

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

### PRODUCT SUMMARY

V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (mΩ)(Typ.)	I <sub>D</sub> (A) <sup>a</sup>	Q <sub>g</sub> (Typ.)
-200	310 at V <sub>GS</sub> = -10 V	-10	30 nC

### FEATURES

- DT-Trench Power MOSFET
- 100 % R<sub>g</sub> and UIS Tested
- Low Gate Charge
- Advanced trench process technology

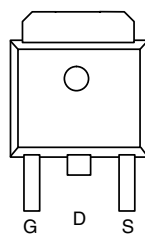


**RoHS**  
COMPLIANT

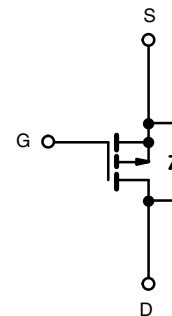
### APPLICATIONS

- Portable equipment and battery powered systems

TO-252 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>	-200	V
Gate-Source Voltage	V <sub>GS</sub>	±20	
Continuous Drain Current (T <sub>J</sub> = 150 °C) <sup>a</sup>	I <sub>D</sub>	T <sub>C</sub> = 25 °C	-10
		T <sub>C</sub> = 100 °C	-6
Pulsed Drain Current <sup>b</sup>	I <sub>DM</sub>	-40	A
Single Avalanche Energy	E <sub>AS</sub>	510	mJ
Maximum Power Dissipation <sup>c</sup>	P <sub>D</sub>	T <sub>C</sub> = 25 °C	96
		T <sub>C</sub> = 100 °C	38
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-55 to +150	°C

### THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Junction-to-Ambient (PCB Mount) <sup>d</sup>	R <sub>thJA</sub>	65	°C/W
Junction-to-Case (Drain)	R <sub>thJC</sub>	1.3	

### Notes

- Calculated continuous current based on maximum allowable junction temperature.
- Repetitive rating; pulse width limited by max. junction temperature.
- P<sub>d</sub> is based on max. junction temperature, using junction-case thermal resistance.
- The value of R<sub>thJA</sub> is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T<sub>a</sub>=25 °C.

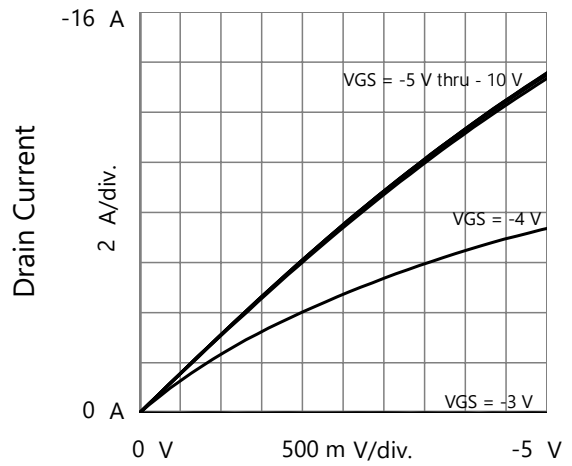
<b>SPECIFICATIONS</b> ( $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0, I_D = -250\text{ }\mu\text{A}$	-200			V
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	-2		-4	V
Gate-Source Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -200\text{ V}, V_{GS} = 0\text{ V}$			-1	$\mu\text{A}$
		$V_{DS} = -160\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			-50	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \leq -5\text{ V}, V_{GS} = -10\text{ V}$	-10			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -3.5\text{ A}$		310	380	$\text{m}\Omega$
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -5\text{ V}, I_D = -3.5\text{ A}$		10		S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = -100\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		4090		$\text{pF}$
Output Capacitance	$C_{oss}$			50		
Reverse Transfer Capacitance	$C_{rss}$			44		
Total Gate Charge	$Q_g$	$V_{DS} = -100\text{ V}, V_{GS} = -10\text{ V}, I_D = -3.5\text{ A}$		30		$\text{nC}$
Gate-Source Charge	$Q_{gs}$			7		
Gate-Drain Charge	$Q_{gd}$			10		
Gate Resistance	$R_g$	$f = 1\text{ MHz}$		3.3		$\Omega$
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -100\text{ V}, R_L = 1.5\text{ }\Omega$ $I_D \cong -3.5\text{ A}, V_{GEN} = -10\text{ V}, R_g = 3\text{ }\Omega$		17		$\text{ns}$
Rise Time	$t_r$			95		
Turn-Off Delay Time	$t_{d(off)}$			35		
Fall Time	$t_f$			50		
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Source-Drain Diode Current	$I_S$	$T_C = 25\text{ }^\circ\text{C}$			-10	A
Pulse Diode Forward Current	$I_{SM}$				-40	
Body Diode Voltage	$V_{SD}$	$I_S = -1\text{ A}$			-1.2	V
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F = -3.5\text{ A}, dI/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		120		ns
Body Diode Reverse Recovery Charge	$Q_{rr}$			25		nC

**Notes:**

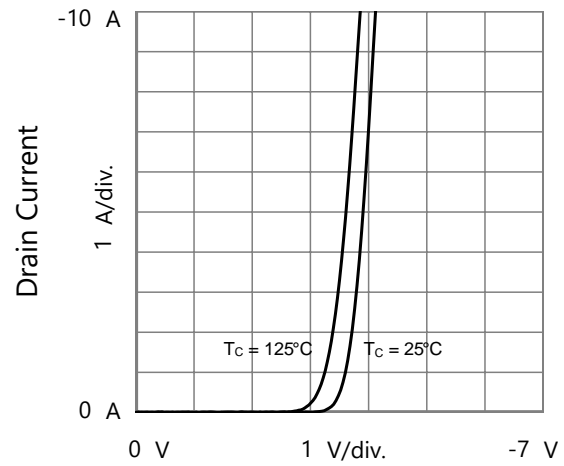
- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .  
 b. Guaranteed by design, not subject to production testing.

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.

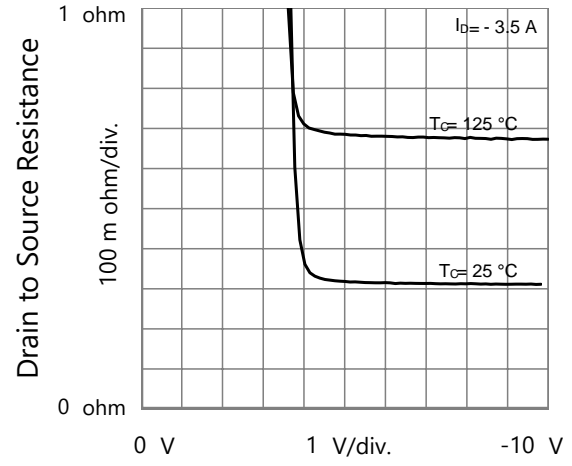
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



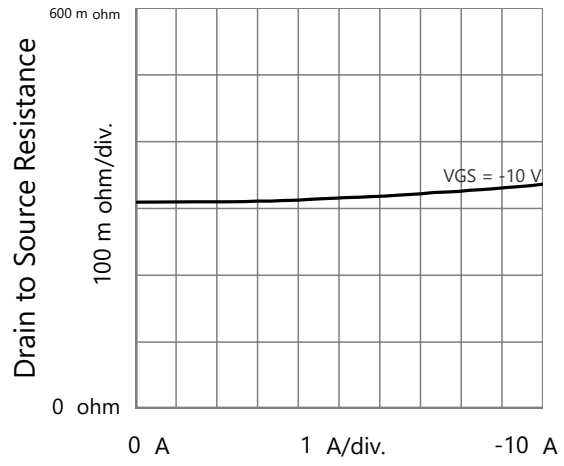
Drain to Source Voltage  
Output Characteristics



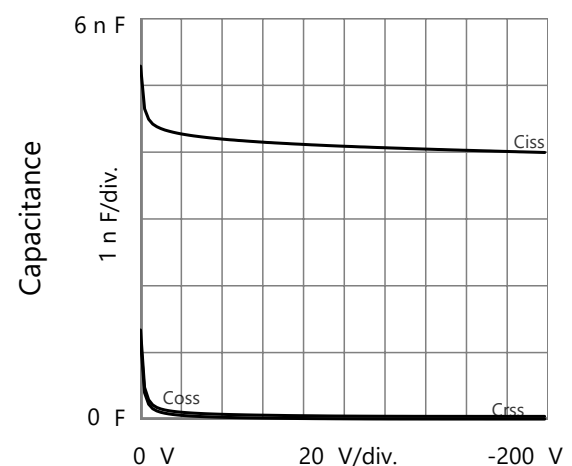
Gate to Source Voltage  
Transfer Characteristics



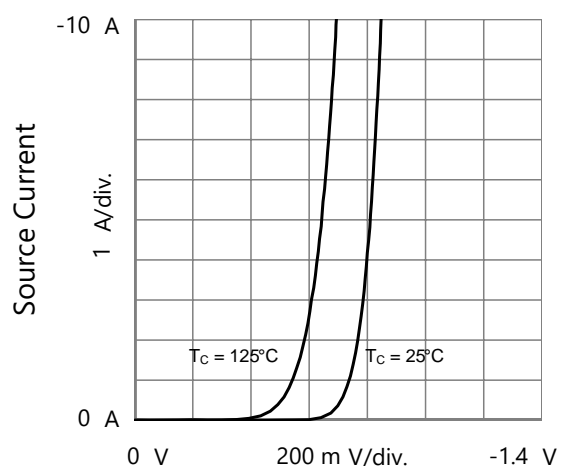
Gate to Source Voltage  
Drain to Source Resistance vs. Gate to Source Voltage



Drain Current  
Drain to Source Resistance vs. Drain Current

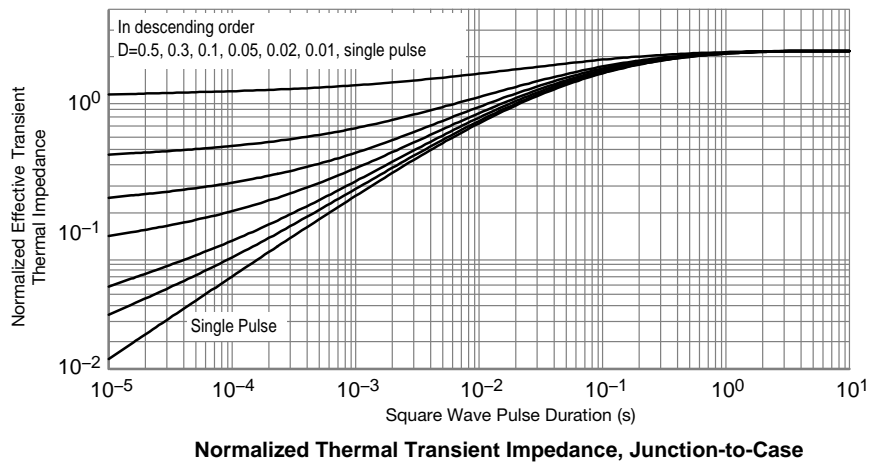
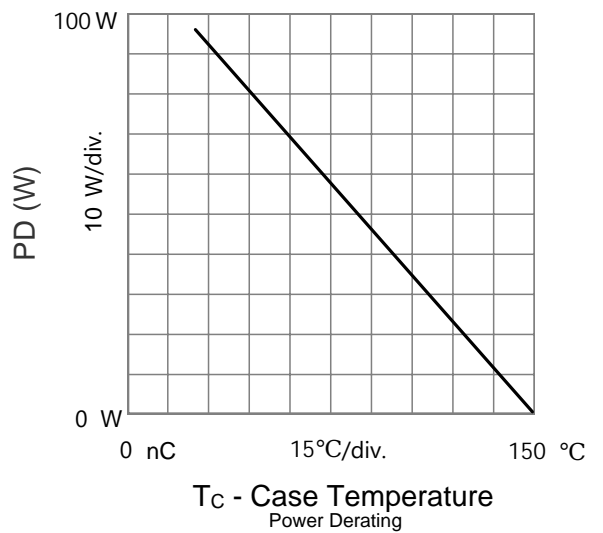
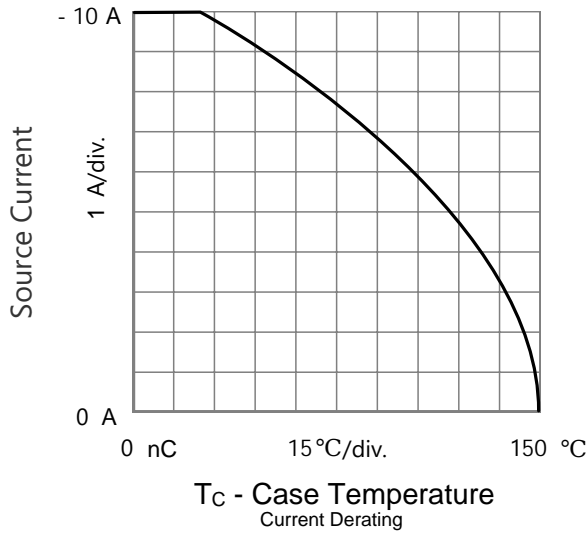
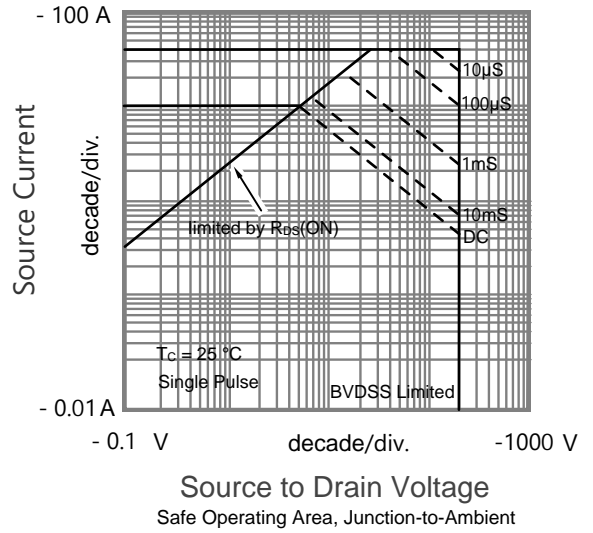
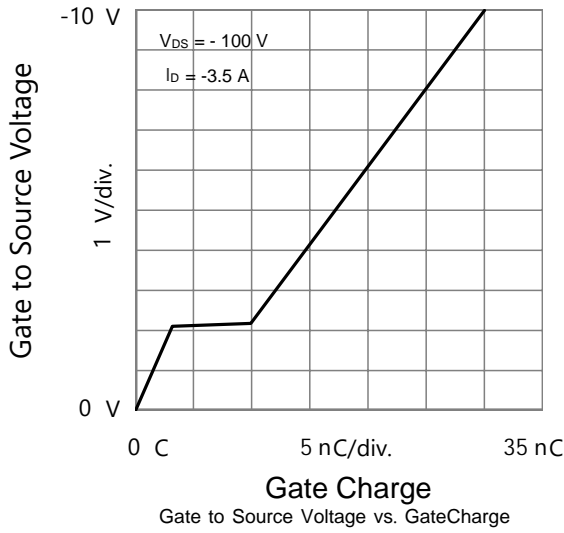


Drain to Source Voltage  
Capacitances

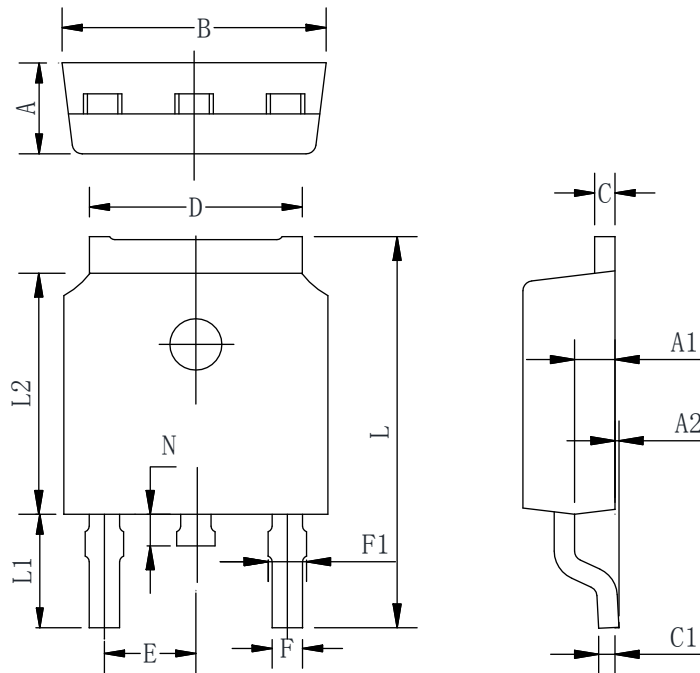


Source to Drain Voltage  
Body Diode Forward Characteristics

**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



**TO-252-2L PACKAGE OUTLINE**



COMMON DIMENSIONS  
(UNITS OF MEASURE=MILLIMETER)

Symbol	Min	Typ	Max
A	2.10	2.30	2.50
A1	0.88	1.01	1.16
A2	0.00	0.15	0.28
B	6.40	6.60	6.80
C	0.42	0.50	0.63
C1	0.42	0.50	0.63
D	5.08	5.32	5.65
E	2.286 TYP		
F	0.63	0.76	0.89
F1	0.64	0.86	1.08
L	9.30	9.90	10.80
L1	2.4	2.8	3.6
L2	5.90	6.10	6.55
N	0.57	0.80	1.05

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