

P-Channel 200-V (D-S) MOSFET

PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)	Q _g (Typ.)
- 200	2.0 at V _{GS} = - 10 V	- 0.6	5.7
	2.3 at V _{GS} = - 4.5 V	- 0.4	

FEATURES

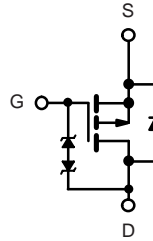
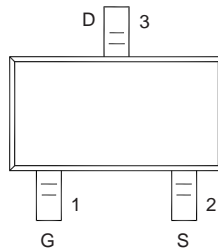
- TrenchFET Power MOSFET
- Small Size
- 100% R_g and UIS Tested
- ESD Protected



APPLICATIONS

- Active Clamp Circuits in DC/DC Power Supplies

(SOT-23-3L)



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T _A = 25 °C, unless otherwise noted			
Parameter	Symbol	LIMIT	
Drain-Source Voltage	V _{DS}	- 200	V
Gate-Source Voltage	V _{GS}	± 20	
Continuous Drain Current (T _J = 150 °C) ^{a, b}	I _D	T _A = 25 °C	- 0.6
		T _A = 70 °C	- 0.48
Pulsed Drain Current	I _{DM}	- 3.0	A
Continuous Source Current (Diode Conduction) ^{a, b}	I _S	- 0.6	
Single Pulse Avalanche Current	I _{AS}	- 0.5	
Single Pulse Avalanche Energy	E _{AS}	22.1	mJ
Maximum Power Dissipation ^{a, b}	P _D	T _A = 25 °C	0.75
		T _A = 70 °C	0.48
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 ≤ 5 s	95	130	°C/W
		Steady State	140	185	
Maximum Junction-to-Foot (Drain)	R _{thJF}	48	60		

Notes:

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

b. Pulse width limited by maximum junction temperature.

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

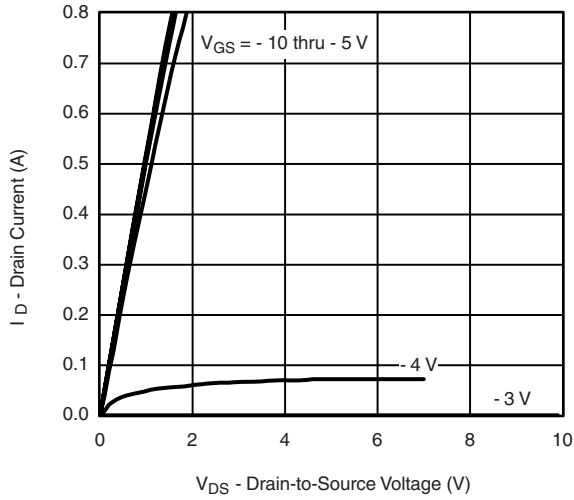
Parameter	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	-200			V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	-1.0		-3.0	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 16\text{ V}$			± 10	μA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -120\text{ V}, V_{GS} = 0\text{ V}$			-1	μA
		$V_{DS} = -120\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			-10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \leq -15\text{ V}, V_{GS} = 10\text{ V}$	-0.6			A
Drain-Source On-Resistance ^a	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -0.5\text{ A}$		2000	2900	$\text{m}\Omega$
		$V_{GS} = -4.5\text{ V}, I_D = -0.5\text{ A}$		2300	3300	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -15\text{ V}, I_D = -0.5\text{ A}$		0.3		S
Diode Forward Voltage	V_{SD}	$I_S = -1.0\text{ A}, V_{GS} = 0\text{ V}$		-0.7	-1.2	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = -120\text{ V}, V_{GS} = 10\text{ V},$ $I_D \cong -0.5\text{ A}$		5.7	10	nC
Gate-Source Charge	Q_{gs}			0.6		
Gate-Drain Charge	Q_{gd}			1.5		
Gate Resistance	R_g	$f = 1.0\text{ MHz}$		5		Ω
Input Capacitance	C_{iss}	$V_{DS} = -25\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		130	310	pF
Output Capacitance	C_{oss}			18		
Reverse Transfer Capacitance	C_{rss}			8		
Switching^c						
Turn-On Time	$t_{d(on)}$	$V_{DD} = -120\text{ V}, R_L = 75\text{ }\Omega$ $I_D \cong -1.0\text{ A}, V_{GEN} = -10\text{ V}$ $R_g = 6\text{ }\Omega$		7	11	ns
	t_r			8	15	
Turn-Off Time	$t_{d(off)}$			16	25	
	t_f			51	97	
Body Diode Reverse Recovery Charge	Q_{rr}	$I_F = 0.5\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		90	135	nC

Notes:

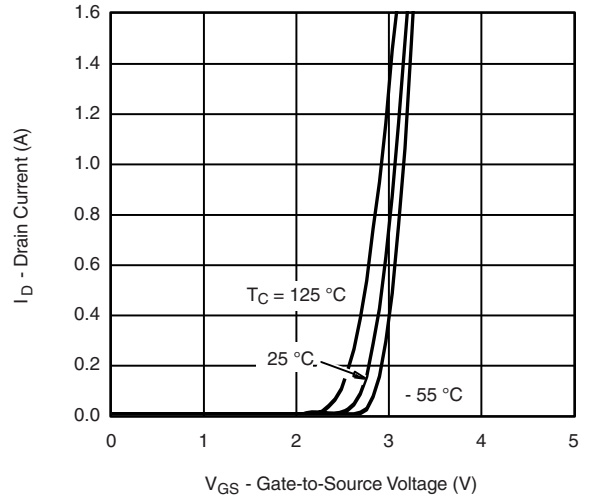
- Pulse test: $PW \leq 300\text{ }\mu\text{s}$ duty cycle $\leq 2\%$.
- For DESIGN AID ONLY, not subject to production testing.
- Switching time is essentially independent of operating temperature.

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.

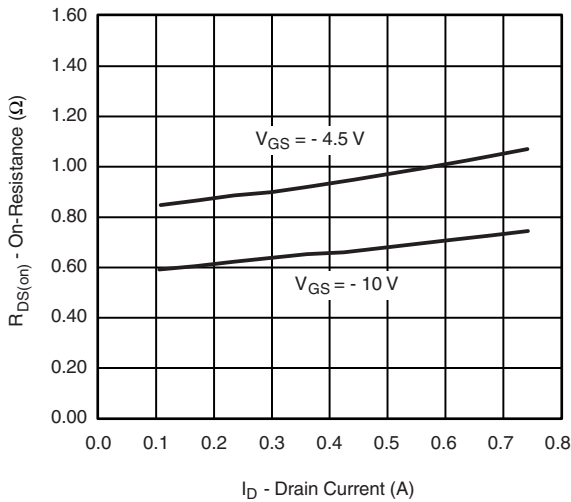
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



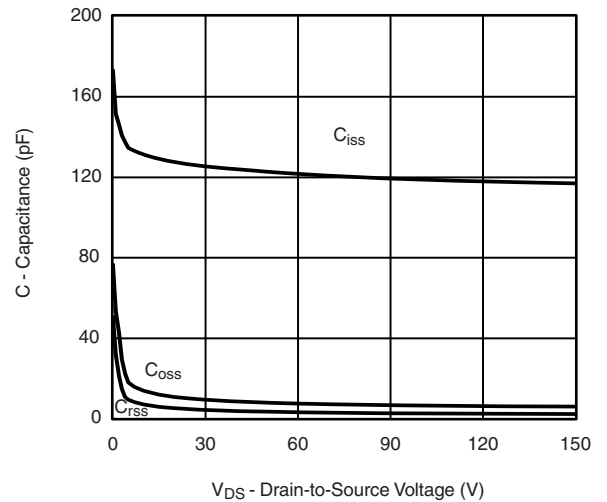
Output Characteristics



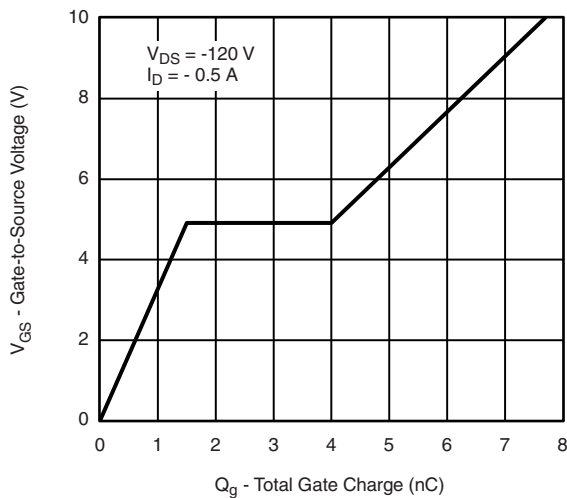
Transfer Characteristics



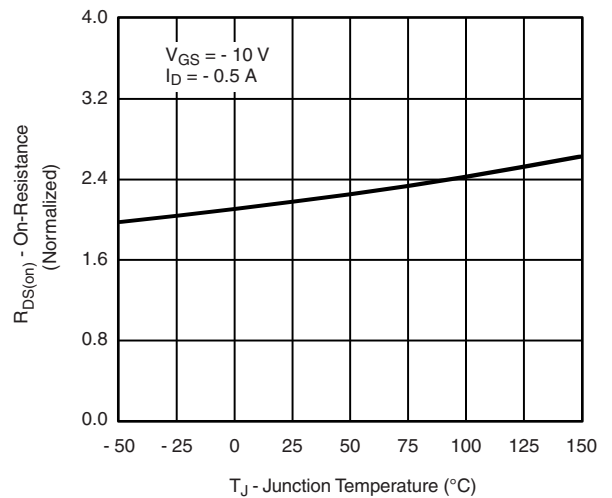
On-Resistance vs. Drain Current



Capacitance

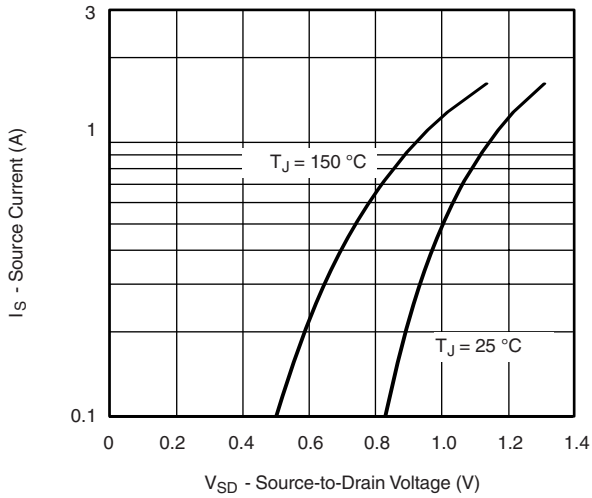


Gate Charge

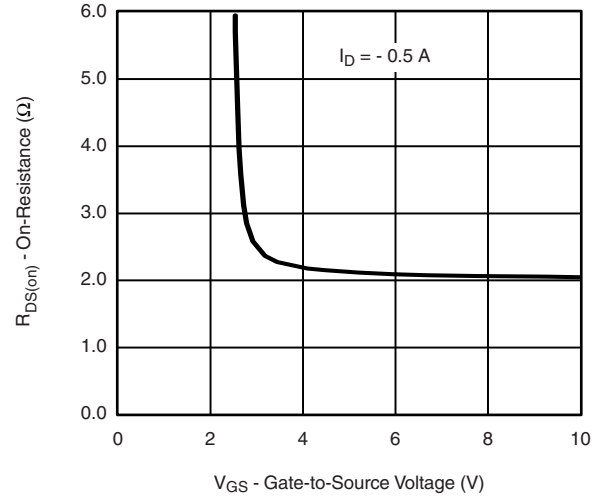


On-Resistance vs. Junction Temperature

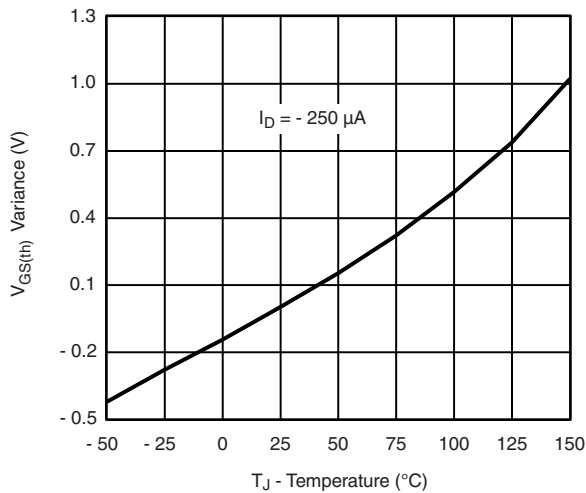
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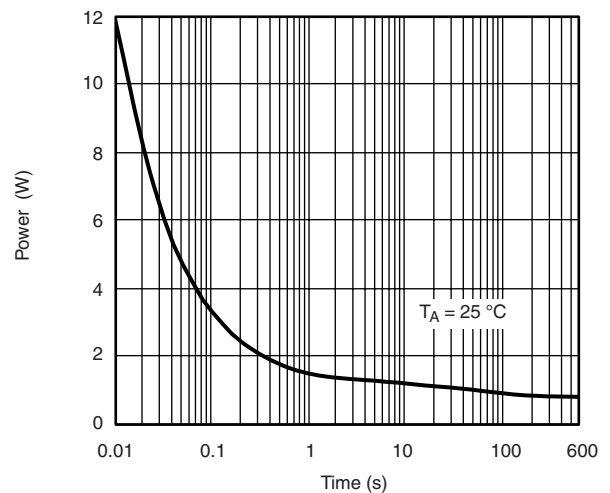
Source-Drain Diode Forward Voltage



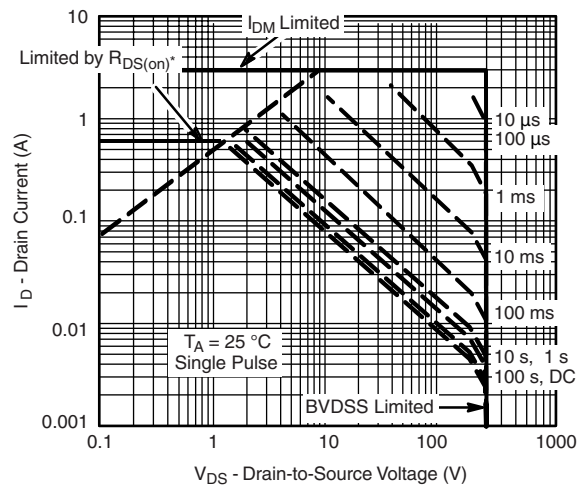
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



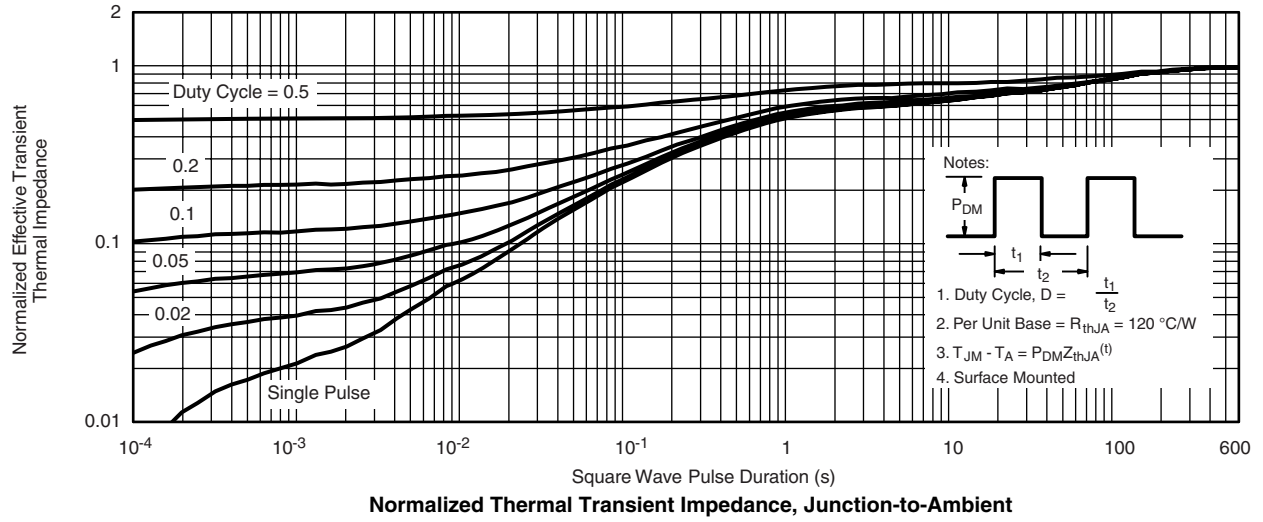
Single Pulse Power



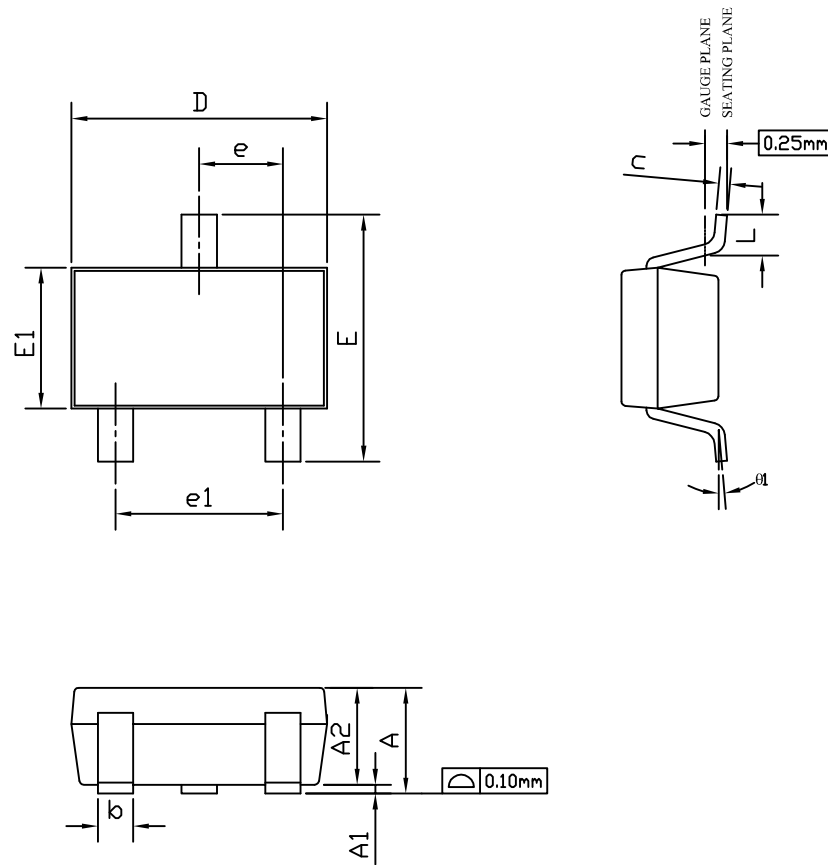
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area

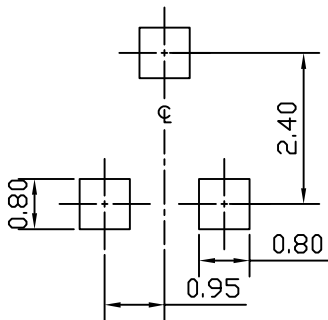
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



SOT-23-3L PACKAGE OUTLINE



RECOMMENDED LAND PATTERN



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.85	—	1.25	0.033	—	0.049
A1	0.00	—	0.13	0.000	—	0.005
A2	0.70	1.00	1.15	0.028	0.039	0.045
b	0.30	0.40	0.50	0.012	0.016	0.020
c	0.08	0.13	0.20	0.003	0.005	0.008
D	2.80	2.90	3.10	0.110	0.114	0.122
E	2.60	2.80	3.00	0.102	0.110	0.118
E1	1.40	1.60	1.80	0.055	0.063	0.071
e	0.95 BSC			0.037 BSC		
e1	1.90 BSC			0.075 BSC		
L	0.30	—	0.60	0.012	—	0.024
θ1	0°	5°	8°	0°	5°	8°

UNIT: mm

NOTE

1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH OR GATE BURRS.
MOLD FLASH AT THE NON-LEAD SIDES SHOULD BE LESS THAN 5 MILS EACH.
2. TOLERANCE ± 0.100 mm (4 mil) UNLESS OTHERWISE SPECIFIED.
3. DIMENSION L IS MEASURED IN GAUGE PLANE.
4. CONTROLLING DIMENSION IS MILLIMETER. CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.
5. ALL DIMENSIONS ARE IN MILLIMETERS.

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