Si1330EDL

Vishay Siliconix

N-Channel 60 V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
60	2.5 at V_{GS} = 10 V	0.25
	3 at V_{GS} = 4.5 V	0.23
	8 at V_{GS} = 3 V	0.05

FEATURES

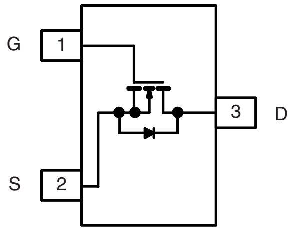
- **Halogen-free According to IEC 61249-2-21 Definition**
- TrenchFET® Power MOSFET
- ESD Protected: 2000 V
- Compliant to RoHS Directive 2002/95/EC

APPLICATIONS

- P-Channel Driver
  - Notebook PC
  - Servers

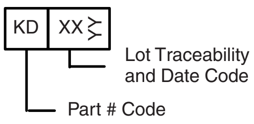
SOT-323

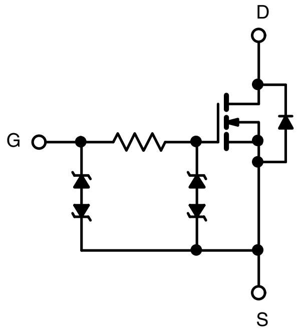
SC-70 (3-LEADS)



Top View

Marking Code





Ordering Information: Si1330EDL-T1-E3 (Lead (Pb)-free)
Si1330EDL-T1-GE3 (Lead (Pb)-free and Halogen-free)

ABSOLUTE MAXIMUM RATINGS T_A = 25 °C, unless otherwise noted

Parameter		Symbol	5 s	Steady State	Unit
Drain-Source Voltage		V_{DS}	60		V
Gate-Source Voltage		V_{GS}	± 20		
Continuous Drain Current (T_J = 150 °C)[a]	T_A = 25 °C	I_D	0.25	0.24	A
	T_A = 70 °C		0.2	0.19	
Pulsed Drain Current		I_{DM}	1.0		
Continuous Source Current (Diode Conduction)[a]		I_S	0.26	0.23	
Maximum Power Dissipation[a]	T_A = 25 °C	P_D	0.31	0.28	W
	T_A = 70 °C		0.20	0.18	
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[a]	t ≤ 5 s	R_{thJA}	355	400	°C/W
	Steady State		380	450	
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	285	340	

Notes:

a. Surface mounted on 1" x 1" FR4 board.

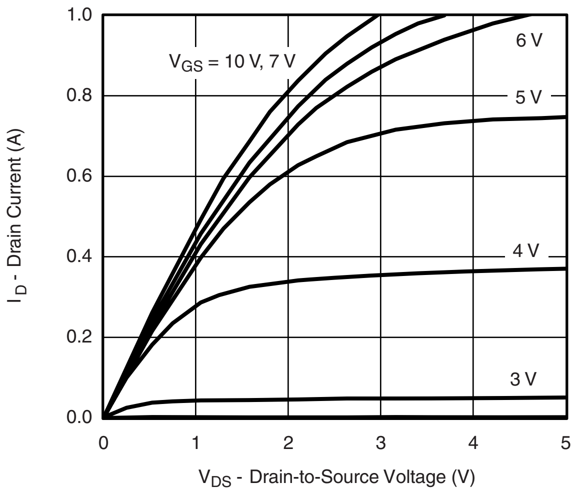
SPECIFICATIONS T_J = 25 °C, unless otherwise noted[a]

Parameter	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = 10 µA	60			V
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	1	2.0	2.5	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 10 V			± 1	µA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 60 V, V_{GS} = 0 V			1	
		V_{DS} = 60 V, V_{GS} = 0 V, T_J = 55 °C			10	
On-State Drain Current[b]	$I_{D(on)}$	V_{GS} = 10 V, V_{DS} = 7.5 V	0.5			A
		V_{GS} = 4.5 V, V_{DS} = 10 V	0.4			
		V_{GS} = 3 V, V_{DS} = 10 V	0.05			
Drain-Source On-Resistance[b]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 0.25 A		1.0	2.5	Ω
		V_{GS} = 4.5 V, I_D = 0.2 A		1.4	3	
		V_{GS} = 3 V, I_D = 0.025 A		3.0	8	
Forward Transconductance[b]	g_{fs}	V_{DS} = 10 V, I_D = 0.25 A		350		mS
Diode Forward Voltage	V_{SD}	I_S = 0.23 A, V_{GS} = 0 V		0.83	1.2	V
Dynamic[b]						
Total Gate Charge	Q_g	V_{DS} = 10 V, V_{GS} = 4.5 V $I_D \cong$ 0.25 A		0.4	0.6	nC
Gate-Source Charge	Q_{gs}			0.11		
Gate-Drain Charge	Q_{gd}			0.15		
Gate Resistance	R_g			173		Ω
Turn-On Time	$t_{d(on)}$	V_{DD} = 30 V, R_L = 150 Ω $I_D \cong$ 0.2 A, V_{GEN} = 10 V R_g = 10 Ω		3.8	10	ns
	t_r			4.8	15	
Turn-Off Time	$t_{d(off)}$			12.8	20	
	t_f			9.6	15	

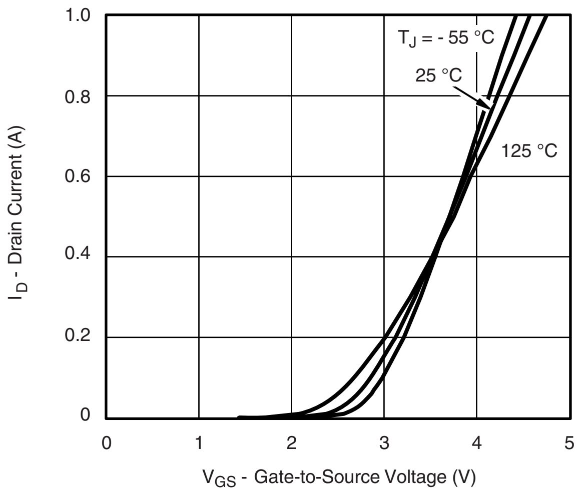
Notes:
a. Pulse test: PW ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.

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 otherwise noted

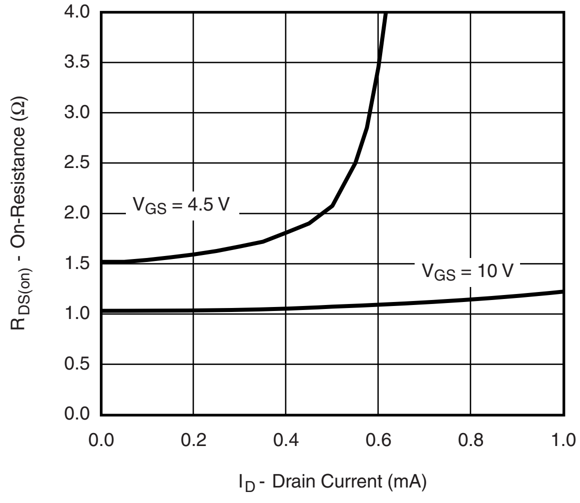


Output Characteristics

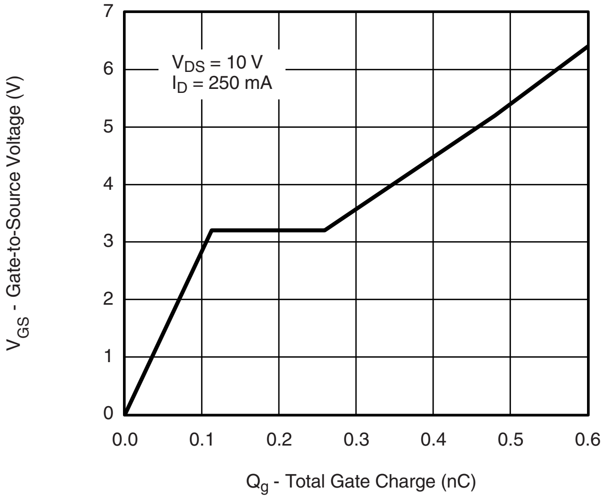


Transfer Characteristics

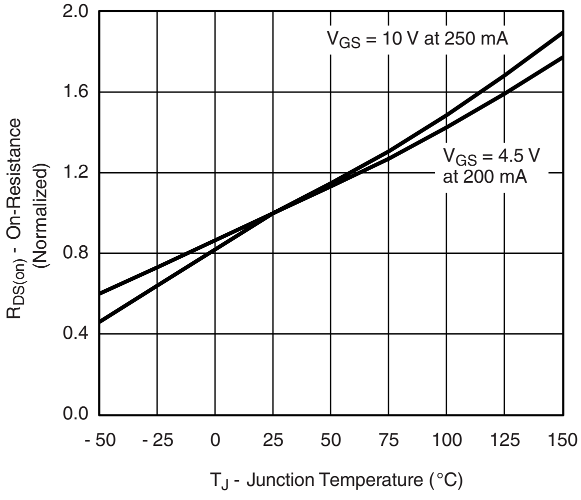
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



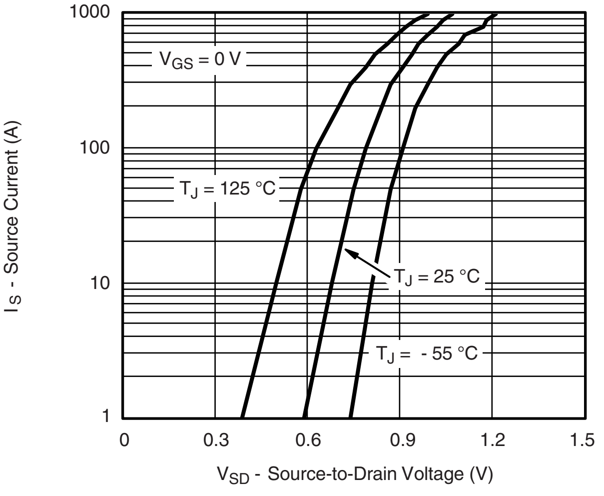
On-Resistance vs. Drain Current



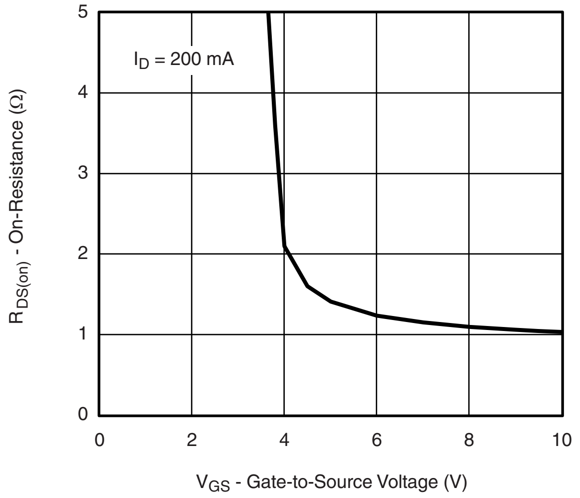
Gate Charge



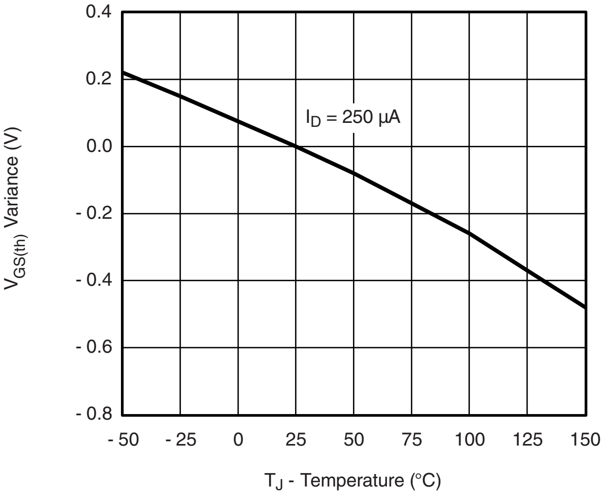
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

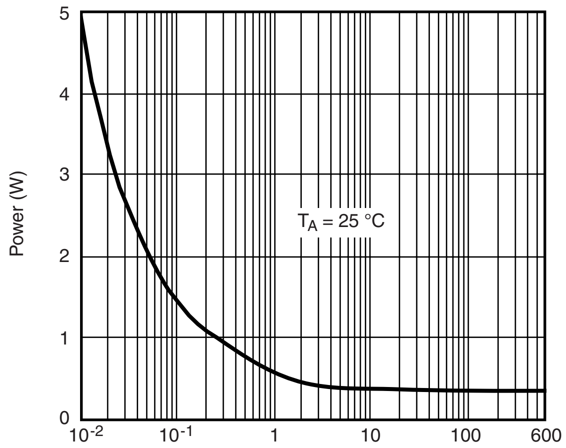


On-Resistance vs. Gate-Source Voltage

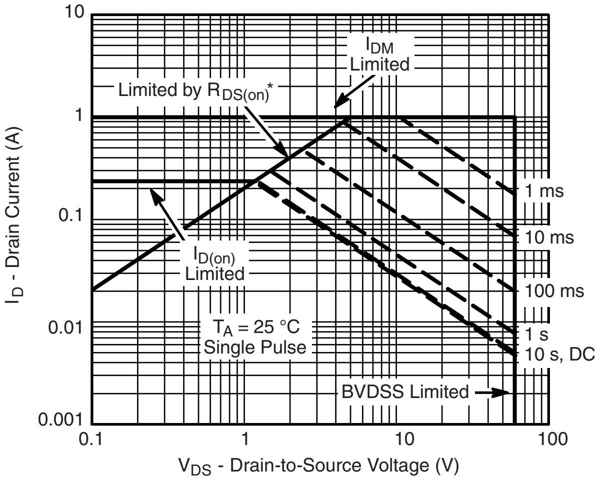


Threshold Voltage Variance over Temperature

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

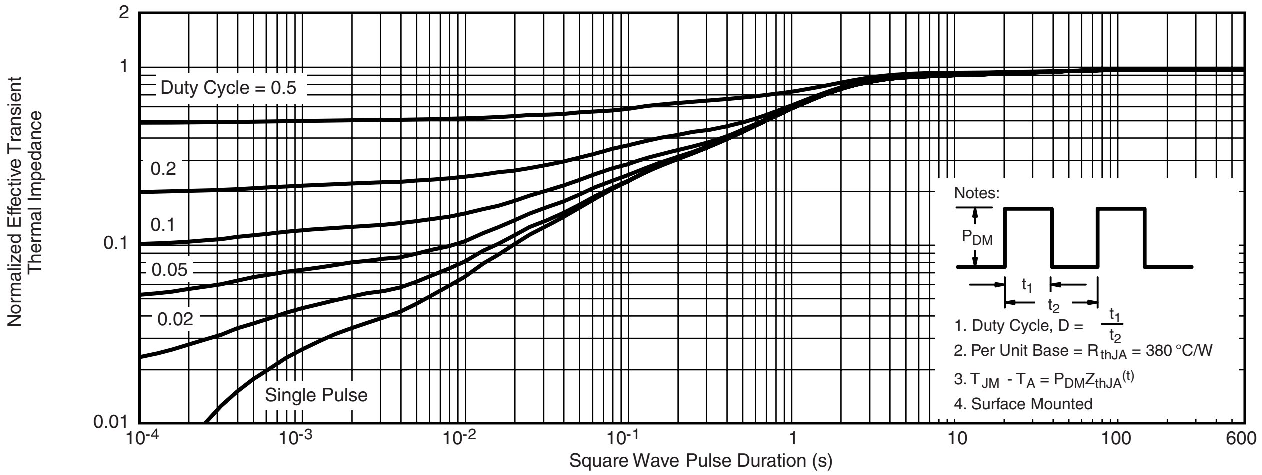


Single Pulse Power

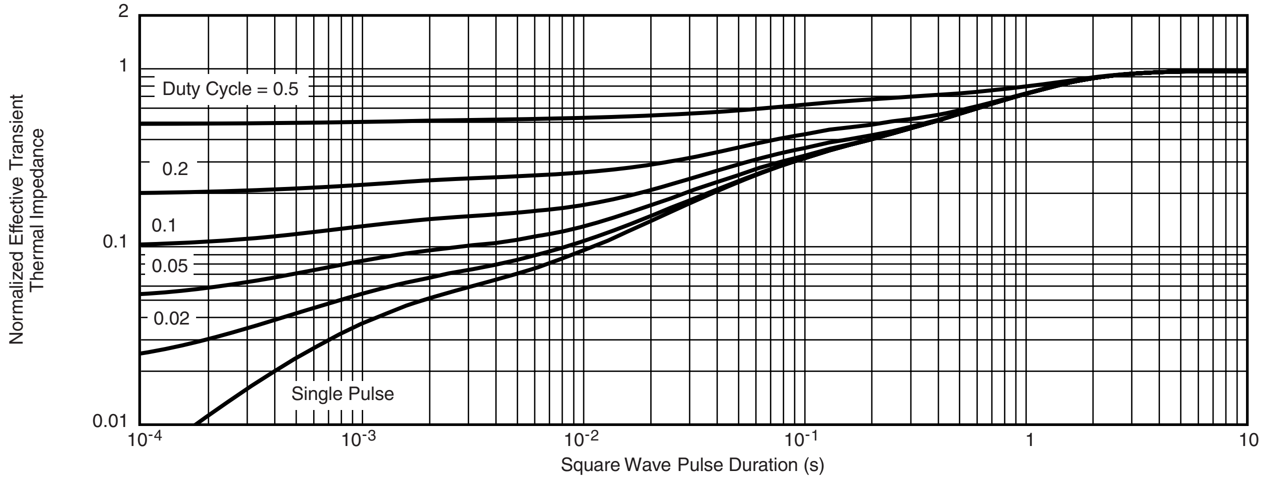


* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot

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