P-Channel 20-V (D-S) MOSFET

PRODUCT SUMMARY	
V_{DS} (V)	- 20
$R_{DS(on)}$ (mΩ) at V_{GS} = - 4.5 V	40
$R_{DS(on)}$ (mΩ) at V_{GS} = - 3.7 V	45
$R_{DS(on)}$ (mΩ) at V_{GS} = - 2.5 V	55
I_D (A)	- 6
Configuration	Single

FEATURES

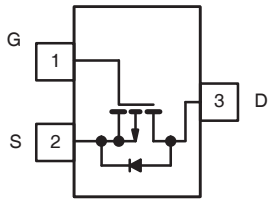
- DT-Trench Power MOSFET
- 100 % R_g and UIS Tested
- Compliant to RoHS Directive 2002/95/EC

Pb-free
RoHS COMPLIANT

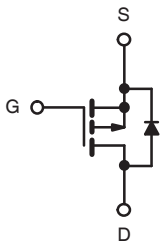
APPLICATIONS

- Load Switch for Portable Devices

(SOT-23)



Top View



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise noted)				
PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V_{DS}	- 20	V
Gate-Source Voltage		V_{GS}	± 8	
Continuous Drain Current	T_C = 25 °C	I_D	- 6	A
	T_C = 75 °C		- 5	
Continuous Source Current (Diode Conduction)		I_S	- 3.5	
Pulsed Drain Current[a]		I_{DM}	- 20	
Single Pulse Avalanche Current	L = 0.1 mH	I_{AS}	- 12	
Single Pulse Avalanche Energy		E_{AS}	6	mJ
Maximum Power Dissipation[a]	T_C = 25 °C	P_D	2	W
	T_C = 75 °C		0.8	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to + 150	°C

THERMAL RESISTANCE RATINGS				
PARAMETER		SYMBOL	LIMIT	UNIT
Junction-to-Ambient	PCB Mount[b]	R_{thJA}	175	°C/W
Junction-to-Foot (Drain)		R_{thJF}	75	

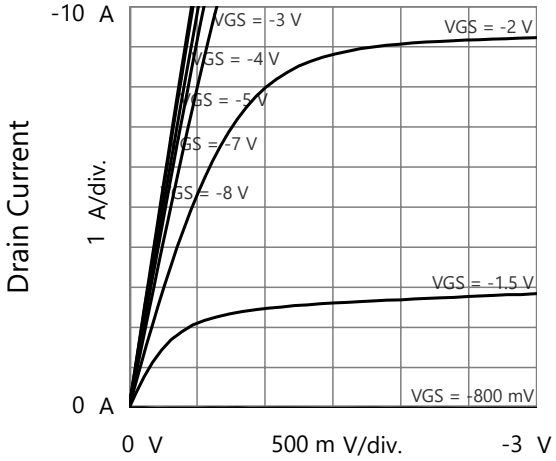
SPECIFICATIONS (T_C = 25 °C, unless otherwise noted)						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D= - 250 µA	- 20	-	-	V
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = - 250 µA	- 0.45	-	- 2	
Gate-Source Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 8 V	-	-	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS} = 0 V, V_{DS} = - 20 V	-	-	- 1	µA
		V_{GS} = 0 V, V_{DS} = - 12 V, T_J = 55 °C	-	-	- 10	
On-State Drain Current[a]	$I_{D(on)}$	V_{GS} = - 4.5 V, V_{DS} ≤ - 5 V	- 6	-	-	A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = - 4.5 V, I_D = - 3 A	-	40	48	mΩ
		V_{GS} = - 3.7 V, I_D = - 2 A	42	45	48	
		V_{GS} = - 2.5 V, I_D= - 2 A	-	55	70	
Forward Transconductance[b]	g_{fs}	V_{DS} = - 5 V, I_D = - 3A	-	7	-	S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = - 10 V, f = 1 MHz	-	762	-	pF
Output Capacitance	C_{oss}		-	444	-	
Reverse Transfer Capacitance	C_{rss}		-	350	-	
Total Gate Charge[c]	Q_g	V_{GS} = - 4.5 V, V_{DS} = - 10 V, I_D= - 3 A	-	8.4	-	nC
Gate-Source Charge[c]	Q_{gs}		-	1	-	
Gate-Drain Charge[c]	Q_{gd}		-	2.4	-	
Gate Resistance	R_g	f = 1 MHz	-	18.6	-	Ω
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = - 6 V, R_L = 1.6 Ω I_D ≅ - 3 A, V_{GEN} = - 4.5 V, R_g = 1 Ω	-	17	-	ns
Rise Time[c]	t_r		-	19	-	
Turn-Off Delay Time[c]	$t_{d(off)}$		-	28	-	
Fall Time[c]	t_f		-	13	-	
Source-Drain Diode Ratings and Characteristics[b]						
Pulsed Current[a]	I_{SM}		-	-	- 20	A
Forward Voltage	V_{SD}	I_F = - 1 A, V_{GS} = 0 V	-	- 0.7	- 1.2	V

Notes

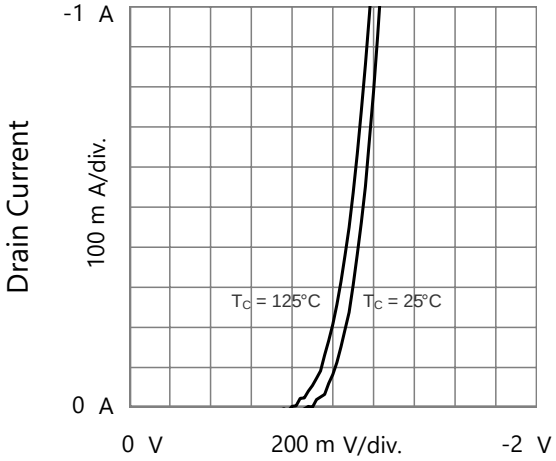
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

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.

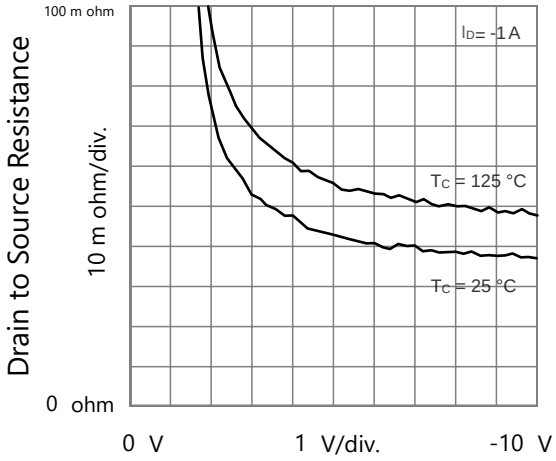
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



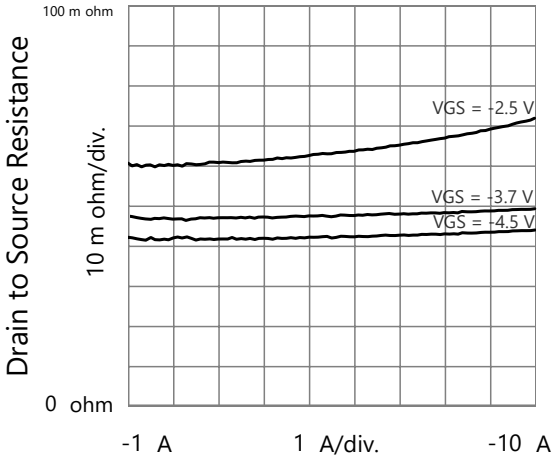
Output Characteristics



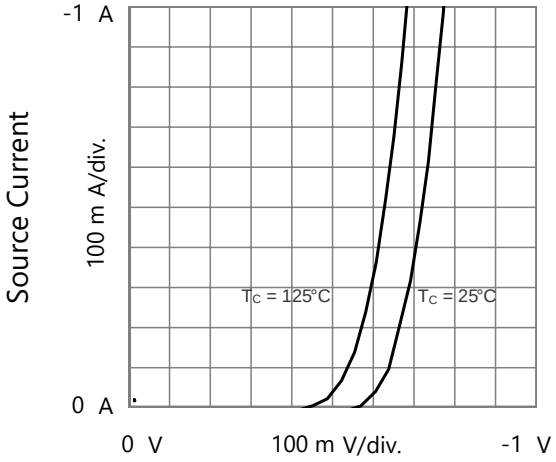
Transfer Characteristics



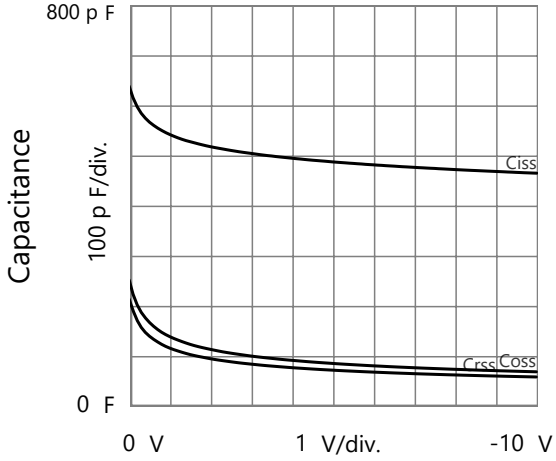
Drain to Source Resistance vs. Gate to Source Voltage



Drain to Source Resistance vs. Drain Current

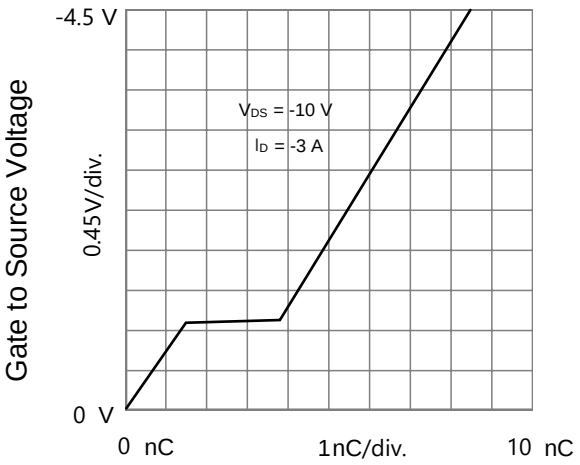


Body Diode Forward Characteristics

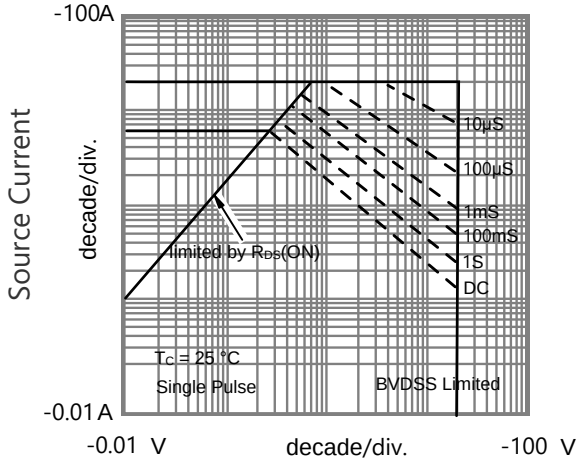


Capacitances

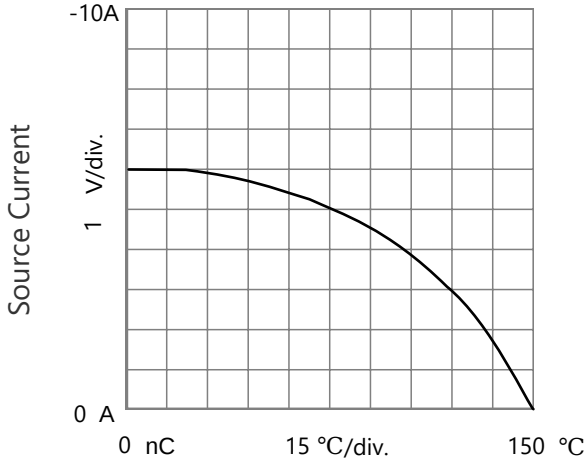
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



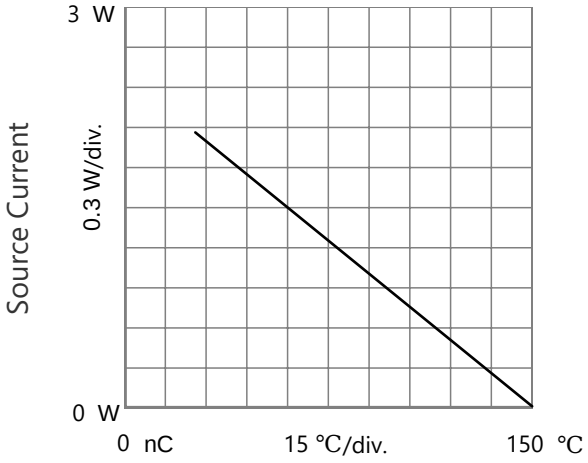
Gate to Source Voltage vs. GateCharge



Safe Operating Area, Junction-to-Ambient

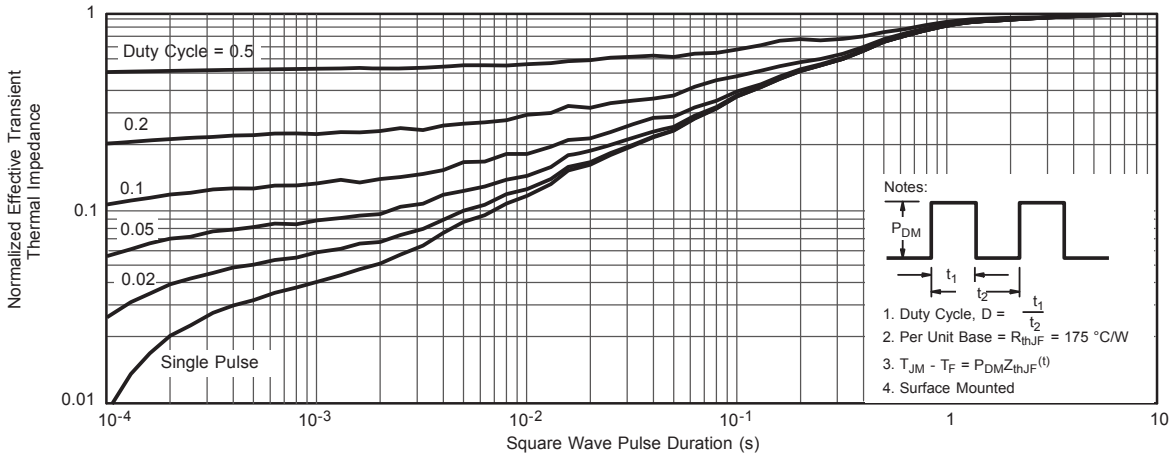


Current Derating



Current Derating

THERMAL RATINGS (T_A = 25 °C, unless otherwise noted)



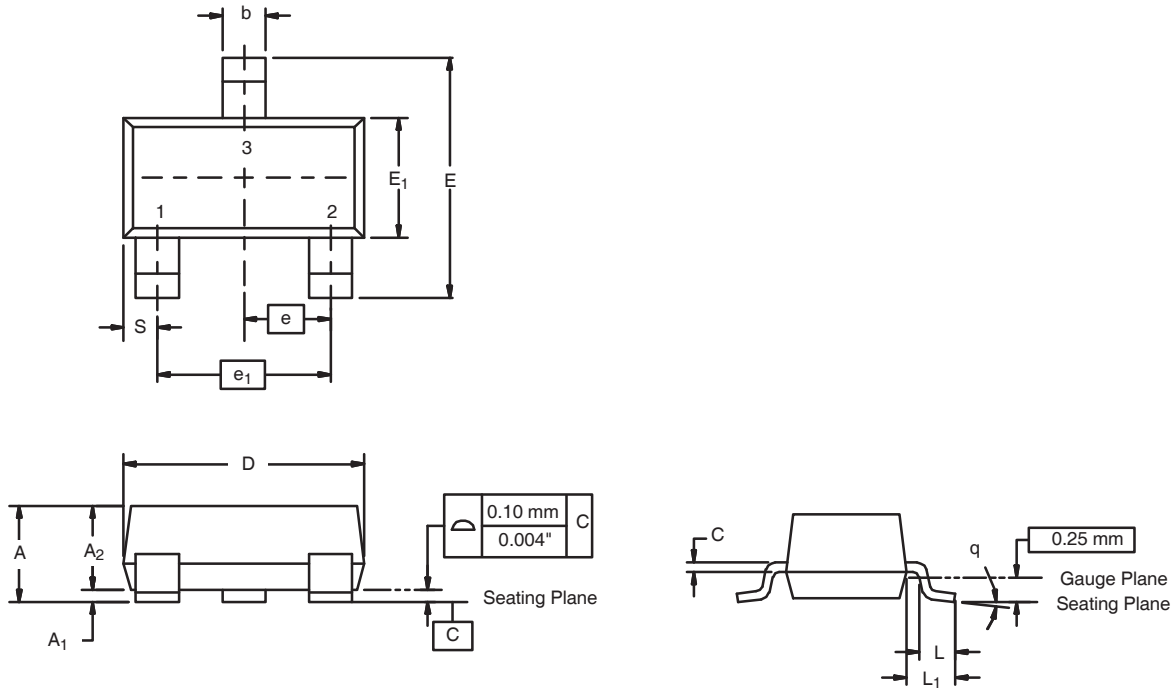
Normalized Thermal Transient Impedance, Junction-to-Foot

Note

- The characteristics shown in the two graphs
  - Normalized Transient Thermal Impedance Junction-to-Ambient (25 °C)
  - Normalized Transient Thermal Impedance Junction-to-Foot (25 ℃)

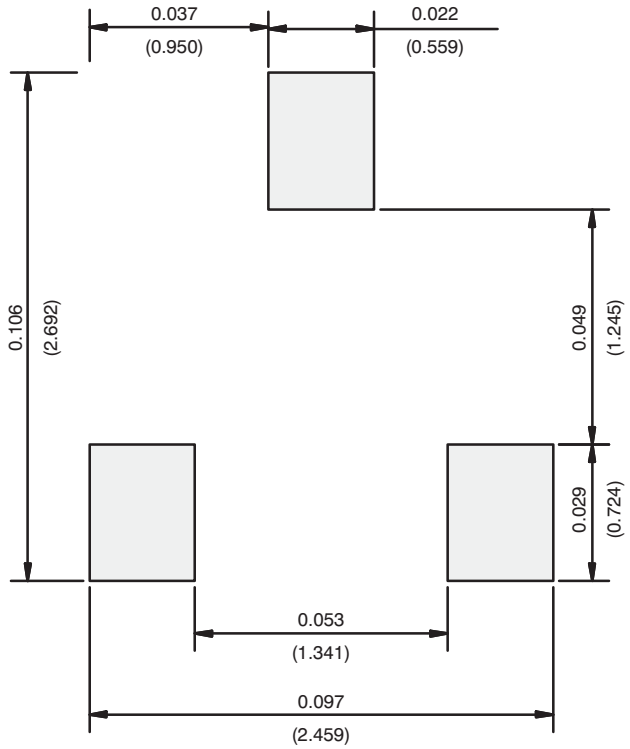
  are given for general guidelines only to enable the user to get a “ball park” indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board - FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions.

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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