

## N-Channel 1200 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.)
1200	0.63 at V <sub>GS</sub> = 10 V	12	46 nC

### FEATURES

- DT-Trench Power MOSFET
- 100 % R<sub>g</sub> and UIS tested
- High Speed Power Switching

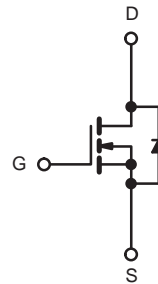
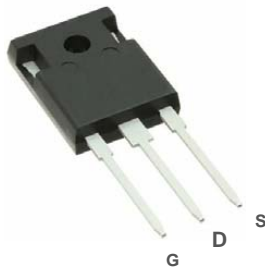


**RoHS**  
COMPLIANT

### APPLICATIONS

- Switching applications

TO-247 Pin Configuration



N-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>	1200	V
Gate-Source Voltage		V <sub>GS</sub>	± 30	
Continuous Drain Current (T <sub>J</sub> = 150 °C)	T <sub>C</sub> = 25 °C	I <sub>D</sub>	12	A
	T <sub>C</sub> = 100 °C		7.9	
Pulsed Drain Current (t = 100 μs)		I <sub>DM</sub>	48	
Avalanche Current	L = 0.1 mH	I <sub>AS</sub>	11.5	
Single Avalanche Energy <sup>a</sup>		E <sub>AS</sub>	239	
Maximum Power Dissipation <sup>a</sup>	T <sub>C</sub> = 25 °C	P <sub>D</sub>	257 <sup>b</sup>	W
	T <sub>C</sub> = 100 °C		102.8 <sup>b</sup>	
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>	t ≤ 10 s	R <sub>thJA</sub>	50	°C/W
Junction-to-Case (Drain)	Steady State	R <sub>thJC</sub>	0.5	

### Notes

- Duty cycle ≤ 1 %.
- See SOA curve for voltage derating.
- When mounted on 1" square PCB (FR4 material).

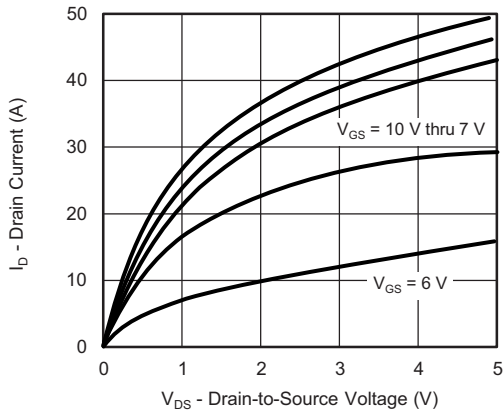
SPECIFICATIONS (T <sub>J</sub> = 25 °C, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>DS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA	1200	-	-	V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	2	-	4	
Gate-Body 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> = 1200 V, V <sub>GS</sub> = 0 V	-	-	1	μA
		V <sub>DS</sub> = 1200 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 100 °C	-	-	50	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> ≥ 10 V, V <sub>GS</sub> = 10 V	12	-	-	A
Drain-Source On-State Resistance <sup>a</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 6 A	-	0.63	0.69	Ω
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 50 V, I <sub>D</sub> = 6 A	-	15	-	S
<b>Dynamic <sup>b</sup></b>						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 100 V, f = 1 MHz	-	1365	-	pF
Output Capacitance	C <sub>oss</sub>		-	103	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	10	-	
Total Gate Charge <sup>c</sup>	Q <sub>g</sub>	V <sub>DS</sub> = 960 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 12 A	-	46	-	nC
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>		-	8	-	
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>		-	31	-	
Gate Resistance	R <sub>g</sub>	f = 1 MHz	-	3	-	Ω
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>	V <sub>DD</sub> = 600 V, I <sub>D</sub> = 6 A, R <sub>g</sub> = 6Ω V <sub>GS</sub> = 10 V	-	29	-	ns
Rise Time <sup>c</sup>	t <sub>r</sub>		-	10	-	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>		-	79	-	
Fall Time <sup>c</sup>	t <sub>f</sub>		-	15	-	
<b>Drain-Source Body Diode Ratings and Characteristics <sup>b</sup> (T<sub>C</sub> = 25 °C)</b>						
Continuous Source-Drain Diode Current	I <sub>S</sub>	T <sub>C</sub> = 25 °C	-	-	12	A
Pulsed Current (t = 100 μs)	I <sub>SM</sub>		-	-	48	A
Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>F</sub> = 12 A, V <sub>GS</sub> = 0 V	-	-	1.5	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 12 A, di/dt = 100 A/μs	-	896	-	ns
Reverse Recovery Charge	Q <sub>rr</sub>		-	11.9	-	μC

**Notes**

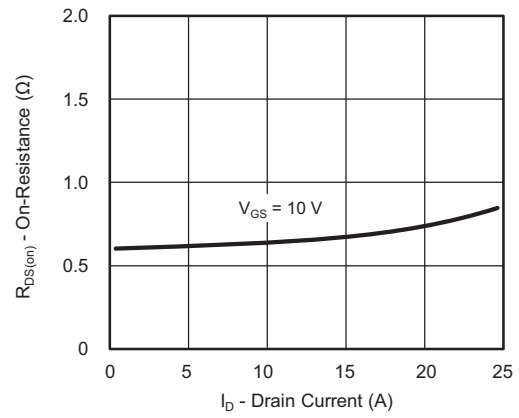
- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.
- b. Guaranteed by design, not subject to production testing.
- c. Independent of operating temperature.

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.

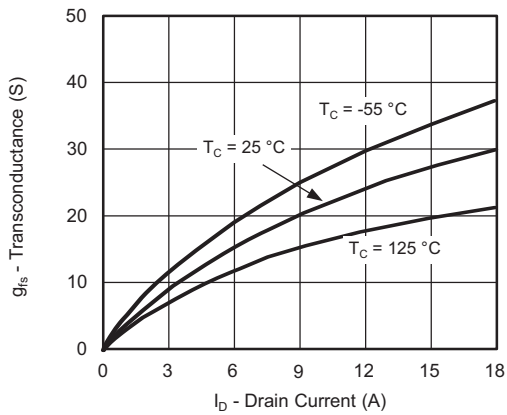
**TYPICAL CHARACTERISTICS** ( $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted)



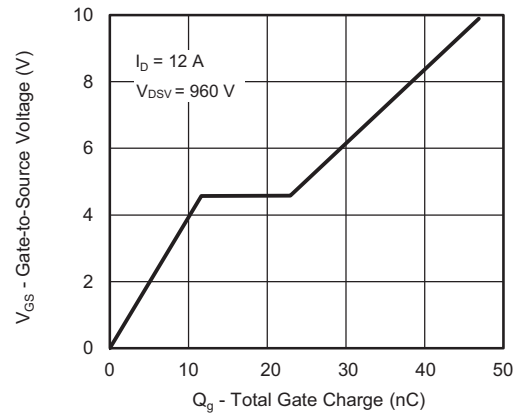
**Output Characteristics**



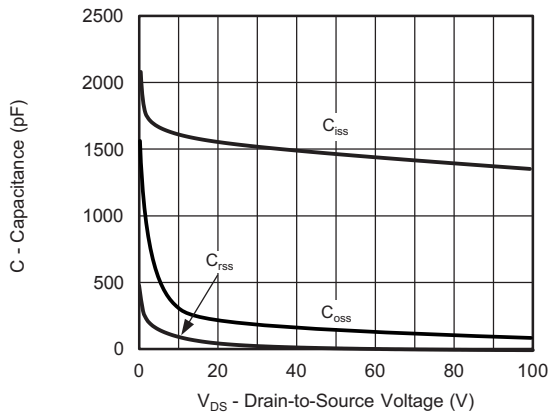
**On-Resistance vs. Drain Current**



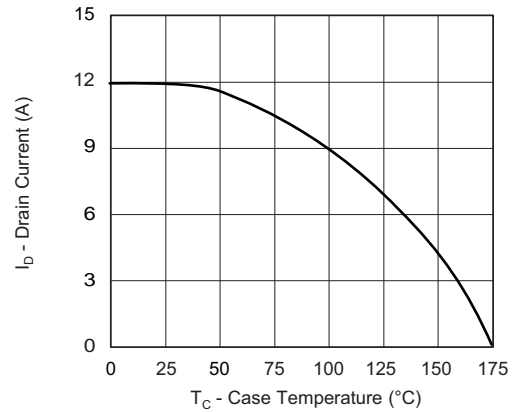
**Transconductance**



**Gate Charge**

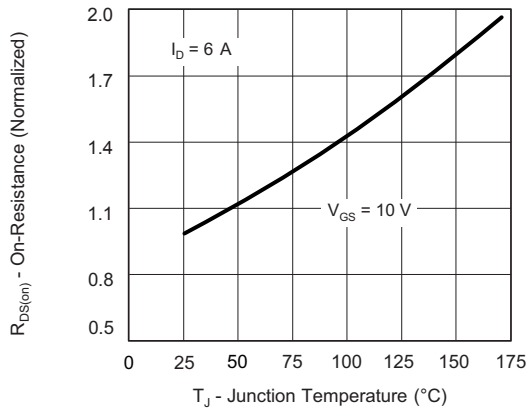


**Capacitance**

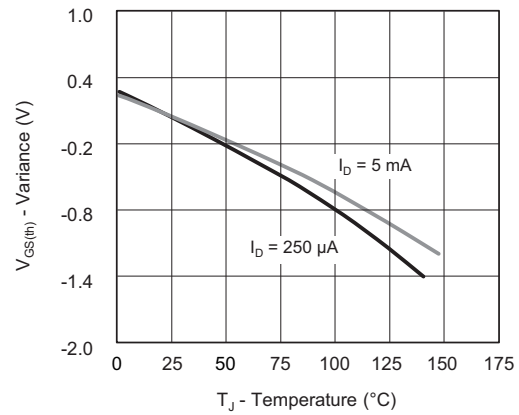


**Current De-Rating**

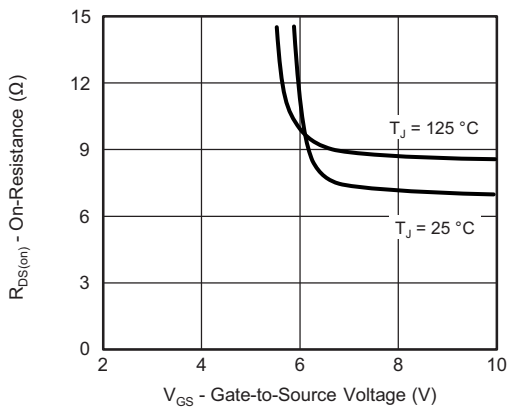
**TYPICAL CHARACTERISTICS** ( $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted)



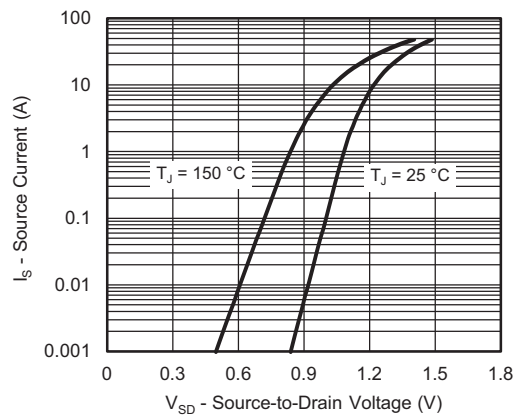
**On-Resistance vs. Junction Temperature**



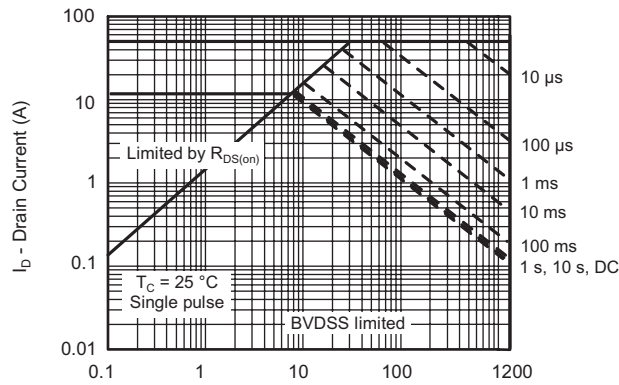
**Threshold Voltage**



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



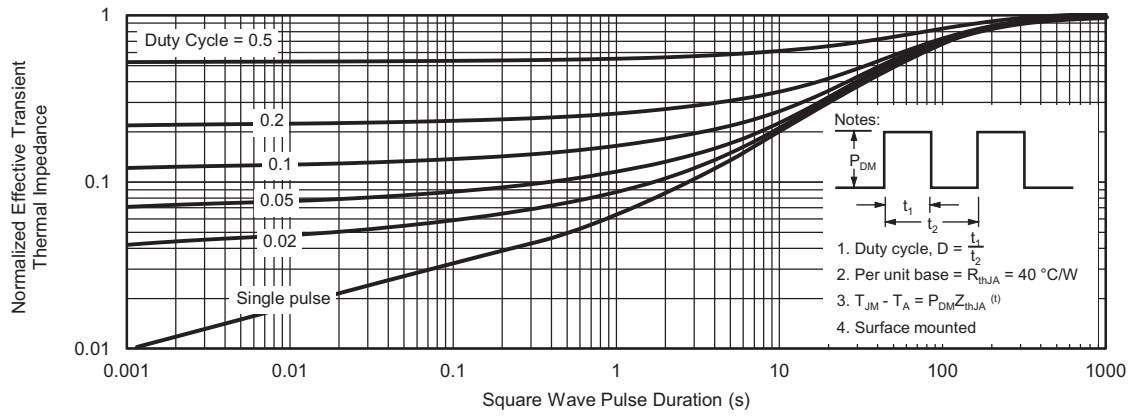
**Source Drain Diode Forward Voltage**



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

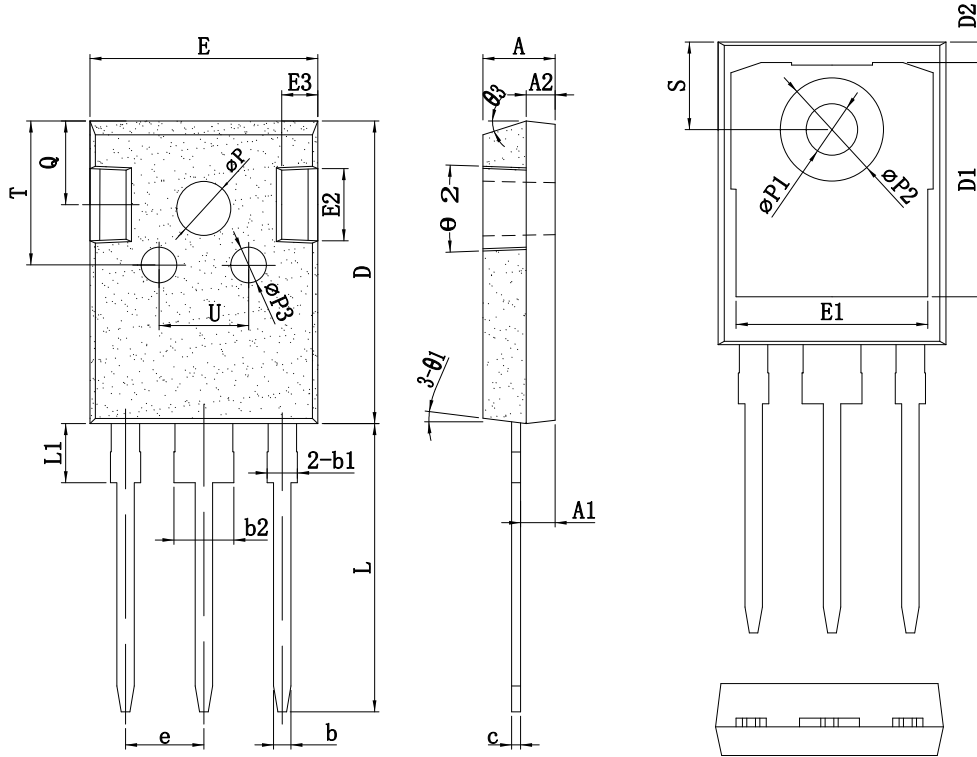
**Safe Operating Area**

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



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

## TO-247\_3L PACKAGE OUTLINE



COMMON DIMENSIONS  
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	TYP	MAX	SYMBOL	MIN	TYP	MAX
A	4.60	5.00	5.40	e	2.10	5.44	5.70
A1	2.10	2.41	2.70	L	19.00	19.98	21.00
A2	1.70	2.00	2.30	L1	-	-	4.50
b	1.00	1.20	1.40	$\Phi P$	3.30	3.70	4.00
b1	1.80	2.10	2.40	$\Phi P1$	3.25	3.55	3.85
b2	2.80	3.10	3.40	$\Phi P2$	6.80	7.18	7.60
C	0.45	0.60	0.75	$\Phi P3$	2.30	2.50	3.30
D	19.00	21.00	23.00	Q	5.50	5.80	6.30
D1	16.00	16.55	17.00	S	5.60	6.15	6.30
D2	0.95	1.20	1.45	T	9.50	10.00	10.50
E	15.70	15.80	16.50	U	6.00	-	8.00
E1	12.80	13.25	13.70	$\theta 1$	5°	7°	9°
E2	4.20	5.00	5.30	$\theta 2$	1°	3°	5°
E3	2.20	2.50	2.80	$\theta 3$	13°	15°	17°

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