

N-Channel Enhancement-Mode MOSFET

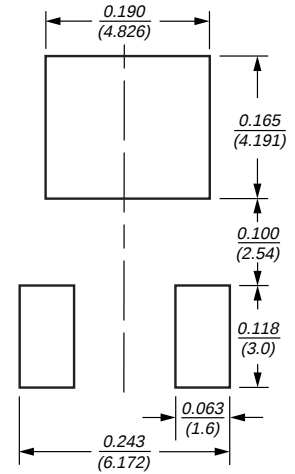
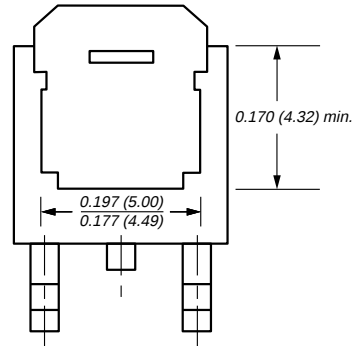
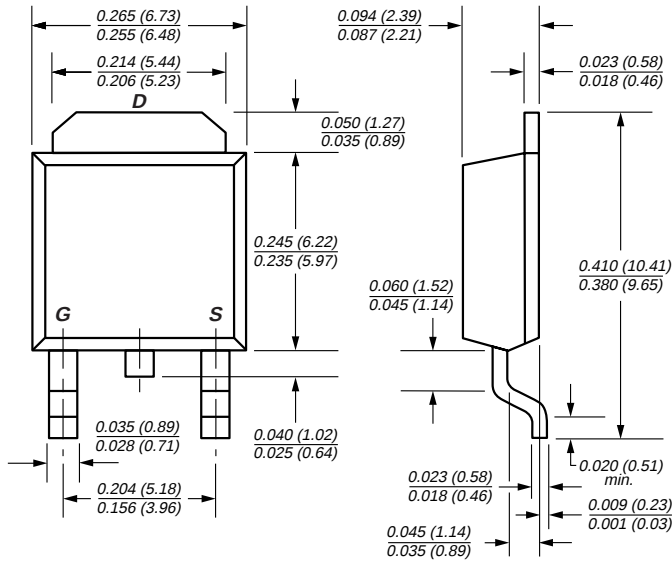
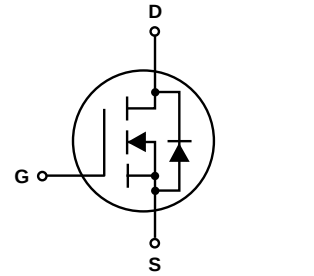
V_{DS} 30V $R_{DS(ON)}$ 7m Ω I_D 78A



**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}	± 20	
Continuous Drain Current ⁽¹⁾	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 ⁽²⁾	$R_{\theta JA}$	40	$^\circ\text{C/W}$

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

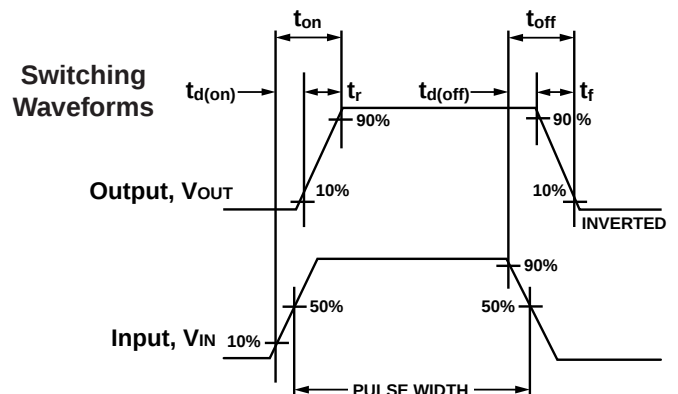
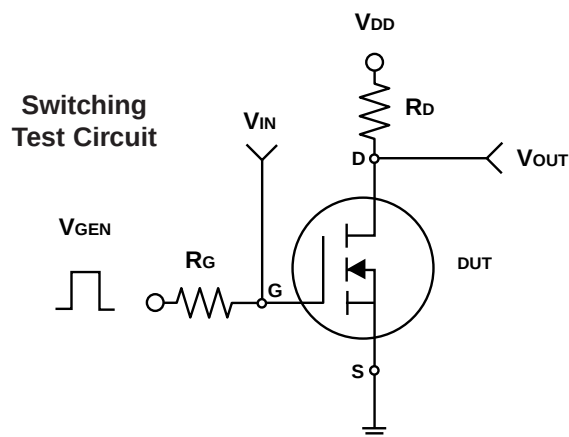
(2) 1-in² 2oz. Cu PCB mounted

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Electrical Characteristics (T_J = 25°C unless otherwise noted)

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

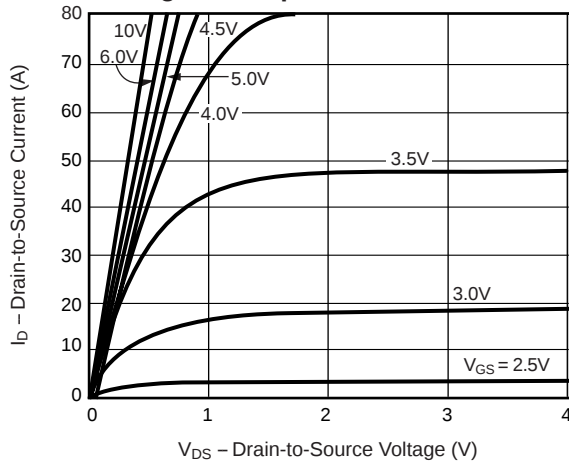


Fig. 2 – Transfer Characteristics

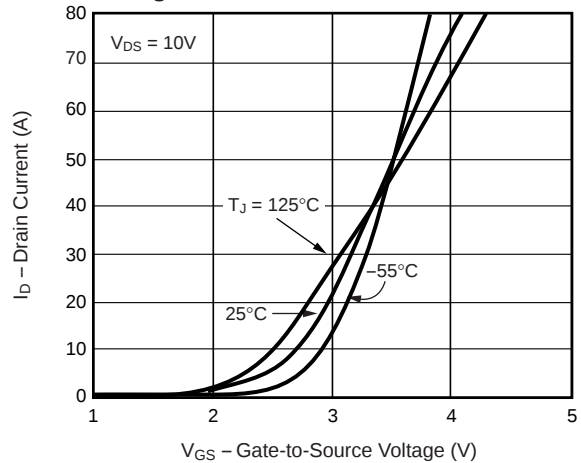
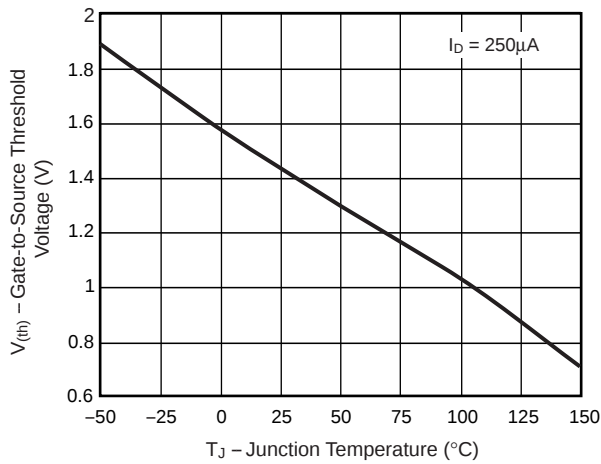
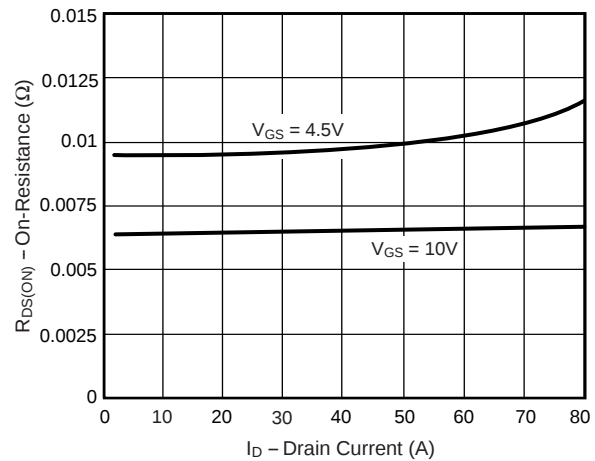


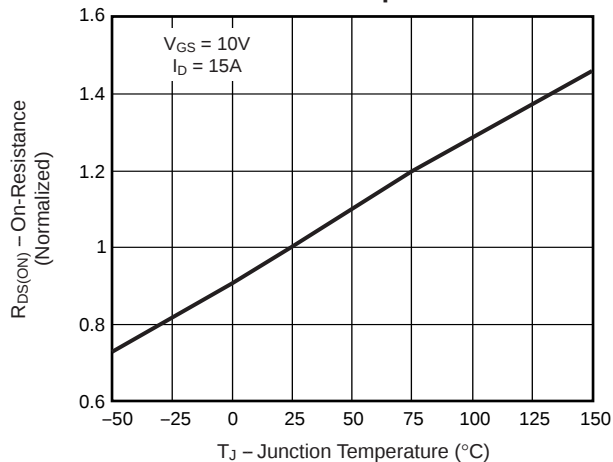
Fig. 3 – Threshold Voltage



**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**

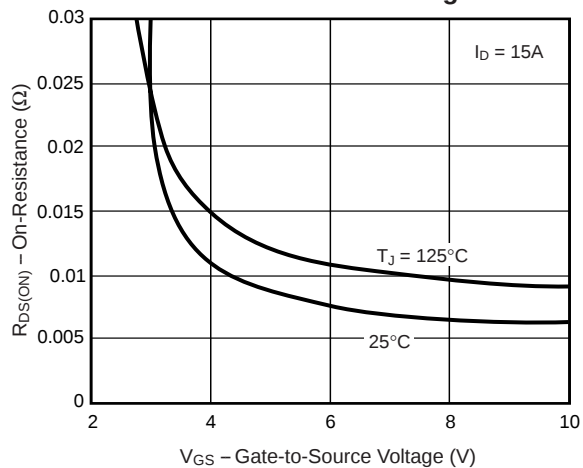


Fig. 7 – Gate Charge

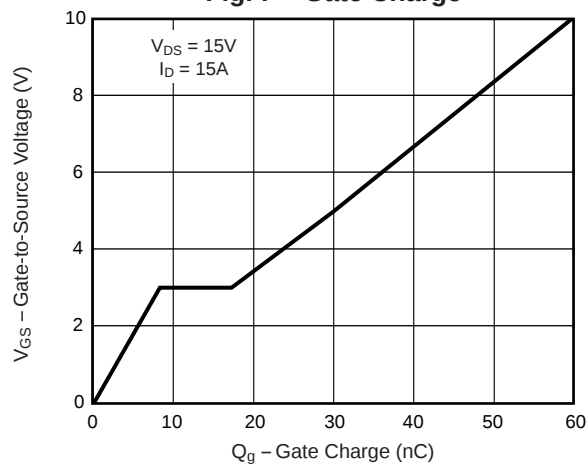
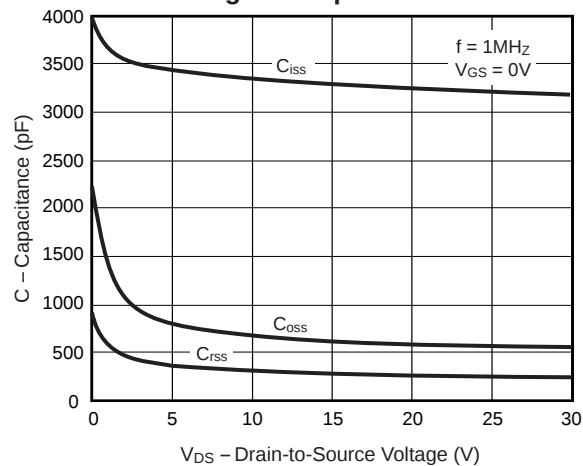
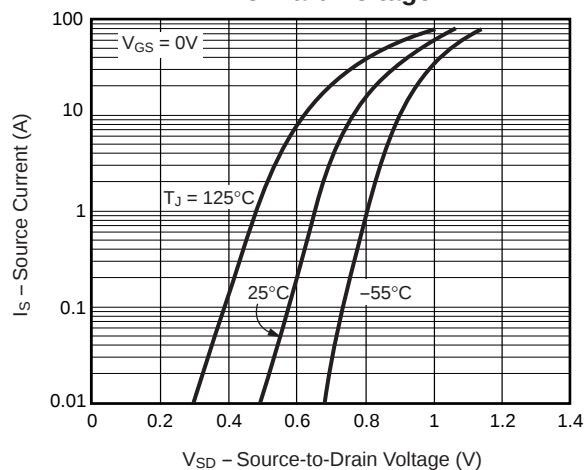


Fig. 8 – Capacitance



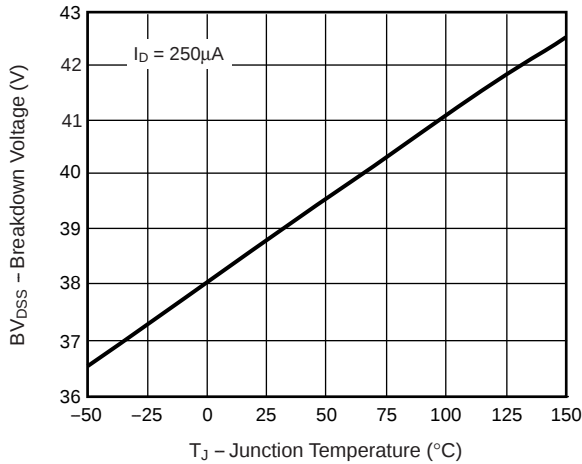
**Fig. 9 – Source-Drain Diode
Forward Voltage**



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



**Fig. 11 – Transient Thermal
Impedance**

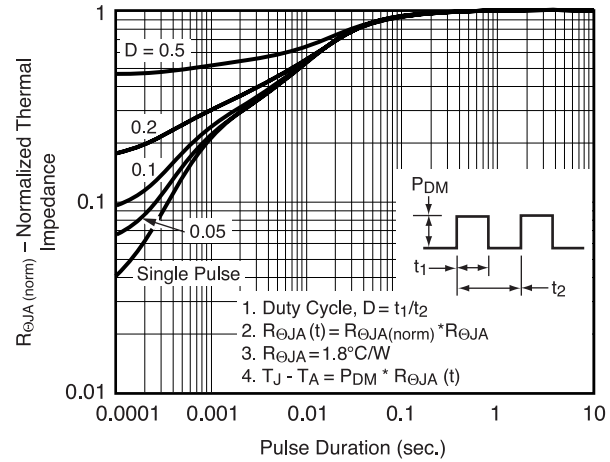


Fig. 12 – Power vs. Pulse Duration

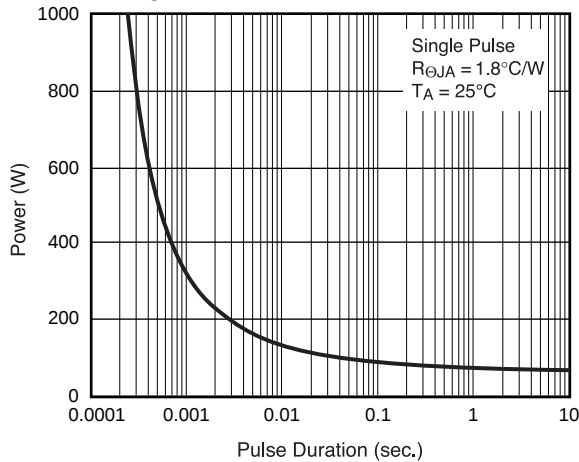


Fig. 13 – Maximum Safe Operating Area

