

N-Channel 20 V (D-S) MOSFET

PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (Ω) Max.	I _D (A)	Q _g (Typ.)
20	0.038 at V _{GS} = 4.5 V	2	3.5
	0.055 at V _{GS} = 2.5 V	1.6	

FEATURES

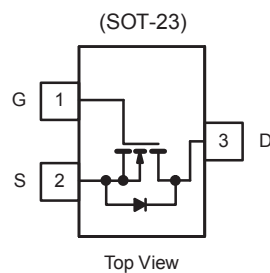
- DT-Trench Power MOSFET
- 100 % R_g Tested
- Compliant to RoHS Directive 2002/95/EC



RoHS
COMPLIANT

APPLICATIONS

- Load Switching for Portable Devices
- DC/DC Converter



ABSOLUTE MAXIMUM RATINGS (T _A = 25 °C, unless otherwise noted)				
Parameter	Symbol	5 s	Steady State	Unit
Drain-Source Voltage	V _{DS}	20		V
Gate-Source Voltage	V _{GS}	± 8		
Continuous Drain Current (T _J = 150 °C) ^a	T _A = 25 °C	2	1.7	A
	T _A = 70 °C	1.7	1.5	
Pulsed Drain Current (t = 300 μs) ^b	I _{DM}	8		
Continuous Source Current (Diode Conduction) ^a	I _S	0.7	0.5	W
Power Dissipation ^a	T _A = 25 °C	0.6	0.51	
	T _A = 70 °C	0.45	0.35	
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	t ≤ 5 s	100	135	°C/W
	Steady State	120	155	
Maximum Junction-to-Foot	Steady State	52	65	

Notes:

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

b. Pulse width limited by maximum junction temperature.

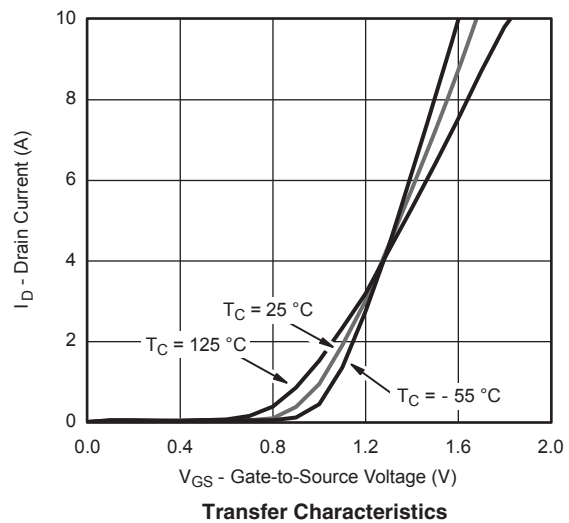
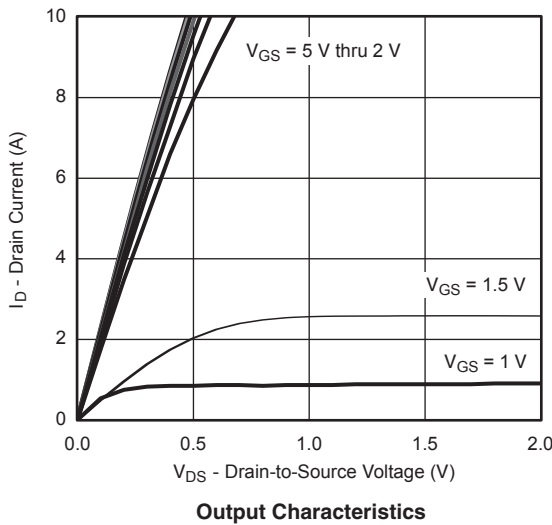
SPECIFICATIONS (T _A = 25 °C, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	20			V
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	0.40		0.85	V
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 8 V			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 20 V, V _{GS} = 0 V			1	μA
		V _{DS} = 20 V, V _{GS} = 0 V, T _J = 70 °C			75	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 10 V, V _{GS} = 4.5 V	8			A
Drain-Source On-Resistance ^a	R _{DS(on)}	V _{GS} = 4.5 V, I _D = 3.6 A		0.038	0.042	Ω
		V _{GS} = 2.5 V, I _D = 3.1 A		0.055	0.061	
Forward Transconductance ^a	g _{fs}	V _{DS} = 5 V, I _D = 3.6 A		13		S
Diode Forward Voltage	V _{SD}	I _S = 0.95 A, V _{GS} = 0 V		0.7	1.2	V
Dynamic^b						
Total Gate Charge	Q _g	V _{DS} = 10 V, V _{GS} = 4.5 V, I _D = 3.6 A		3.4		nC
Gate-Source Charge	Q _{gs}			0.55		
Gate-Drain Charge	Q _{gd}			0.44		
Gate Resistance	R _g	f = 1 MHz		4		Ω
Switching						
Turn-On Delay Time	t _{d(on)}	V _{DD} = 10 V, R _L = 2.78 Ω I _D ≅ 3.6 A, V _{GEN} = 4.5 V, R _g = 1 Ω		8		ns
Rise Time	t _r			7		
Turn-Off Delay Time	t _{d(off)}			29		
Fall Time	t _f			7		
Source-Drain Reverse Recovery Time	t _{rr}	I _F = 3.6 A, di/dt = 100 A/μs		8.4		nC
Body Diode Reverse Recovery Charge	Q _{rr}			2		

Notes:

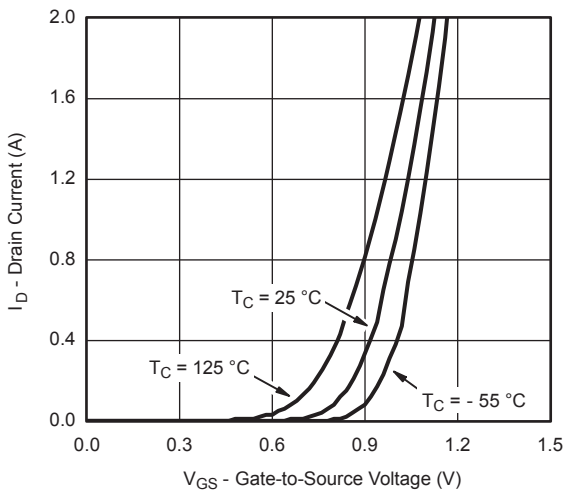
- a. Pulse test: Pulse width ≤ 300 μs, duty cycle ≤ 2 %.
- b. Guaranteed by design, not subject to production testing.

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.

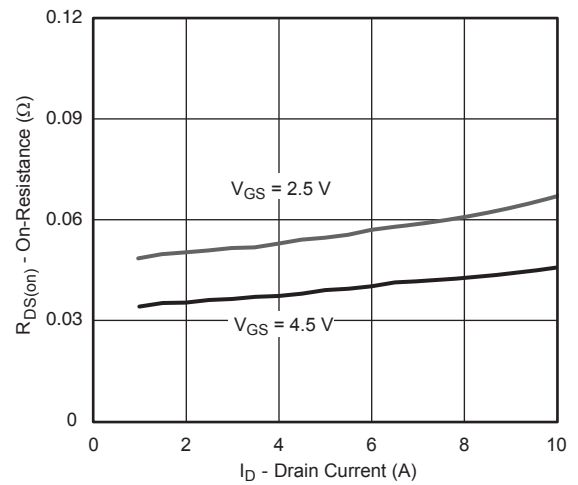
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



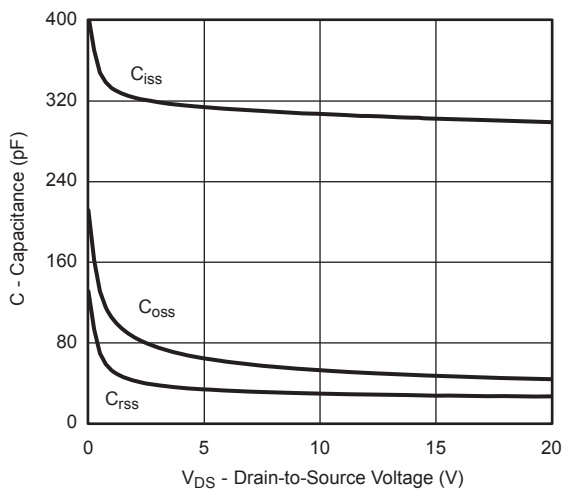
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



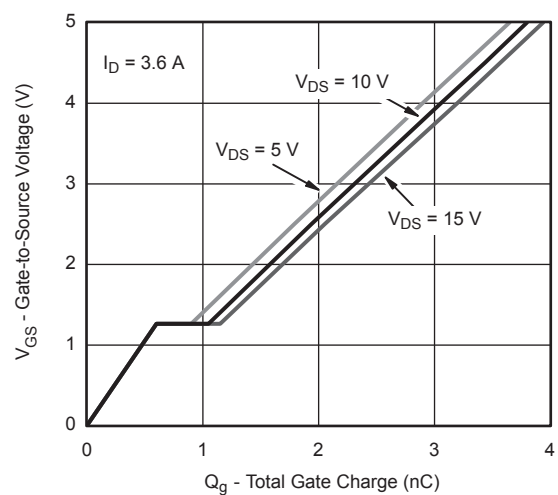
Transfer Characteristics



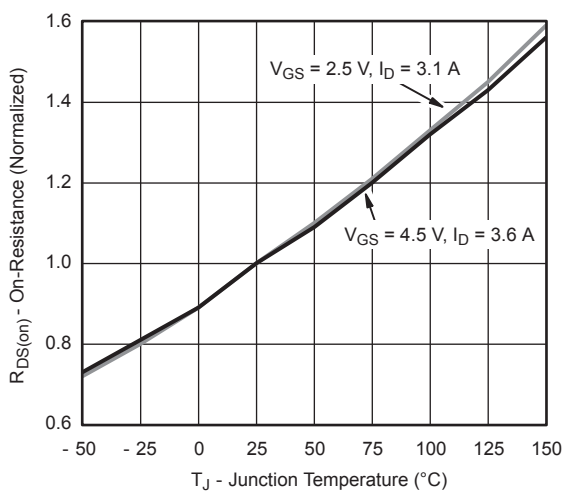
On-Resistance vs. Drain Current



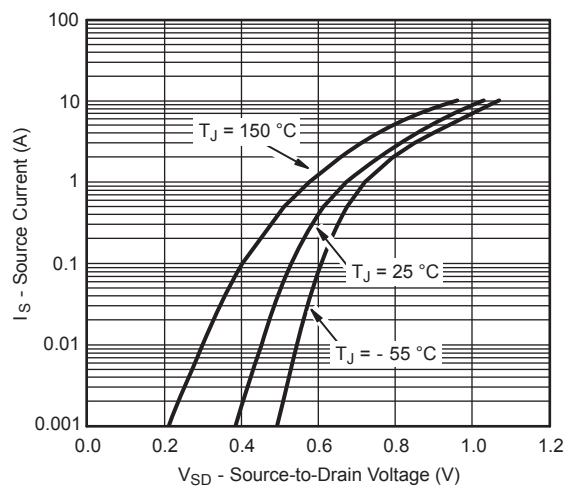
Capacitance



Gate Charge

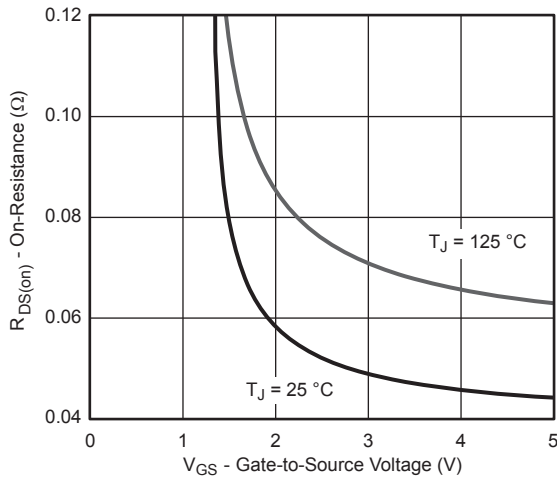


On-Resistance vs. Junction Temperature

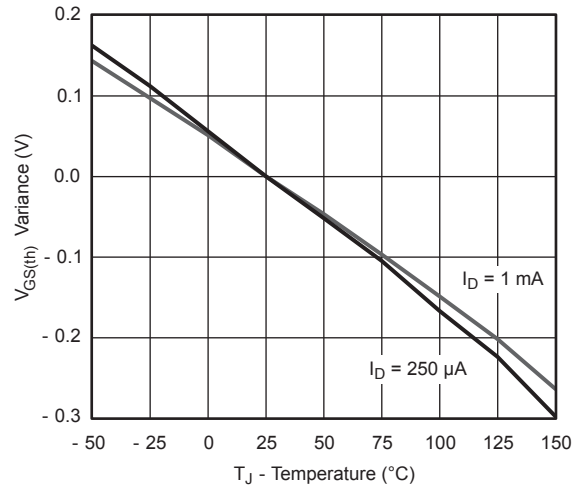


Source-Drain Diode Forward Voltage

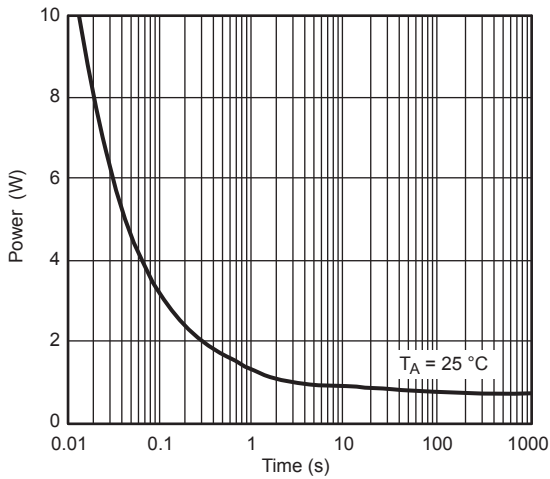
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



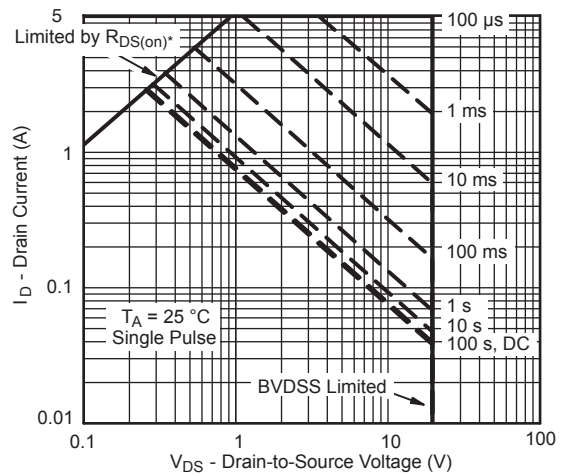
On-Resistance vs. Gate-to-Source Voltage



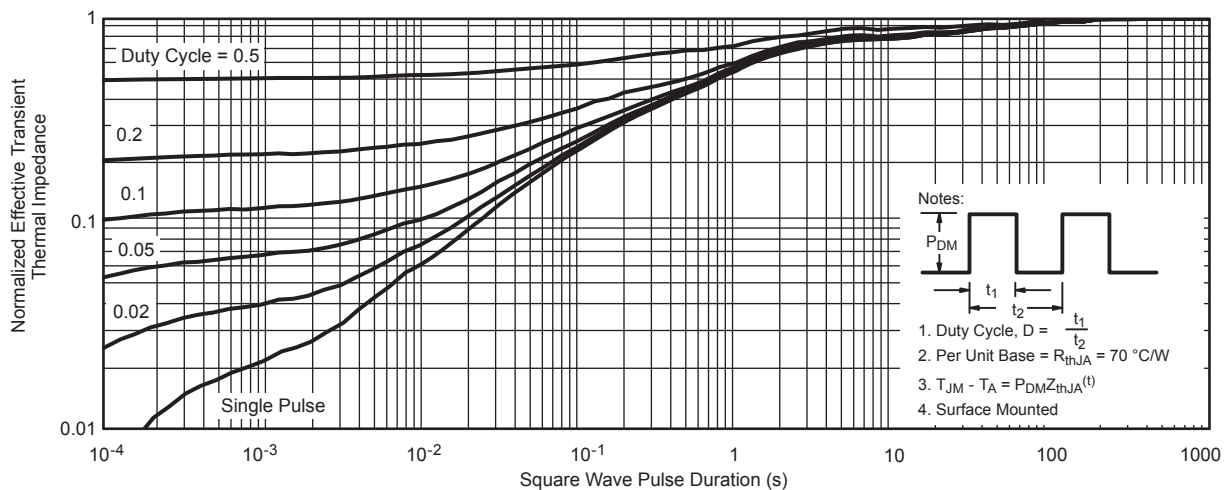
Threshold Voltage



Single Pulse Power

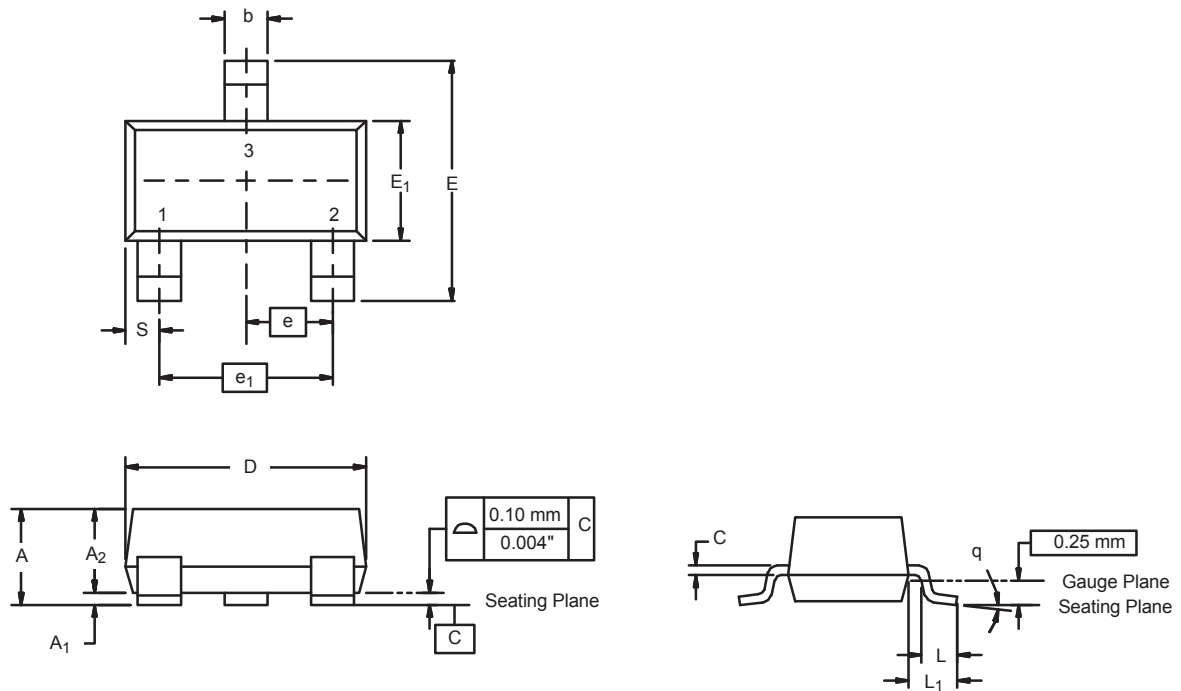


* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified
Safe Operating Area, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Ambient

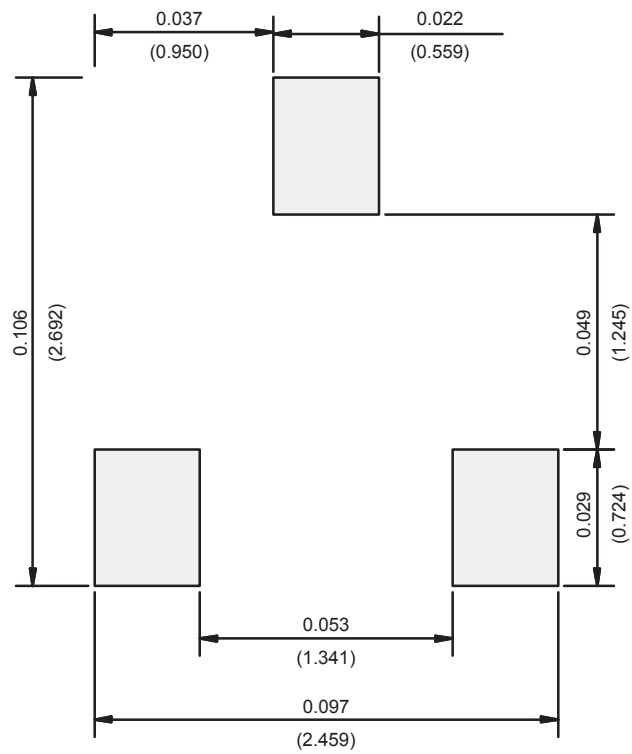
SOT-23 : 3-LEAD



Dim	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	0.89	1.12	0.035	0.044
A ₁	0.01	0.10	0.0004	0.004
A ₂	0.88	1.02	0.0346	0.040
b	0.35	0.50	0.014	0.020
c	0.085	0.18	0.003	0.007
D	2.80	3.04	0.110	0.120
E	2.10	2.64	0.083	0.104
E ₁	1.20	1.40	0.047	0.055
e	0.95 BSC		0.0374 Ref	
e ₁	1.90 BSC		0.0748 Ref	
L	0.40	0.60	0.016	0.024
L ₁	0.64 Ref		0.025 Ref	
S	0.50 Ref		0.020 Ref	
q	3°	8°	3°	8°

ECN: S-03946-Rev. K, 09-Jul-01
DWG: 5479

RECOMMENDED MINIMUM PADS FOR SOT-23



Recommended Minimum Pads
Dimensions in Inches/(mm)

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