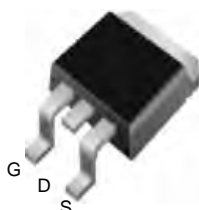


## N-Channel 200-V (D-S) MOSFET

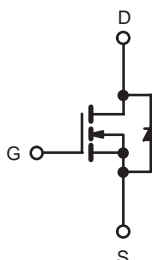
### PRODUCT SUMMARY

$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
200	0.035 at $V_{GS} = 10$ V	45

D<sup>2</sup>PAK  
(TO-263)



Top View



N-Channel MOSFET

### FEATURES

- DT-Trench Power MOSFET
- 175 °C Junction Temperature
- Low Thermal Resistance Package
- 100 %  $R_g$  and UIS tested



**RoHS\***  
COMPLIANT

### APPLICATIONS

- LCD/LED TV
- Consumer Appliances
- Lighting
- AC-DC Power Supply

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

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	$V_{DS}$	200	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current	$V_{GS}$ at 10 V	$T_C = 25$ °C	A
		$T_C = 100$ °C	
Pulsed Drain Current	$I_{DM}$	180	A
Single Pulse Avalanche Energy	$E_{AS}$	139	
Avalanche Current	$I_{AR}$	42	A
Repetitive Avalanche Energy	$E_{AR}$	33	mJ
Maximum Power Dissipation	$P_D$	$T_C = 25$ °C	W
		$T_A = 25$ °C <sup>b</sup>	
Peak Diode Recovery dV/dt	dV/dt	5.0	V/ns
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	- 55 to + 175	°C
Soldering Recommendations (Peak Temperature)	for 10 s	300	

### THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Maximum Junction-to-Ambient (PCB Mounted, Steady-State)	$R_{thJA}$	-	40	°C/W
Maximum Junction-to-Case (Drain)	$R_{thJC}$	-	0.45	

a. Package limited.

b. When Mounted on 1" square PCB (FR-4 material).

c. See SOA curve for voltage derating.

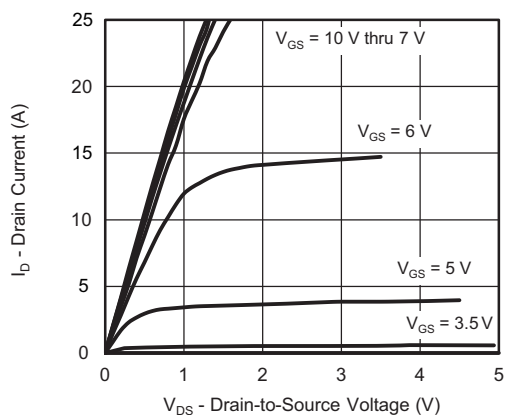
SPECIFICATIONS (T <sub>J</sub> = 25 °C, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	V <sub>DS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA	200	-	-	V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = 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> = 160 V, V <sub>GS</sub> = 0 V	-	-	1	μA
		V <sub>DS</sub> = 160 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125 °C	-	-	100	
		V <sub>DS</sub> = 160 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 175 °C	-	-	2	mA
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> ≥ 10 V, V <sub>GS</sub> = 10 V	45	-	-	A
Drain-Source On-State Resistance <sup>a</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 15 A	-	0.035	0.045	Ω
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 20 V, I <sub>D</sub> = 15 A	-	12	-	S
Dynamic <sup>b</sup>						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 100 V, f = 1 MHz	-	10050	-	pF
Output Capacitance	C <sub>oss</sub>		-	480	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	94	-	
Total Gate Charge <sup>c</sup>	Q <sub>g</sub>	V <sub>DS</sub> = 100 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 15 A	-	93	-	nC
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>		-	22	-	
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>		-	39	-	
Gate Resistance	R <sub>g</sub>	f = 1 MHz	-	4.2	-	Ω
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>	V <sub>DD</sub> = 100 V, R <sub>L</sub> = 1.67 Ω I <sub>D</sub> ≅ 15 A, V <sub>GEN</sub> = 10 V, R <sub>g</sub> = 1 Ω	-	17	-	ns
Rise Time <sup>c</sup>	t <sub>r</sub>		-	25	-	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>		-	29	-	
Fall Time <sup>c</sup>	t <sub>f</sub>		-	11	-	
Drain-Source Body Diode Ratings and Characteristics <sup>b</sup> (T <sub>C</sub> = 25 °C)						
Pulsed Current (t = 100 μs)	I <sub>SM</sub>		-	-	180	A
Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>F</sub> = 20 A, V <sub>GS</sub> = 0 V	-	0.75	1.2	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 20 A, d/dt = 100 A/μs	-	88	-	ns
Peak Reverse Recovery Charge	I <sub>RM(REC)</sub>		-	5	-	A
Reverse Recovery Charge	Q <sub>rr</sub>		-	0.25	-	μC

**Notes**

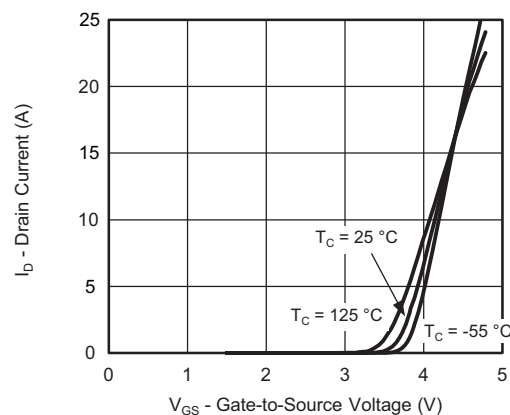
- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .  
 b. Guaranteed by design, not subject to production testing.  
 c. Independent of operating temperature.

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.

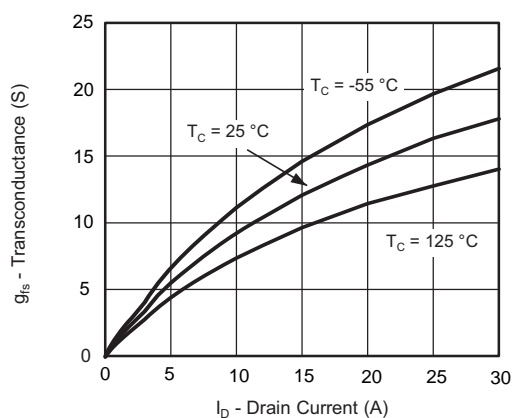
**TYPICAL CHARACTERISTICS** ( $T_A = 25\text{ }^{\circ}\text{C}$ , unless otherwise noted)



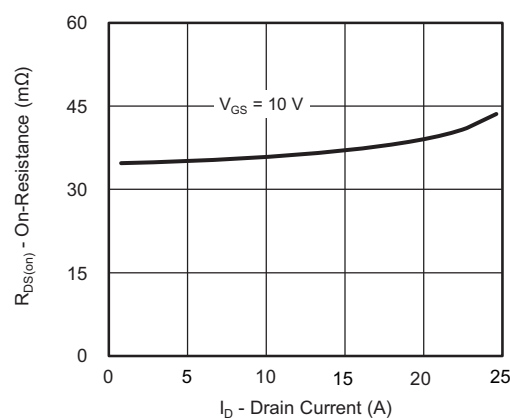
**Output Characteristics**



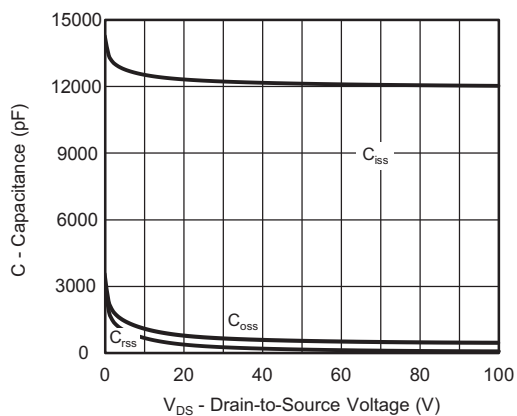
**Transfer Characteristics**



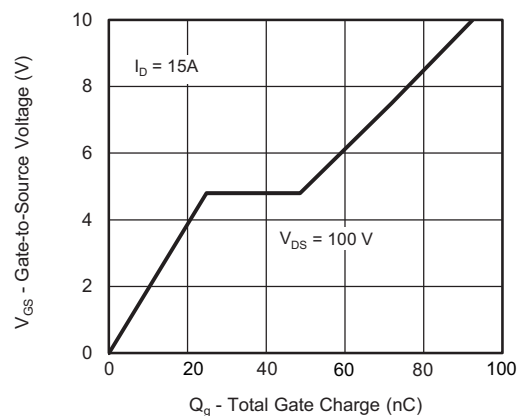
**Transconductance**



**On-Resistance vs. Drain Current**

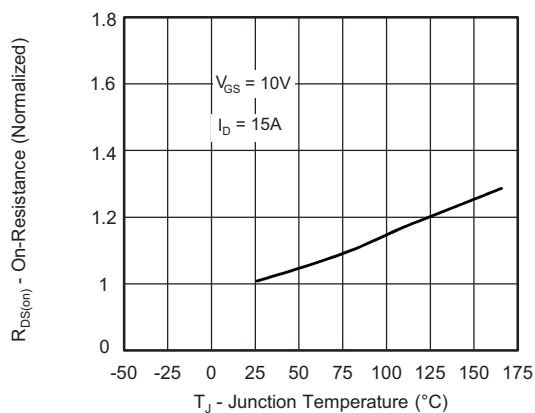


**Capacitance**

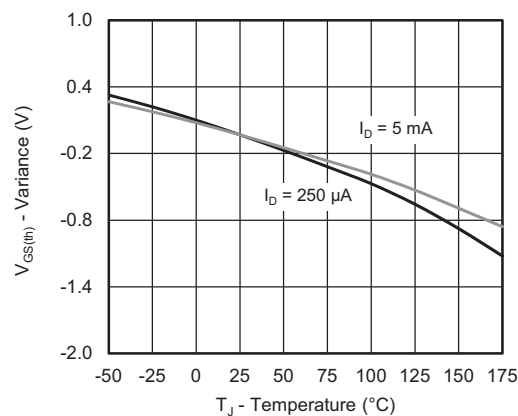


**Gate Charge**

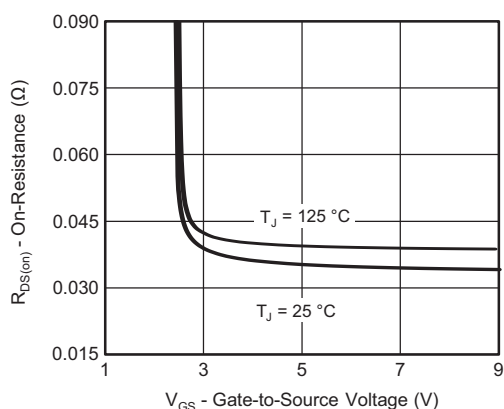
**TYPICAL CHARACTERISTICS** ( $T_A = 25\text{ }^{\circ}\text{C}$ , unless otherwise noted)



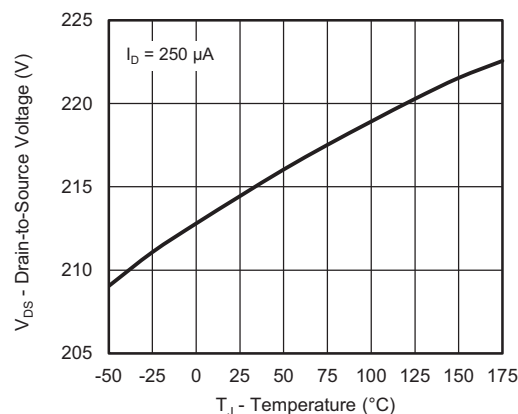
**On-Resistance vs. Junction Temperature**



**Threshold Voltage**

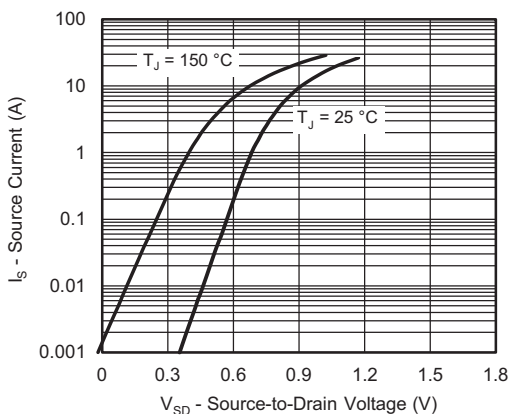


**On-Resistance vs. Gate-to-Source Voltage**

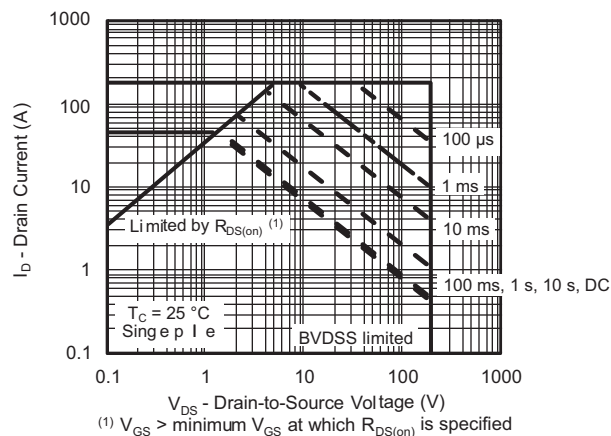


**Drain Source Breakdown vs. Junction Temperature**

$I_{DM}$  limited



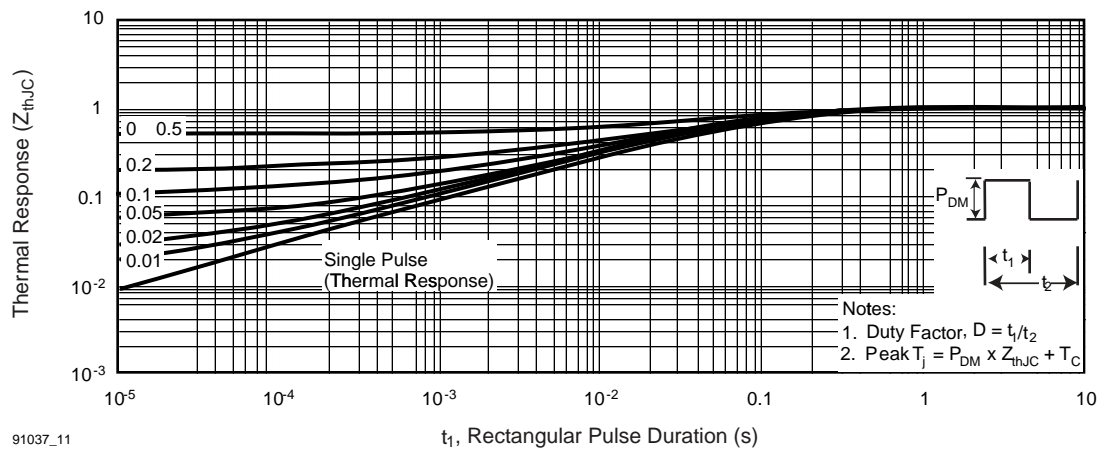
**Source Drain Diode Forward Voltage**



**Safe Operating Area**

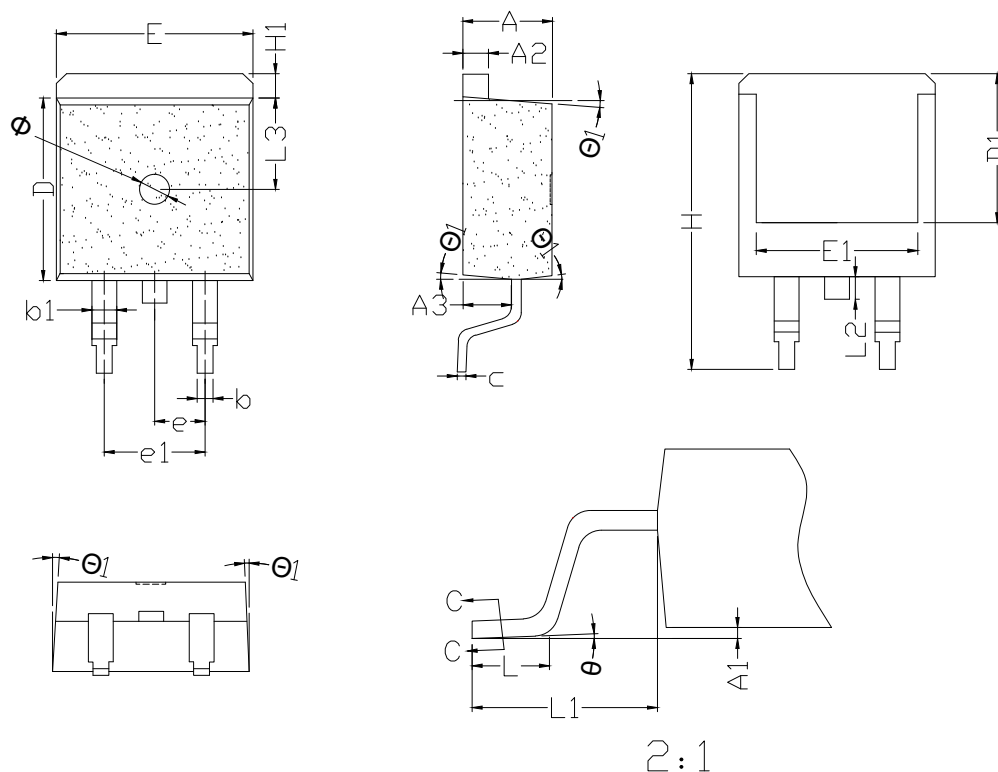
$I_D$  limited

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



**Fig. 11 - Maximum Effective Transient Thermal Impedance, Junction-to-Case**

## TO-263 PACKAGE OUTLINE



COMMON DIMENSIONS  
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	TYP	MAX	SYMBOL	MIN	TYP	MAX
A	4.10	4.50	4.80	e	2.35	2.54	2.75
A1	0.00	0.10	0.30	e1	5.08REF		
A2	1.10	1.30	1.50	H	14.50	15.15	16.00
A3	2.15	2.50	3.10	H1	1.00	1.28	1.75
b	0.60	0.80	1.05	L	1.80	2.23	2.90
b1	1.05	1.33	1.50	L1	4.30	4.75	5.50
c	0.33	0.50	0.66	L2	1.00	1.30	1.85
D	8.40	9.20	9.60	L3	0.90	4.65	9.00
D1	7.50REF			$\phi$	0°	2°	5°
E	9.60	10.02	10.80	$\phi 1$	2°	-	7°
E1	7.60	9.88	10.30	$\Phi$	1.5BSC		

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