

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



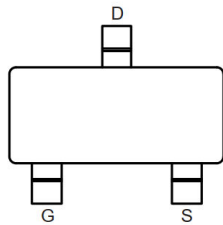
**RoHS**  
COMPLIANT

PRODUCT SUMMARY			
V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (mΩ)(TYP.)	I <sub>D</sub> (A)	Q <sub>g</sub> (TYP.)
-20	70 at V <sub>GS</sub> = - 4.5 V	-5	5
	93 at V <sub>GS</sub> = - 2.5 V		

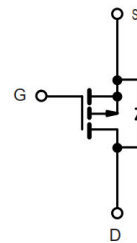
### FEATURES

- DT-Trench Power MOSFET
- AEC-Q101 Qualified<sup>d</sup>
- 100 % R<sub>g</sub> and UIS Tested
- Compliant to RoHS Directive 2002/95/EC

SOT-23 Pin Configuration



Top View



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T <sub>C</sub> = 25 °C, unless otherwise noted)				
PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V <sub>DS</sub>	- 20	V
Gate-Source Voltage		V <sub>GS</sub>	± 8	
Continuous Drain Current	T <sub>C</sub> = 25 °C	I <sub>D</sub>	- 5.0	A
	T <sub>C</sub> = 125 °C		- 3.2	
Continuous Source Current (Diode Conduction) <sup>a</sup>		I <sub>S</sub>	- 3	
Pulsed Drain Current <sup>b</sup>		I <sub>DM</sub>	- 15	
Single Pulse Avalanche Current	L = 0.1 mH	I <sub>AS</sub>	- 3	mJ
Single Pulse Avalanche Energy		E <sub>AS</sub>	4	
Maximum Power Dissipation <sup>b</sup>	T <sub>C</sub> = 25 °C	P <sub>D</sub>	3	W
	T <sub>C</sub> = 125 °C		1	
Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>stg</sub>	- 55 to + 175	°C

THERMAL RESISTANCE RATINGS				
PARAMETER		SYMBOL	LIMIT	UNIT
Junction-to-Ambient	PCB Mount <sup>c</sup>	R <sub>thJA</sub>	166	°C/W
Junction-to-Foot (Drain)		R <sub>thJF</sub>	50	

### Notes

- Package limited.
- Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.
- When mounted on 1" square PCB (FR-4 material).
- Parametric verification ongoing.

**SPECIFICATIONS** ( $T_C = 25\text{ }^{\circ}\text{C}$ , unless otherwise noted)

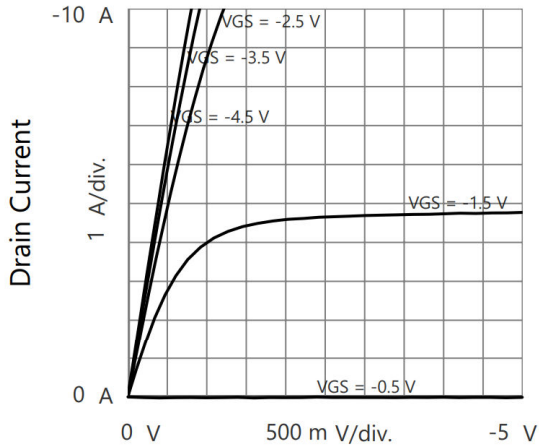
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static							
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0, I_D = - 250 \mu A$		- 20	-	-	V
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = - 250 \mu A$		- 0.45	-	- 1.5	
Gate-Source Leakage	$I_{GSS}$	$V_{DS} = 0 V, V_{GS} = \pm 8 V$		-	-	$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{GS} = 0 V$	$V_{DS} = - 20 V$	-	-	- 1	$\mu A$
		$V_{GS} = 0 V$	$V_{DS} = - 20 V, T_J = 125 ^\circ C$	-	-	- 50	
		$V_{GS} = 0 V$	$V_{DS} = - 20 V, T_J = 175 ^\circ C$	-	-	- 150	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{GS} = - 4.5 V$	$V_{DS} \geq 5 V$	- 5	-	-	A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = - 4.5 V$	$I_D = - 2.8 A$	-	70	77	m $\Omega$
		$V_{GS} = - 2.5 V$	$I_D = - 2 A$	-	93	105	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = - 1.6 V, I_D = - 2.8 A$		-	7	-	S
Dynamic <sup>b</sup>							
Input Capacitance	$C_{iss}$	$V_{GS} = 0 V$	$V_{DS} = - 10 V, f = 1 MHz$	-	357	-	pF
Output Capacitance	$C_{oss}$			-	65	-	
Reverse Transfer Capacitance	$C_{rss}$			-	54	-	
Total Gate Charge <sup>c</sup>	$Q_g$	$V_{GS} = - 4.5 V$	$V_{DS} = - 10 V, I_D = - 2.8 A$	-	5	-	nC
Gate-Source Charge <sup>c</sup>	$Q_{gs}$			-	0.7	-	
Gate-Drain Charge <sup>c</sup>	$Q_{gd}$			-	1.3	-	
Gate Resistance	$R_g$	$f = 1 MHz$		-	3	-	$\Omega$
Turn-On Delay Time <sup>c</sup>	$t_{d(on)}$	$V_{DD} = - 10 V, R_L = 10 \Omega$ $I_D \cong - 1 A, V_{GEN} = - 4.5 V, R_g = 1 \Omega$		-	15	-	ns
Rise Time <sup>c</sup>	$t_r$			-	14	-	
Turn-Off Delay Time <sup>c</sup>	$t_{d(off)}$			-	30	-	
Fall Time <sup>c</sup>	$t_f$			-	9	-	
Source-Drain Diode Ratings and Characteristics <sup>b</sup>							
Pulsed Current <sup>a</sup>	$I_{SM}$			-		- 15	A
Forward Voltage	$V_{SD}$	$I_F = - 1.6 A, V_{GS} = 0$		-	- 0.8	- 1.2	V

**Notes**

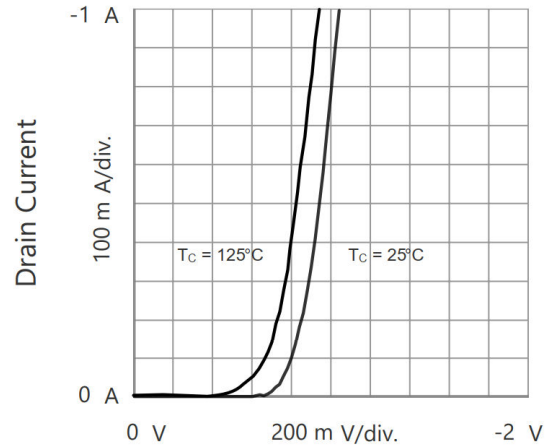
- Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .
- Guaranteed by design, not subject to production testing.
- Independent of operating temperature.

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.

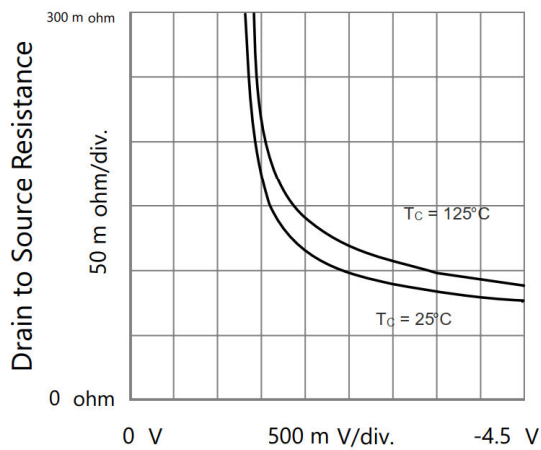
**TYPICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$ , unless otherwise noted)



Drain to Source Voltage  
Output Characteristics

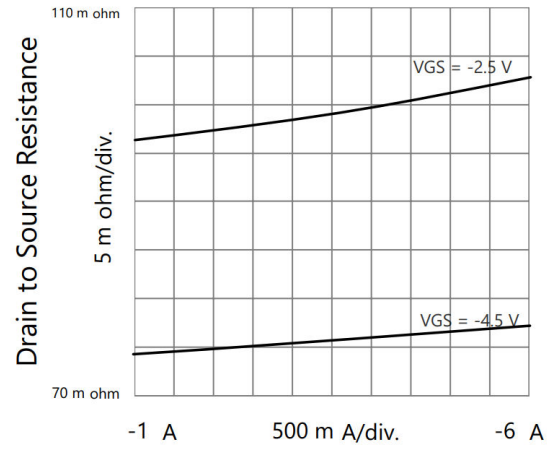


Gate to Source Voltage  
Transfer Characteristics



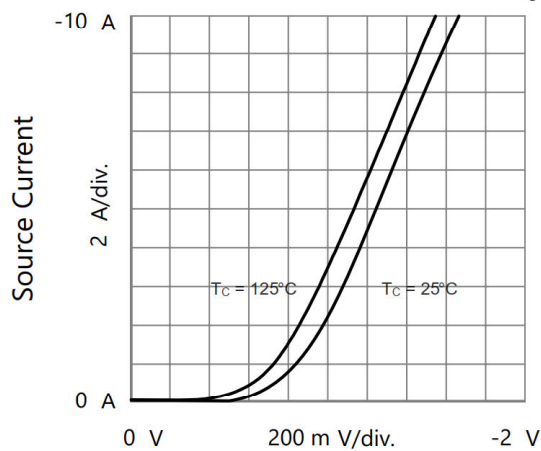
Gate to Source Voltage

Drain to Source Resistance vs. Gate to Source Voltage

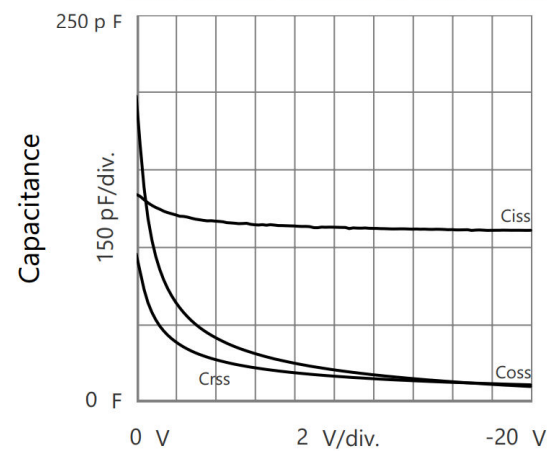


Drain Current

Drain to Source Resistance vs. Drain Current

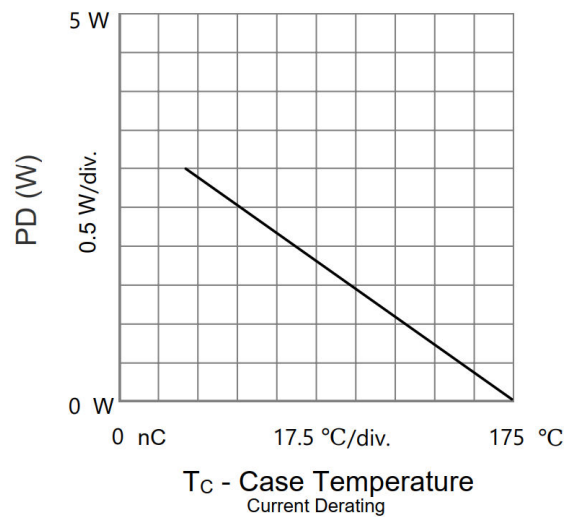
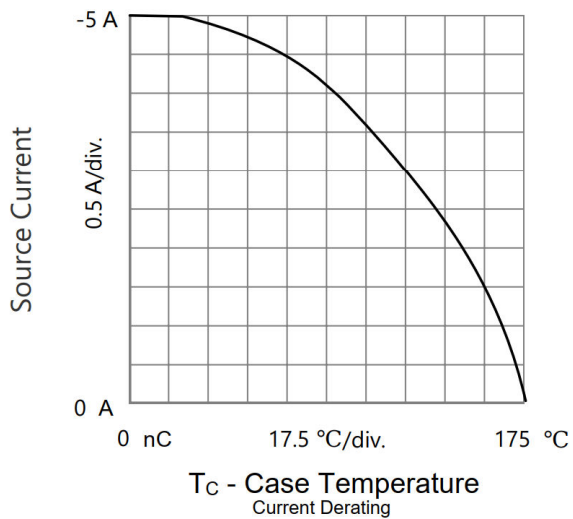
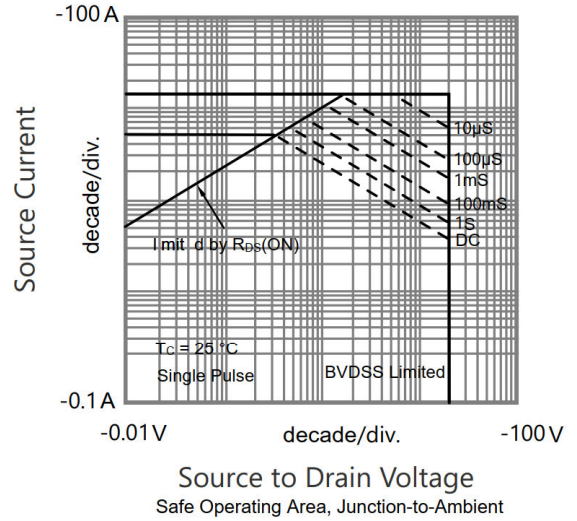
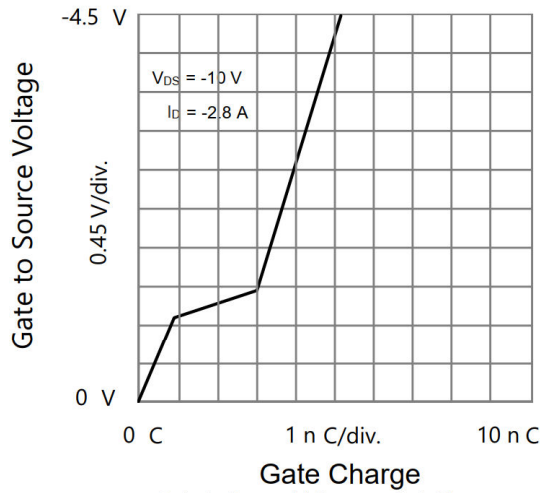


Source to Drain Voltage  
Body Diode Forward Characteristics

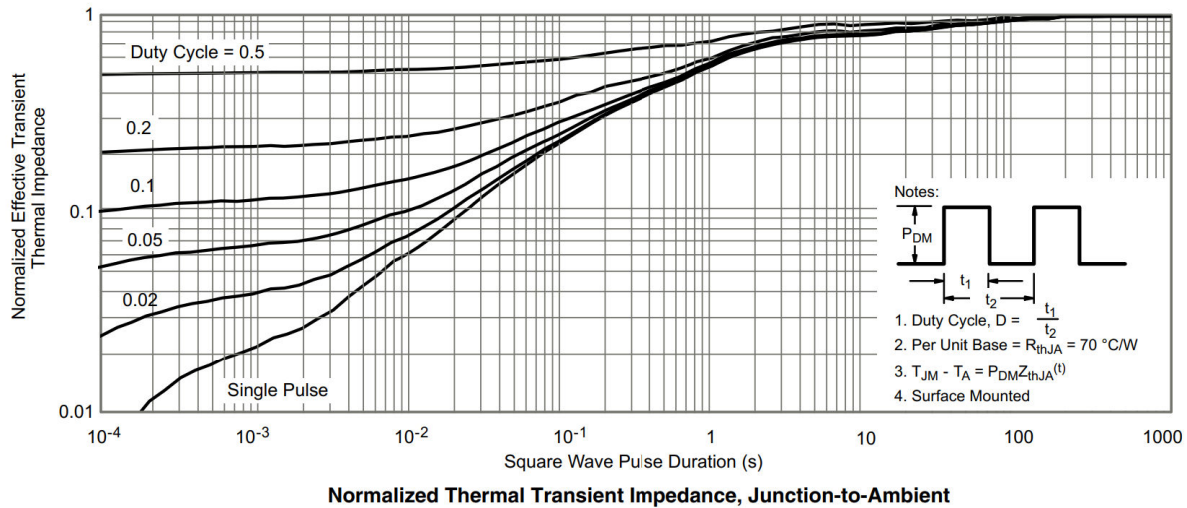


Drain to Source Voltage  
Capacitances

**TYPICAL CHARACTERISTICS** ( $T_A = 25\text{ }^{\circ}\text{C}$ , unless otherwise noted)



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



**Note**

- The characteristics shown in the two graphs
    - Normalized Transient Thermal Impedance Junction to Ambient ( $25\text{ }^{\circ}\text{C}$ )
    - Normalized Transient Thermal Impedance Junction to Case ( $25\text{ }^{\circ}\text{C}$ )
- 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.



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