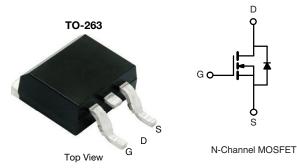


Vishay Siliconix

Automotive N-Channel 100 V (D-S) 175 °C MOSFET

PRODUCT SUMMARY						
V _{DS} (V)	100					
$R_{DS(on)} (\Omega)$ at $V_{GS} = 10 V$	0.030					
$R_{DS(on)}(\Omega)$ at $V_{GS} = 6 V$	0.034					
I _D (A)	40					
Configuration	Single					
Package	TO-263					



FEATURES

- TrenchFET[®] power MOSFET
- · Package with low thermal resistance
- AEC-Q101 qualified ^d
- 100 % $\rm R_g$ and UIS tested
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>



ABSOLUTE MAXIMUM RATINGS (T _C = 25 °C, unless otherwise noted)						
PARAMETER	SYMBOL	LIMIT	UNIT			
Drain-Source Voltage	V _{DS}	100	V			
Gate-Source Voltage	V _{GS}	± 20	v			
Continuous Drain Current	T _C = 25 °C	- I _D	40			
Continuous Drain Current	T _C = 125 °C		22			
Continuous Source Current (Diode Conduction) ^a	I _S	60	А			
Pulsed Drain Current ^b	I _{DM}	155				
Single Pulse Avalanche Current		I _{AS}	40			
Single Pulse Avalanche Energy	L = 0.1 min	E _{AS}	80	mJ		
Maximum Power Dissipation ^b	T _C = 25 °C	PD	107	W		
Maximum Fower Dissipation ~	T _C = 125 °C	٢D	35	٧V		
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}	1.4	0/10		

Notes

- a. Package limited.
- b. Pulse test; pulse width \leq 300 µs, duty cycle \leq 2 %.
- c. When mounted on 1" square PCB (FR4 material).

d. Parametric verification ongoing.

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PARAMETER	SYMBOL	TES	MIN.	TYP.	MAX.	UNIT		
Static					•			
Drain-Source Breakdown Voltage	V _{DS}	$V_{GS} = 0 V, I_D = 250 \mu A$		100	-	-	v	
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} =	$V_{DS} = V_{GS}, I_D = 250 \ \mu A$		3.0	3.5		
Gate-Source Leakage	I _{GSS}	V _{DS} =	$V_{DS} = 0 V, V_{GS} = \pm 20 V$		-	± 100	nA	
		$V_{GS} = 0 V$	V _{DS} = 100 V	1		1		
Zero Gate Voltage Drain Current	I _{DSS}	$V_{GS} = 0 V$	$V_{DS} = 100 \text{ V}, \text{ T}_{J} = 125 ^{\circ}\text{C}$	-	-	50	μA	
		$V_{GS} = 0 V$	V _{DS} = 100 V, T _J = 175 °C	-	-	250	1	
On-State Drain Current ^a	I _{D(on)}	$V_{GS} = 10 V$	$V_{DS} \ge 5 V$	50	-	-	Α	
		$V_{GS} = 10 V$	I _D = 15 A	-	0.023	0.030		
Drain Course On State Desistance a	Б	V _{GS} = 10 V	I _D = 15 A, T _J = 125 °C	-	-	0.054	Ω	
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V	I _D = 15 A, T _J = 175 °C	-	-	0.067		
		$V_{GS} = 6 V$	I _D = 10 A	-	0.025	0.034		
Forward Transconductance ^a	9 _{fs}	V _{DS} = 15 V, I _D = 15 A		-	52	-	S	
Dynamic ^b	<u>.</u>						•	
Input Capacitance	C _{iss}				2676	3345		
Output Capacitance	C _{oss}	$V_{GS} = 0 V$	V _{DS} = 25 V, f = 1 MHz	-	285	355	pF	
Reverse Transfer Capacitance	C _{rss}	1		-	95	120		
Total Gate Charge ^c	Qg			-	41	62	nC	
Gate-Source Charge ^c	Q _{gs}	$V_{GS} = 10 V$	$V_{DS} = 50 \text{ V}, \text{ I}_{D} = 40 \text{ A}$	-	11	-		
Gate-Drain Charge ^c	Q _{gd}			-	11	-		
Gate Resistance	Rg	f = 1 MHz		0.7	1.3	2.6	Ω	
Turn-On Delay Time ^c	t _{d(on)}				12	18	- ns	
Rise Time ^c	t _r	$\label{eq:VDD} \begin{split} V_{DD} &= 50 \text{ V}, \text{ R}_L = 1.25 \ \Omega \\ I_D &\cong 40 \text{ A}, \text{ V}_{\text{GEN}} = 10 \text{ V}, \text{ R}_g = 1 \ \Omega \end{split}$		-	5	8		
Turn-Off Delay Time ^c	t _{d(off)}			-	23	35		
Fall Time ^c	t _f			-	5	8		
Source-Drain Diode Ratings and Chara	acteristics ^b							
Pulsed Current ^a	I _{SM}			-	-	155	Α	
Forward Voltage	V _{SD}	I _F = 30 A, V _{GS} = 0 V		_	0.85	1.5	V	

Notes

a. Pulse test; pulse width \leq 300 µs, duty cycle \leq 2 %.

b. Guaranteed by design, not subject to production testing.

c. Independent of operating temperature.

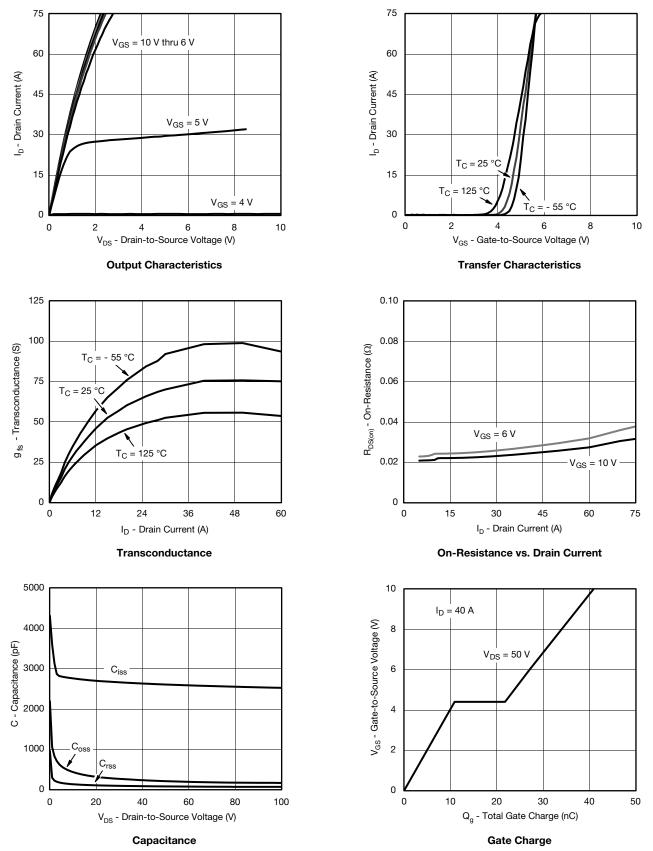
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

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



S15-1873-Rev. D, 10-Aug-15

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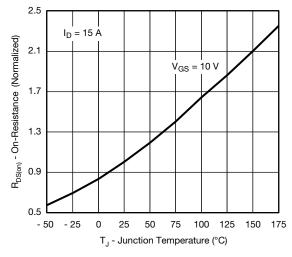
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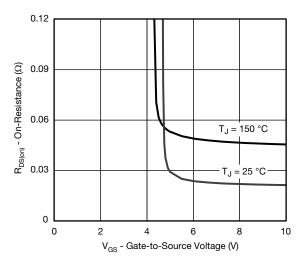
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TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)

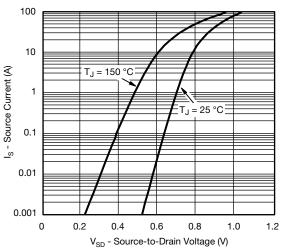


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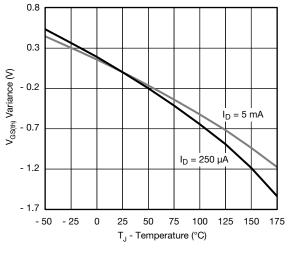




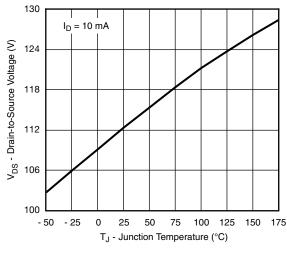
On-Resistance vs. Gate-to-Source Voltage



Source Drain Diode Forward Voltage







Drain Source Breakdown vs. Junction Temperature 4

Document Number: 64716

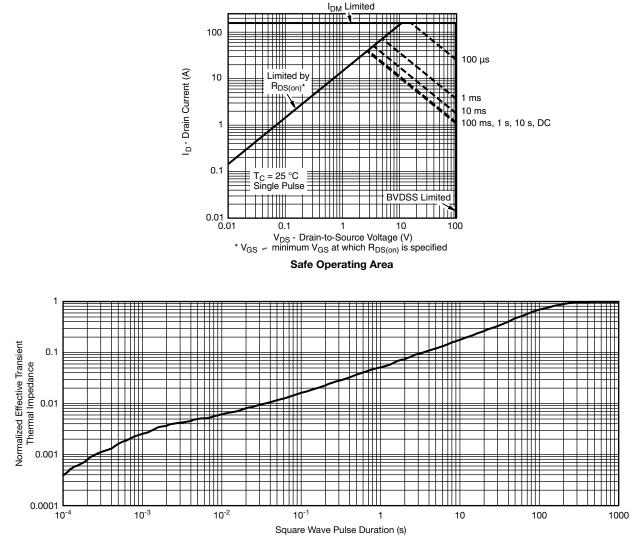
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THERMAL RATINGS ($T_A = 25 \text{ °C}$, unless otherwise noted)



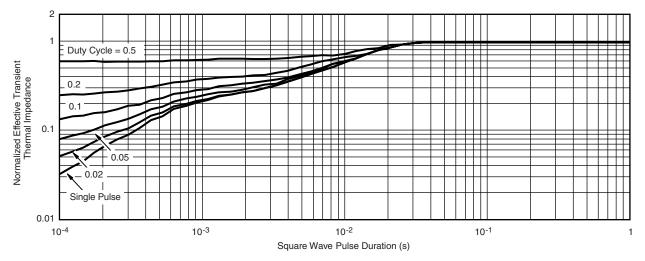
Normalized Thermal Transient Impedance, Junction-to-Ambient





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THERMAL RATINGS (T_A = 25 °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.

Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see www.vishay.com/ppg?64716.



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REVISION HISTORY ^a				
REVISION	DATE	DESCRIPTION OF CHANGE		
D	04-Aug-15	Revised R _g minimum limit		

Note

a. As of April 2014



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TO-263 (D²PAK): 3-LEAD









DETAIL A (ROTATED 90°)



		INCHES		MILLIMETERS		
DIM.		MIN.	MAX.	MIN.	MAX.	
А		0.160	0.190	4.064	4.826	
	b	0.020	0.039	0.508	0.990	
	b1	0.020	0.035	0.508	0.889	
	b2	0.045	0.055	1.143	1.397	
с*	Thin lead	0.013	0.018	0.330	0.457	
C	Thick lead	0.023	0.028	0.584	0.711	
c1	Thin lead	0.013	0.017	0.330	0.431	
CI	Thick lead	0.023	0.027	0.584	0.685	
	c2	0.045	0.055	1.143	1.397	
	D	0.340	0.380	8.636	9.652	
	D1	0.220	0.240	5.588	6.096	
	D2	0.038	0.042	0.965	1.067	
	D3	0.045	0.055	1.143	1.397	
D4		0.044	0.052	1.118	1.321	
	E	0.380	0.410	9.652	10.414	
	E1	0.245	-	6.223	-	
E2		0.355	0.375	9.017	9.525	
E3		0.072	0.078	1.829	1.981	
е		0.100 BSC		2.54 BSC		
	К	0.045	0.055	1.143	1.397	
L		0.575	0.625	14.605	15.875	
	L1	0.090	0.110	2.286	2.794	
L2		0.040	0.055	1.016	1.397	
L3		0.050	0.070	1.270	1.778	
L4		0.010 BSC		0.254 BSC		
М		-	0.002	-	0.050	
ECN: T13-0707-Rev. K, 30-Sep-13 DWG: 5843						

Notes

- 1. Plane B includes maximum features of heat sink tab and plastic. 2. No more than 25 % of L1 can fall above seating plane by
- max. 8 mils.3. Pin-to-pin coplanarity max. 4 mils.
- 4. *: Thin lead is for SUB, SYB.
 - Thick lead is for SUM, SYM, SQM.
- 5. Use inches as the primary measurement.

This feature is for thick lead.

Revison: 30-Sep-13



RECOMMENDED MINIMUM PADS FOR D²PAK: 3-Lead



Recommended Minimum Pads Dimensions in Inches/(mm)

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