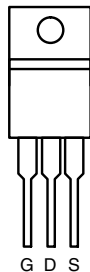


## N-Channel 80 V (D-S) MOSFET

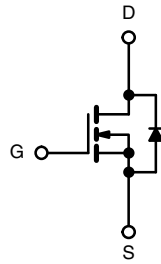
### PRODUCT SUMMARY

V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω) Max.	I <sub>D</sub> (A)	Q <sub>g</sub> (Typ.)
80	0.0048 at V <sub>GS</sub> = 10 V	120 <sup>a</sup>	161 nC

TO-220AB



Top View



N-Channel MOSFET

### FEATURES

- DT-Trench Power MOSFET
- 100 % R<sub>g</sub> and UIS Tested



**RoHS**  
COMPLIANT

### APPLICATIONS

- Primary Side Switching
- Synchronous Rectification
- DC/AC Inverters
- LED Backlighting

### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25 °C, unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V <sub>DS</sub>	80	V
Gate-Source Voltage	V <sub>GS</sub>	± 20	
Continuous Drain Current (T <sub>J</sub> = 150 °C)	I <sub>D</sub>	T <sub>C</sub> = 25 °C	120 <sup>a</sup>
		T <sub>C</sub> = 70 °C	92
		T <sub>A</sub> = 25 °C	35 <sup>b</sup>
		T <sub>A</sub> = 70 °C	21 <sup>b</sup>
Pulsed Drain Current (t = 100 μs)	I <sub>DM</sub>	460	A
Continuous Source-Drain Diode Current	I <sub>S</sub>	T <sub>C</sub> = 25 °C	
		T <sub>A</sub> = 25 °C	15 <sup>b</sup>
Single Pulse Avalanche Current	I <sub>AS</sub>	110	mJ
Single Pulse Avalanche Energy	E <sub>AS</sub>	1450	
Maximum Power Dissipation	P <sub>D</sub>	T <sub>C</sub> = 25 °C	255
		T <sub>C</sub> = 70 °C	160
		T <sub>A</sub> = 25 °C	5 <sup>b</sup>
		T <sub>A</sub> = 70 °C	3.3 <sup>b</sup>
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	- 55 to 150	°C
Soldering Recommendations (Peak Temperature)		260	

### THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>b, f</sup>	R <sub>thJA</sub>	10	16	°C/W
Maximum Junction-to-Case (Drain)	R <sub>thJC</sub>	0.50	0.68	

#### Notes

- Package limited.
- Surface mounted on 1" x 1" FR4 board.

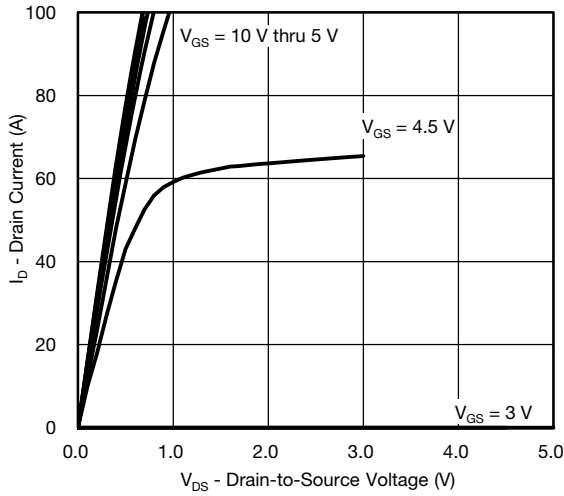
<b>SPECIFICATIONS</b> ( $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted)							
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
<b>Static</b>							
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	80			V	
$V_{DS}$ Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250\text{ }\mu\text{A}$		37		mV/°C	
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			-6			
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1.5		3.5	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	$I_{DSS}$	$V_{DS} = 64\text{ V}, V_{GS} = 0\text{ V}$			1	$\mu\text{A}$	
		$V_{DS} = 64\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			10		
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	460			A	
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 40\text{ A}$		0.0048	0.006	$\Omega$	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 25\text{ V}, I_D = 20\text{ A}$		90		S	
<b>Dynamic<sup>b</sup></b>							
Input Capacitance	$C_{iss}$	$V_{DS} = 64\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		6255		pF	
Output Capacitance	$C_{oss}$			550			
Reverse Transfer Capacitance	$C_{rss}$			366			
Total Gate Charge	$Q_g$	$V_{DS} = 64\text{ V}, V_{GS} = 10\text{ V}, I_D = 40\text{ A}$		161		nC	
		$V_{DS} = 64\text{ V}, V_{GS} = 6\text{ V}, I_D = 30\text{ A}$		95			
Gate-Source Charge	$Q_{gs}$	$V_{DS} = 64\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 20\text{ A}$		80			
Gate-Drain Charge	$Q_{gd}$			33			
Output Charge	$Q_{oss}$			12			
Gate Resistance	$R_g$	$V_{DS} = 50\text{ V}, V_{GS} = 0\text{ V}$ $f = 1\text{ MHz}$		61			$\Omega$
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 40\text{ V}, R_L = 4\text{ }\Omega$ $I_D \cong 10\text{ A}, V_{GEN} = 10\text{ V}, R_g = 1\text{ }\Omega$		1.5		ns	
Rise Time	$t_r$			24			
Turn-Off Delay Time	$t_{d(off)}$			20			
Fall Time	$t_f$			83			
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 40\text{ V}, R_L = 4\text{ }\Omega$ $I_D \cong 10\text{ A}, V_{GEN} = 6.0\text{ V}, R_g = 1\text{ }\Omega$		28			
Rise Time	$t_r$			25			
Turn-Off Delay Time	$t_{d(off)}$			73			
Fall Time	$t_f$			34			
<b>Drain-Source Body Diode Characteristics</b>							
Continuous Source-Drain Diode Current	$I_S$	$T_C = 25\text{ }^\circ\text{C}$			120		A
Pulse Diode Forward Current ( $t = 100\text{ }\mu\text{s}$ )	$I_{SM}$				460		
Body Diode Voltage	$V_{SD}$	$I_S = 5\text{ A}$		0.7	1.2		V
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F = 10\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		39		ns	
Body Diode Reverse Recovery Charge	$Q_{rr}$			32		nC	
Reverse Recovery Fall Time	$t_a$			20		ns	
Reverse Recovery Rise Time	$t_b$			19			

**Notes**

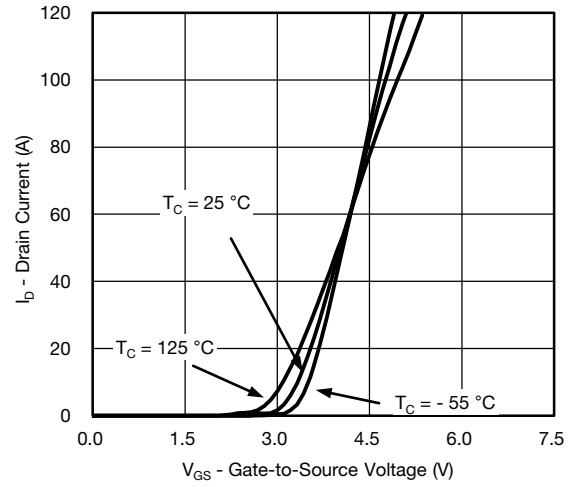
- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .  
 b. Guaranteed by design, not subject to production testing.

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.

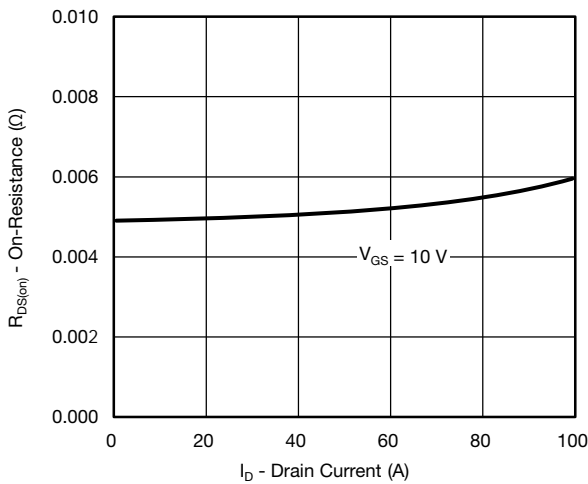
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



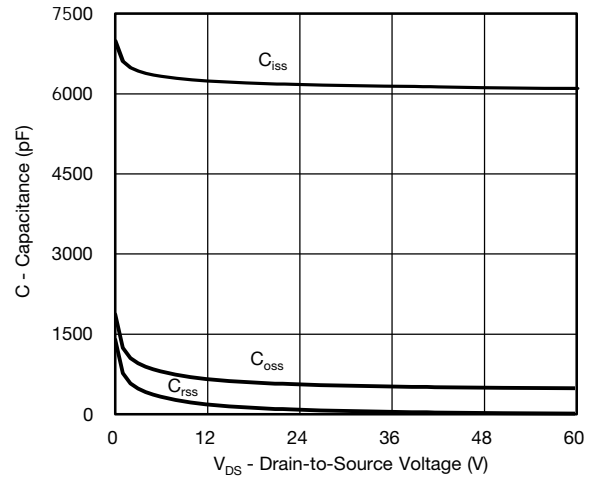
**Output Characteristics**



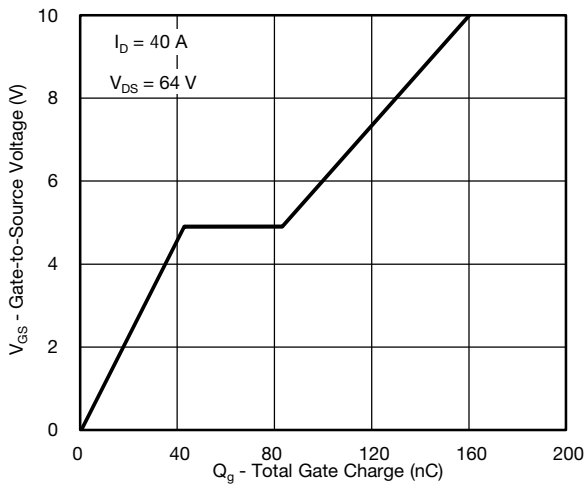
**Transfer Characteristics**



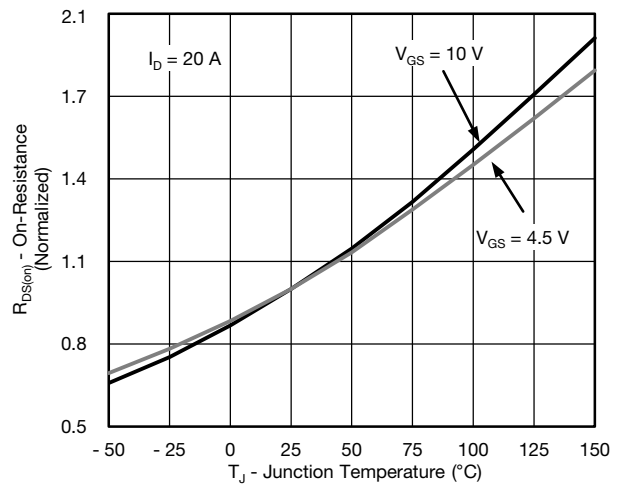
**On-Resistance vs. Drain Current**



**Capacitance**

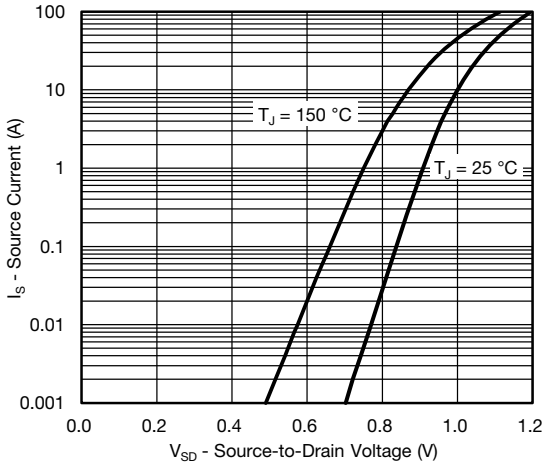


**Gate Charge**



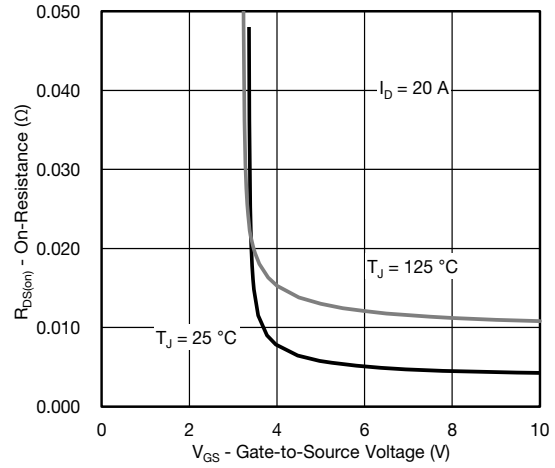
**On-Resistance vs. Junction Temperature**

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

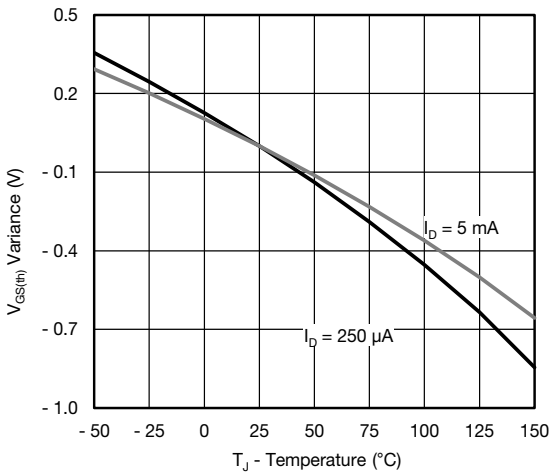


**Source-Drain Diode Forward Voltage**

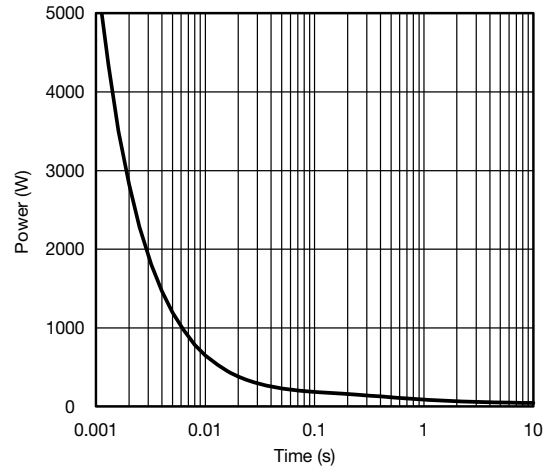
3



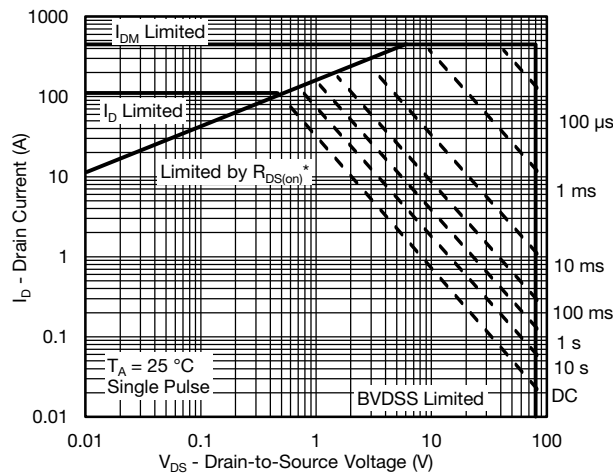
**On-Resistance vs. Gate-to-Source Voltage**



**Threshold Voltage**



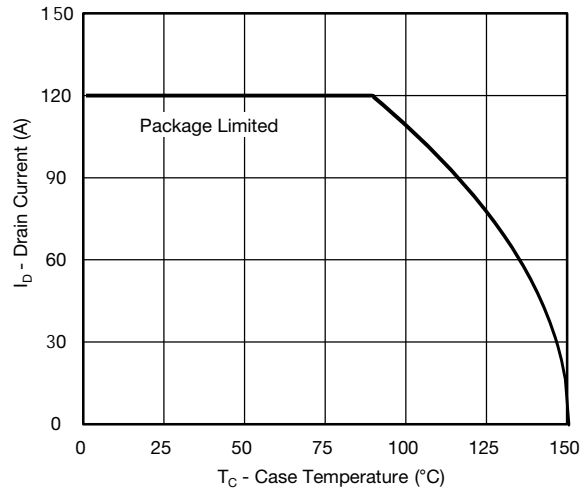
**Single Pulse Power, Junction-to-Ambient**



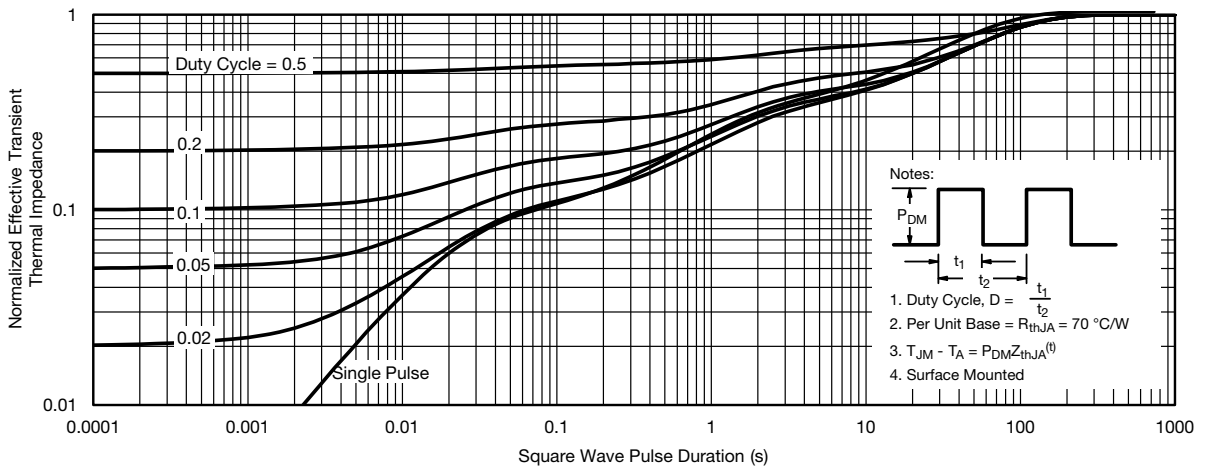
\*  $V_{GS} >$  minimum  $V_{GS}$  at which  $R_{DS(on)}$  is specified

**Safe Operating Area, Junction-to-Ambient**

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



**Current Derating\***



**Normalized Thermal Transient Impedance, Junction-to-Ambient**

**TO-220AB**



DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.25	4.65	0.167	0.183
b	0.69	1.01	0.027	0.040
b(1)	1.20	1.73	0.047	0.068
c	0.36	0.61	0.014	0.024
D	14.85	15.49	0.585	0.610
E	10.04	10.51	0.395	0.414
e	2.41	2.67	0.095	0.105
e(1)	4.88	5.28	0.192	0.208
F	1.14	1.40	0.045	0.055
H(1)	6.09	6.48	0.240	0.255
J(1)	2.41	2.92	0.095	0.115
L	13.35	14.02	0.526	0.552
L(1)	3.32	3.82	0.131	0.150
$\varnothing P$	3.54	3.94	0.139	0.155
Q	2.60	3.00	0.102	0.118

ECN: X12-0208-Rev. N, 08-Oct-12  
DWG: 5471

**Notes**

\* M = 1.32 mm to 1.62 mm (dimension including protrusion)  
Heatsink hole for HVM

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