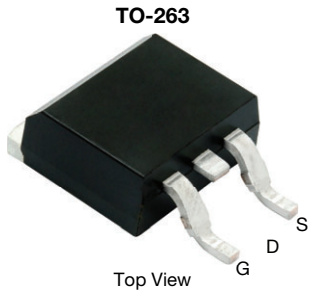


Automotive N-Channel 40 V (D-S) 175 °C MOSFET



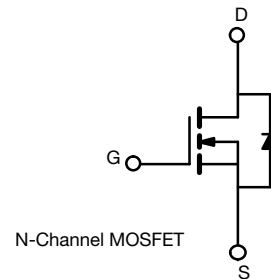
FEATURES

- TrenchFET® power MOSFET
- Package with low thermal resistance
- 100 % R_g and UIS tested
- AEC-Q101 qualified
- Material categorization:
for definitions of compliance please see www.vishay.com/doc?99912

 AUTOMOTIVE
GRADE

RoHS
COMPLIANT
HALOGEN
FREE

PRODUCT SUMMARY	
V _{DS} (V)	40
R _{DS(on)} (Ω) at V _{GS} = 10 V	0.00163
I _D (A)	150
Configuration	Single
Package	TO-263



ABSOLUTE MAXIMUM RATINGS (T _C = 25 °C, unless otherwise noted)				
PARAMETER		SYMBOL	LIMIT	UNIT
Drain-source voltage		V _{DS}	40	V
Gate-source voltage		V _{GS}	± 20	
Continuous drain current	T _C = 25 °C ^a	I _D	150	A
	T _C = 125 °C		125	
Continuous source current (diode conduction) ^a		I _S	136	
Pulsed drain current ^b		I _{DM}	300	
Single pulse avalanche current	L = 0.1 mH	I _{AS}	60	
Single pulse avalanche energy		E _{AS}	180	
Maximum power dissipation ^b	T _C = 25 °C	P _D	150	W
	T _C = 125 °C		50	
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 ^c	R _{thJA}	40	°C/W
Junction-to-case (drain)		R _{thJC}	1	

Notes

- Package limited
- Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %
- When mounted on 1" square PCB (FR4 material)



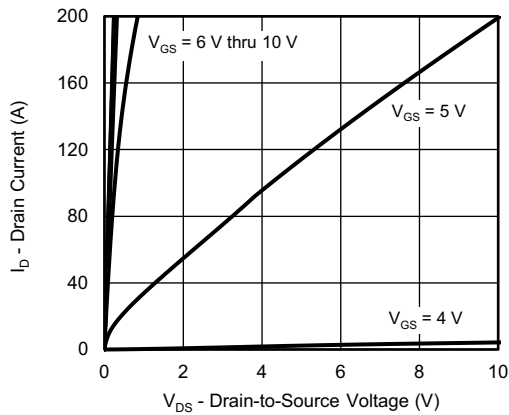
SPECIFICATIONS (T _C = 25 °C, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-source breakdown voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	40	-	-	V
Gate-source threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	2.5	3.0	3.5	
Gate-source leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V	-	-	± 100	nA
Zero gate voltage drain current	I _{DSS}	V _{GS} = 0 V, V _{DS} = 40 V	-	-	1	μA
		V _{GS} = 0 V, V _{DS} = 40 V, T _J = 125 °C	-	-	50	
		V _{GS} = 0 V, V _{DS} = 40 V, T _J = 175 °C	-	-	300	μA
On-state drain current ^a	I _{D(on)}	V _{GS} = 10 V, V _{DS} ≥ 5 V	100	-	-	A
Drain-source on-state resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 35 A	-	0.00133	0.00163	
		V _{GS} = 10 V, I _D = 35 A, T _J = 125 °C	-	-	0.00268	Ω
		V _{GS} = 10 V, I _D = 35 A, T _J = 175 °C	-	-	0.00326	
Forward transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 35 A	-	143	-	S
Dynamic ^b						
Input capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz	-	6783	9200	pF
Output capacitance	C _{oss}		-	1771	2400	
Reverse transfer capacitance	C _{rss}		-	109	150	
Total gate charge ^c	Q _g	V _{GS} = 10 V, V _{DS} = 20 V, I _D = 100 A	-	106	160	nC
Gate-source charge ^c	Q _{gs}		-	33	-	
Gate-drain charge ^c	Q _{gd}		-	21	-	
Gate resistance	R _g	f = 1 MHz	1.25	2.75	4.35	Ω
Turn-on delay time ^c	t _{d(on)}	V _{DD} = 20 V, R _L = 0.2 Ω I _D ≅ 100 A, V _{GEN} = 10 V, R _g = 1 Ω	-	19	30	ns
Rise time ^c	t _r		-	194	300	
Turn-off delay time ^c	t _{d(off)}		-	45	70	
Fall time ^c	t _f		-	26	40	
Source-Drain Diode Ratings and Characteristics ^b						
Pulsed current ^a	I _{SM}		-	-	300	A
Forward voltage	V _{SD}	I _F = 60 A, V _{GS} = 0 V	-	0.83	1.5	V
Body diode reverse recovery time	t _{rr}	I _F = 30 A, di/dt = 100 A/μs	-	88	180	ns
Body diode reverse recovery charge	Q _{rr}		-	186	380	nC
Reverse recovery fall time	t _a		-	57	-	ns
Reverse recovery rise time	t _b		-	31	-	
Body diode peak reverse recovery current	I _{RM(REC)}			-	-4.6	-

Notes

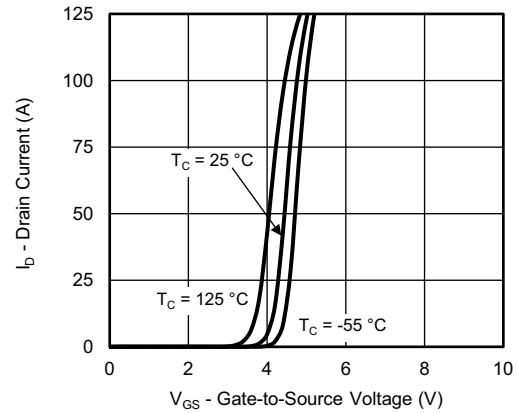
- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %
- b. Guaranteed by design, not subject to production testing
- c. Independent of operating temperature

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.

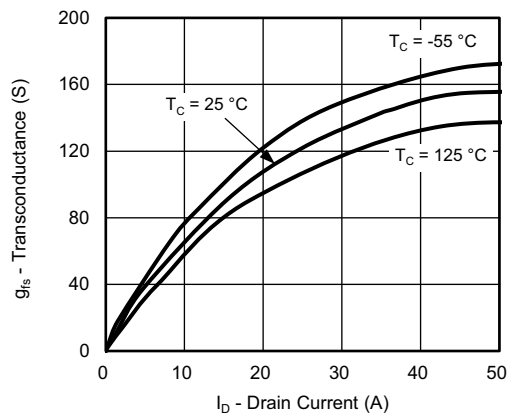
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



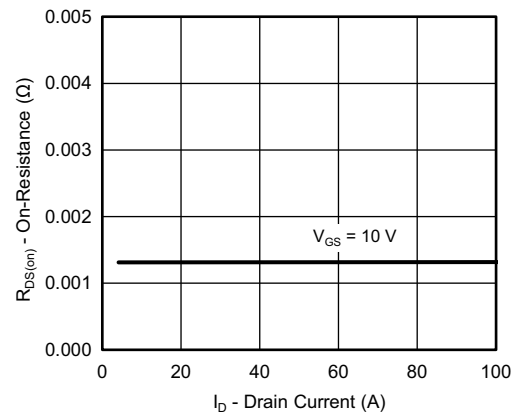
Output Characteristics



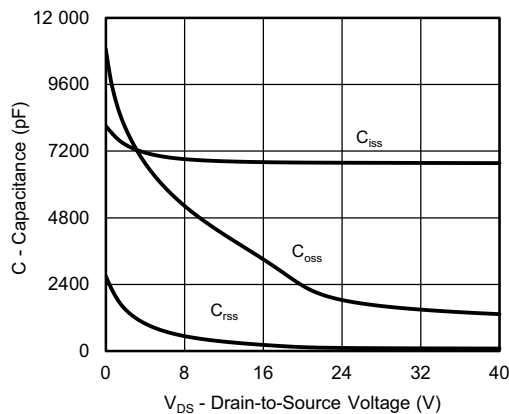
Transfer Characteristics



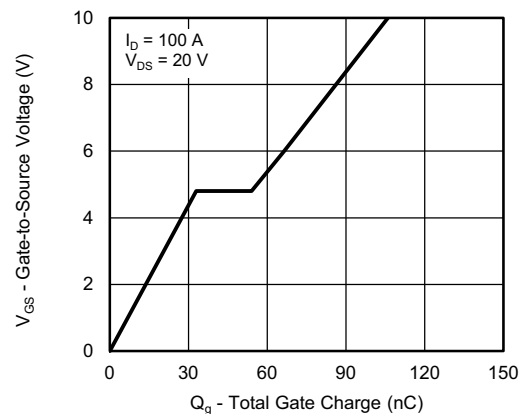
Transconductance



On-Resistance vs. Drain Current



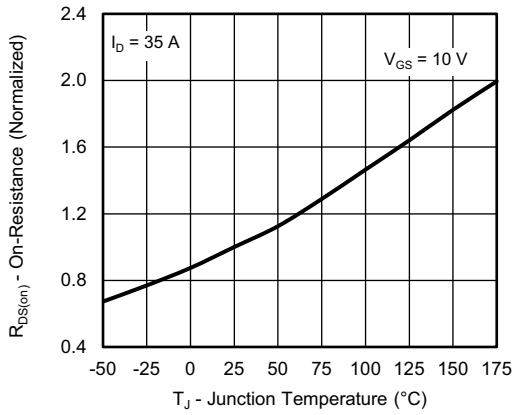
Capacitance



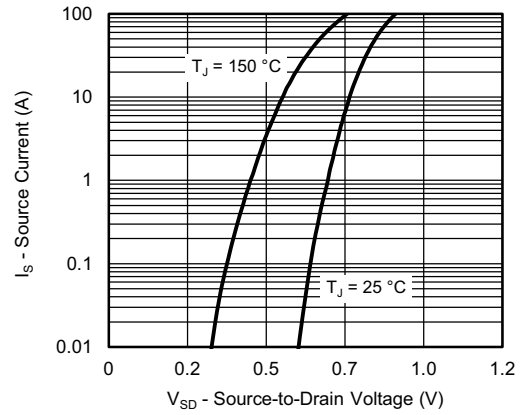
Gate Charge



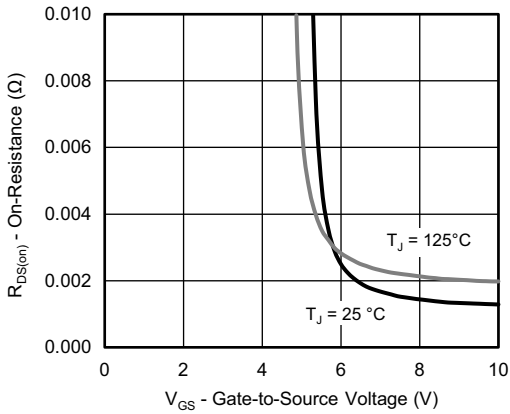
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



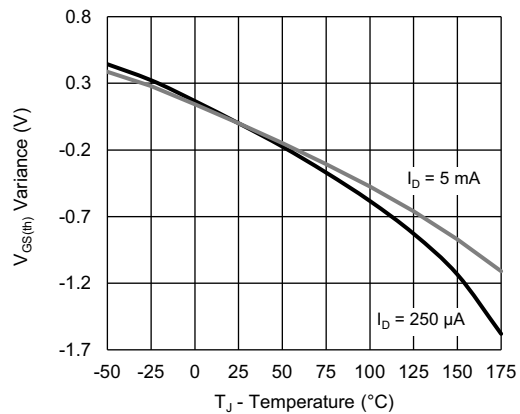
On-Resistance vs. Junction Temperature



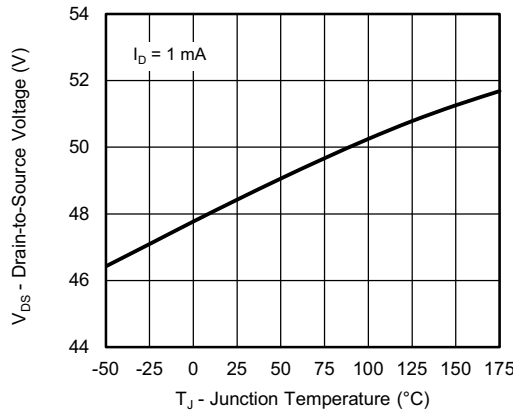
Source Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage



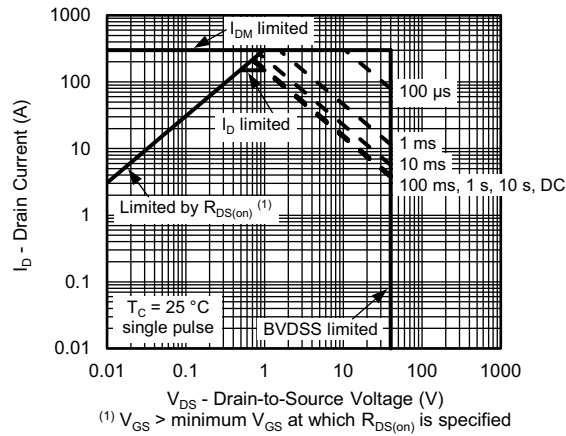
Threshold Voltage



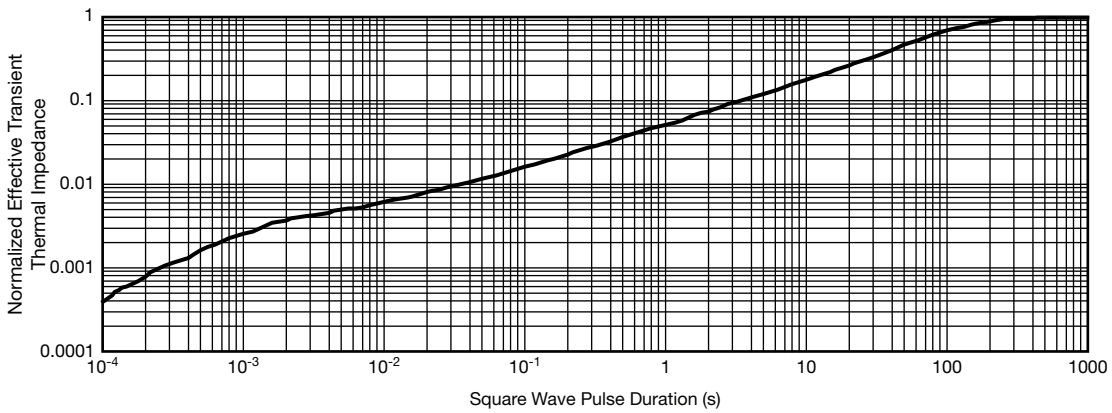
Drain Source Breakdown vs. Junction Temperature



THERMAL RATINGS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



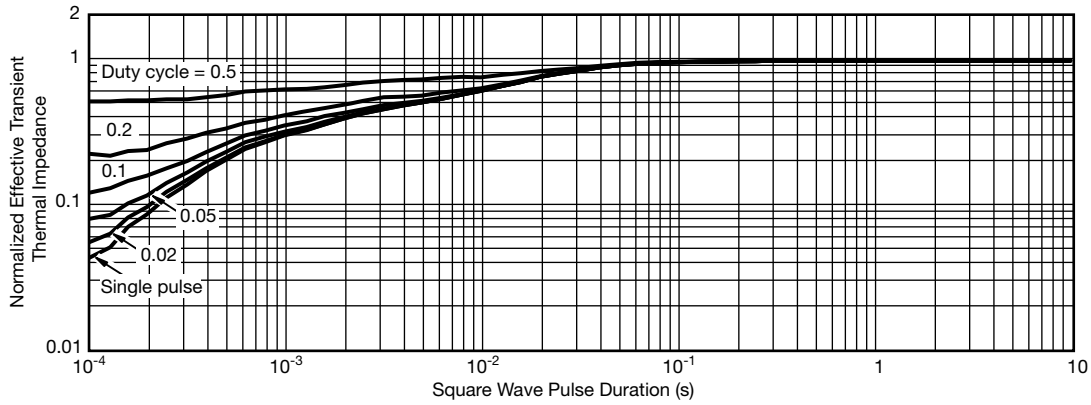
Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient



THERMAL RATINGS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Case

Note

- The characteristics shown in the two graphs
 - Normalized Transient Thermal Impedance Junction-to-Ambient (25 °C)
 - Normalized Transient Thermal Impedance Junction-to-Case (25 °C)
 are given for general guidelines only to enable the user to get a “ball park” indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board - FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions

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