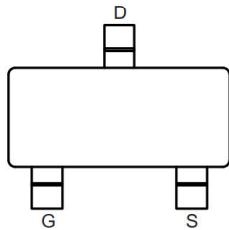


## N-Channel 20 V (D-S) MOSFET

### PRODUCT SUMMARY

$V_{DS}$ (V)	$R_{DS(on)}$ (m $\Omega$ )(Typ.)	$I_D$ (A) <sup>a</sup>	$Q_g$ (Typ.)
20	24 at $V_{GS} = 4.5$ V	5.2	5.5 nC
	33 at $V_{GS} = 2.5$ V		

SOT-23 Pin Configuration



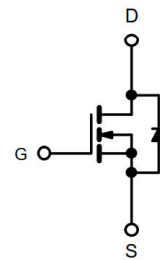
Top View

### FEATURES

- DT-Trench Power MOSFET
- 100 %  $R_g$  and UIS Tested

### APPLICATIONS

- Notebook PC Core
- VRM/POL



N-Channel MOSFET

### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25$ °C, unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		$V_{DS}$	20	V
Gate-Source Voltage		$V_{GS}$	$\pm 8$	
Continuous Drain Current ( $T_J = 150$ °C)	$T_A = 25$ °C	$I_D$	5.2 <sup>b, c</sup>	A
	$T_A = 70$ °C		4.2 <sup>b, c</sup>	
Pulsed Drain Current		$I_{DM}$	16	
Avalanche Current Pulse	L = 0.1 mH	$I_{AS}$	5	
Single Pulse Avalanche Energy		$E_{AS}$	6	mJ
Continuous Source-Drain Diode Current	$T_C = 25$ °C	$I_S$	2.5 <sup>a</sup>	A
Maximum Power Dissipation	$T_A = 25$ °C	$P_D$	1.6 <sup>b, c</sup>	W
	$T_A = 70$ °C		1 <sup>b, c</sup>	
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 <sup>b</sup>	$t \leq 10$ s	$R_{thJA}$	75	90	°C/W
Maximum Junction-to-Case	Steady State	$R_{thJC}$	63	80	

Notes:

 a. Based on  $T_C = 25$  °C.

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

 c.  $t = 10$  s.

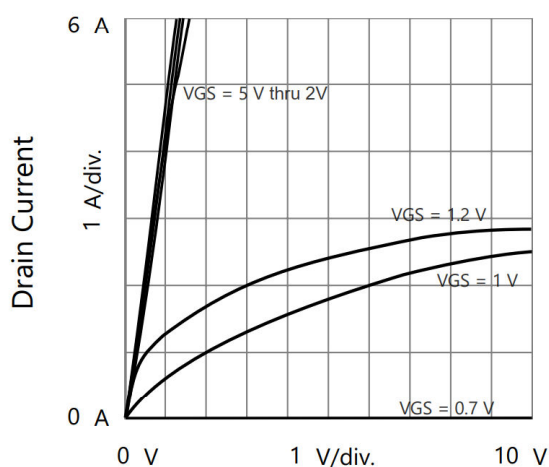
SPECIFICATIONS (T <sub>J</sub> = 25 °C, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min .	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V <sub>DS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA	20			V
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA			1.2	V
Gate-Source Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 8 V, V <sub>GS</sub> = 0 V			1	μA
		V <sub>DS</sub> = 8 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 55 °C			10	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> ≥ 5 V, V <sub>GS</sub> = 4.5 V	5			A
Drain-Source On-State Resistance <sup>a</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 3 A		24	27	mΩ
		V <sub>GS</sub> = 2.5 V, I <sub>D</sub> = 2 A		33	37	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 3 A		30		S
Dynamic <sup>b</sup>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 0 V, f = 1 MHz		357		pF
Output Capacitance	C <sub>oss</sub>			66		
Reverse Transfer Capacitance	C <sub>rss</sub>			54		
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 3 A		5.5		nC
Gate-Source Charge	Q <sub>gs</sub>			0.3		
Gate-Drain Charge	Q <sub>gd</sub>			1.4		
Gate Resistance	R <sub>g</sub>	f = 1 MHz		3		Ω
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 10 V, R <sub>L</sub> = 2.5 Ω I <sub>D</sub> ≅ 3 A, V <sub>GEN</sub> = 4.5 V, R <sub>g</sub> = 1 Ω		10		ns
Rise Time	t <sub>r</sub>			20		
Turn-Off Delay Time	t <sub>d(off)</sub>			25		
Fall Time	t <sub>f</sub>			10		
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I <sub>S</sub>	T <sub>A</sub> = 25 °C			5.2	A
Pulse Diode Forward Current <sup>a</sup>	I <sub>SM</sub>				16	
Body Diode Voltage	V <sub>SD</sub>	I <sub>S</sub> = 1 A		0.6	1	V
Body Diode Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 3 A, di/dt = 100 A/μs, T <sub>J</sub> = 25 °C		20	30	ns
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>			7		nC

**Notes:**

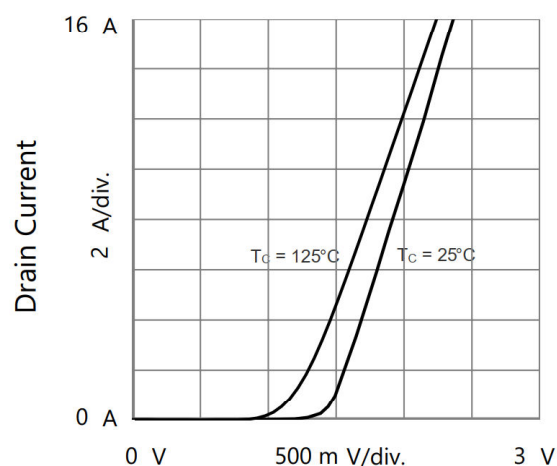
- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .  
 b. Guaranteed by design, not subject to production testing.

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.

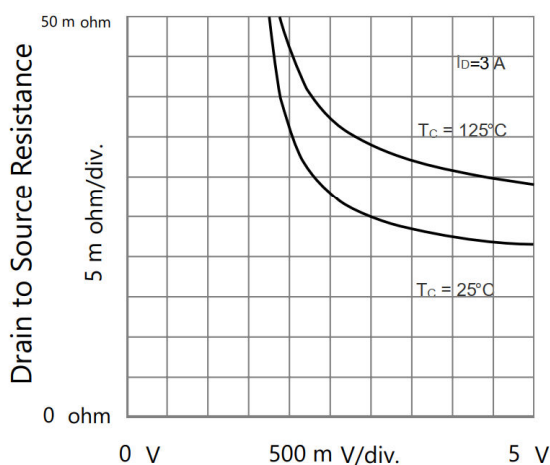
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



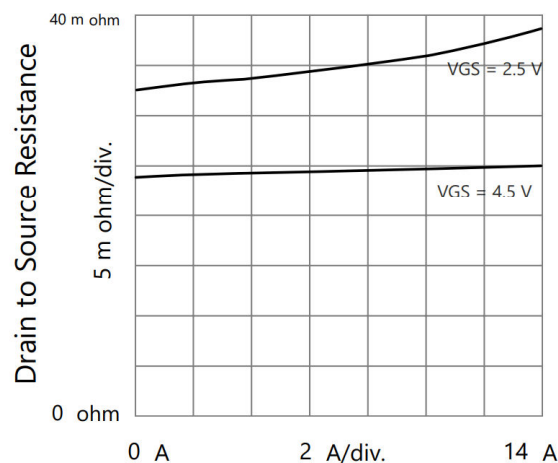
Drain to Source Voltage  
Output Characteristics



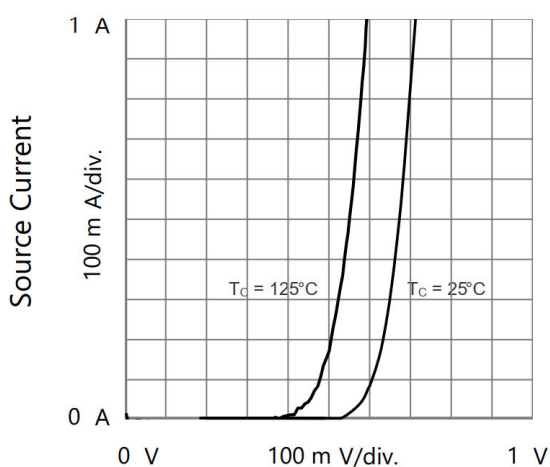
Gate to Source Voltage  
Transfer Characteristics



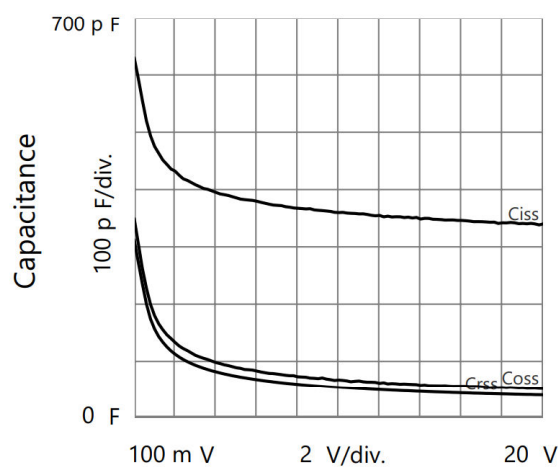
Gate to Source Voltage  
Drain to Source Resistance vs. Gate to Source Voltage



Drain Current  
Drain to Source Resistance vs. Drain Current

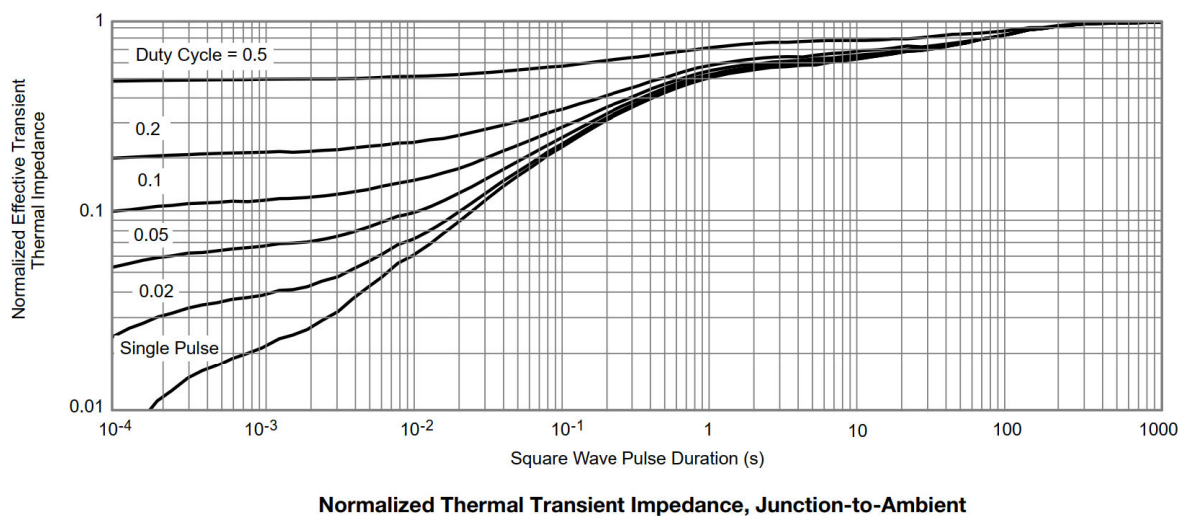
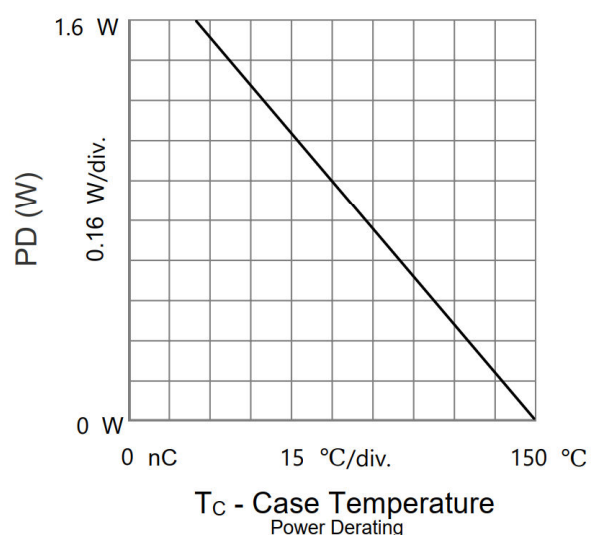
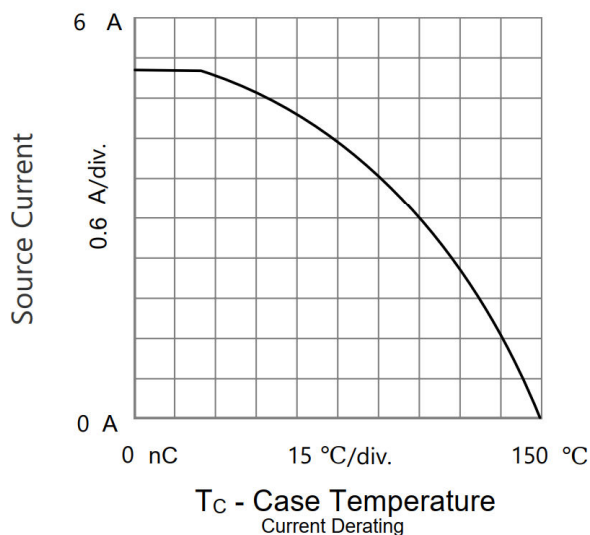
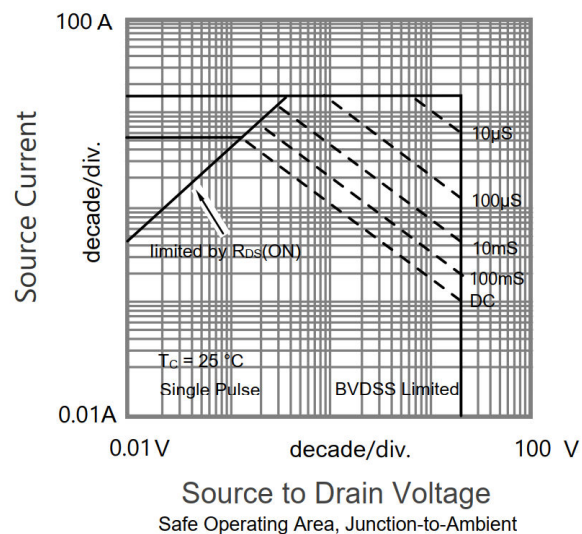
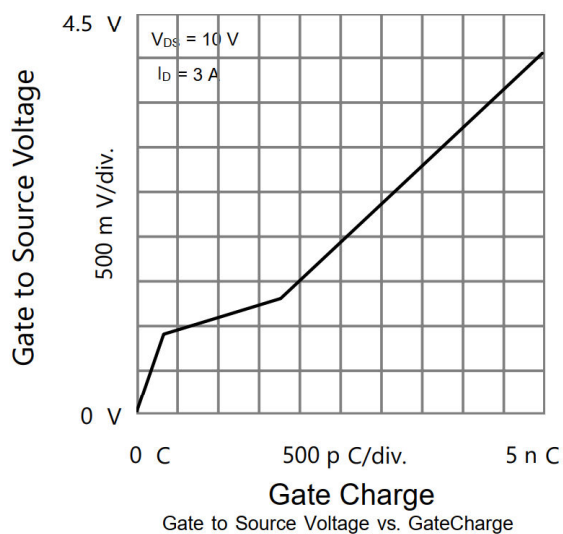


Source to Drain Voltage  
Body Diode Forward Characteristics



Drain to Source Voltage  
Capacitances

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





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