

## N-Channel Enhancement-Mode MOSFET

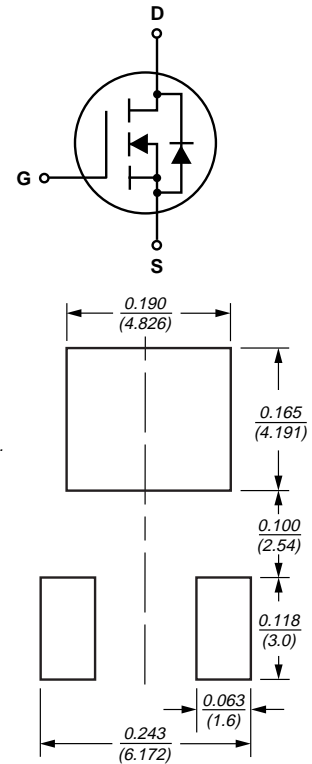
$V_{DS}$  30V  $R_{DS(ON)}$  7m $\Omega$   $I_D$  78A



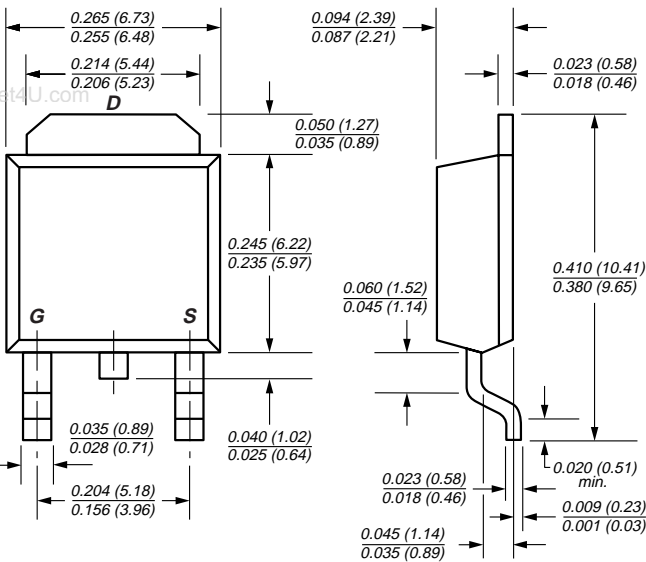
**TRENCH  
GENFET®**

**TO-252 (DPAK)**

**New Product**



**Mounting Pad Layout**



### Mechanical Data

**Case:** JEDEC TO-252 molded plastic body

**Terminals:** Solder plated, solderable per MIL-STD-750, Method 2026

**High temperature soldering guaranteed:**  
250°C/10 seconds at terminals

**Weight:** 0.011oz., 0.4g

### Features

- Advanced Trench Process Technology
- High Density Cell Design for Ultra Low On-Resistance
- Specially Designed for Low Voltage DC/DC Converters
- Fast Switching for High Efficiency

### Maximum Ratings and Thermal Characteristics ( $T_C = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current <sup>(1)</sup>	$I_D$	78	A
Pulsed Drain Current	$I_{DM}$	180	
Maximum Power Dissipation	$P_D$	70 45	W
	$T_C = 25^\circ\text{C}$ $T_C = 70^\circ\text{C}$		
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to 150	$^\circ\text{C}$
Junction-to-Case Thermal Resistance	$R_{\theta JC}$	1.8	$^\circ\text{C/W}$
Junction-to-Ambient Thermal Resistance <sup>(2)</sup>	$R_{\theta JA}$	40	$^\circ\text{C/W}$

**Notes:** (1) Maximum DC current limited by the package

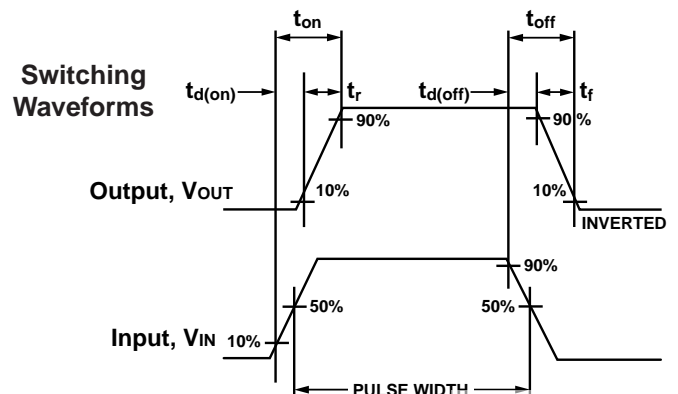
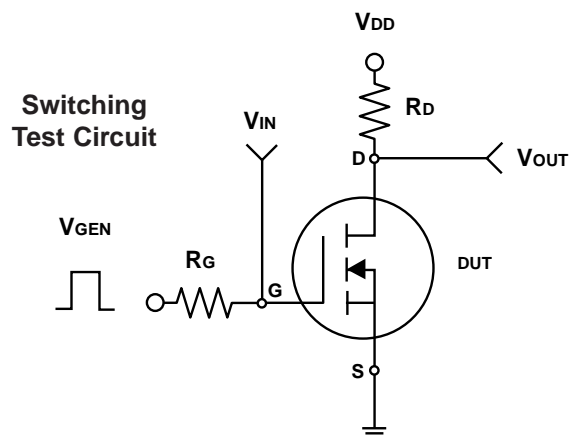
(2) 1-in<sup>2</sup> 2oz. Cu PCB mounted

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## Electrical Characteristics (T<sub>J</sub> = 25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	30	—	—	V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	1.0	—	3.0	V
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±20V	—	—	±100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V	—	—	1.0	μA
On-State Drain Current <sup>(1)</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> ≥ 5V, V <sub>GS</sub> = 10V	50	—	—	A
Drain-Source On-State Resistance <sup>(1)</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 15A	—	6.2	7	mΩ
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 13A	—	8.5	10	
Forward Transconductance <sup>(1)</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15V, I <sub>D</sub> = 15A	—	50	—	S
Dynamic						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =5V, I <sub>D</sub> =15A	—	31	43	nC
Gate-Source Charge	Q <sub>gs</sub>	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 10V I <sub>D</sub> = 15A	—	60	84	
Gate-Drain Charge	Q <sub>gd</sub>		—	9	—	
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 15V, R <sub>L</sub> = 15Ω I <sub>D</sub> ≅ 1A, V <sub>GEN</sub> = 10V R <sub>G</sub> = 6Ω	—	13	26	ns
Turn-On Rise Time	t <sub>r</sub>		—	16	29	
Turn-Off Delay Time	t <sub>d(off)</sub>		—	94	132	
Turn-Off Fall Time	t <sub>f</sub>		—	38	57	
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0V	—	3240	—	pF
Output Capacitance	C <sub>oss</sub>	V <sub>DS</sub> = 15V	—	625	—	
Reverse Transfer Capacitance	C <sub>rss</sub>	f = 1.0MHz	—	285	—	
Source-Drain Diode						
Max Diode Forward Current	I <sub>S</sub>	—	—	—	20	A
Diode Forward Voltage <sup>(1)</sup>	V <sub>SD</sub>	I <sub>S</sub> = 20A, V <sub>GS</sub> = 0V	—	0.85	1.3	V

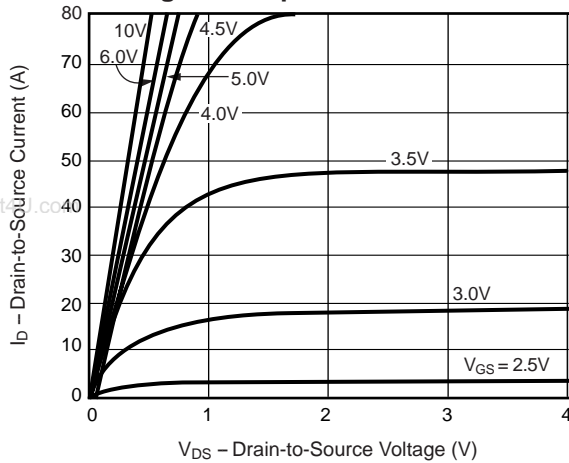
**Notes:** (1) Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%



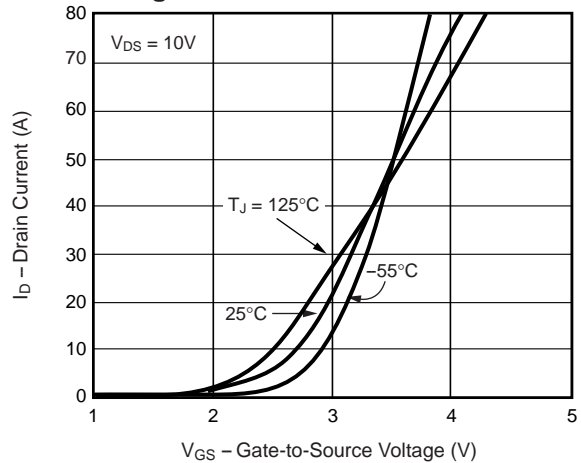
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## Ratings and Characteristic Curves ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

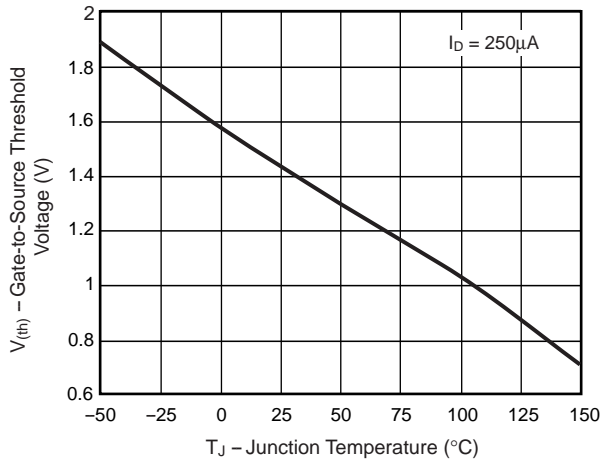
**Fig. 1 – Output Characteristics**



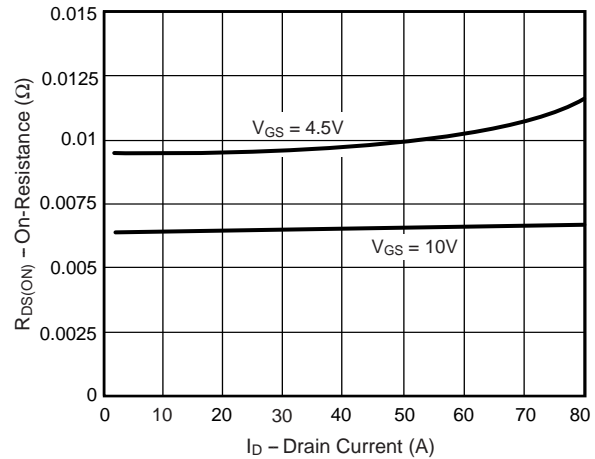
**Fig. 2 – Transfer Characteristics**



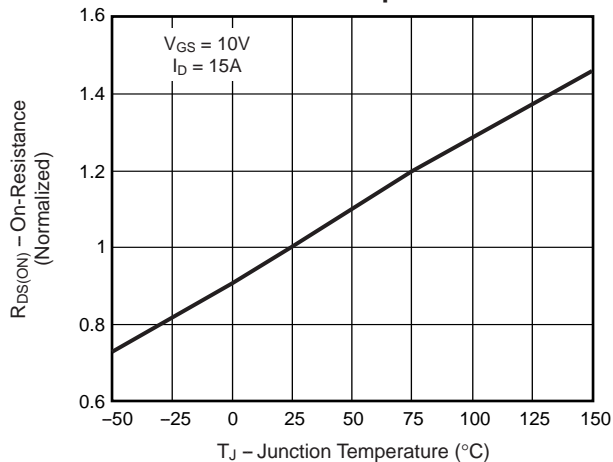
**Fig. 3 – Threshold Voltage**



**Fig. 4 – On-Resistance vs.  
Drain Current**



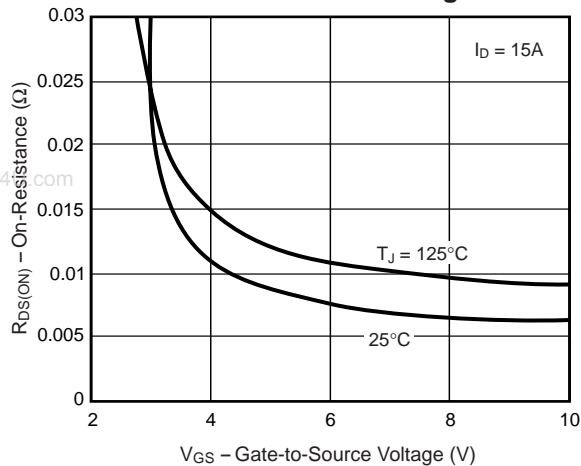
**Fig. 5 – On-Resistance vs.  
Junction Temperature**



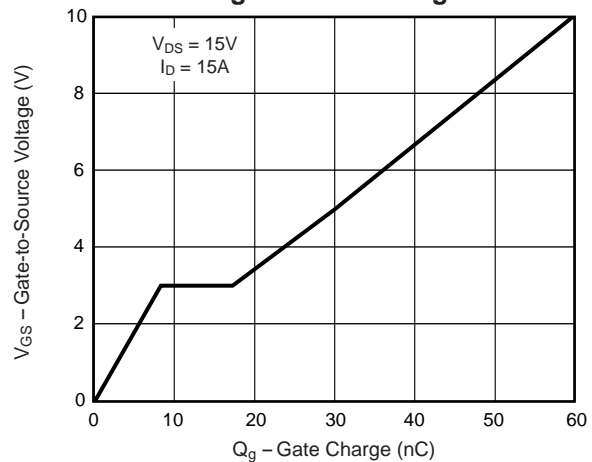
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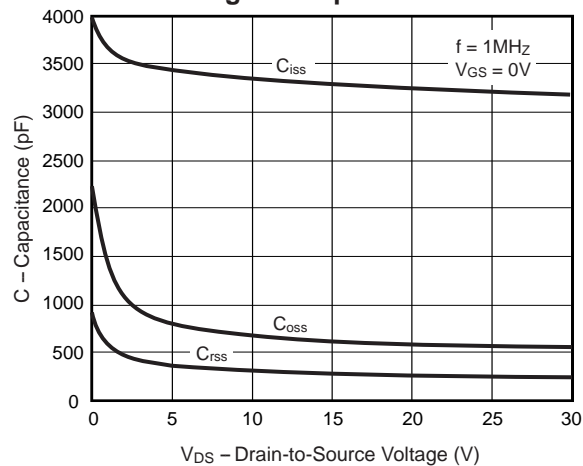
**Fig. 6 – On-Resistance vs.  
Gate-to-Source Voltage**



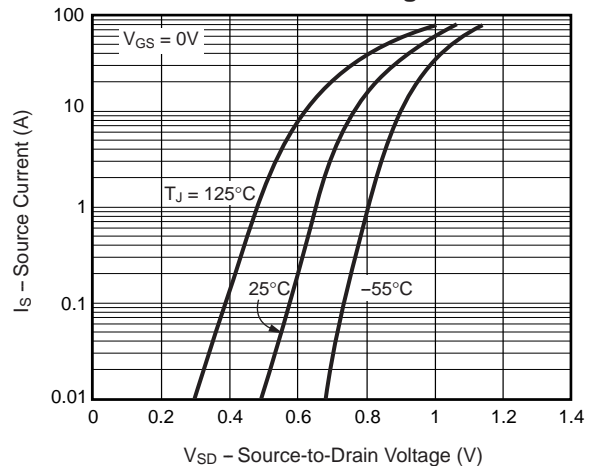
**Fig. 7 – Gate Charge**



**Fig. 8 – Capacitance**



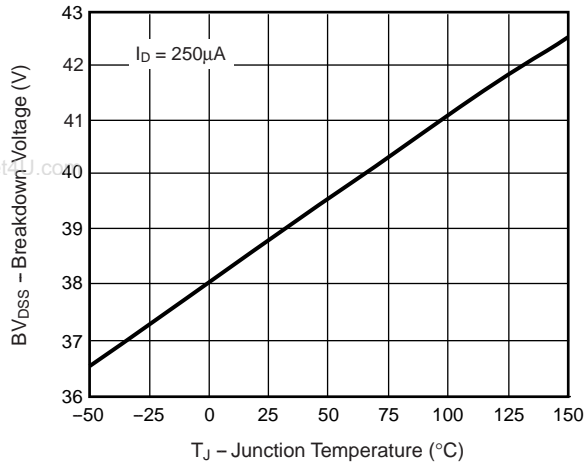
**Fig. 9 – Source-Drain Diode  
Forward Voltage**



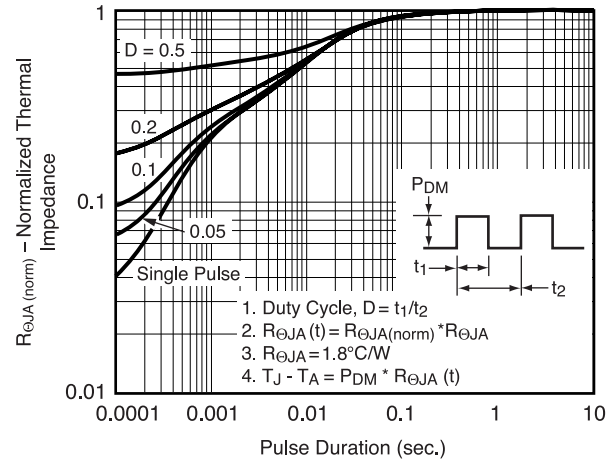
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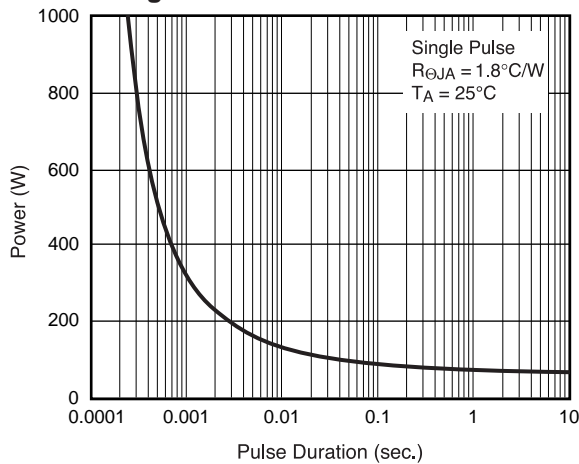
**Fig. 10 – Breakdown Voltage  
vs. Junction Temperature**



**Fig. 11 – Transient Thermal  
Impedance**



**Fig. 12 – Power vs. Pulse Duration**



**Fig. 13 – Maximum Safe Operating Area**

