

## N-Channel 30 V (D-S) MOSFET

### PRODUCT SUMMARY

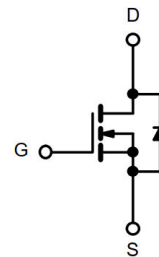
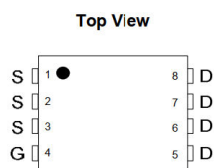
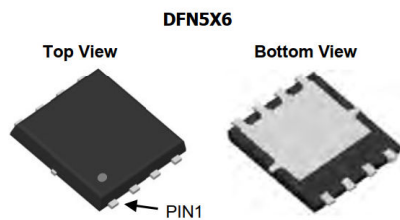
$V_{DS}$ (V)	$R_{DS(on)}$ (m $\Omega$ )(Typ.)	$I_D$ (A) <sup>a, e</sup>	$Q_g$ (Typ.)
30	0.55 at $V_{GS} = 10$ V	330	118 nC
	0.82 at $V_{GS} = 4.5$ V	200	

### FEATURES

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

### APPLICATIONS

- DC/DC Converter
- Synchronous Rectification


**RoHS**  
 COMPLIANT


N-Channel MOSFET

### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ , unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current ( $T_J = 175^\circ\text{C}$ )	$I_D$	$330^{\text{a, e}}$	A
		$300^{\text{e}}$	
		$56^{\text{b, c}}$	
		$43^{\text{b, c}}$	
Pulsed Drain Current	$I_{DM}$	960	mJ
Avalanche Current Pulse	$I_{AS}$	120	
Single Pulse Avalanche Energy	$E_{AS}$	240	
Continuous Source-Drain Diode Current	$I_S$	$320^{\text{a, e}}$	A
		$56.5^{\text{b, c}}$	
Maximum Power Dissipation	$P_D$	$312^{\text{a}}$	W
		218	
		$9.2^{\text{b, c}}$	
		$6.4^{\text{b, c}}$	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	- 55 to 175	$^\circ\text{C}$

### THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>b, d</sup>	$R_{thJA}$	14	16.3	$^\circ\text{C/W}$
Maximum Junction-to-Case	$R_{thJC}$	0.35	0.48	

Notes:

 a. Based on  $T_C = 25^\circ\text{C}$ .

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

 c.  $t = 10$  s.

 d. Maximum under steady state conditions is  $90^\circ\text{C/W}$ .

e. Calculated based on maximum junction temperature. Package limitation current is 330 A.

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	30			V
V <sub>DS</sub> Temperature Coefficient	ΔV <sub>DS</sub> /T <sub>J</sub>	I <sub>D</sub> = 250 μA		35		mV/°C
V <sub>GS(th)</sub> Temperature Coefficient	ΔV <sub>GS(th)</sub> /T <sub>J</sub>			- 7.5		
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	1		3	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> = 30 V, V <sub>GS</sub> = 0 V			1	μA
		V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 55 °C			5	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> ≥ 5 V, V <sub>GS</sub> = 10 V	330			A
Drain-Source On-State Resistance <sup>a</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 20 A		0.55	0.75	mΩ
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 20 A		0.82	1.1	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 5 V, I <sub>D</sub> = 20 A		108		S
Dynamic <sup>b</sup>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 0 V, f = 1 MHz		9130		pF
Output Capacitance	C <sub>oss</sub>			5790		
Reverse Transfer Capacitance	C <sub>rss</sub>			219		
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 20 A		118		nC
Gate-Source Charge	Q <sub>gs</sub>			18		
Gate-Drain Charge	Q <sub>gd</sub>			8.9		
Gate Resistance	R <sub>g</sub>	f = 1 MHz		1.5		Ω
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 15 V, R <sub>L</sub> = 0.65 Ω I <sub>D</sub> ≅ 20 A, V <sub>GEN</sub> = 10 V, R <sub>g</sub> = 1 Ω		17		ns
Rise Time	t <sub>r</sub>			55		
Turn-Off Delay Time	t <sub>d(off)</sub>			128		
Fall Time	t <sub>f</sub>			105		
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I <sub>S</sub>	T <sub>C</sub> = 25 °C			330	A
Pulse Diode Forward Current <sup>a</sup>	I <sub>SM</sub>				960	
Body Diode Voltage	V <sub>SD</sub>	I <sub>S</sub> = 1 A		0.6	1.0	V
Body Diode Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 20 A, di/dt = 100 A/μs, T <sub>J</sub> = 25 °C		42		ns
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>			138		nC
Reverse Recovery Fall Time	t <sub>a</sub>			29		ns
Reverse Recovery Rise Time	t <sub>b</sub>			40		

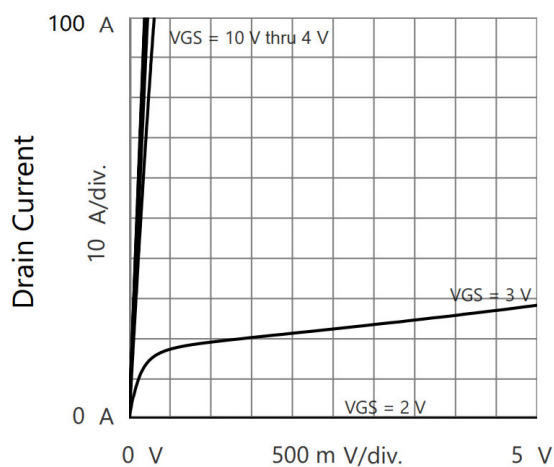
Notes:

a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .

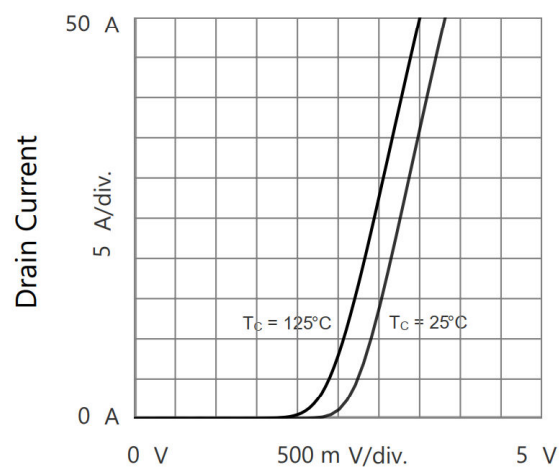
b. Guaranteed by design, not subject to production testing.

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.

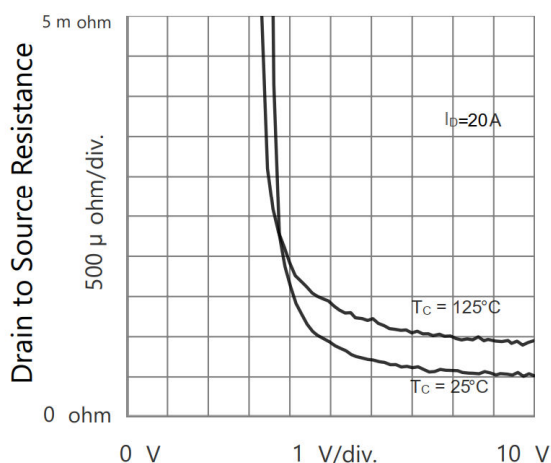
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



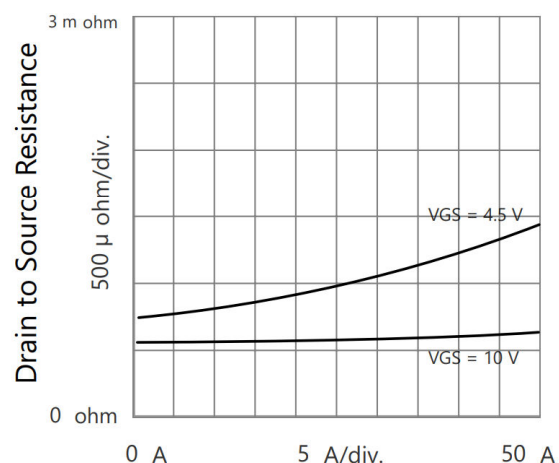
Drain to Source Voltage  
Output Characteristics



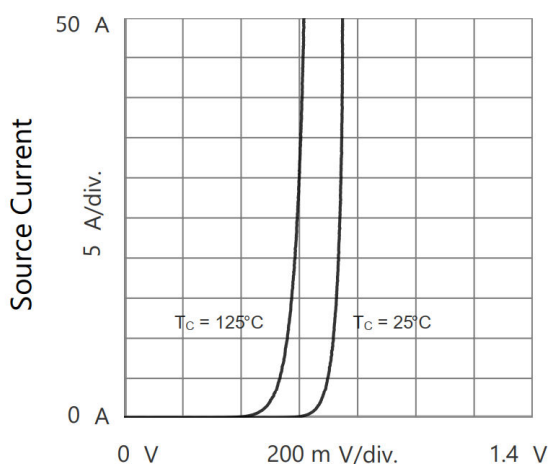
Gate to Source Voltage  
Transfer Characteristics



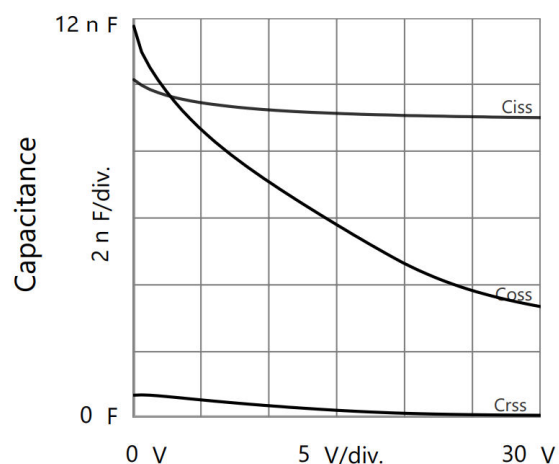
Gate to Source Voltage  
Drain to Source Resistance vs. Gate to Source Voltage



Drain Current  
Drain to Source Resistance vs. Drain Current

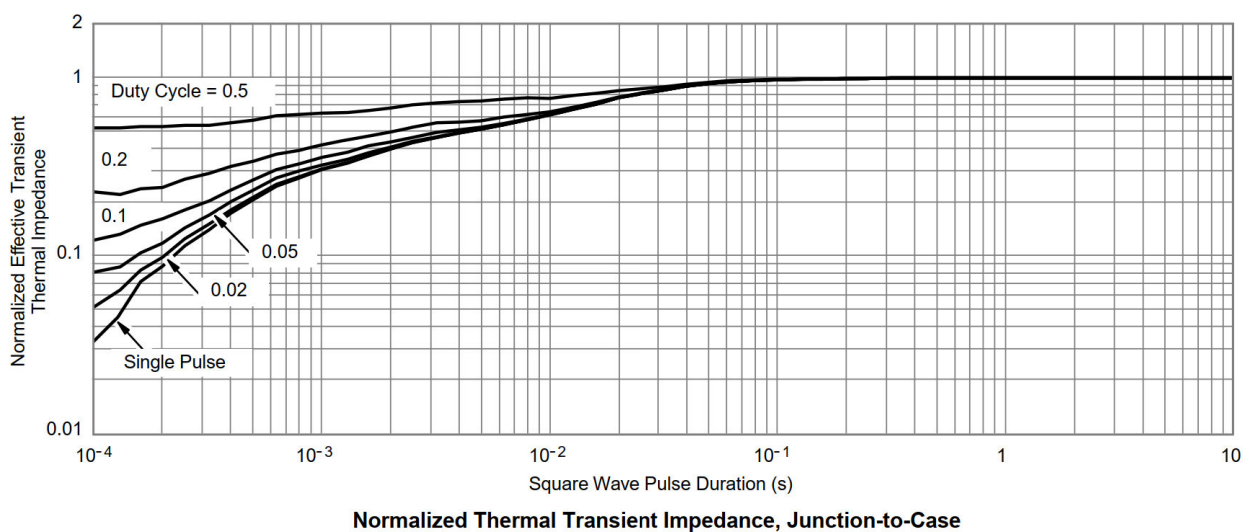
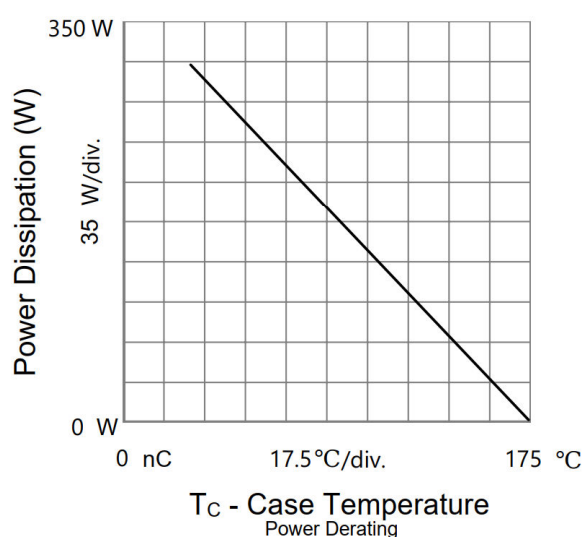
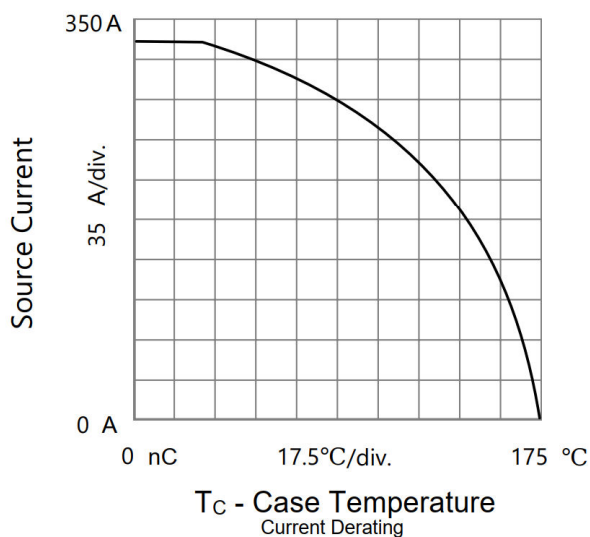
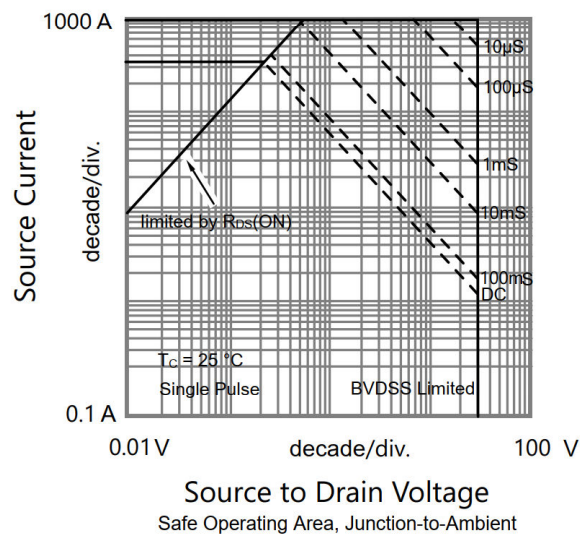
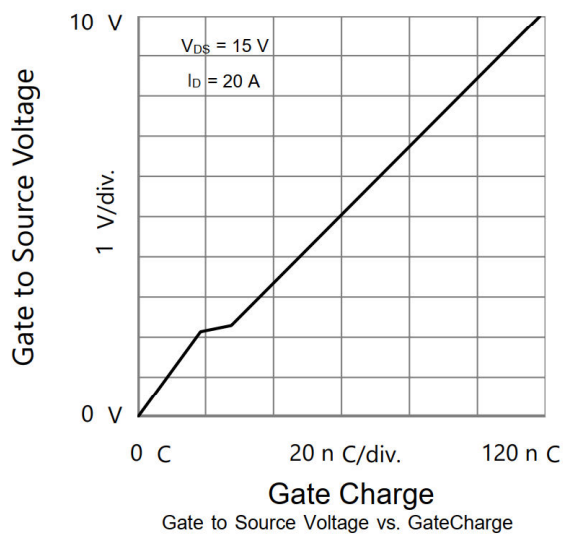


Source to Drain Voltage  
Body Diode Forward Characteristics



Drain to Source Voltage  
Capacitances

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





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