

N-Channel 200 V (D-S) 175 °C MOSFET

PRODUCT SUMMARY		
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)
200	0.048 at V _{GS} = 10 V	40
	0.060 at V _{GS} = 6.5 V	35

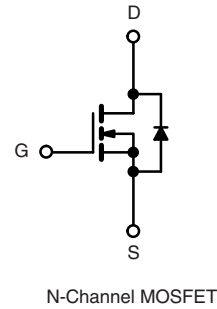
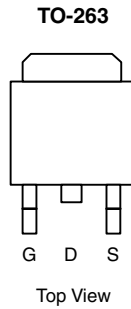
FEATURES

- TrenchFET® Power MOSFET
- 175 °C Junction Temperature
- Low Thermal Resistance Package
- PWM Optimized for Fast Switching
- Compliant to RoHS Directive 2002/95/EC



APPLICATIONS

- Isolated DC/DC Converters
- Primary-Side Switch



ABSOLUTE MAXIMUM RATINGS (T _C = 25 °C, unless otherwise noted)				
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V _{DS}	200	V
Gate-Source Voltage		V _{GS}	± 20	
Continuous Drain Current (T _J = 175 °C)	T _C = 25 °C	I _D	40	A
	T _C = 125 °C		25	
Pulsed Drain Current		I _{DM}	80	
Avalanche Current		I _{AR}	20	
Repetitive Avalanche Energy ^a	L = 0.1 mH	E _{AR}	16.2	mJ
Maximum Power Dissipation ^a	T _C = 25 °C	P _D	200 ^b	W
	T _A = 25 °C ^c		4.5	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	- 55 to 175	°C

THERMAL RESISTANCE RATINGS				
Parameter		Symbol	Limit	Unit
Junction-to-Ambient	PCB Mount (TO-263) ^c	R _{thJA}	40	°C/W
Junction-to-Case (Drain)		R _{thJC}	1	

Notes:

- Duty cycle ≤ 1 %.
- See SOA curve for voltage derating.
- When mounted on 1" square PCB (FR-4 material).

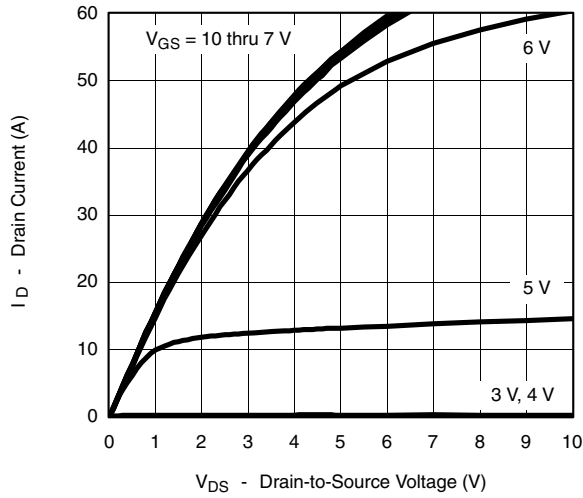
SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min .	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	200			V
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	2		4	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 160 V, V _{GS} = 0 V			1	μA
		V _{DS} = 160 V, V _{GS} = 0 V, T _J = 125 °C			50	
		V _{DS} = 160 V, V _{GS} = 0 V, T _J = 175 °C			250	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 15 V, V _{GS} = 10 V	60			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 20 A		0.048		Ω
		V _{GS} = 10 V, I _D = 20 A, T _J = 125 °C		0.150		
		V _{GS} = 10 V, I _D = 20 A, T _J = 175 °C		0.180		
Drain-Source on State Resistance		V _{GS} = 6.5 V, I _D = 15 A		0.060		
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 30 A	15			S
Dynamic^b						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz		2820		pF
Output Capacitance	C _{oss}			300		
Reverse Transfer Capacitance	C _{rss}			120		
Total Gate Charge ^c	Q _g	V _{DS} = 100 V, V _{GS} = 10 V, I _D = 20 A		35		nC
Gate-Source Charge ^c	Q _{gs}			11		
Gate-Drain Charge ^c	Q _{gd}			14		
Gate Resistance	R _G			2		Ω
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 100 V, R _L = 5 Ω I _D ≅ 20 A, V _{GEN} = 10 V, R _G = 2.5 Ω		15	25	ns
Rise Time ^c	t _r			35	55	
Turn-Off Delay Time ^c	t _{d(off)}			40	60	
Fall Time ^c	t _f			30	45	
Source-Drain Diode Ratings and Characteristics (T_C = 25 °C)^b						
Continuous Current	I _S				40	A
Pulsed Current	I _{SM}				60	
Forward Voltage ^a	V _{SD}	I _F = 20 A, V _{GS} = 0 V		1	1.5	V
Reverse Recovery Time	t _{rr}	I _F = 50 A, di/dt = 100 A/μs		115	170	ns
Peak Reverse Recovery Charge	I _{RM(REC)}			7.5	12	A
Reverse Recovery Charge	Q _{rr}			0.43	1.02	μC

Notes:

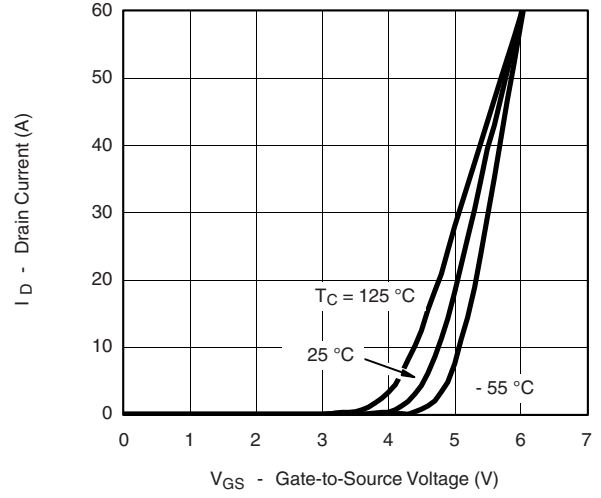
- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.
- b. Guaranteed by design, not subject to production testing.
- c. Independent of operating temperature.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

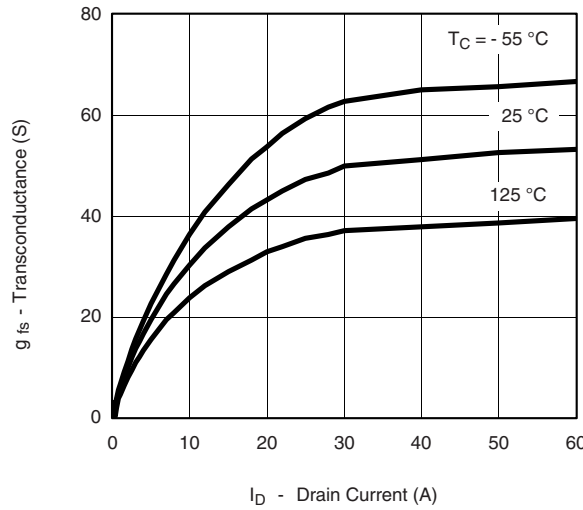
TYPICAL CHARACTERISTICS (25 °C unless noted)



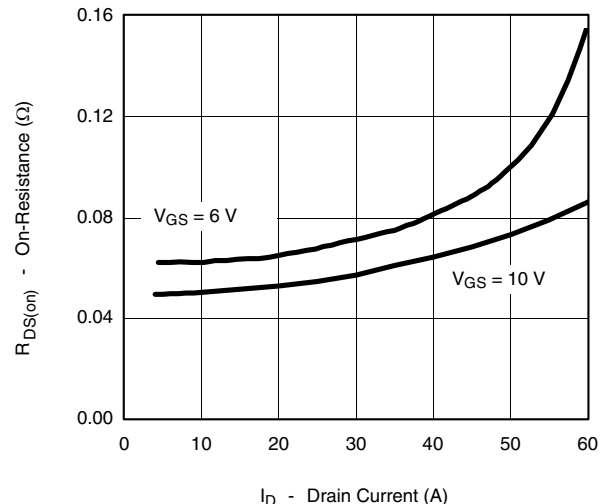
Output Characteristics



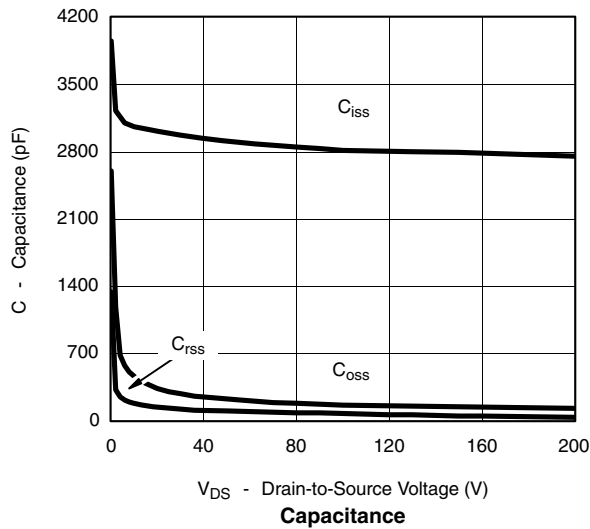
Transfer Characteristics



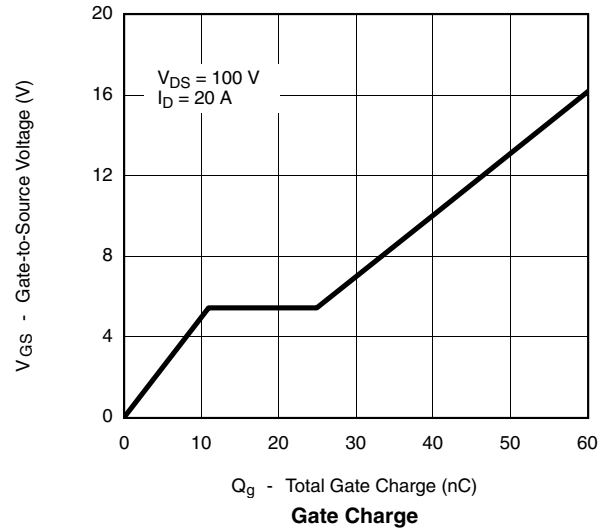
Transconductance



On-Resistance vs. Drain Current

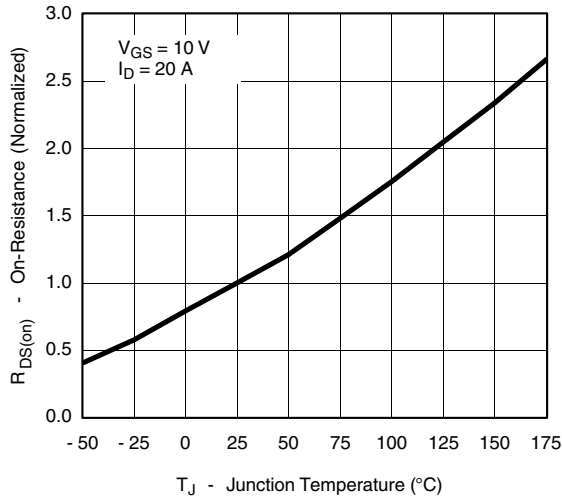


Capacitance

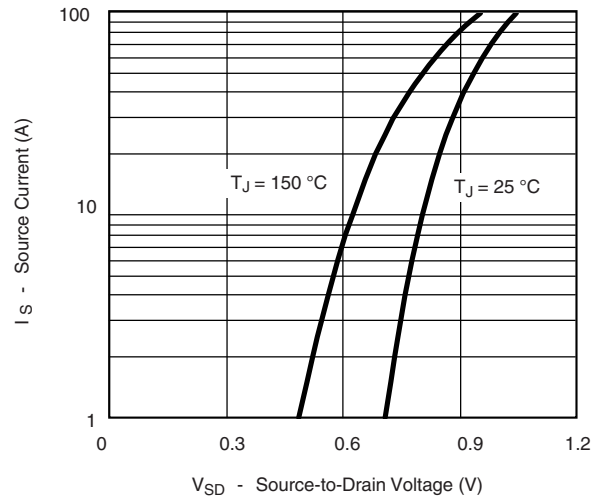


Gate Charge

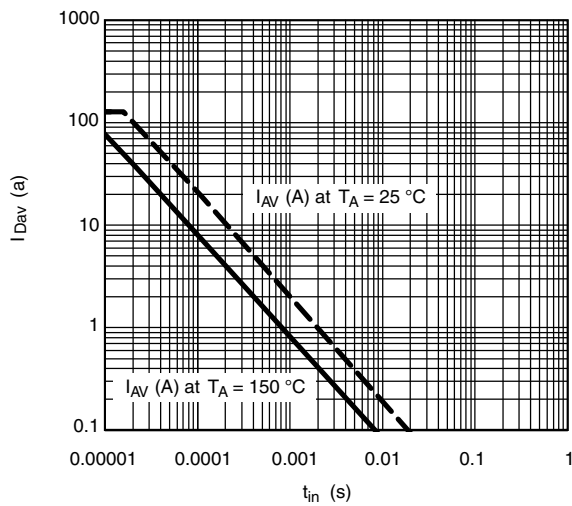
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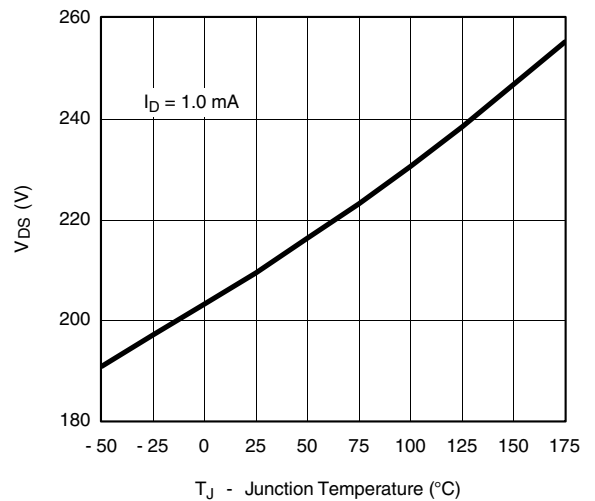
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

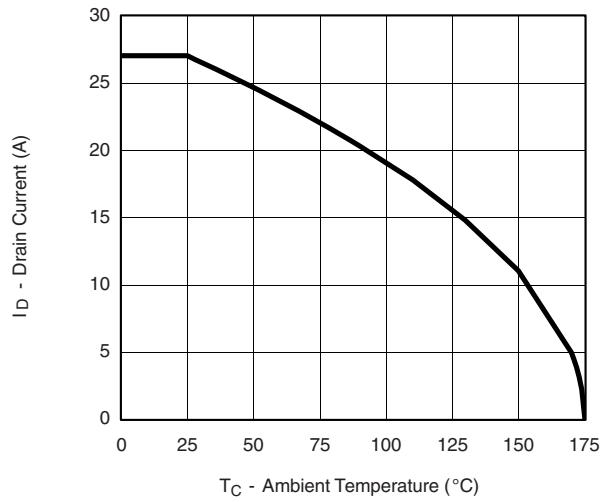


Avalanche Current vs. Time

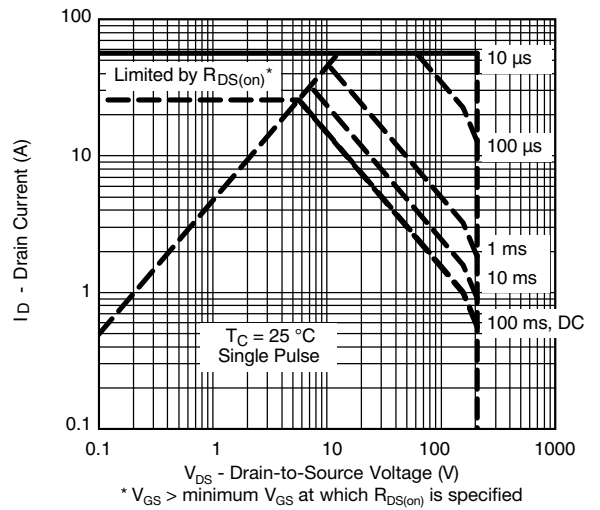


Drain Source Breakdown vs. Junction Temperature

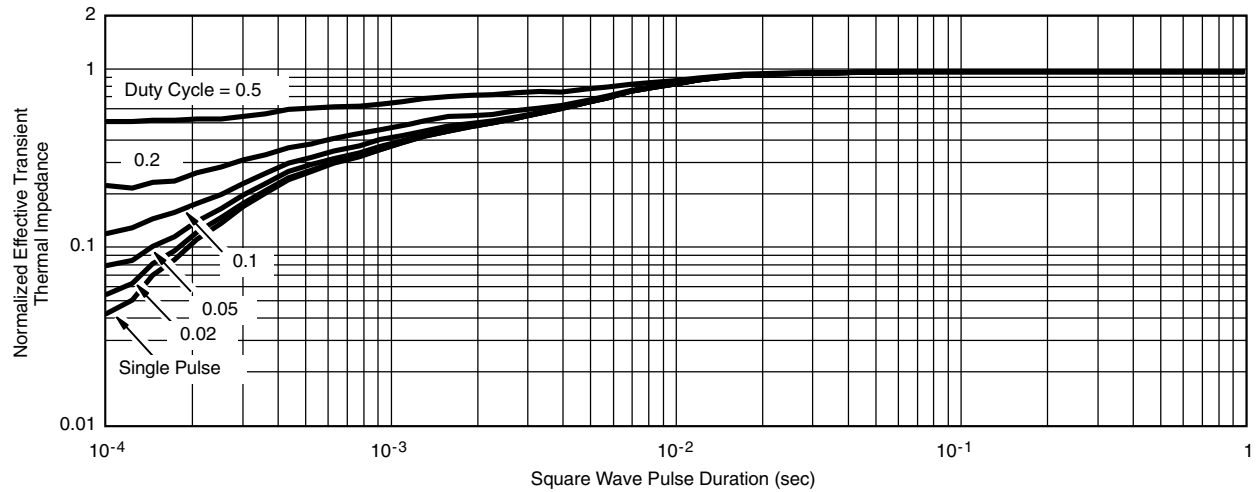
THERMAL RATINGS



Maximum Avalanche and Drain Current vs. Case Temperature



Safe Operating Area
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified



Normalized Thermal Transient Impedance, Junction-to-Case

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