

MCH3321-VB Datasheet

P-Channel 100-V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ.)
- 100	1.0 at $V_{GS} = - 10$ V	- 0.52	7.7
	1.05 at $V_{GS} = - 6.0$ V	- 0.46	

FEATURES

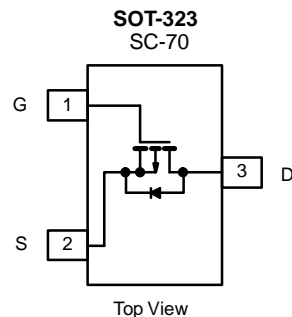
- Halogen-free According to IEC 61249-2-21 Available
- Trench Power MOSFET
- Ultra Low On-Resistance
- Small Size



RoHS
COMPLIANT
HALOGEN
FREE
Available

APPLICATIONS

- Active Clamp Circuits in DC/DC Power Supplies



ABSOLUTE MAXIMUM RATINGS $T_A = 25^\circ\text{C}$, unless otherwise noted

ABSOLUTE MAXIMUM RATINGS T _A = 25 °C, unless otherwise noted					
Parameter		Symbol	5 s	Steady State	Unit
Drain-Source Voltage		V _{DS}	- 100		V
Gate-Source Voltage		V _{GS}	± 20		
Continuous Drain Current (T _J = 150 °C) ^{a, b}	T _A = 25 °C	I _D	- 0.52	- 0.43	A
	T _A = 70 °C		- 0.46	- 0.33	
Pulsed Drain Current		I _{DM}	- 1.6		
Continuous Source Current (Diode Conduction) ^{a, b}		I _S	- 0.8	- 0.5	
Single Pulse Avalanche Current	L = 1.0 mH	I _{AS}	4.5		
Single Pulse Avalanche Energy		E _{AS}	1.01		mJ
Maximum Power Dissipation ^{a, b}	T _A = 25 °C	P _D	1.05	0.65	W
	T _A = 70 °C		0.55	0.38	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	- 55 to 150		°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^a	R_{thJA}	$t \leq 5$ s	75	$^\circ\text{C/W}$
		Steady State	120	
Maximum Junction-to-Foot (Drain)	R_{thJF}	40	50	

Notes:

a. Surface Mounted on 1" x 1" FR4 board.

b. Pulse width limited by maximum junction temperature.

SPECIFICATIONS T _J = 25 °C, unless otherwise noted						
Parameter	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = - 250 μA	- 100			V
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = - 250 μA	- 2.5		- 4.5	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = - 150 V, V _{GS} = 0 V			- 1	μA
		V _{DS} = - 150 V, V _{GS} = 0 V, T _J = 55 °C			- 10	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≤ - 15 V, V _{GS} = 10 V	- 1.6			A
Drain-Source On-Resistance ^a	R _{DS(on)}	V _{GS} = - 10 V, I _D = - 0.5 A		1.0		Ω
		V _{GS} = - 6.0 V, I _D = - 0.5 A		1.05		
Forward Transconductance ^a	g _{fs}	V _{DS} = - 15 V, I _D = - 0.5 A		2.2		S
Diode Forward Voltage	V _{SD}	I _S = - 1.0 A, V _{GS} = 0 V		0.7	- 1.2	V
Dynamic ^b						
Total Gate Charge	Q _g	V _{DS} = - 75 V, V _{GS} = 10 V, I _D ≅ - 0.5 A		7.7	12	nC
Gate-Source Charge	Q _{gs}			1.5		
Gate-Drain Charge	Q _{gd}			2.5		
Gate Resistance	R _g	f = 1.0 MHz		9		Ω
Input Capacitance	C _{iss}	V _{DS} = - 25 V, V _{GS} = 0 V, f = 1 MHz		340	510	pF
Output Capacitance	C _{oss}			30		
Reverse Transfer Capacitance	C _{rss}			16		
Switching ^c						
Turn-On Time	t _{d(on)}	V _{DD} = - 75 V, R _L = 75 Ω I _D ≅ - 1.0 A, V _{GEN} = - 10 V R _g = 6 Ω		7	11	ns
	t _r			11	17	
Turn-Off Time	t _{d(off)}			16	25	
	t _f			11	17	
Body Diode Reverse Recovery Charge	Q _{rr}	I _F = 0.5 A, dI/dt = 100 A/μs		90	135	nC

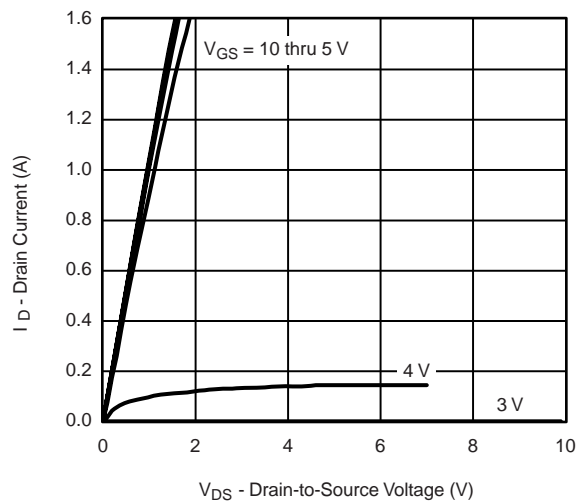
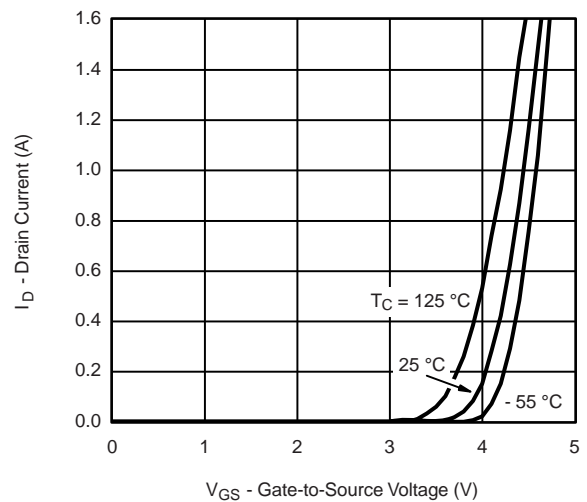
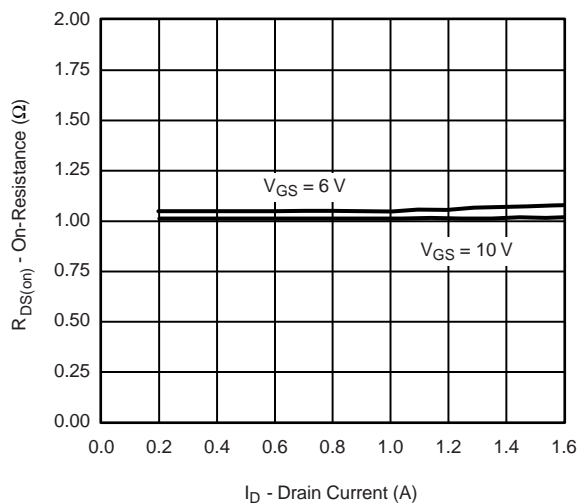
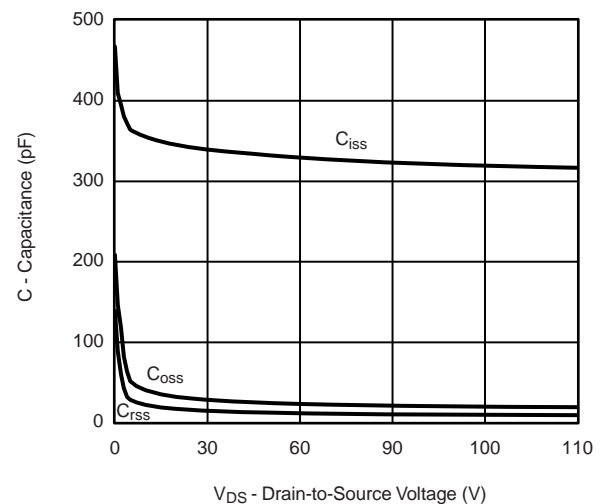
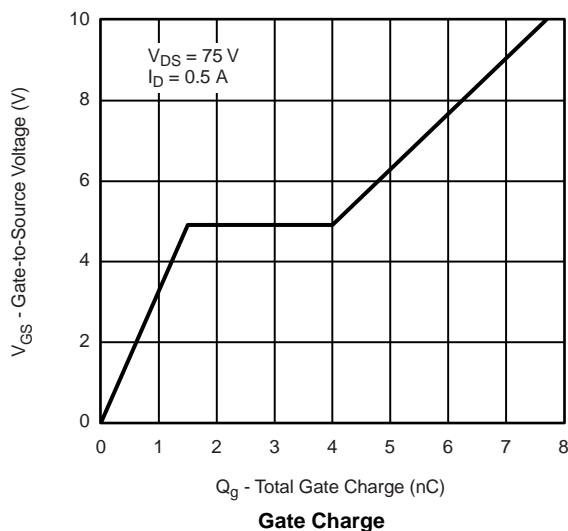
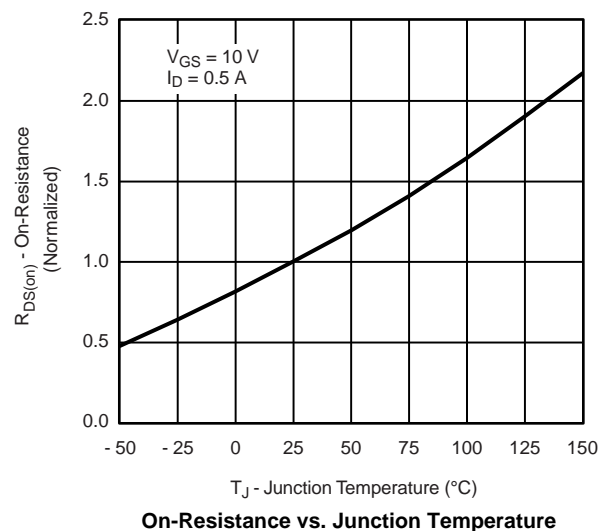
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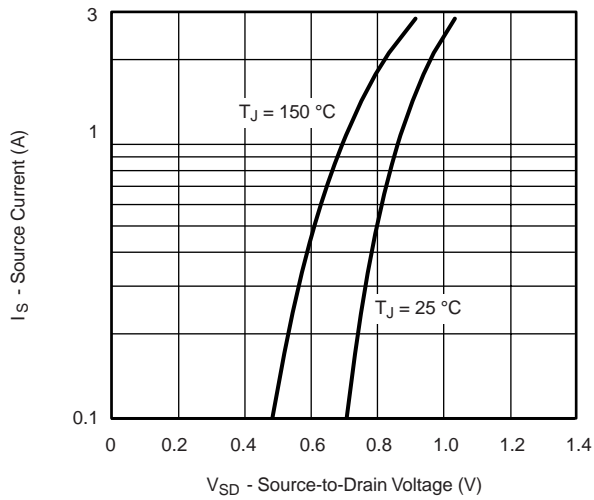
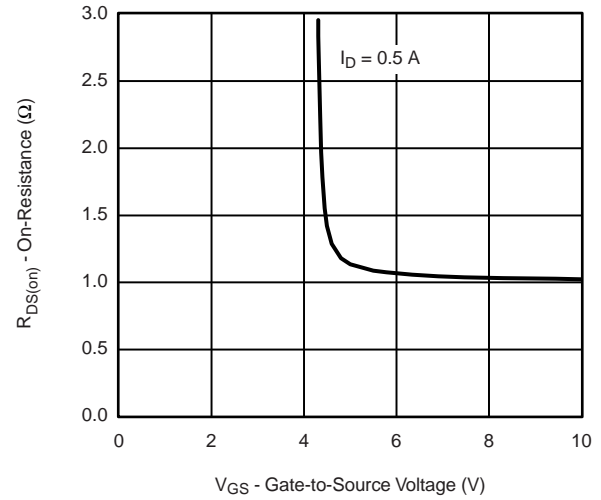
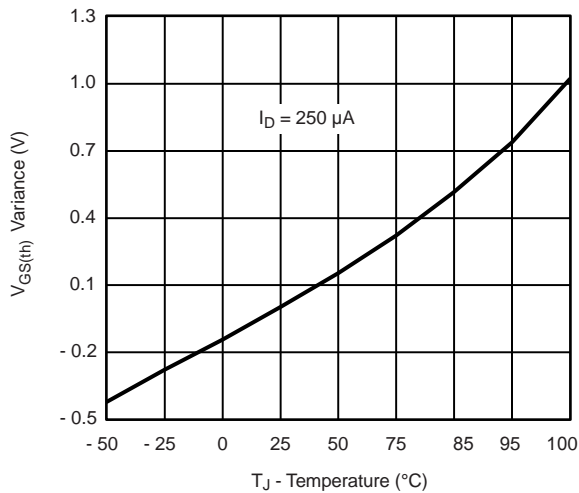
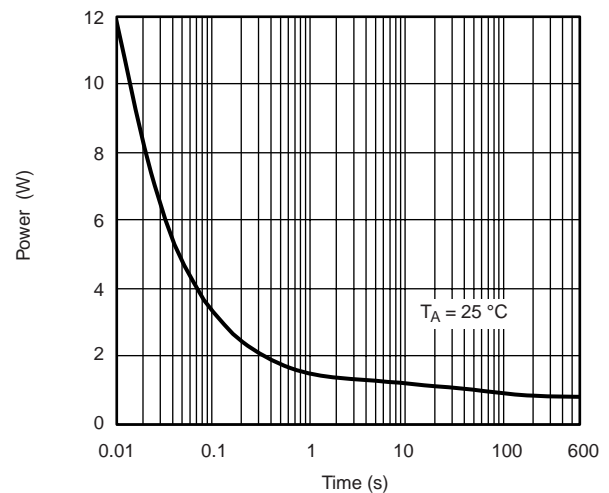
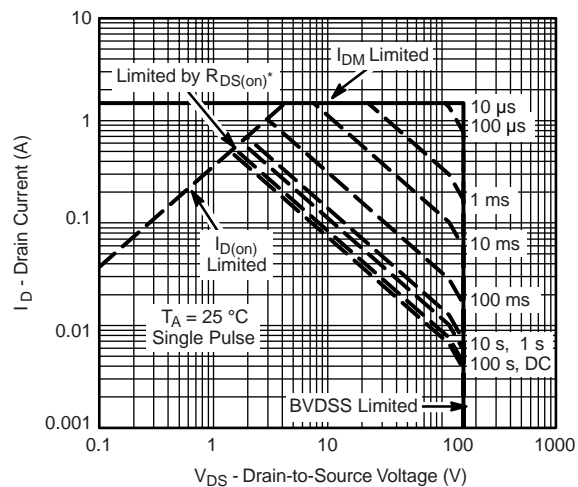
a. Pulse test: $PW \leq 300\text{ }\mu\text{s}$ duty cycle $\leq 2\%$.

b. For DESIGN AID ONLY, not subject to production testing.

c. Switching time is essentially independent of operating temperature.

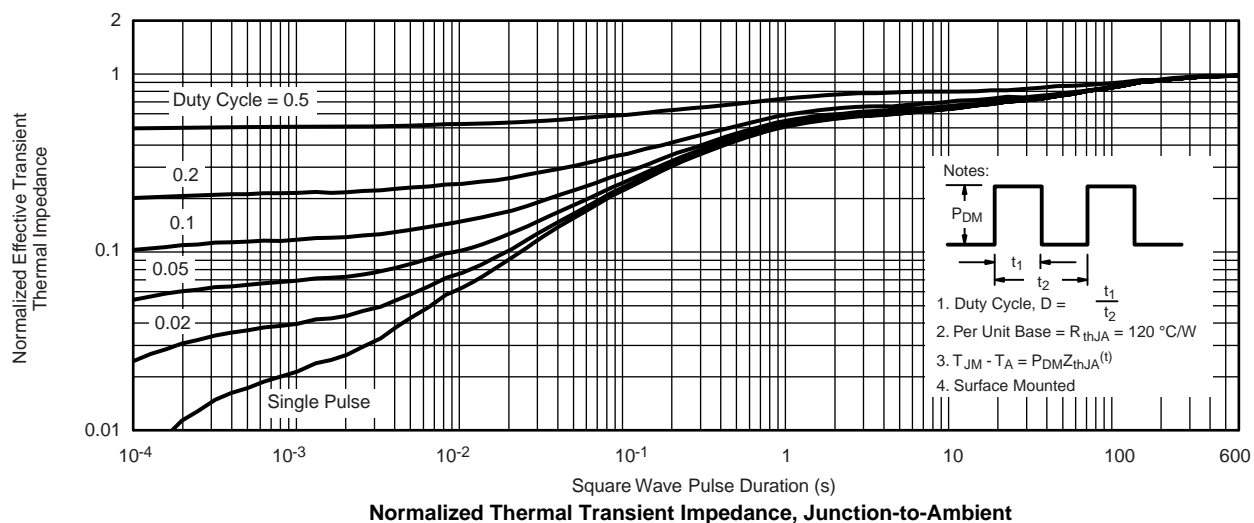
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

Output Characteristics

Transfer Characteristics

On-Resistance vs. Drain Current

Capacitance

Gate Charge

On-Resistance vs. Junction Temperature

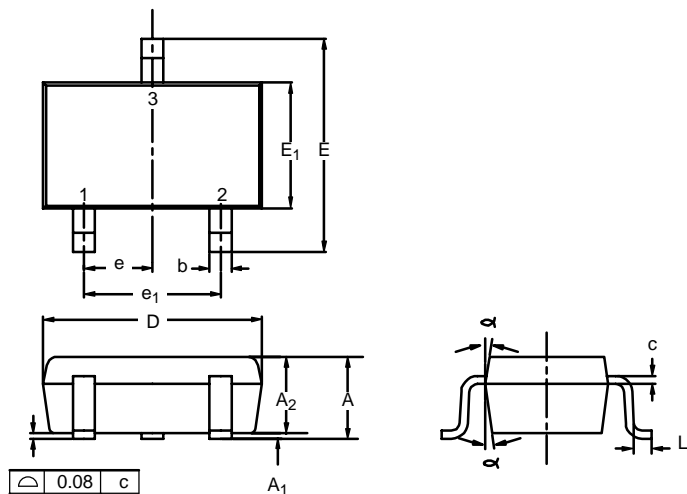
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

Source-Drain Diode Forward Voltage

On-Resistance vs. Gate-to-Source Voltage

Threshold Voltage

Single Pulse Power


* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area

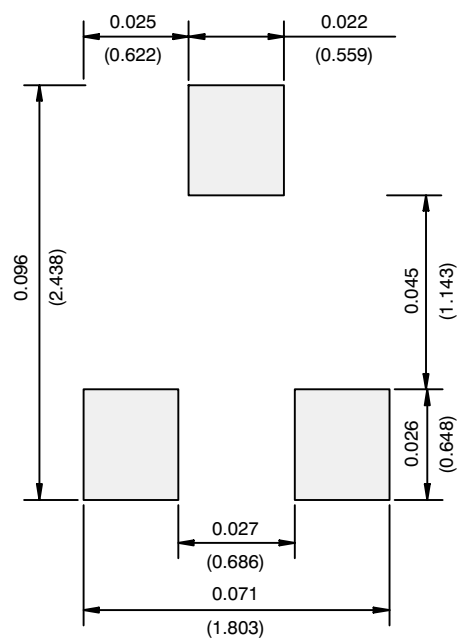
THERMAL RATINGS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)

SC-70: 3-LEADS



	MILLIMETERS			INCHES		
Dim	Min	Nom	Max	Min	Nom	Max
A	0.90	—	1.10	0.035	—	0.043
A ₁	—	—	0.10	—	—	0.004
A ₂	0.80	—	1.00	0.031	—	0.039
b	0.25	—	0.40	0.010	—	0.016
c	0.10	—	0.25	0.004	—	0.010
D	1.80	2.00	2.20	0.071	0.079	0.087
E	1.80	2.10	2.40	0.071	0.083	0.094
E ₁	1.15	1.25	1.35	0.045	0.049	0.053
e	0.65BSC			0.026BSC		
e ₁	1.20	1.30	1.40	0.047	0.051	0.055
L	0.10	0.20	0.30	0.004	0.008	0.012
α	7°Nom			7°Nom		
ECN: S-03946—Rev. C, 09-Jul-01 DWG: 5549						

RECOMMENDED MINIMUM PADS FOR SC-70: 3-Lead



Recommended Minimum Pads
Dimensions in Inches/(mm)

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