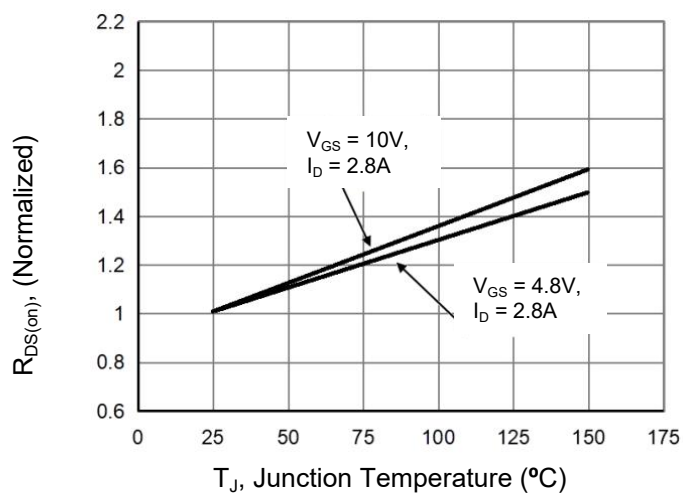


Figure 8. Safe Operation Area

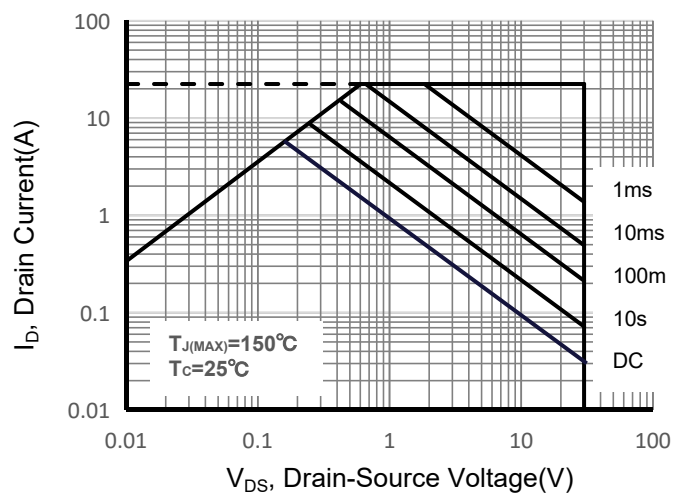


Figure 9. Maximum Continuous Drain Current vs Case Temperature

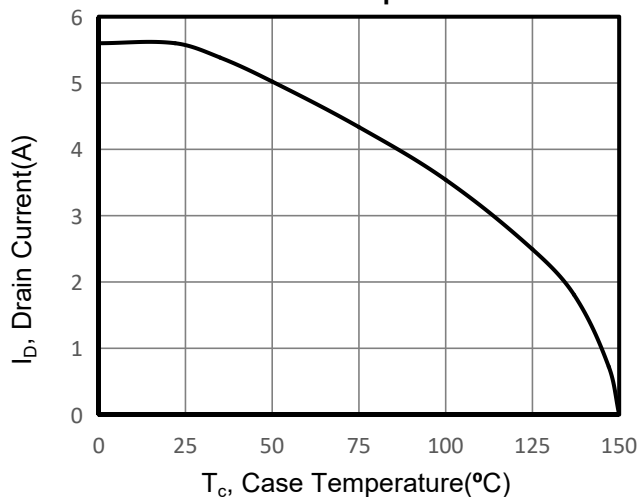


Figure 10. Normalized Maximum Transient Thermal Impedance

