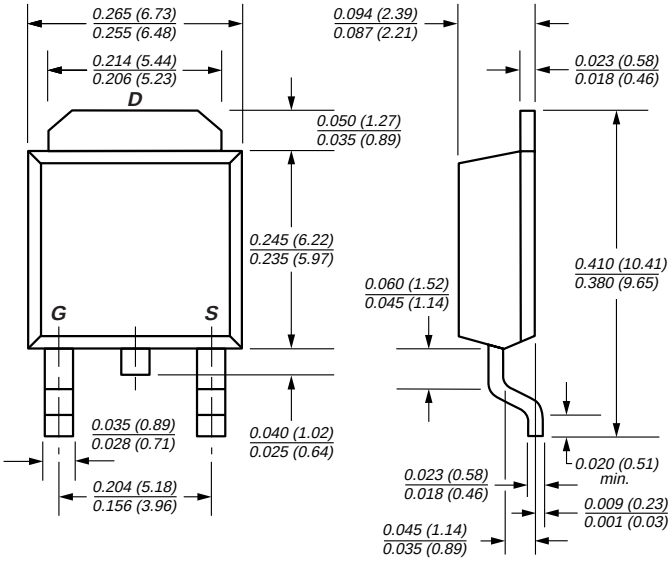
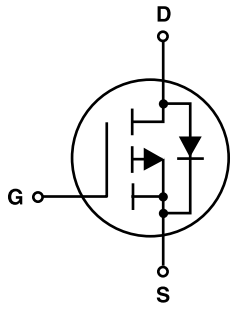
N-Channel Enhancement-Mode MOSFET

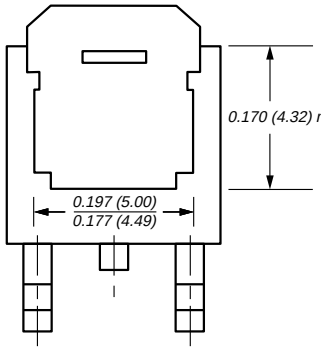
V_{DS} 30V
$R_{DS(ON)}$ 10mΩ
I_D 53A

TRENCH GENFET®

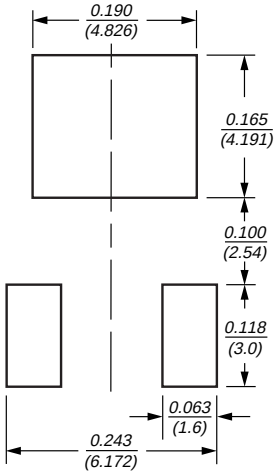
TO-252 (DPAK)







Dimensions in inches and (millimeters)



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)

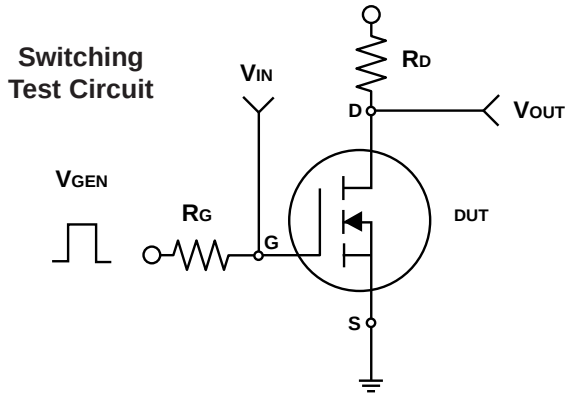
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current(3) T_J = 150°C	T_C = 25°C T_C = 100°C	I_D	53 33	A
Pulsed Drain Current(1)		I_{DM}	150	
Power Dissipation T_J = 150°C	T_C = 25°C T_C = 100°C T_A = 25°C(2)	P_D	45 18 2.5	W
Operating 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	

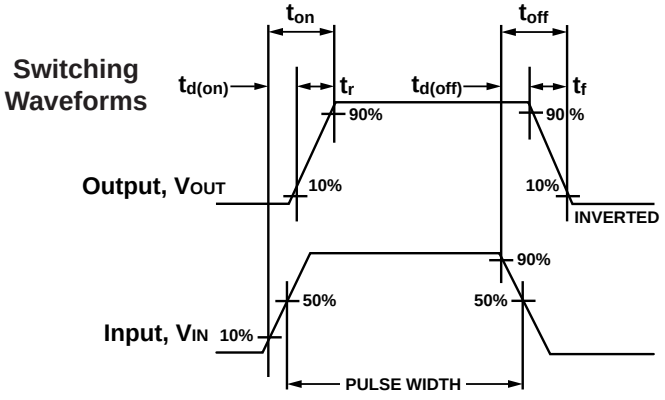
Notes: (1) Pulse width limited by maximum junction temperature
(2) Surface mounted on a 1in² 2oz. Cu PCB (FR-4 material)
(3) Maximum DC current limited by the package

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} = 24V, V_{GS} = 0V	–	–	1	μA
		V_{DS} = 24V, V_{GS} = 0V, T_J = 125°C	–	–	10	
On-State Drain Current[1]	$I_{D(on)}$	V_{DS} ≥ 5V, V_{GS} = 10V	53	–	–	A
Drain-Source On-State Resistance[1]	$R_{DS(on)}$	V_{GS} = 10V, I_D = 25A	–	8	10	mΩ
		V_{GS} = 4.5V, I_D = 20A	–	12.5	15.5	
Forward Transconductance[1]	g_{fs}	V_{DS} = 10V, I_D = 25A	–	40	–	S
Dynamic						
Total Gate Charge[1]	Q_g	V_{DS}=15V, V_{GS}=5.0V, I_D=25A	–	21	25	nC
		V_{DS} = 15V, V_{GS} = 10V, I_D = 25A	–	38	50	
Gate-Source Charge[1]	Q_{gs}		–	7	–	
Gate-Drain Charge[1]	Q_{gd}		–	7.5	–	
Turn-On Delay Time[1]	$t_{d(on)}$	V_{DD} = 15V, I_D ≅ 1A, V_{GEN} = 10V, R_G = 6Ω	–	15	25	ns
Rise Time[1]	t_r		–	13	20	
Turn-Off Delay Time[1]	$t_{d(off)}$		–	70	100	
Fall Time[1]	t_f		–	31	50	
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 15V, f = 1.0MHz	–	2204	–	pF
Output Capacitance	C_{oss}		–	446	–	
Reverse Transfer Capacitance	C_{rss}		–	219	–	
Source-Drain Diode						
Max. Diode Forward Current	I_S	–	–	–	35	A
Max. Pulsed Diode Forward Current[2]	I_{SM}	–	–	–	150	A
Diode Forward Voltage[1]	V_{SD}	I_S = 20A, V_{GS} = 0V	–	0.87	1.3	V
Reverse Recovery Time[1]	t_{rr}	I_F = 20A, di/dt = 100A/μs	–	159	–	ns
Peak Reverse Recovery Current[1]	I_{RRM}		–	3.3	–	A
Reverse Recovery Charge[1]	Q_{rr}		–	282	–	nC

Note: (1) Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%
(2) Pulse width limited by maximum junction temperature





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

Fig. 1 – Output Characteristics

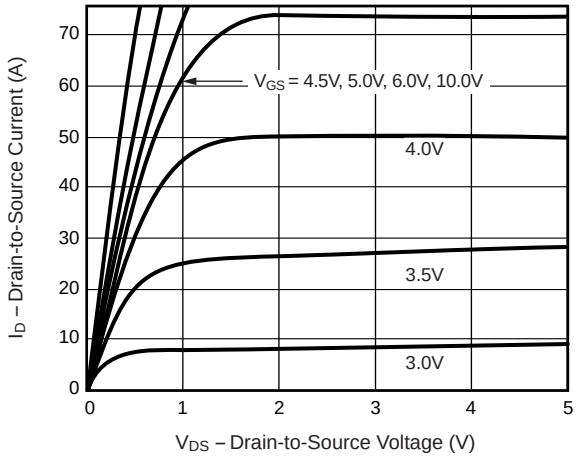


Fig. 2 – Transfer Characteristics

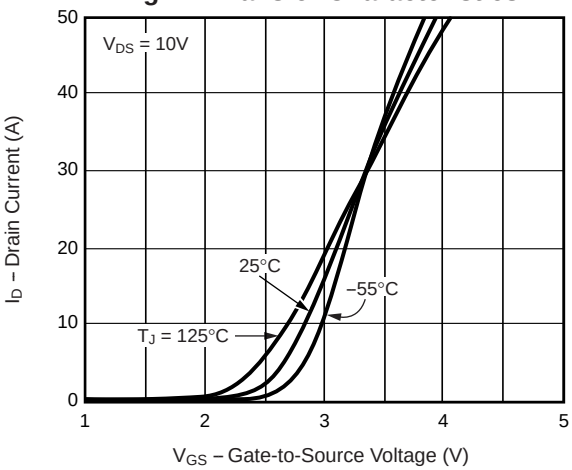


Fig. 3 – Threshold Voltage

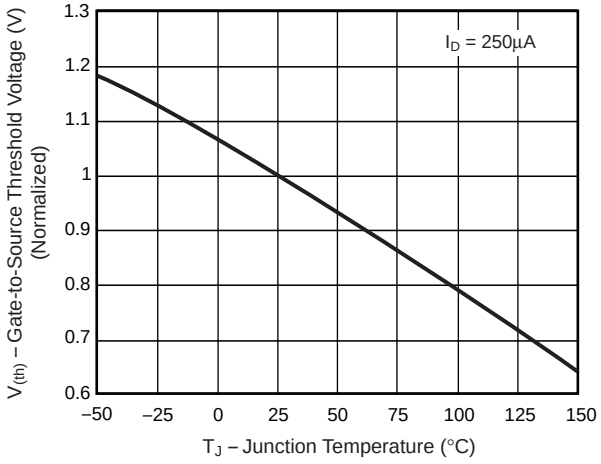


Fig. 4 – On-Resistance vs. Drain Current

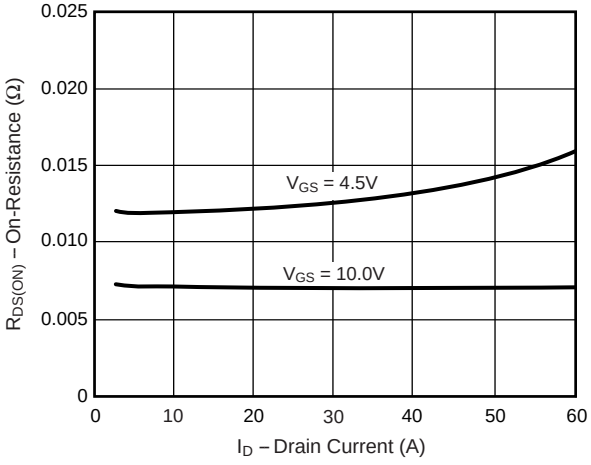


Fig. 5 – On-Resistance vs. Junction Temperature

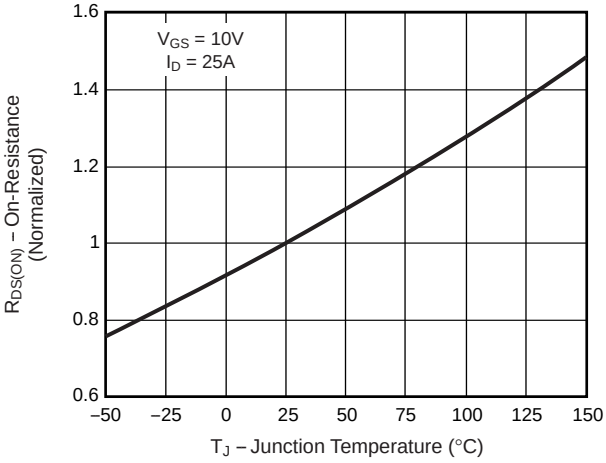
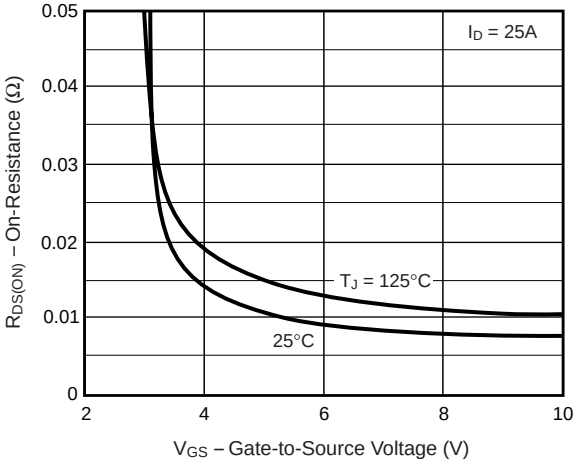


Fig. 6 – On-Resistance vs. Gate-to-Source Voltage



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

Fig. 7 – Gate Charge

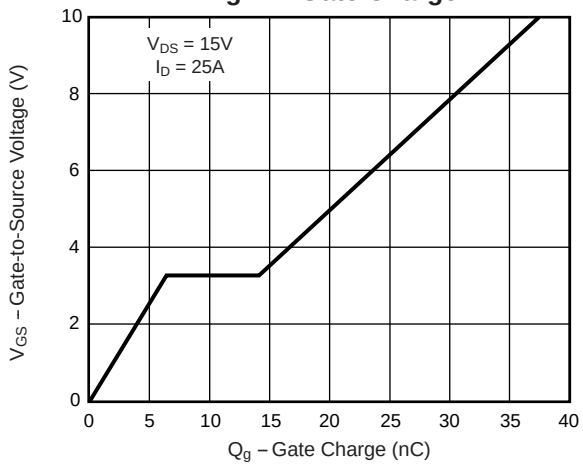


Fig. 8 – Capacitance

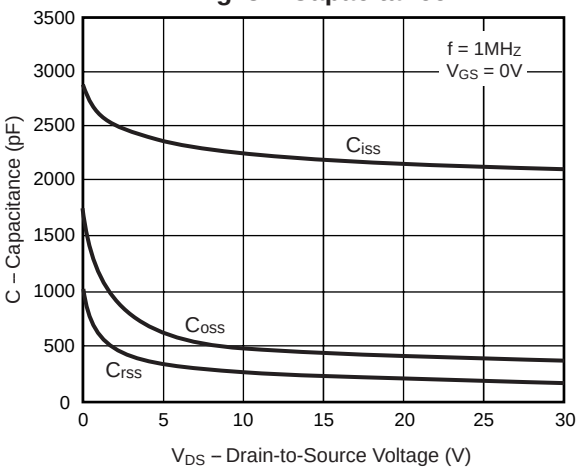


Fig. 9 – Source-Drain Diode Forward Voltage

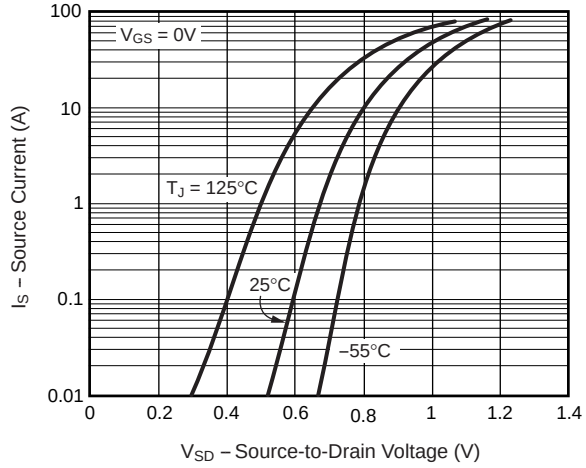


Fig. 10 – Thermal Impedance

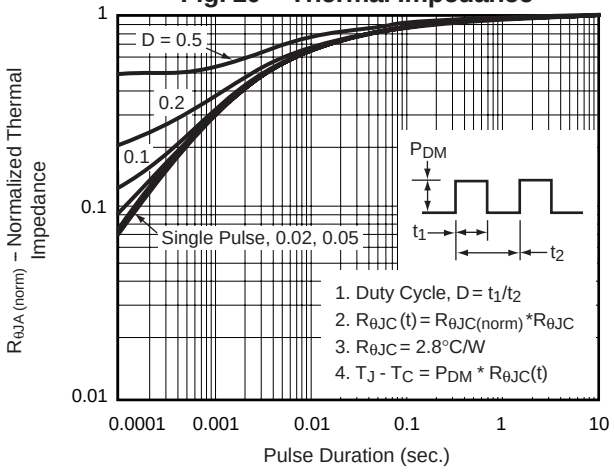


Fig. 11 – Power vs. Pulse Duration

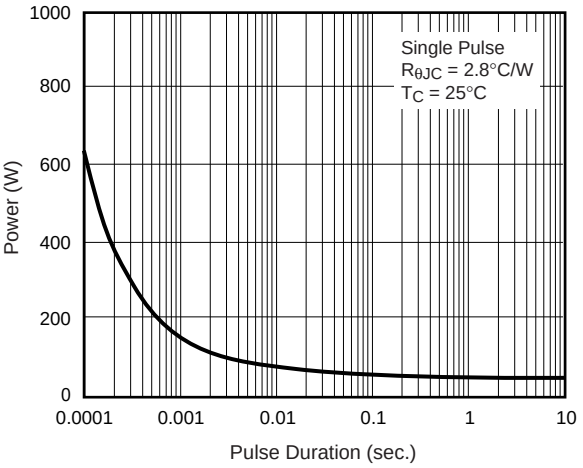


Fig. 12 – Maximum Safe Operating Area