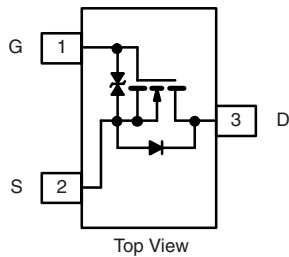


## N-Channel 1.8-V (G-S) MOSFET

PRODUCT SUMMARY		
$V_{DS}$ (V)	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (mA)
20	0.70 at $V_{GS} = 4.5$ V	600
	0.85 at $V_{GS} = 2.5$ V	500
	1.25 at $V_{GS} = 1.8$ V	350

SC-75A or SC-89



ORDERING INFORMATION		
Part Number	Package	Marking Code
Si1012R-T1-E3 (Lead (Pb)-free) Si1012R-T1-GE3 (Lead (Pb)-free and Halogen-free)	SC-75A (SOT-416)	C
Si1012X-T1-E3 (Lead (Pb)-free) Si1012X-T1-GE3 (Lead (Pb)-free and Halogen-free)	SC-89 (SOT-490)	A

### FEATURES

- Halogen-free Option Available
- TrenchFET® Power MOSFET: 1.8 V Rated
- Gate-Source ESD Protected: 2000 V
- High-Side Switching
- Low On-Resistance: 0.7  $\Omega$
- Low Threshold: 0.8 V (typ.)
- Fast Switching Speed: 10 ns



**RoHS**  
COMPLIANT

### APPLICATIONS

- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories
- Battery Operated Systems
- Power Supply Converter Circuits
- Load/Power Switching Cell Phones, Pagers

### BENEFITS

- Ease in Driving Switches
- Low Offset (Error) Voltage
- Low-Voltage Operation
- High-Speed Circuits
- Low Battery Voltage Operation

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted					
Parameter	Symbol	5 s	Steady State	Unit	
Drain-Source Voltage	$V_{DS}$	20		V	
Gate-Source Voltage	$V_{GS}$	$\pm 6$			
Continuous Drain Current ( $T_J = 150$ °C) <sup>b</sup>	$I_D$	$T_A = 25$ °C	600	500	mA
		$T_A = 85$ °C	400	350	
Pulsed Drain Current <sup>a</sup>	$I_{DM}$	1000			
Continuous Source Current (Diode Conduction) <sup>b</sup>	$I_S$	275	250	mW	
Maximum Power Dissipation <sup>b</sup> for SC-75	$P_D$	$T_A = 25$ °C	175		150
		$T_A = 85$ °C	90		80
Maximum Power Dissipation <sup>b</sup> for SC-89	$P_D$	$T_A = 25$ °C	275		250
		$T_A = 85$ °C	160	140	
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. Pulse width limited by maximum junction temperature.  
b. Surface Mounted on FR4 board.

<b>SPECIFICATIONS</b> $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	0.45		0.9	V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 4.5\text{ V}$		$\pm 0.5$	$\pm 1.0$	$\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V}$		0.3	100	nA
		$V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V}, T_J = 85\text{ }^\circ\text{C}$			5	$\mu\text{A}$
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} = 5\text{ V}, V_{GS} = 4.5\text{ V}$	700			mA
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = 4.5\text{ V}, I_D = 600\text{ mA}$		0.41	0.70	$\Omega$
		$V_{GS} = 2.5\text{ V}, I_D = 500\text{ mA}$		0.53	0.85	
		$V_{GS} = 1.8\text{ V}, I_D = 350\text{ mA}$		0.70	1.25	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 10\text{ V}, I_D = 400\text{ mA}$		1.0		S
Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$I_S = 150\text{ mA}, V_{GS} = 0\text{ V}$		0.8	1.2	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = 10\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 250\text{ mA}$		750		pC
Gate-Source Charge	$Q_{gs}$			75		
Gate-Drain Charge	$Q_{gd}$			225		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 10\text{ V}, R_L = 47\text{ }\Omega$ $I_D \cong 200\text{ mA}, V_{GEN} = 4.5\text{ V}, R_G = 10\text{ }\Omega$		5		ns
Rise Time	$t_r$			5		
Turn-Off Delay Time	$t_{d(off)}$			25		
Fall Time	$t_f$			11		

## Notes:

- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .  
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.