



N-Channel 20-V (D-S) 175°C MOSFET

PRODUCT SUMMARY

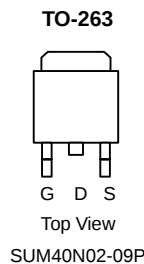
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A) ^a
20	0.0095 @ $V_{GS} = 10$ V	40 ^a
	0.017 @ $V_{GS} = 4.5$ V	40 ^a

FEATURES

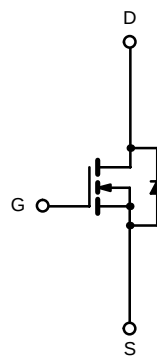
- TrenchFET® Power MOSFET
- 175°C Junction Temperature

APPLICATIONS

- Desktop or Server CPU Core
- Game Station



DRAIN connected to TAB



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current ($T_J = 175^\circ\text{C}$)	$T_C = 25^\circ\text{C}$	I_D	40 ^a	A
	$T_C = 100^\circ\text{C}$		40 ^a	
Pulsed Drain Current		I_{DM}	100	
Maximum Power Dissipation ^b	$T_C = 25^\circ\text{C}$	P_D	93 ^c	W
	$T_A = 25^\circ\text{C}$ ^d		3.75	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 175	$^\circ\text{C}$

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Limit	Unit
Junction-to-Ambient (PCB Mount) ^d	R_{thJA}	40	$^\circ\text{C}/\text{W}$
Junction-to-Case	R_{thJC}	1.6	

Notes

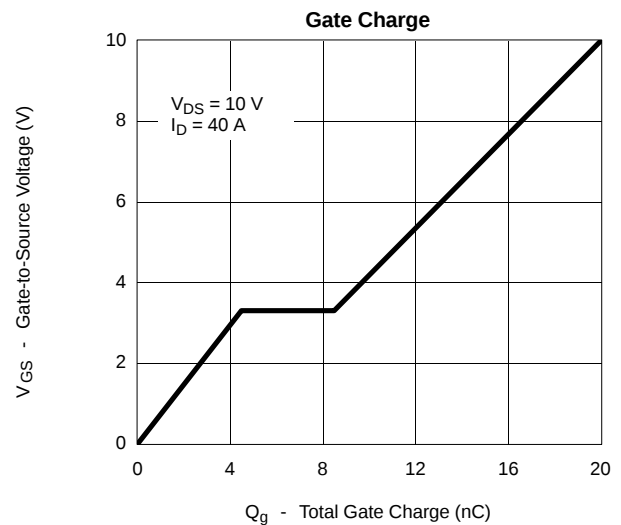
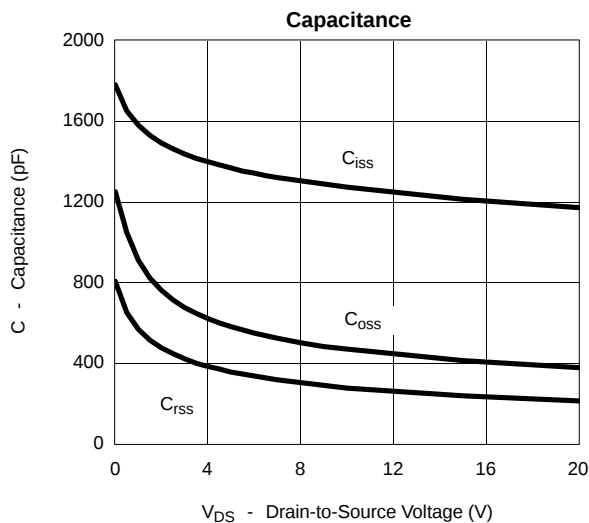
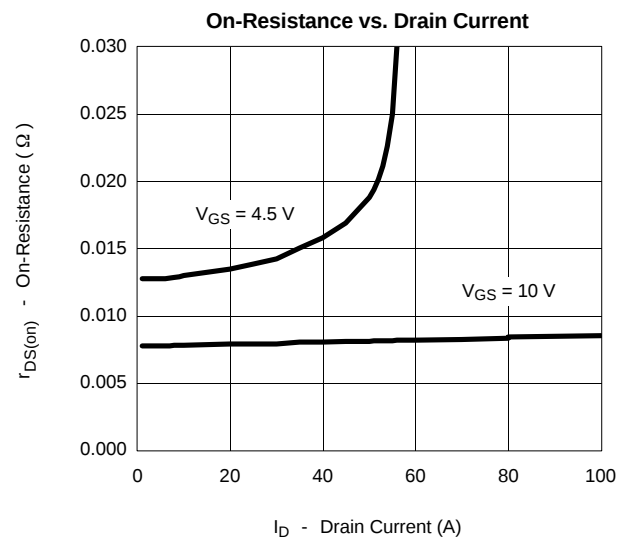
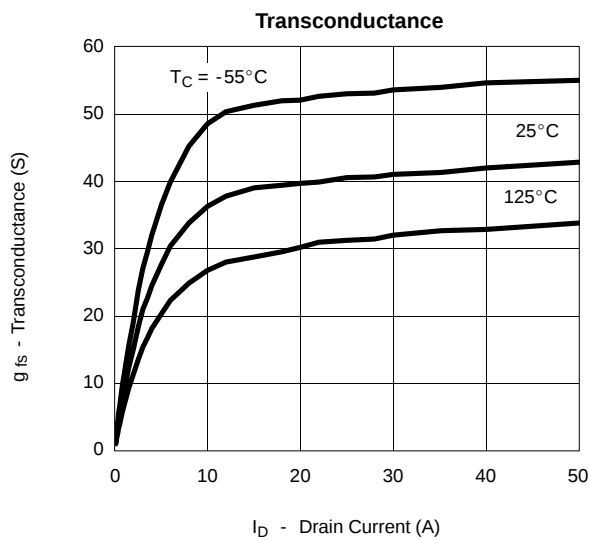
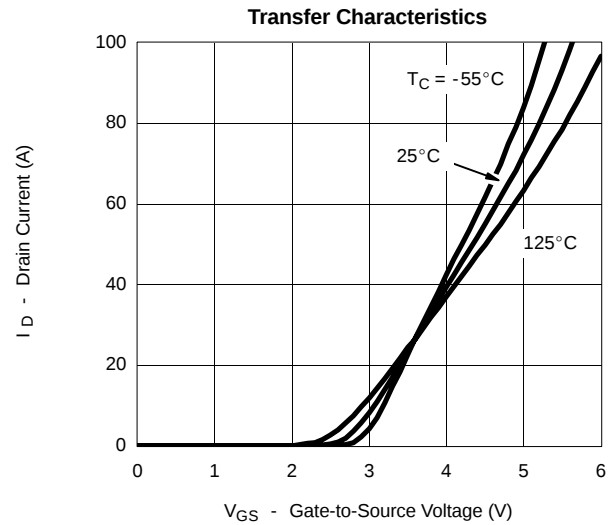
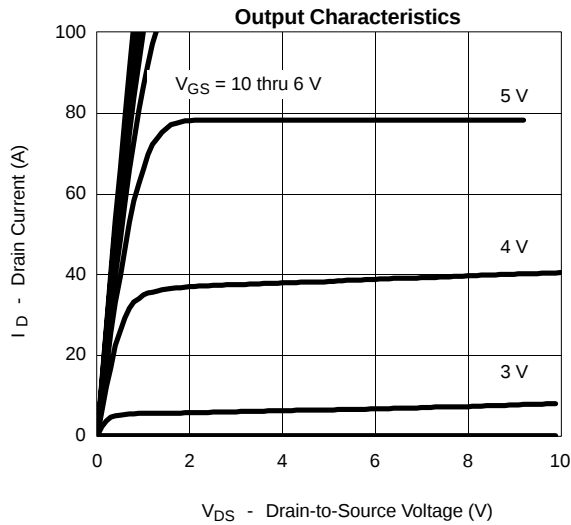
- Package limited.
- Duty cycle $\leq 1\%$.
- See SOA curve for voltage derating.
- When mounted on 1" square PCB (FR-4 material).

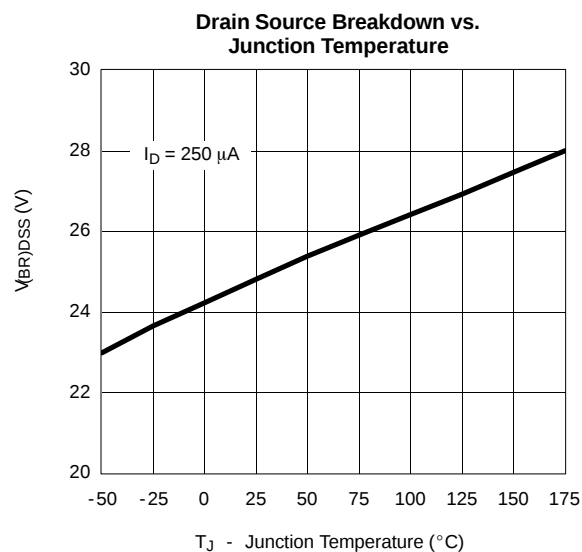
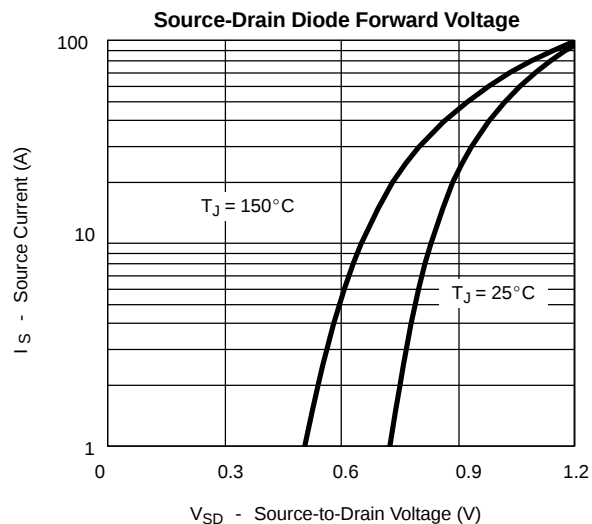
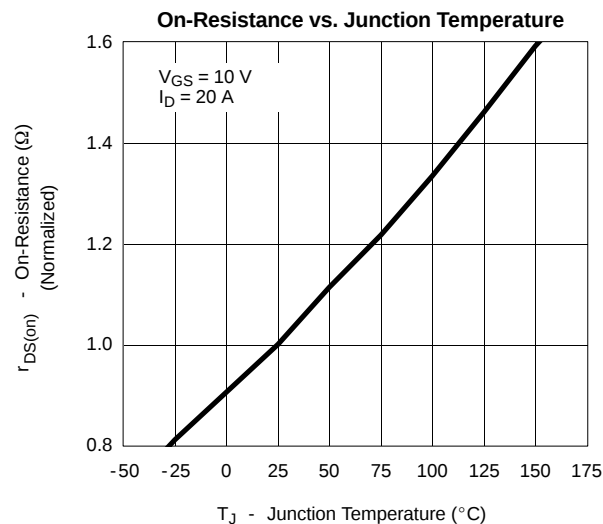
SPECIFICATIONS (T_J = 25 °C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{DS} = 0 V, I _D = 250 μA	20			V
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	0.85		3	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 16 V, V _{GS} = 0 V			1	μA
		V _{DS} = 16 V, V _{GS} = 0 V, T _J = 125°C			50	
		V _{DS} = 16 V, V _{GS} = 0 V, T _J = 175°C			250	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 10 V	100			A
Drain-Source On-State Resistance ^a	r _{DS(on)}	V _{GS} = 10 V, I _D = 20 A		0.008	0.0095	Ω
		V _{GS} = 10 V, I _D = 20 A, T _J = 125°C			0.014	
		V _{GS} = 10 V, I _D = 20 A, T _J = 175°C			0.016	
		V _{GS} = 4.5 V, I _D = 20 A		0.0135	0.017	
Forward Transconductance ^a	g _{fs}	V _{DS} = 10 V, I _D = 20 A	15			S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 10 V, f = 1 MHz		1300		pF
Output Capacitance	C _{oss}			470		
Reverse Transfer Capacitance	C _{rss}			275		
Total Gate Charge ^b	Q _g	V _{DS} = 10 V, V _{GS} = 4.5 V, I _D = 40 A		10.5	16	nC
Gate-Source Charge ^b	Q _{gs}			4.2		
Gate-Drain Charge ^b	Q _{gd}			4.0		
Gate Resistance	R _G			4.0		Ω
Turn-On Delay Time ^b	t _{d(on)}	V _{DD} = 10 V, R _L = 0.25 Ω I _D ≅ 40 A, V _{GEN} = 10 V, R _G = 2.5 Ω		8	12	ns
Rise Time ^b	t _r			10	15	
Turn-Off Delay Time ^b	t _{d(off)}			25	40	
Fall Time ^b	t _f			12	20	
Source-Drain Diode Ratings and Characteristics (T _C = 25°C) ^c						
Continuous Current	I _S				40	A
Pulsed Current	I _{SM}				100	
Forward Voltage ^a	V _{SD}	I _F = 40 A, V _{GS} = 0 V		1.1	1.5	V
Reverse Recovery Time	t _{rr}	I _F = 40 A, di/dt = 100 A/μs		25	40	ns
Peak Reverse Recovery Current	I _{RM}			0.7	1.1	A
Reverse Recovery Charge	Q _{rr}				0.009	0.022

Notes

- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
b. Independent of operating temperature.
c. Guaranteed by design, not subject to production testing.

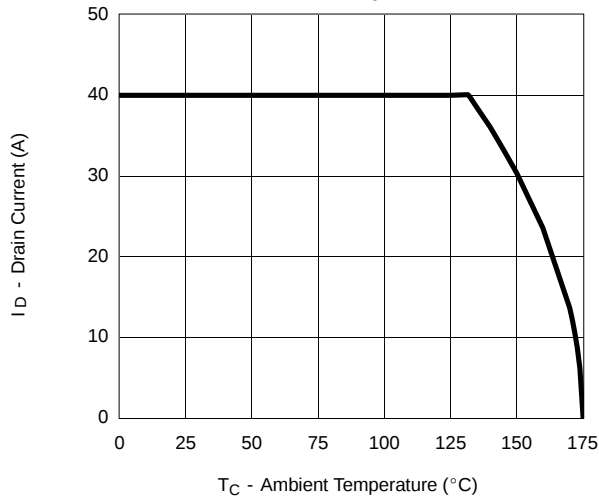
**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

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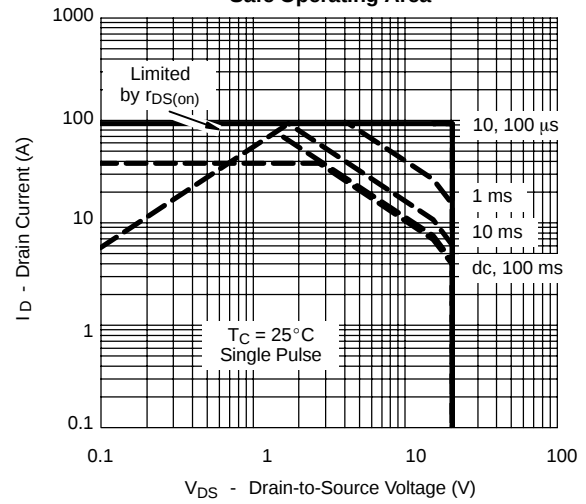


THERMAL RATINGS

Maximum Avalanche and Drain Current
vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

