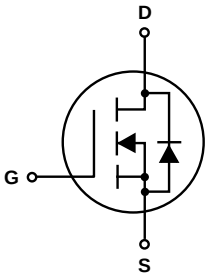
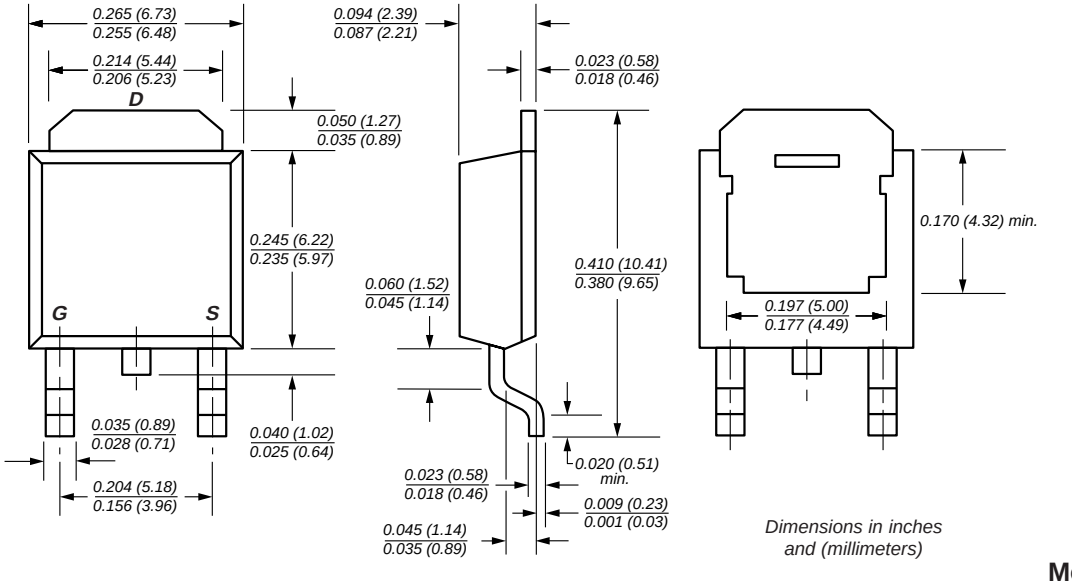
N-Channel Enhancement-Mode MOSFET

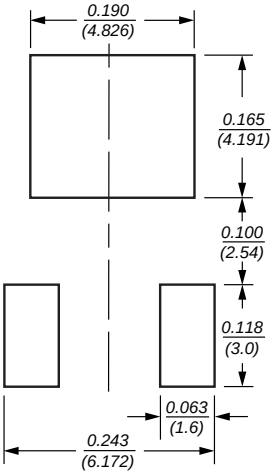
TRENCH GENFET®

V_{DS} 30V
$R_{DS(ON)}$ 15mΩ
I_D 43A



TO-252 (DPAK)





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°C unless otherwise noted)

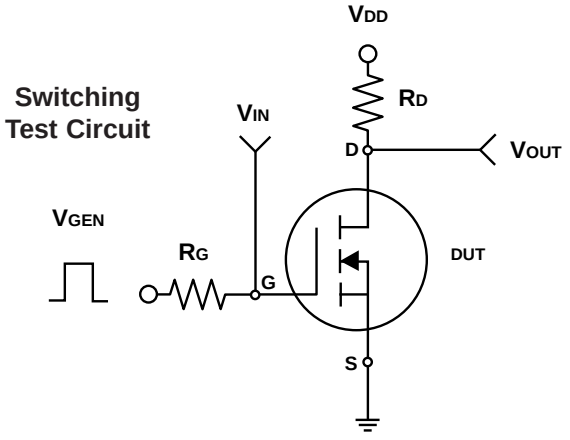
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current		I_D	43	A
Pulsed Drain Current[1]		I_{DM}	120	
Maximum Power Dissipation	T_C = 25°C T_C = 100°C	P_D	44.5 17.8	W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	–55 to 150	°C
Junction-to-Case Thermal Resistance		$R_{\theta JC}$	2.8	°C/W
Junction-to-Ambient Thermal Resistance[2]		$R_{\theta JA}$	50	

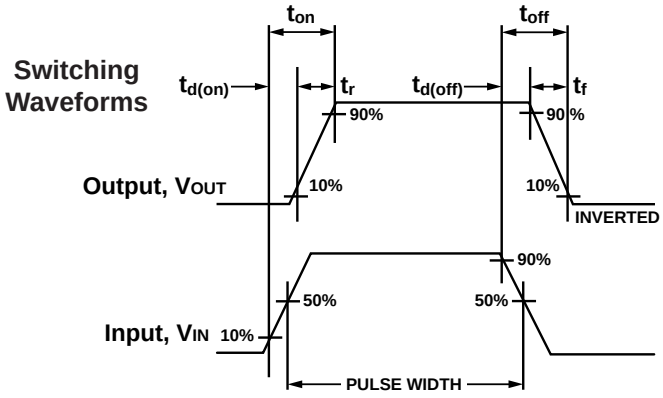
Note: (1) Pulse width limited by maximum junction temperature
(2) 1-in^2 2oz. Cu PCB mounted

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_{GS} = ±20V, V_{DS} = 0V	–	–	±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 30V, V_{GS} = 0V	–	–	1	µA
On-State Drain Current(1)	$I_{D(on)}$	V_{DS} ≥ 5V, V_{GS} = 10V	40	–	–	A
Drain-Source On-State Resistance(2)	$R_{DS(on)}$	V_{GS} = 10V, I_D = 20A	–	12.5	15	mΩ
		V_{GS} = 4.5V, I_D = 17A	–	17.5	21	
Forward Transconductance(1)	g_{fs}	V_{DS} = 15V, I_D = 20A	–	35	–	S
Dynamic						
Total Gate Charge	Q_g	V_{DS}=15V, V_{GS}=5.0V, I_D=20A	–	16	22	nC
		V_{DS} = 15V, V_{GS} = 10V, I_D = 20A	–	34	48	
Gate-Source Charge	Q_{gs}		–	5.7	–	
Gate-Drain Charge	Q_{gd}		–	4.7	–	
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 15V, R_L = 15Ω, I_D ≅ 1A, V_{GEN} = 10V, R_G = 6Ω	–	10	20	ns
Rise Time	t_r		–	9	18	
Turn-Off Delay Time	$t_{d(off)}$		–	47	75	
Fall Time	t_f		–	13	26	
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 15V, f = 1.0MHz	–	1850	–	pF
Output Capacitance	C_{oss}		–	315	–	
Reverse Transfer Capacitance	C_{rss}		–	150	–	
Source-Drain Diode						
Max Diode Forward Current	I_S	–	–	–	20	A
Diode Forward Voltage(1)	V_{SD}	I_S = 20A, V_{GS} = 0V	–	0.91	1.3	V

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





Ratings and Characteristic Curves (T_A = 25°C unless otherwise noted)

Fig. 1 – Output Characteristics

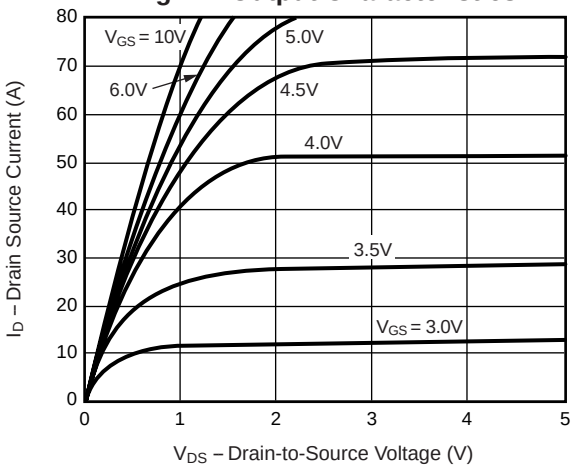


Fig. 2 – Transfer Characteristics

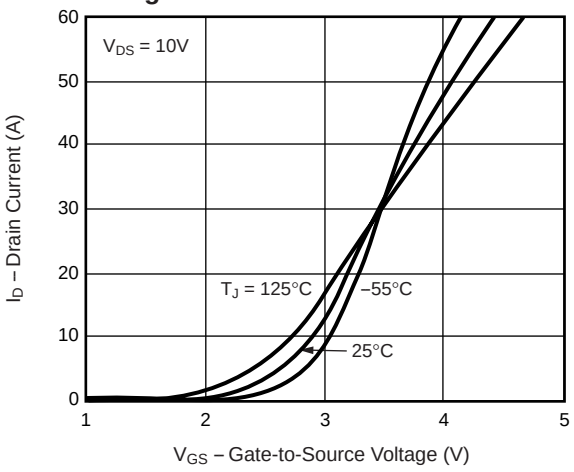


Fig. 3 – Threshold Voltage vs. Temperature

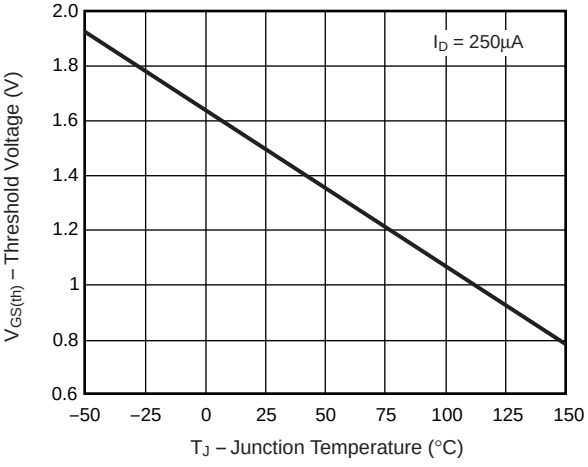


Fig. 4 – On-Resistance vs. Drain Current

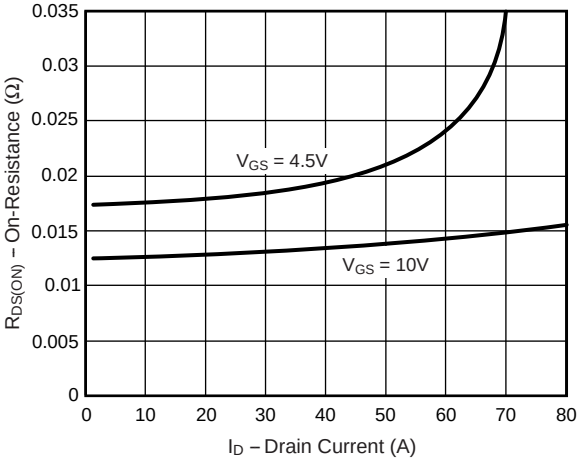
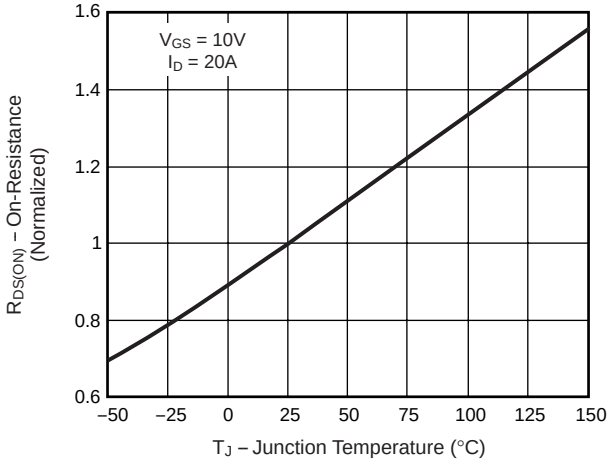


Fig. 5 – On-Resistance vs. Junction Temperature



Ratings and Characteristic Curves (T_A = 25°C unless otherwise noted)

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

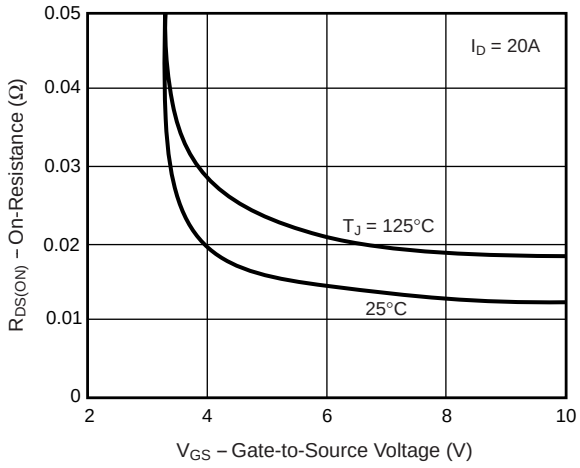


Fig. 7 – Gate Charge

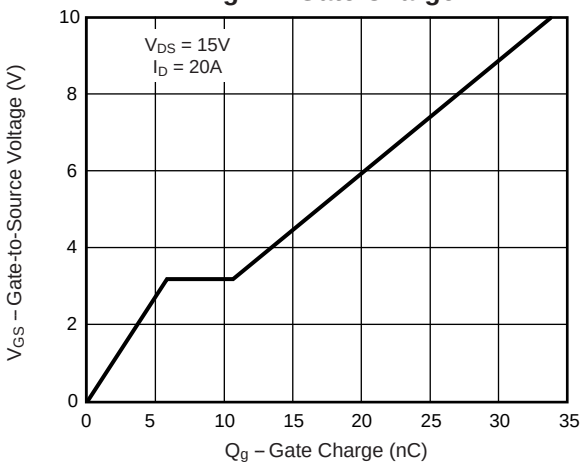


Fig. 8 – Capacitance

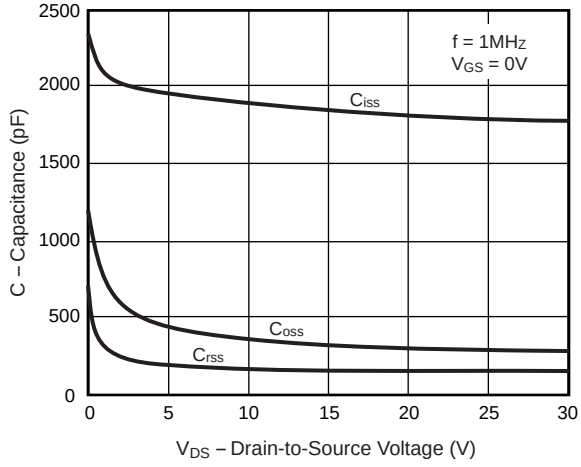
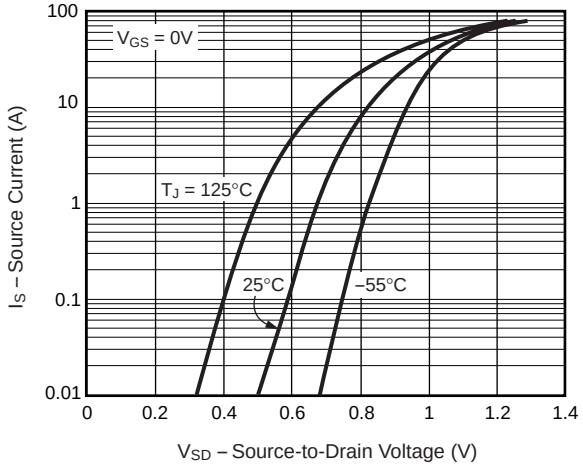


Fig. 9 – Source-Drain Diode Forward Voltage



Ratings and Characteristic Curves (T_A = 25°C unless otherwise noted)

Fig. 10 – Transient Thermal Impedance

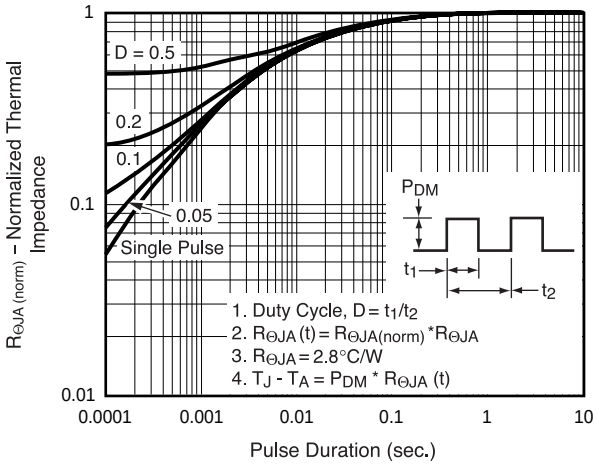


Fig. 11 – Power vs. Pulse Duration

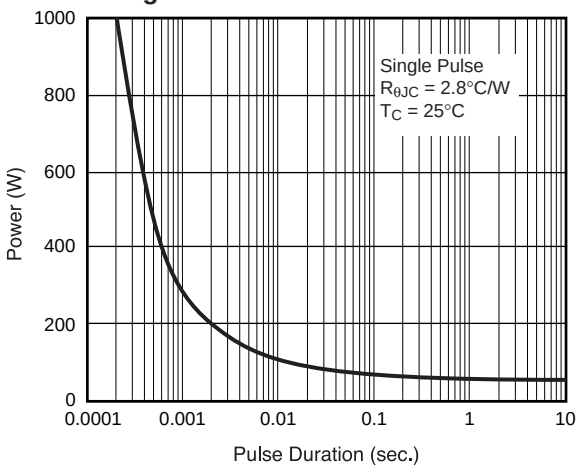


Fig. 12 – Maximum Safe Operating Area