

N-Channel 60 V (D-S) MOSFET

PRODUCT SUMMARY

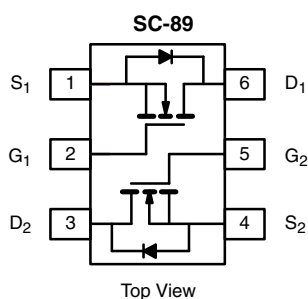
$V_{DS(min)}$ (V)	$R_{DS(on)}$ (Ω)	$V_{GS(th)}$ (V)	I_D (mA)
60	1.40 at $V_{GS} = 10$ V	1 to 2.5	500

FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- Low On-Resistance: 1.40 Ω
- Low Threshold: 2 V (typ.)
- Low Input Capacitance: 30 pF
- Fast Switching Speed: 15 ns (typ.)
- Low Input and Output Leakage
- ESD Protected: 2000 V
- Miniature Package
- Compliant to RoHS Directive 2002/95/EC



RoHS
COMPLIANT
HALOGEN
FREE



Marking Code: E

Ordering Information: Si1026X-T1-GE3 (Lead (Pb)-free and Halogen-free)

BENEFITS

- Low Offset Voltage
- Low-Voltage Operation
- High-Speed Circuits
- Low Error Voltage
- Small Board Area

APPLICATIONS

- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc.
- Battery Operated Systems
- Solid-State Relays

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	I_D	320	305	mA
		230	220	
Pulsed Drain Current ^b	I_{DM}	- 650		
Continuous Source Current (Diode Conduction) ^a	I_S	450	380	
Maximum Power Dissipation ^a	P_D	280	250	mW
		145	130	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 150		°C
Gate-Source ESD Rating (HBM, Method 3015)	ESD	2000		V

Notes:

a. Surface mounted on FR4 board.

b. Pulse width limited by maximum junction temperature.

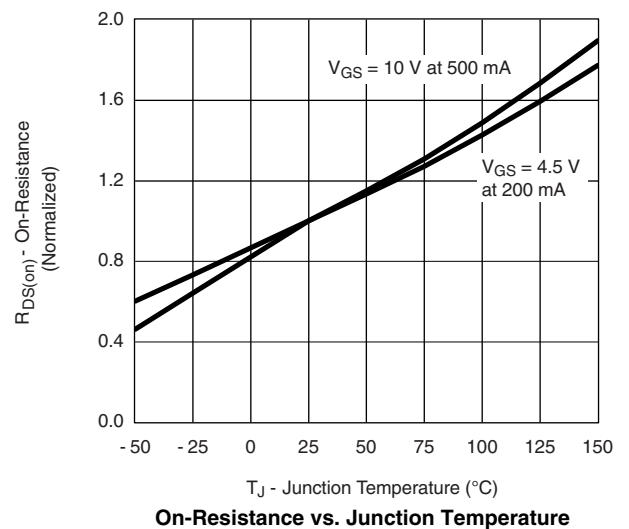
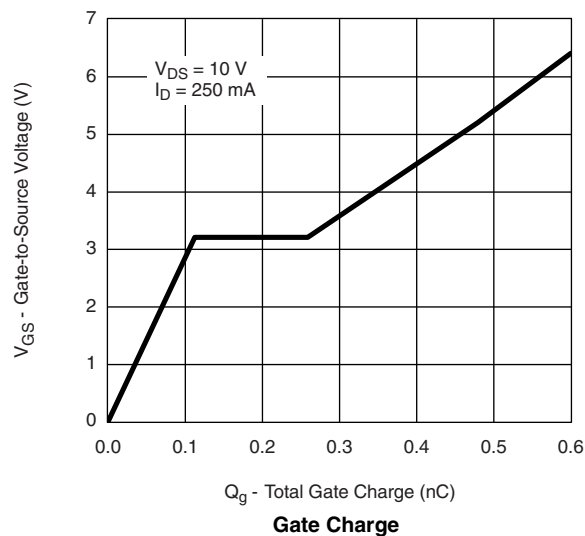
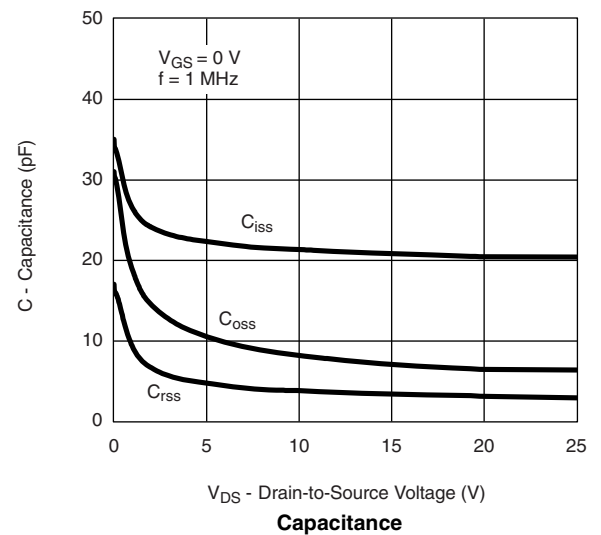
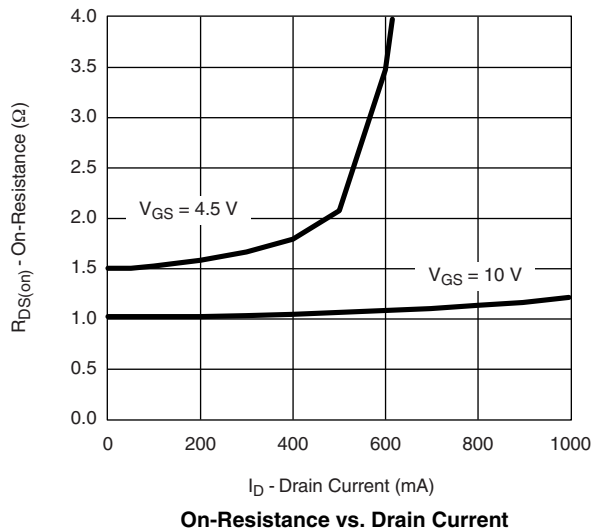
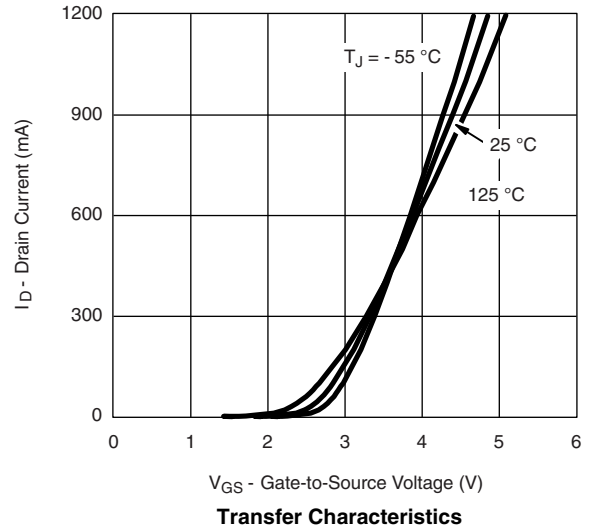
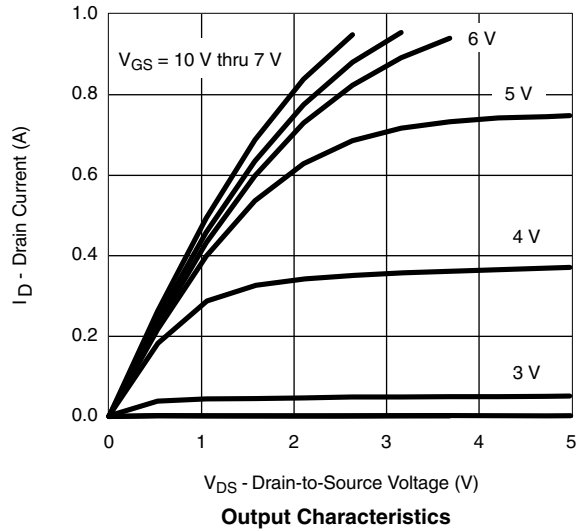
SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 10 μA	60			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 0.25 mA	1		2.5	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 10 V			± 150	nA
		V _{DS} = 0 V, V _{GS} = ± 5 V			± 50	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 60 V, V _{GS} = 0 V			1	μA
		V _{DS} = 60 V, V _{GS} = 0 V, T _J = 85 °C			10	
On-State Drain Current ^a	I _{D(on)}	V _{DS} = 10 V, V _{GS} = 4.5 V	500			mA
		V _{DS} = 7.5 V, V _{GS} = 10 V	800			
Drain-Source On-Resistance ^a	R _{DS(on)}	V _{GS} = 4.5 V, I _D = 200 mA			3.0	Ω
		V _{GS} = 10 V, I _D = 500 mA			1.40	
		V _{GS} = 10 V, I _D = 500 mA, T _J = 125 °C			2.50	
Forward Transconductance ^a	g _{fs}	V _{DS} = 10 V, I _D = 200 mA		200		mS
Diode Forward Voltage ^a	V _{SD}	V _{GS} = 0 V, I _S = 200 mA			1.40	V
Dynamic ^b						
Total Gate Charge	Q _g	V _{DS} = 10 V, I _D = 250 mA, V _{GS} = 4.5 V		600		pC
Gate-Source Charge	Q _{gs}			120		
Gate-Drain Charge	Q _{gd}			225		
Input Capacitance	C _{iss}	V _{DS} = 25 V, V _{GS} = 0 V, f = 1 MHz		30		pF
Output Capacitance	C _{oss}			6		
Reverse Transfer Capacitance	C _{rss}			3		
Switching ^{b, c}						
Turn-On Time	t _(on)	V _{DD} = 30 V, R _L = 150 Ω		15		ns
Turn-Off Time	t _(off)	I _D = 200 mA, V _{GEN} = 10 V, R _g = 10 Ω		20		

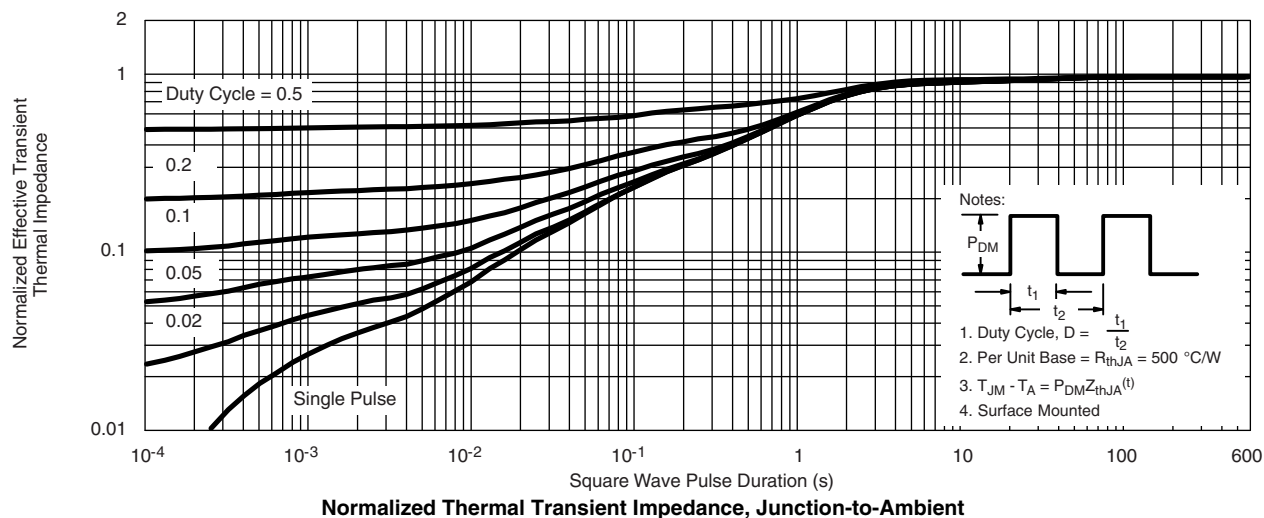
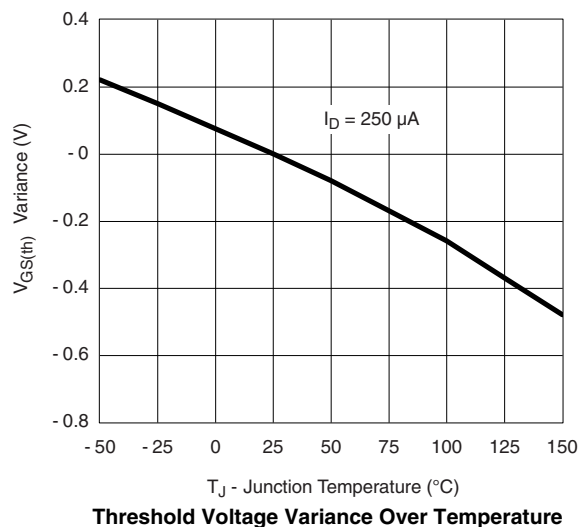
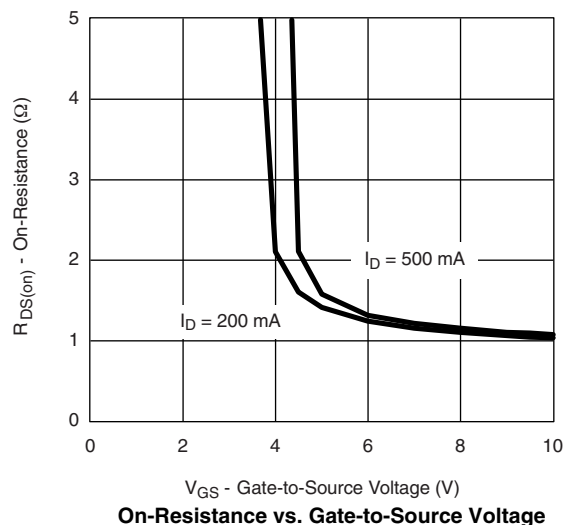
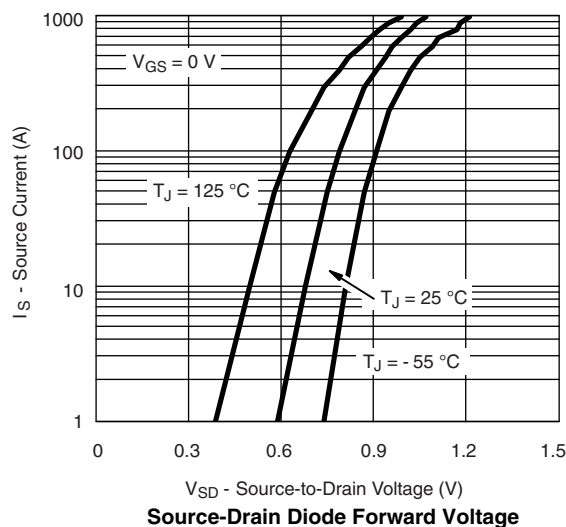
Notes:

- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
b. For DESIGN AID ONLY, not subject to production testing.
c. Switching time is essentially 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.

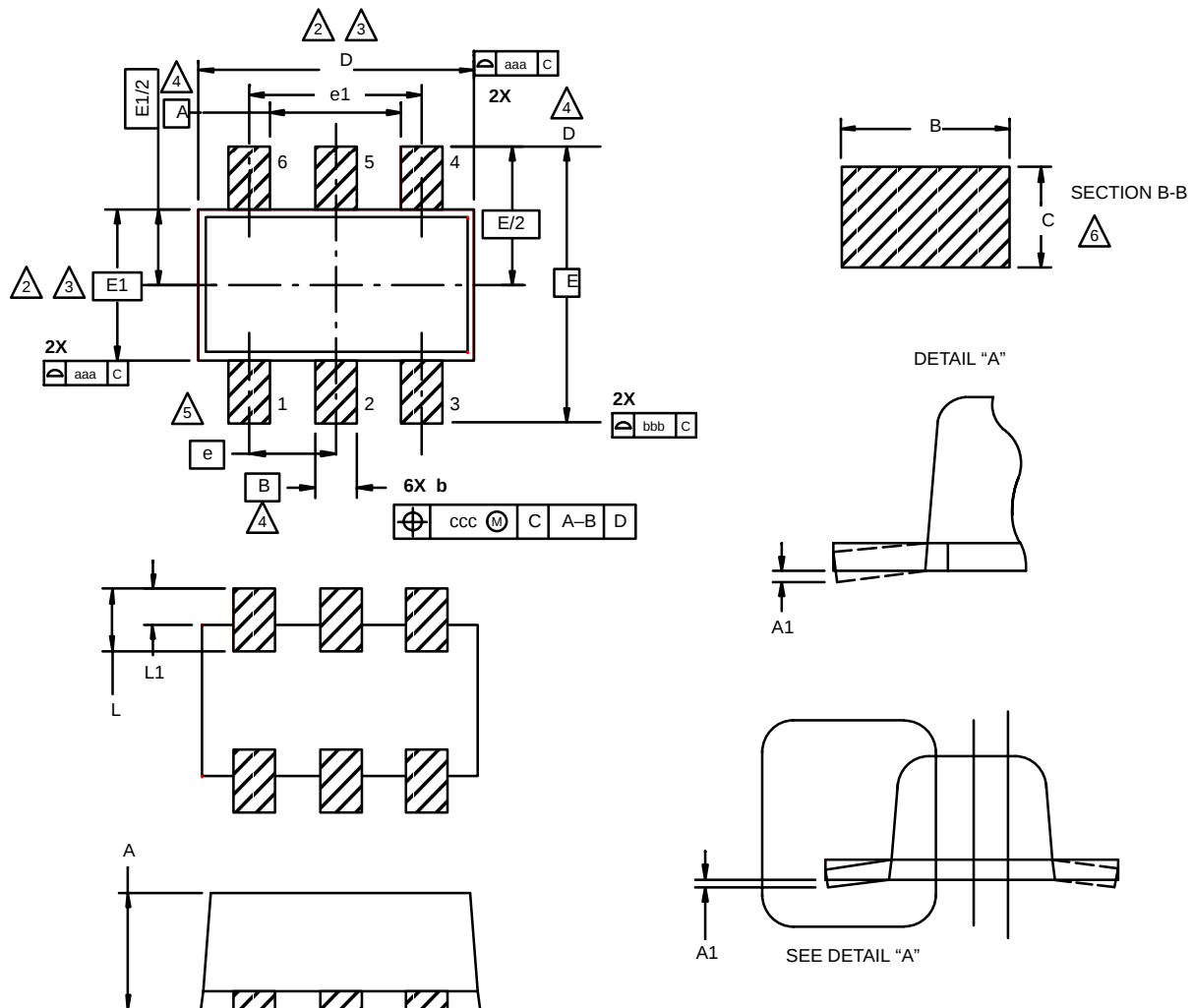
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



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SC89: 6- LEADS (SOT-563F)



NOTES:

1. Dimensions in millimeters.

- 2 Dimension D does not include mold flash, protrusions or gate burrs. Mold flash, protrusions or gate burrs shall not exceed 0.15 mm per dimension E1 does not include interlead flash or protrusion, interlead flash or protrusion shall not exceed 0.15 mm per side.
- 3 Dimensions D and E1 are determined at the outmost extremes of the plastic body exclusive of mold flash, the bar burrs, gate burrs and interlead flash, but including any mismatch between the top and the bottom of the plastic body.
- 4 Datums A, B and D to be determined 0.10 mm from the lead tip.
- 5 Terminal numbers are shown for reference only.
- 6 These dimensions apply to the flat section of the lead between 0.08 mm and 0.15 mm from the lead tip.

Dim	MILLIMETERS		Note	Symbol	Tolerances Of Form And Position
	Min	Max			
A	0.56	0.60		aaa	0.10
A1	0.00	0.10		bbb	0.10
b	0.15	0.30		ccc	0.10
c	0.10	0.18			
D	1.50	1.70	2, 3		
E	1.55	1.70			
E1	1.20 BSC		2, 3		
e	0.50 BSC				
e1	1.00 BSC				
L	0.35 BSC				
L1	0.20 BSC				

ECN: E-00499—Rev. B, 02-Jul-01
DWG: 5880

RECOMMENDED MINIMUM PADS FOR SC-89: 6-Lead



Recommended Minimum Pads
Dimensions in Inches/(mm)

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