

N-Channel Enhancement-Mode MOSFET

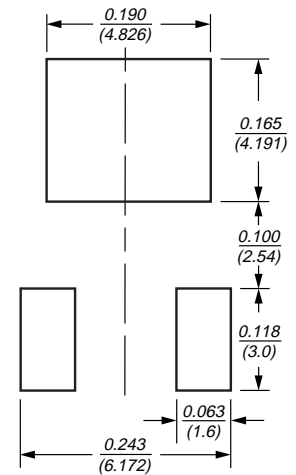
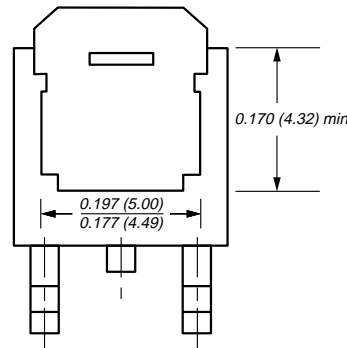
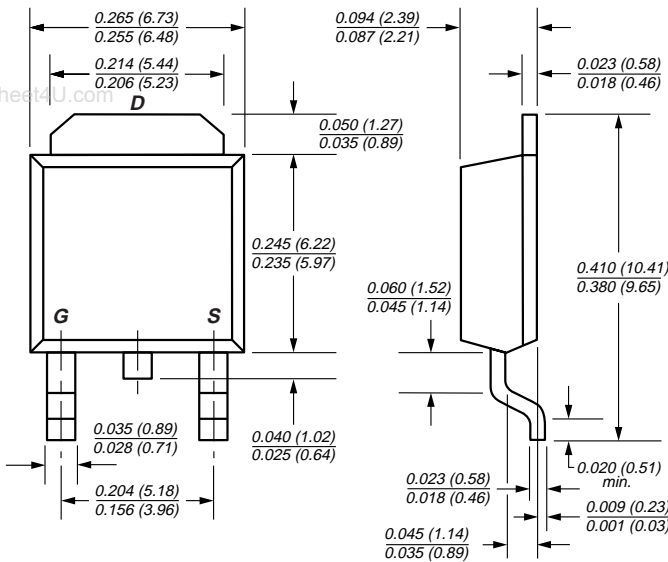
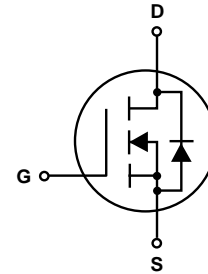
V_{DS} 60V R_{DS(ON)} 22mΩ I_D 42A



TRENCH GENFET®

New Product

TO-252 (DPAK)



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
- Rugged-Avalanche Energy Rated
- 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}	60	V
Gate-Source Voltage	V _{GS}	±20	V
Continuous Drain Current V _{GS} = 10V	I _D	42 26	A
Pulsed Drain Current ⁽¹⁾	I _{DM}	100	A
Maximum Power Dissipation	P _D	62.5	W
Single Pulse Avalanche Energy ⁽²⁾	E _{AS}	210	mJ
Avalanche Current ⁽¹⁾	I _{AR}	21	A
Repetitive Avalanche Energy ⁽¹⁾	E _{AR}	11	mJ
Operating Junction and Storage Temperature Range	T _J , T _{stg}	-55 to 150	°C
Junction-to-Case Thermal Resistance	R _{θJC}	2	°C/W
Junction-to-Ambient Thermal Resistance ⁽³⁾	R _{θJA}	40	°C/W

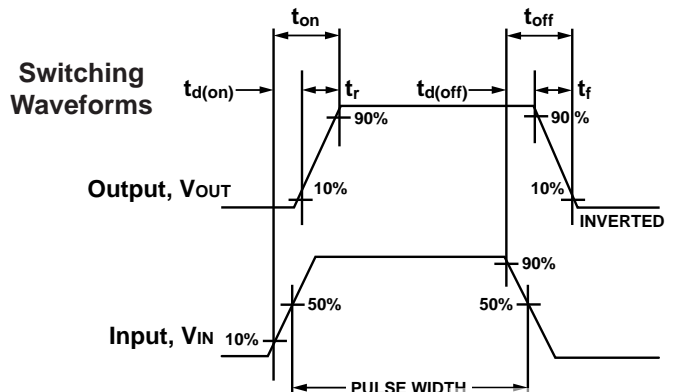
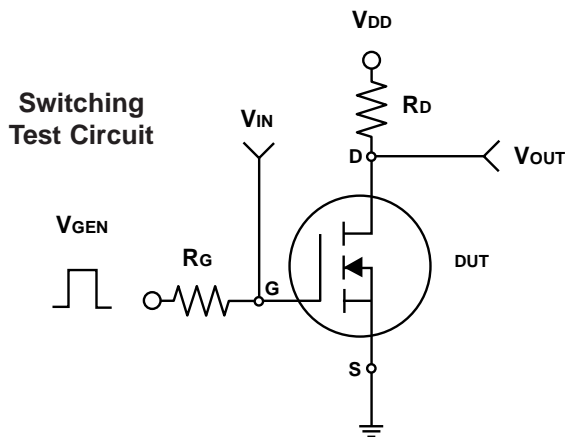
Notes: (1) Repetitive rating; pulse width limited by max. junction temperature
 (2) V_{DD} = 30V, starting T_J = 25°C, L = 470μH, R_G = 25Ω, I_{AS} = 21A
 (3) Mounted on 1in², 2oz. Cu pad on PCB

N-Channel Enhancement-Mode MOSFET

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

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	60	–	–	V
Drain-Source On-State Resistance ⁽¹⁾	R _{DS(on)}	V _{GS} = 10V, I _D = 21A	–	15	22	mΩ
		V _{GS} = 6V, I _D = 20A	–	19	25	
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	2.0	–	4.0	V
Forward Transconductance ⁽¹⁾	g _{fs}	V _{DS} = 25V, I _D = 21A	–	50	–	S
Drain-Source Leakage Current	I _{DSS}	V _{DS} = 48V, V _{GS} = 0V	–	–	1	μA
Gate-Source Leakage	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V	–	–	±100	nA
Dynamic						
Total Gate Charge ⁽¹⁾	Q _g	V _{DS} = 48V, I _D = 21A, V _{GS} = 5V	–	36	50	nC
		V _{DS} = 48V, V _{GS} = 10V I _D = 21A	–	65	80	
Gate-Source Charge ⁽¹⁾	Q _{gs}	V _{DS} = 48V, V _{GS} = 10V I _D = 21A	–	15	–	nC
Gate-Drain (“Miller”) Charge ⁽¹⁾	Q _{gd}		–	17	–	
Turn-On Delay Time ⁽¹⁾	t _{d(on)}	V _{DD} = 30V I _D = 21A, R _G = 12Ω R _D = 1.4Ω, V _{GEN} = 10V	–	20	35	ns
Rise Time ⁽¹⁾	t _r		–	107	160	
Turn-Off Delay Time ⁽¹⁾	t _{d(off)}		–	92	120	
Fall Time ⁽¹⁾	t _f		–	56	90	
Input Capacitance	C _{iss}	V _{GS} = 0V	–	3425	–	pF
Output Capacitance	C _{oss}	V _{DS} = 25V	–	320	–	
Reverse Transfer Capacitance	C _{rss}	f = 1.0MHz	–	162	–	
Source-Drain Diode						
Continuous Source Current	I _S	–	–	–	42	A
Pulsed Source Current	I _{SM}	–	–	–	100	
Diode Forward Voltage ⁽¹⁾	V _{SD}	I _S = 21A, V _{GS} = 0V	–	0.93	1.3	V
Source-Drain Reverse Recovery Time ⁽¹⁾	t _{rr}	I _F = 21A, di/dt = 100A/μs	–	53	–	ns
Source-Drain Reverse Recovery Charge ⁽¹⁾	Q _{rr}		–	92	–	nC

Notes: (1) Pulse width ≤ 300μs; duty cycle ≤ 2%



N-Channel Enhancement-Mode MOSFET

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

Fig. 1 – Output Characteristics

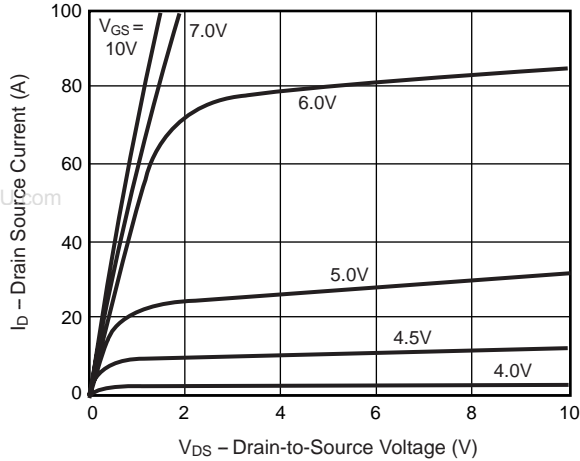


Fig. 2 – Transfer Characteristics

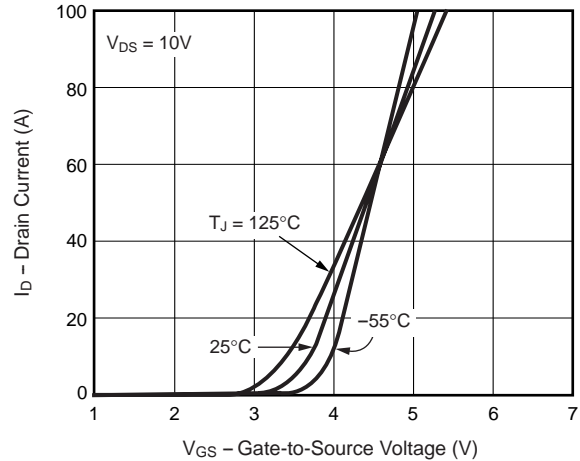


Fig. 3 – On-Resistance vs. Drain Current

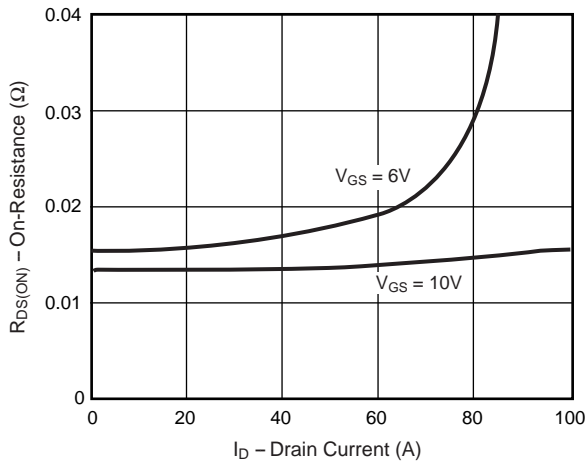


Fig. 4 – Capacitance

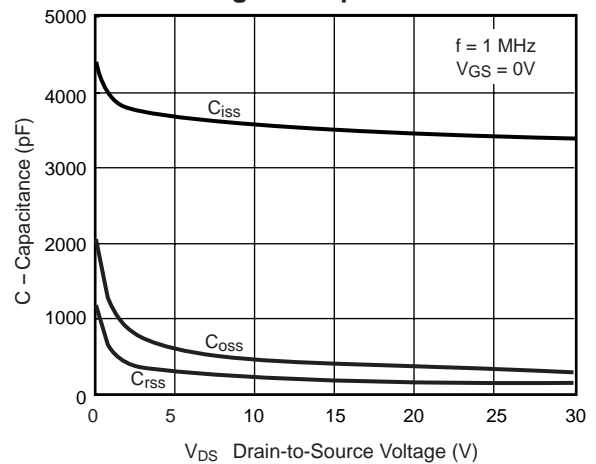


Fig. 5 – Gate Charge

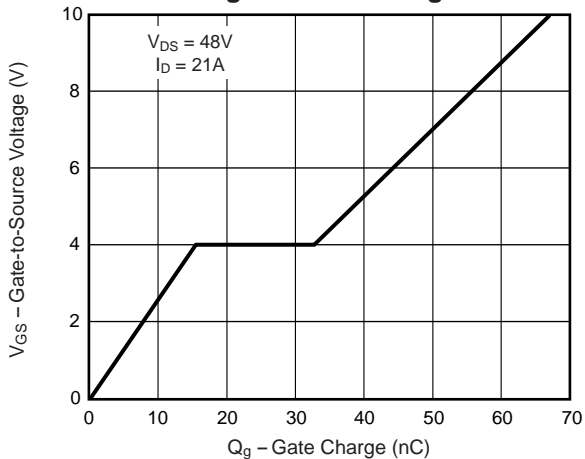
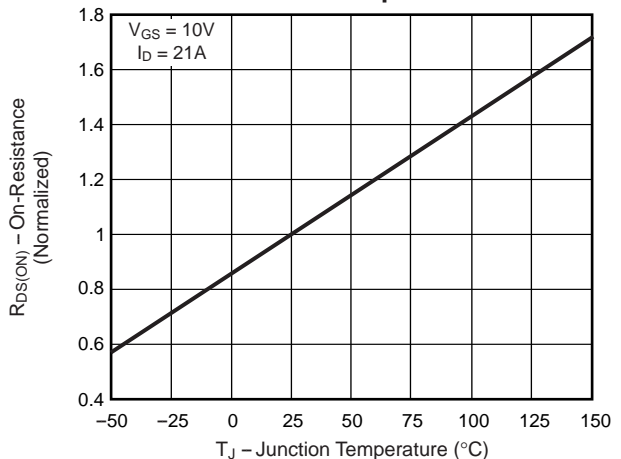


Fig. 6 – On-Resistance vs. Junction Temperature



N-Channel Enhancement-Mode MOSFET

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

Fig. 7 – Source-Drain Diode Forward Voltage

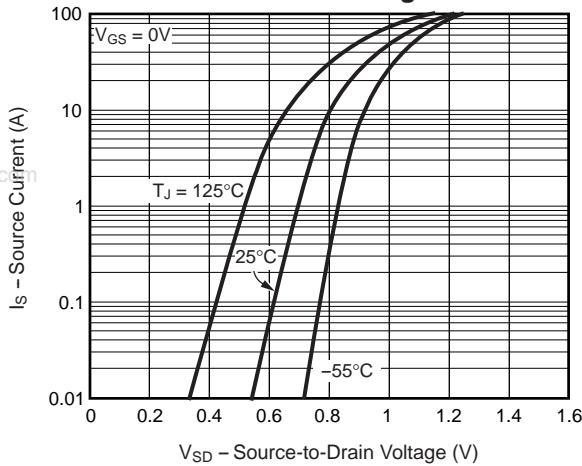


Fig. 8 – On-Resistance vs. Gate-to-Source Voltage

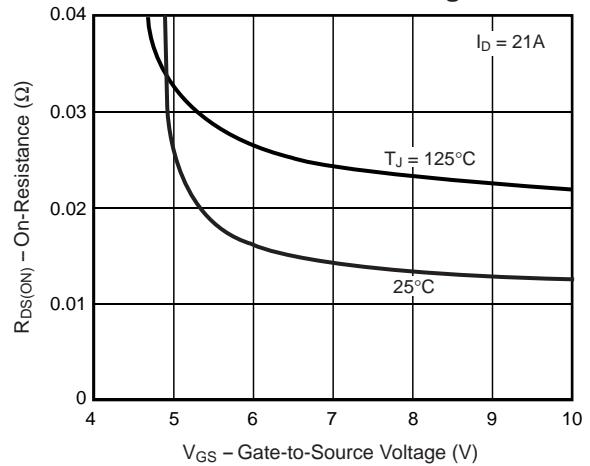


Fig. 9 – Threshold Voltage vs. Temperature

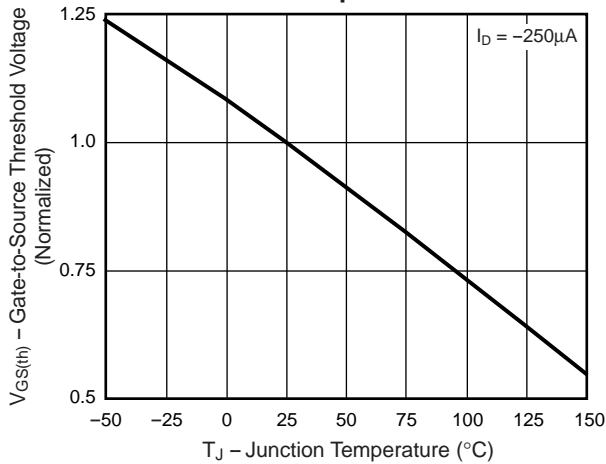


Fig. 10 – Power vs. Pulse Duration

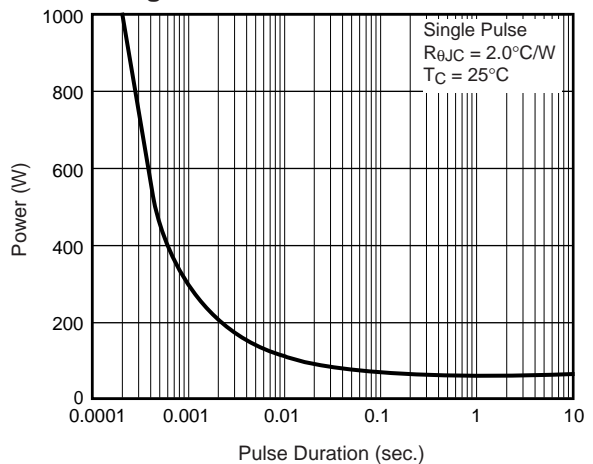


Fig. 11 – Maximum Safe Operating Area

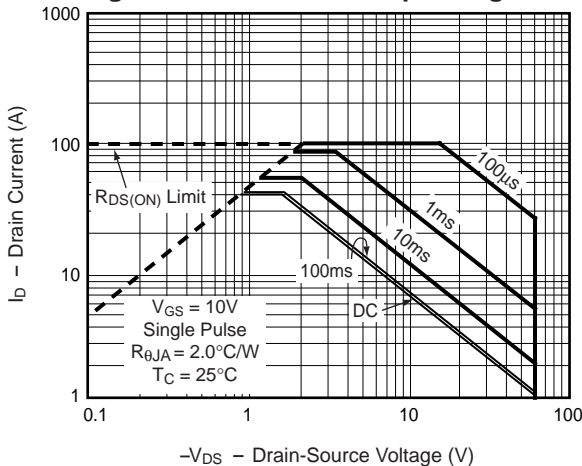


Fig. 12 – Thermal Impedance

