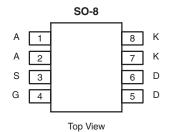




P-Channel 30-V (D-S) MOSFET with Schottky Diode

MOSFET PRODUCT SUMMARY					
V _{DS} (V)	$R_{DS(on)}(\Omega)$	I _D (A) ^a	Q _g (Typ.)		
- 30	0.042 at V _{GS} = - 10 V	- 6.6	7.0		
- 30	0.065 at V _{GS} = - 4.5 V	- 5.3	7.8		

SCHOTTKY PRODUCT SUMMARY				
V _{KA} (V)	V _F (V) Diode Forward Voltage	I _D (A) ^a		
30	0.53 V at 3 A	3.0		



Ordering Information: Si4831BDY-T1-E3 (Lead (Pb)-free)

Si4831BDY-T1-GE3 (Lead (Pb)-free and Halogen-free)

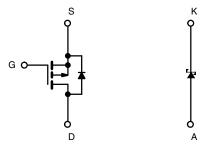
FEATURES

- Halogen-free According to IEC 61249-2-21 Available
- LITTLE FOOT[®] Plus Power MOSFET
- 100 % R_g Tested

APPLICATIONS

- HDD
- Asynchronous Rectification





P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_A = 25$	°C, unless oth	erwise noted		
Parameter	Symbol	Limit	Unit	
Drain-Source Voltage (MOSFET)	V_{DS}	- 30		
Reverse Voltage (Schottky)		V _{KA}	- 30	V
Gate-Source Voltage (MOSFET)		V _{GS}	± 20	
	T _C = 25 °C		- 6.6	
Continuous Drain Current (T _{.I} = 150 °C) (MOSFET)	T _C = 70 °C	I-	- 5.2	
Continuous Diain Current (1) = 130 C) (MOSi E1)	T _A = 25 °C	I _D	- 5.1 ^{b, c}	
	T _A = 70 °C		- 3.9 ^{b, c}	
Pulsed Drain Current (MOSFET)		I _{DM}	- 30	Α
Continuous Source Current (MOSFET Diode Conduction)	T _C = 25 °C		- 2.7	
Continuous Source Current (MOSFET Diode Conduction)	T _A = 25 °C	Is	- 1.6 ^{b, c}	
Average Forward Current (Schottky)		l _F	- 3 ^b	
Pulsed Forward Current (Schottky)		I _{FM}	- 20	
	T _C = 25 °C		3.3	
Maximum Power Dissipation (MOSFET and Schottky)	T _C = 70 °C	PD	2.1	w
	T _A = 25 °C	ט י	2.0 ^{b, c}	VV
	T _A = 70 °C		1.2 ^{b, c}	
Operating Junction and Storage Temperature Range	-	T _J , T _{stg}	- 55 to 150	°C

THERMAL RESISTANCE RATINGS				
Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient (MOSFET and Schottky) ^{b, c, d}	R_{thJA}	53	62.5	°C/W
Maximum Junction-to-Foot (Drain) (MOSFET and Schottky)	R _{th.IF}	30	37	0/11

Notes:

- a. Based on T_C = 25 °C.
- b. Surface Mounted on FR4 board.
- $c. \ t \leq 10 \ s.$
- d. Maximum under Steady State conditions is 110 °C/W.

Si4831BDY

Vishay Siliconix



Static Drain-Source Breakdown Voltage V _{DS} V _{DS} = 0 V, I _D = -250 μA -30 -30 V _{DS} V _{DS} Temperature Coefficient ΔV _{DS} T _D V _{DS} Temperature Coefficient ΔV _{DS} T _D V _{DS} V _{DS} = -250 μA -1 -3 -30 M _{DS} V	MOSFET SPECIFICATIONS $T_J = 25$ °C, unless otherwise notedParameterSymbolTest ConditionsMin.Typ.Max.Unit							
Drain-Source Breakdown Voltage V _{DS} V _{DS} = 0 V, I _D = -250 μA - 30 - 30 V _{DS} Temperature Coefficient ΔV _{DS(H)} Temperature Coefficient ΔV _{DS(H)} Temperature Coefficient 3.6 - 30 V _{GS(H)} Temperature Coefficient V _{DS} = V _{DS} = 0 V - 1 3.6 - 3 Gate Threshold Voltage V _{DS} = V _{DS} = 0 V, V _{DS} = 250 µA - 1 - 3 - 10 Gate-Body Leakage I _{DSS} V _{DS} = 0 V, V _{OS} = 2 V - 1 - 1 - 1 Zero Gate Voltage Drain Current I _{DSS} V _{DS} = 0 V, V _{OS} = 0 V - 1 -		Syllibol	rest Conditions	IVIIII.	Тур.	IVIAX.	Onit	
Vos Temperature Coefficient ΔV _{DS/TJ} V _{SS(th)} Temperature Coefficient ΔV _{DS/TJ} ΔV _{SS(th)} Temperature Coefficient 10 = 250 μA - 30 m Gate Threshold Voltage V _{SS(th)} V _{SS} (th) V _{DS} = V _{SS} , I _D = -250 μA - 1 - 3 - 3 Zero Gate Voltage Drain Current I _{QSS} V _{DS} = O, V _{QS} = 20 V - 1 - 10 Zero Gate Voltage Drain Current I _{DSS} V _{DS} = -30 V, V _{QS} = 0 V - 10 - 10 On-State Drain Current ^A I _{D(pn)} V _{DS} = -30 V, V _{QS} = 0 V, T _J = 75 °C - 10 - 10 Drain-Source On-State Resistance ^A P _{DS} (m) V _{DS} = -15 V, V _{QS} = 0 V, T _J = 75 °C - 0.034 0.042 Drain-Source On-State Resistance ^A P _{DS} (m) V _{DS} = -15 V, V _{QS} = 0 V, T _J = 75 °C - 0.034 0.042 Drain-Source On-State Resistance ^A P _{DS} (m) V _{DS} = -15 V, V _{QS} = 0 V, T _J = 75 °C - 0.034 0.042 Drain-Source Drain-Source Drain Current P _{DS} (m) V _{DS} = -15 V, V _{QS} = 0 V, T _J = 1 MHz 11 11 Drain-Source Charge Q _D V _{DS} = -15 V, V _{QS} = 0 V, T = 1 MHz 150 17 26 Gat		Vpc	V _{DS} = 0 V, I _D = - 250 µA	- 30		l	V	
V _{SS(th)} Temperature Coefficient ΔV _{GS(th)} /To In = 250 μA 3.6 m Gate Threshold Voltage V _{GS(th)} V _{DS} = V _{GS} , I _D = −250 μA -1 -3 Gate Body Leakage I _{GSS} V _{DS} = 0 V, V _{GS} = ±20 V ±100 Zero Gate Voltage Drain Current I _{DSS} V _{DS} = -30 V, V _{GS} = 0 V -10 On-State Drain Current ^a I _{D(on)} V _{DS} = -30 V, V _{GS} = 0 V, T _J = 75 °C -10 Drain-Source On-State Resistance ^a R _{DS(on)} V _{DS} = -10 V, I _D = -5 A 0.034 0.042 Drain-Source On-State Resistance ^a gts V _{DS} = -15 V, I _D = -5 A 0.052 0.065 Forward Transconductance ^a gts V _{DS} = -15 V, I _D = -5 A 0.052 0.065 Forward Transconductance ^a C _{SS} V _{DS} = -15 V, V _{GS} = 0 V, f = 1 MHz 150 150 Dypamic ^b V _{DS} = -15 V, V _{GS} = 0 V, f = 1 MHz 150 150 150 Severse Transfer Capacitance C _{SS} V _{DS} = -15 V, V _{GS} = -10 V, I _D = -5 A 17 26 Gate-Source Charge Q _{gs} Gate-Source Charge 3.5 16			7 DS 6 1, D 200 M.	- 00	- 30		mV/°C	
Gate Threshold Voltage V _{GS(th)} V _{DS} = V _{GS} , I _D = -250 μA -1 -3 Gate-Body Leakage I _{GSS} V _{DS} = 0 V, V _{GS} = ±20 V ±100 Zero Gate Voltage Drain Current I _{DSS} V _{DS} = -30 V, V _{GS} = 0 V -1 On-State Drain Current ^a I _{D(on)} V _{DS} = -5 V, V _{GS} = 0 V, T _J = 75 °C -10 On-State Drain Current ^a I _{D(on)} V _{DS} = -30 V, V _{GS} = 0 V, T _J = 75 °C -10 Drain-Source On-State Resistance ^a P _{DS} (on) V _{DS} = -15 V, V _{DS} = -10 V -10 Drain-Source On-State Resistance ^a P _{DS} (on) V _{DS} = -15 V, V _{DS} = -10 V -10 Drain-Source On-State Resistance ^a P _{DS} (on) V _{DS} = -15 V, V _{DS} = -10 V -10 Drain-Source On-State Resistance ^a P _{DS} (on) V _{DS} = -15 V, V _{DS} = -10 V -10 Drain-Source Constance C _{DS} (on) V _{DS} = -15 V, V _{DS} = -10 V -10 Poscard Transconductance C _{DSS} (on) 115 -115 Cutput Capacitance C _{DSS} (on) -10 150 -115 Drys = -15 V, V _{DS} = -15 V, V _{DS} = 0 V, f = 1 MHz 117 26 -7		+	$I_D = 250 \mu A$					
Case Page	()	` ′	Vpc = Vcc	- 1	0.0	- 3	V	
Variable		.		- 1			nA	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	auto Body Edukago	'655					10/1	
On-State Drain Current³ Ib(on) V _{DS} ≥ - 5 V, V _{GS} = -10 V - 10 - 10 Drain-Source On-State Resistance³ R _{DS(on)} V _{GS} = -10 V, I _D = -5 A 0.034 0.042 Froward Transconductance³ 9I _S V _{DS} = -15 V, I _D = -5 A 11 - 10 Dynamic⁵ Input Capacitance C _{IsS} 625 150 Output Capacitance C _{SS} 8 everse Transfer Capacitance 150 115 Reverse Transfer Capacitance C _{SS} V _{DS} = -15 V, V _{GS} = 0 V, f = 1 MHz 115 - 115 Total Gate Charge Q _g V _{DS} = -15 V, V _{GS} = -4.5 V, I _D = -5 A 17 26 Gate-Drain Charge Q _g V _{DS} = -15 V, V _{GS} = -4.5 V, I _D = -5 A 1.6 - 7.8 12 Gate-Drain Charge Q _g f = 1 MHz 7 14 - 1.6 - 3.5 Gate-Drain Charge Q _g f = 1 MHz 7 14 - 1.6 - 3.5 - 5. Rise Time t _f V _{DS} = -15 V, V _{GS} = -4.5 V, R _g = 1Ω 22 35 55	Zero Gate Voltage Drain Current	I _{DSS}					μΑ	
No.	On-State Drain Current ^a	I _{D(on)}		- 10			Α	
Forward Transconductance ^a 9 _{ls} V _{DS} = -15 V, I _D = -5 A 0.052 0.068			V _{GS} = - 10 V, I _D = - 5 A		0.034	0.042	Ω	
Dynamic	Drain-Source On-State Resistance ^a	H _{DS(on)}	$V_{GS} = -4.5 \text{ V}, I_D = -3 \text{ A}$		0.052	0.065		
Input Capacitance C iss VDS = -15 V, VGS = 0 V, f = 1 MHz 150	Forward Transconductance ^a	9 _{fs}	V _{DS} = - 15 V, I _D = - 5 A		11		S	
Output Capacitance Coss Crss V _{DS} = -15 V, V _{GS} = 0 V, f = 1 MHz 150 115 Reverse Transfer Capacitance Crss V _{DS} = -15 V, V _{GS} = -10 V, I _D = -5 A 17 26 Total Gate Charge Qg V _{DS} = -15 V, V _{GS} = -4.5 V, I _D = -5 A 1.6 -7.8 12 Gate-Source Charge Qgd Total Gate Charge 1.6 -7.8 12 Gate Resistance Rg f = 1 MHz 7 14 Turn-On Delay Time t _{q(on)} 1.6 -3.5 Rise Time t _r V _{DD} = -15 V, R _L = 3 Ω 100 150 Turn-Off Delay Time t _{q(on)} 1.6 22 35 Fall Time t _r V _{DD} = -15 V, R _L = 3 Ω 100 150 Turn-Off Delay Time t _{q(on)} 1.6 8 16 Time t _r V _{DD} = -15 V, R _L = 3 Ω 8 16 Turn-Off Delay Time t _r V _{DD} = -15 V, R _L = 3 Ω 8 16 Fall Time t _r V _{DD} = -5 A, V _{GEN} = -10 V, R _g = 1 Ω 8 1	Dynamic ^b	•			•	•		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Input Capacitance	C _{iss}			625			
Total Gate Charge Qg	Output Capacitance	C _{oss}	V 45VV 0V/ 4MI-		150		pF	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Reverse Transfer Capacitance	C _{rss}	$V_{DS} = -15 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$		115			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Total Gate Charge	Qa	$V_{DS} = -15 \text{ V}, V_{GS} = -10 \text{ V}, I_{D} = -5 \text{ A}$		17	26	nC	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Total date onlings				7.8	12		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Gate-Source Charge	Q_{gs}	$V_{DS} = -15 \text{ V}, V_{GS} = -4.5 \text{ V}, I_{D} = -5 \text{ A}$		1.6			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Gate-Drain Charge	Q_{gd}			3.5			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Gate Resistance	R_g	f = 1 MHz		7	14	Ω	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Turn-On Delay Time	t _{d(on)}			35	55		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Rise Time	t _r			100	150		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Turn-Off Delay Time	t _{d(off)}	$I_D \cong -5 A$, $V_{GEN} = -4.5 V$, $R_g = 1 \Omega$		22	35		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Fall Time	t _f			12	20		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Turn-On Delay Time	t _{d(on)}			8	16		
Fall Time t_f $T_c = 25 ^{\circ}\text{C}$ $T_c $	Rise Time	t _r			8	16	ns	
	Turn-Off Delay Time	t _{d(off)}	$I_D \cong$ - 5 A, V_{GEN} = - 10 V, R_g = 1 Ω		24	40		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Fall Time	t _f			7	14		
Pulse Diode Forward Currenta I_{SM} - 30Body Diode Voltage V_{SD} $I_S = -1.4 \text{ A}, V_{GS} = 0 \text{ V}$ - 0.78- 1.2Body Diode Reverse Recovery Time t_{rr} 3045Body Diode Reverse Recovery Charge Q_{rr} $I_F = -2 \text{ A}, \text{ dI/dt} = 100 \text{ A/µs}, T_J = 25 °C$ 1525Reverse Recovery Fall Time t_a 1414	Drain-Source Body Diode Characteristi	cs						
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Continous Source-Drain Diode Current	I _S	$T_C = 25 ^{\circ}C$			- 3.3		
Body Diode Reverse Recovery Time t_{rr} 3045Body Diode Reverse Recovery Charge Q_{rr} $I_F = -2$ A, dl/dt = 100 A/μs, $T_J = 25$ °C1525Reverse Recovery Fall Time t_a 1414	Pulse Diode Forward Current ^a	I _{SM}				- 30	Α	
Body Diode Reverse Recovery Charge Q_{rr} Reverse Recovery Fall Time t_a $I_F = -2 \text{ A, dI/dt} = 100 \text{ A/}\mu\text{s, T}_J = 25 \text{ °C}$ $15 \qquad 25$ $14 \qquad 14$	Body Diode Voltage	V _{SD}	I _S = - 1.4 A, V _{GS} = 0 V		- 0.78	- 1.2	V	
Reverse Recovery Fall Time t_a $I_F = -2 \text{ A, dl/dt} = 100 \text{ A/}\mu\text{s, } I_J = 25 \text{ C}$	Body Diode Reverse Recovery Time	t _{rr}			30	45	ns	
Reverse Recovery Fall Time t _a	Body Diode Reverse Recovery Charge	Q _{rr}	L2 A dl/dt = 100 A/us T = 25 °C		15	25	nC	
Reverse Recovery Rise Time t _b 16	Reverse Recovery Fall Time	t _a	1 = -2 Λ, αι/αι = 100 Λ/μs, 1 J = 25 °C		14			
	Reverse Recovery Rise Time	t _b			16		ns	

Notes:

a. Pulse test; pulse width $\leq 300~\mu s,$ duty cycle $\leq 2~\%.$

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



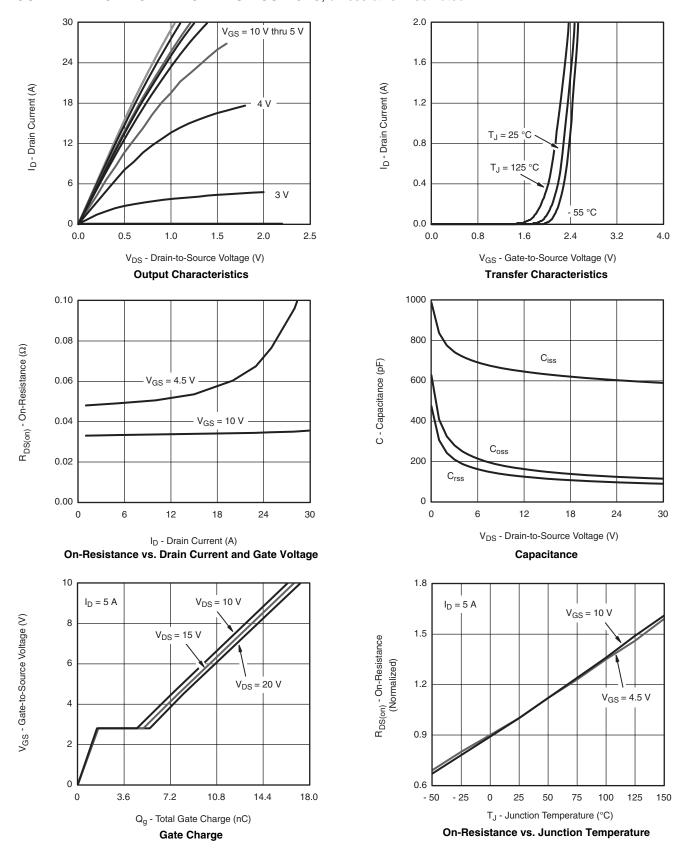


SCHOTTKY SPECIFICATIONS T _J = 25 °C, unless otherwise noted								
Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit		
Forward Voltage Drop	V _F	I _F = 3 A		0.485	0.53	V		
Torward Vollage Drop	٧F	I _F = 3 A, T _J = 125 °C		0.42	0.47			
		V _R = 30 V		0.008	0.1			
Maximum Reverse Leakage Current	I _{rm}	V _R = 30 V, T _J = 75 °C		0.4	5	mA		
		V _R = 30 V, T _J = 125 °C		6.5	20	•		
Junction Capacitance	C _T	V _R = 15 V		102		pF		

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.

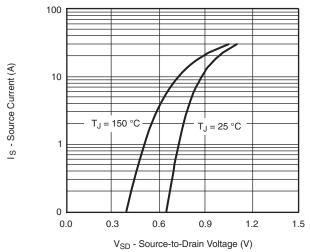
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MOSFET TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

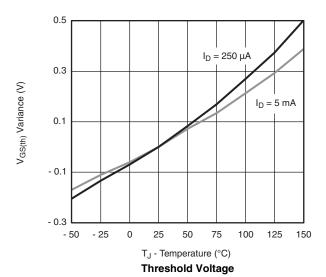




MOSFET TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

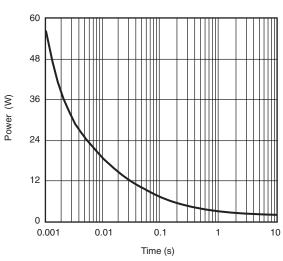


Source-Drain Diode Forward Voltage

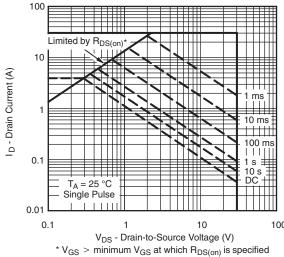


0.20 I_D = 5 A 0.16 $\mathsf{R}_{\mathsf{DS}(\mathsf{on})}$ - On-Resistance (Ω) 0.12 0.08 T_A = 125 °C 0.04 T_A = 25 °C 2 5 0 1 3 4 6 9 10 V_{GS} - Gate-to-Source Voltage (V)

On-Resistance vs. Gate-to-Source Voltage

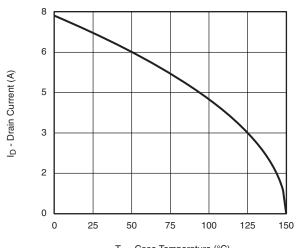


Single Pulse Power, Junction-to-Ambient



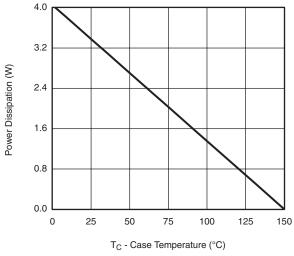
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MOSFET TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

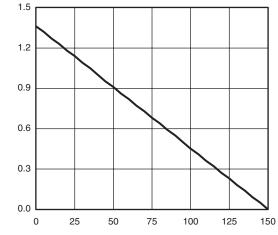


T_C - Case Temperature (°C)

Current Derating*







T_A - Ambient Temperature (°C)

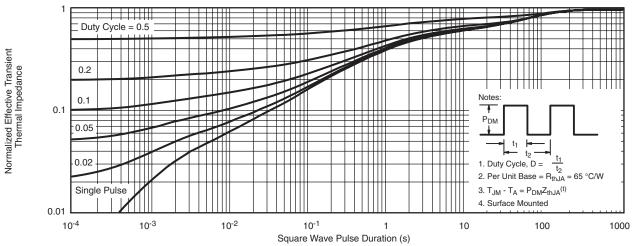
Power Derating, Junction-to-Foot

Power Derating, Junction-to-Ambient

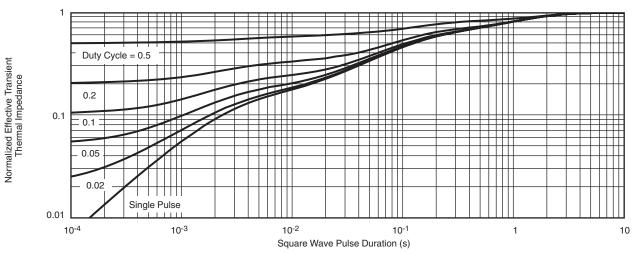
^{*} The power dissipation PD is based on $T_{J(max)} = 150$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.



MOSFETS TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



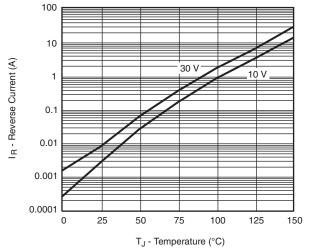
Normalized Thermal Transient Impedance, Junction-to-Ambient

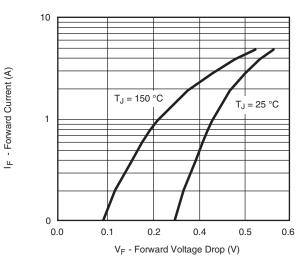


Normalized Thermal Transient Impedance, Junction-to-Foot



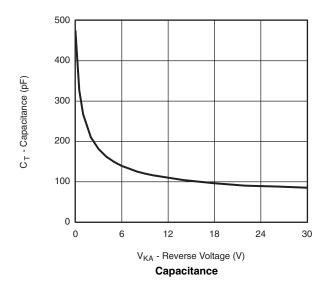
SCHOTTKY TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted





Reverse Current vs. Junction Temperature

Forward Voltage Drop



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/ppq?70483.



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