N-Channel 60-V (D-S) MOSFET

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
60	2.5 @ V_{GS} = 10 V	0.25
	3 @ V_{GS} = 4.5 V	0.23
	8 @ V_{GS} = 3 V	0.05

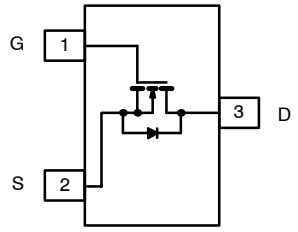
FEATURES

- TrenchFET® Power MOSFET
- ESD Protected: 2000 V

APPLICATIONS

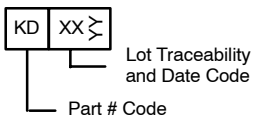
- P-Channel Driver
  - Notebook PC
  - Servers

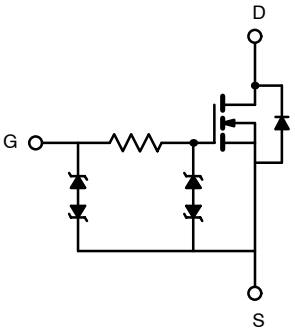
SOT-323
SC-70 (3-LEADS)



Top View

Marking Code





Ordering Information: Si1330EDL-T1

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)					
Parameter		Symbol	5 secs	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 Diode 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 sec	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.

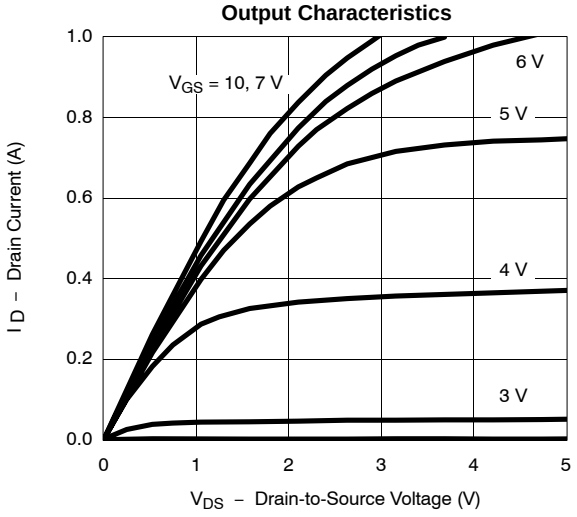
SPECIFICATIONS[a] (T_A = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Conditions	Limits Min	Limits Typ	Limits Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	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 ≅ 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 ≅ 0.2 A, V_{GEN} = 10V 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	

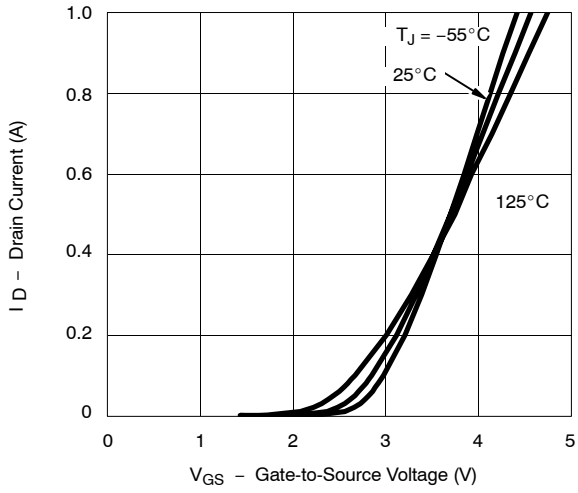
Notes
a. Pulse test: PW ≤ 300 μs duty cycle ≤ 2%.
b. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

Output Characteristics

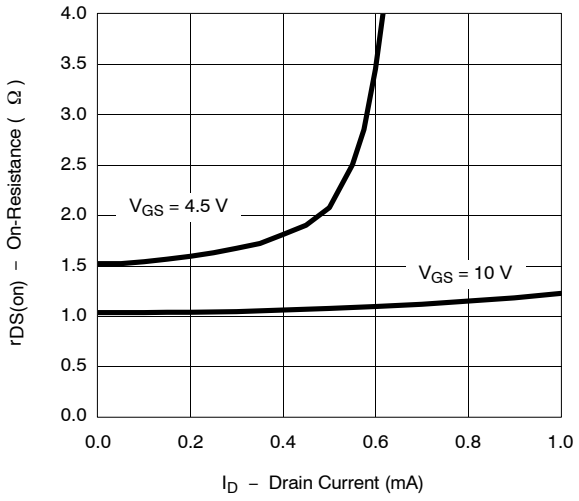


Transfer Characteristics

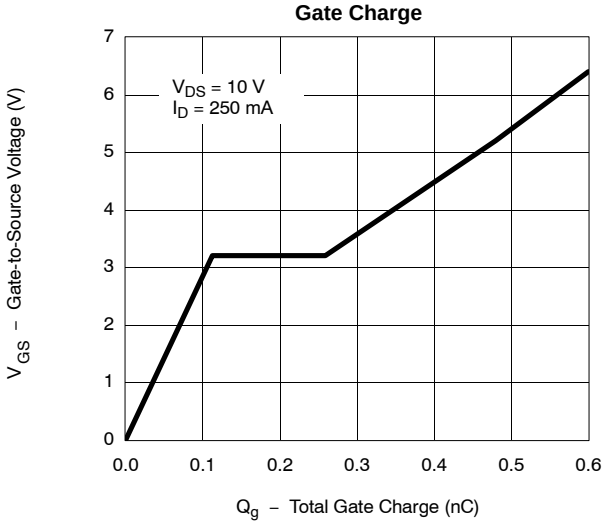


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

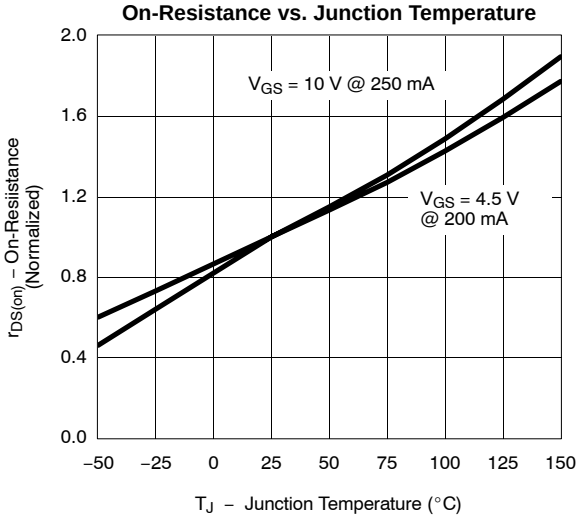
On-Resistance vs. Drain Current



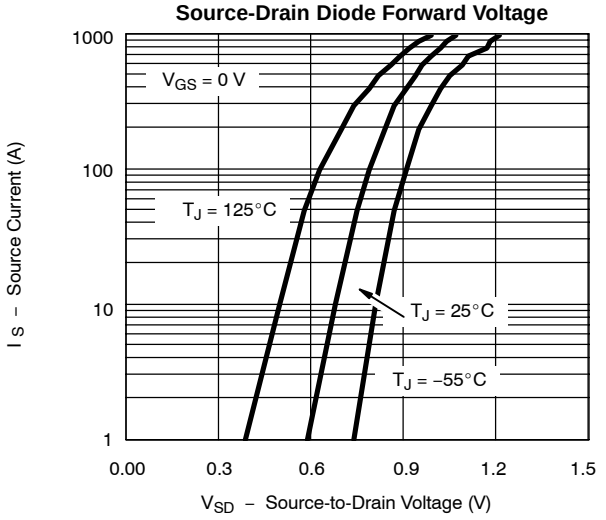
Gate Charge



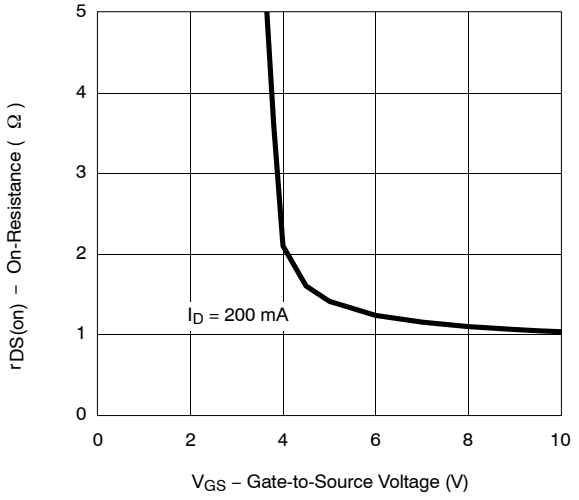
On-Resistance vs. Junction Temperature



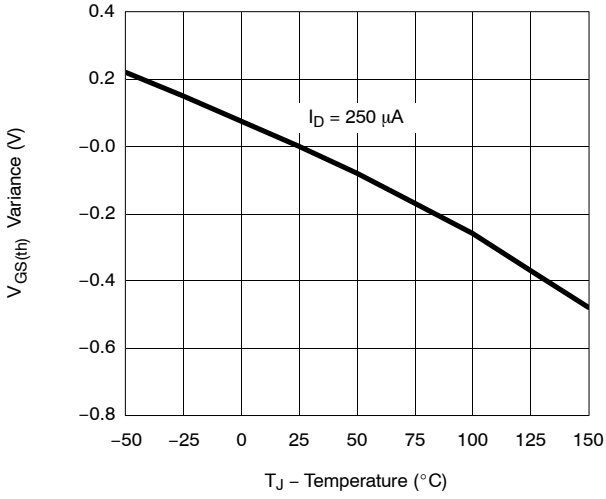
Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-Source Voltage

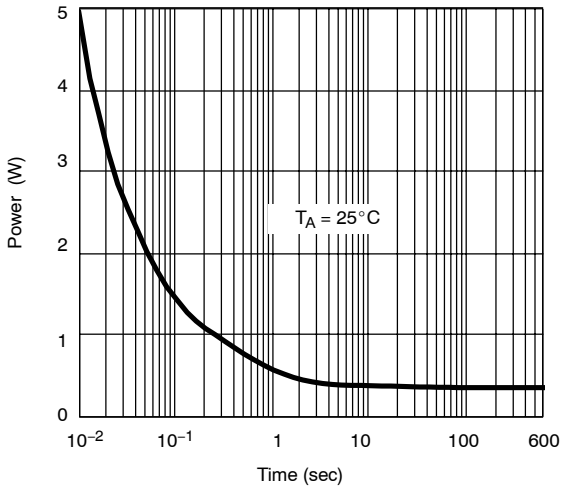


Threshold Voltage Variance over Temperature

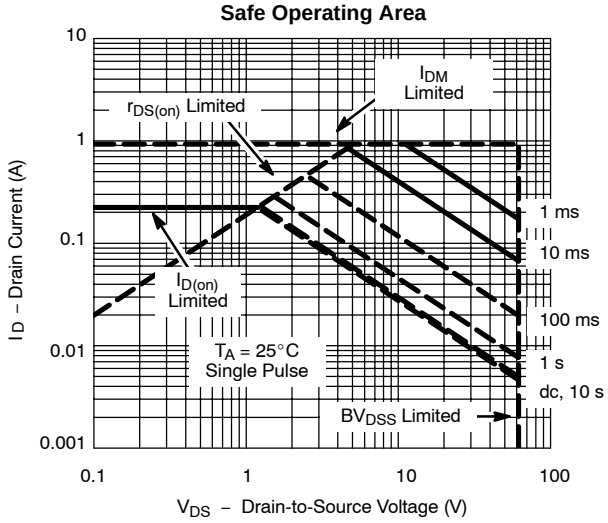


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

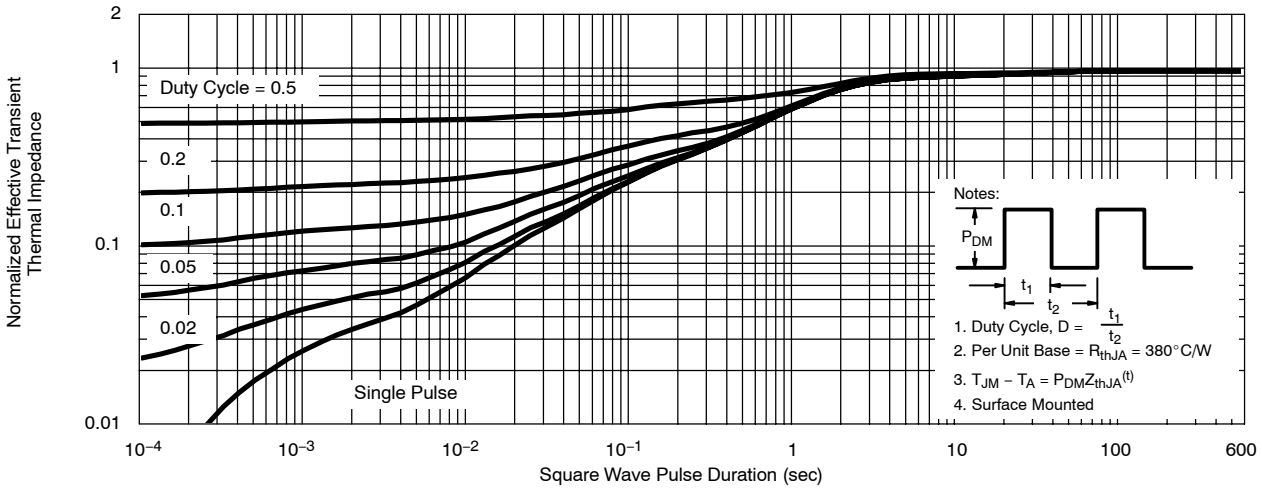
Single Pulse Power



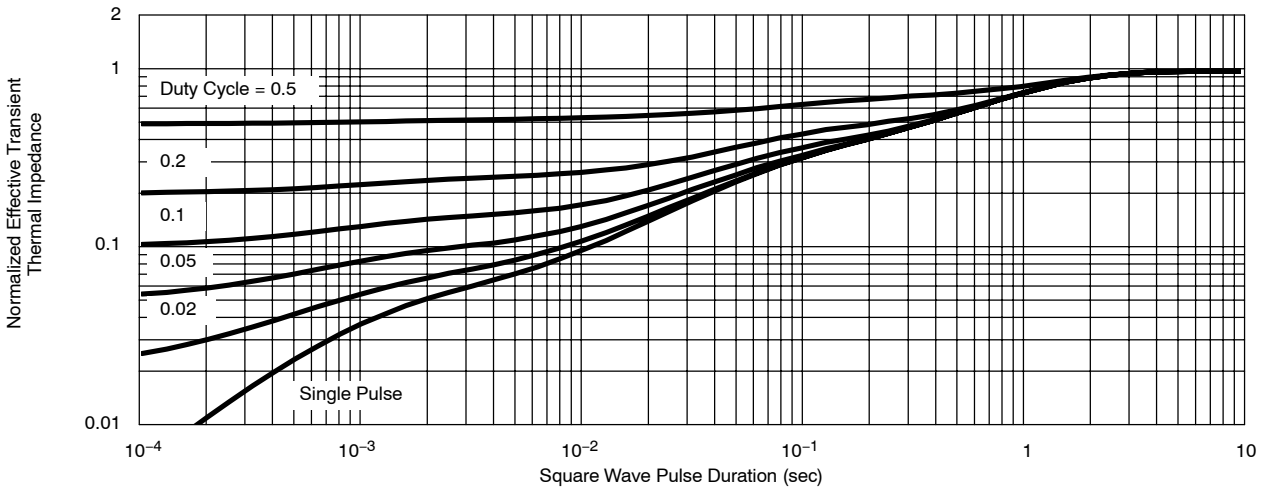
Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot



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