

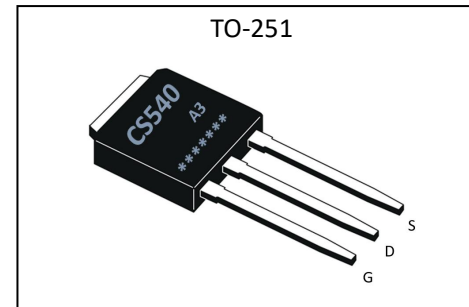
### General Description

The CS540A3 uses advanced trench technology and design to provide excellent RDS(ON) with low gate charge. It can be used in a wide variety of applications. The package form is TO-251, which accords with the RoHS standard.

$V_{DSS}$	100	V
$I_D$	30	A
$P_D$	85	W
$R_{DS(ON)type}$	19	mΩ

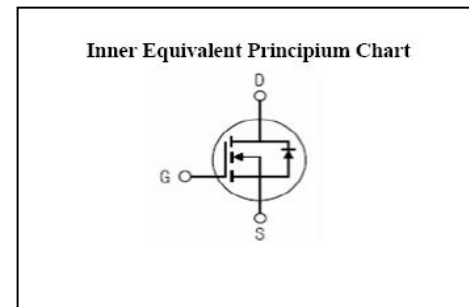
### Features

- Fast Switching
- Low Gate Charge and Rds on
- Low Reverse transfer capacitances
- 100% Single Pulse avalanche energy Test



### Applications

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply



### Absolute (Tc= 25°C unless otherwise specified)

Symbol	Parameter	Rating	Units
$V_{DSS}$	Drain-to-Source Voltage	100	V
$I_D$	Continuous Drain Current	30	A
	Continuous Drain Current $T_C = 100\text{ }^\circ\text{C}$	21	A
$I_{DM}$	Pulsed Drain Current	120	A
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$E_{AS}^{a2}$	Single Pulse Avalanche Energy	260	mJ
$E_{AR}^{a1}$	Avalanche Energy ,Repetitive	35	mJ
$I_{AR}^{a1}$	Avalanche Current	8	A
$dv/dt^{a3}$	Peak Diode Recovery $dv/dt$	5.0	V/ns
$P_D$	Power Dissipation	85	W
$T_J, T_{stg}$	Operating Junction and Storage Temperature Range	175, -55 to 175	$^\circ\text{C}$
$T_L$	Maximum Temperature for Soldering	300	$^\circ\text{C}$

Caution Stresses greater than those in the "Absolute Maximum Ratings" may cause permanent damage to the device

### Electrical Characteristics (Tc= 25°C unless otherwise specified)



# CS540A3

## GL Silicon N-Channel Power MOSFET

OFF Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$V_{DSS}$	Drain to Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	100	--	--	V
$\Delta BV_{DSS}/\Delta T_J$	Bvdss Temperature Coefficient	$I_D=250\mu A, \text{Reference } 25^\circ C$	--	0.1	--	V/ $^\circ C$
$I_{DSS}$	Drain to Source Leakage Current	$V_{DS}=100V, V_{GS}=0V, T_a=25^\circ C$	--	--	1	$\mu A$
		$V_{DS}=80V, V_{GS}=0V, T_a=125^\circ C$	--	--	250	
$I_{GSS(F)}$	Gate to Source Forward Leakage	$V_{GS}=+20V$	--	--	1	$\mu A$
$I_{GSS(R)}$	Gate to Source Reverse Leakage	$V_{GS}=-20V$	--	--	-1	$\mu A$

ON Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$R_{DS(ON)}$	Drain-to-Source On-Resistance	$V_{GS}=10V, I_D=10A$	--	19	26	m $\Omega$
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	--	3.0	V

Pulse width  $t_p \leq 380\mu s, \delta \leq 2\%$

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$g_{fs}$	Forward Transconductance	$V_{DS}=5V, I_D=10.0A$	8.0	--	--	S
$C_{iss}$	Input Capacitance	$V_{GS}=0V, V_{DS}=50V$ $f=1.0MHz$	--	2000	--	pF
$C_{oss}$	Output Capacitance		--	300	--	
$C_{rss}$	Reverse Transfer Capacitance		--	250	--	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	$I_D=15A, V_{DD}=50V$ $V_{GS}=10V, R_G=3.0\Omega$	--	10	--	ns
$t_r$	Rise Time		--	10	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	38	--	
$t_f$	Fall Time		--	14	--	
$Q_g$	Total Gate Charge	$I_D=15A, V_{DD}=50V$ $V_{GS}=10V$	--	45	--	nC
$Q_{gs}$	Gate to Source Charge		--	12	--	
$Q_{gd}$	Gate to Drain ( "Miller" ) Charge		--	18	--	

Source-Drain Diode Characteristics				
Symbol	Parameter	Test Conditions	Rating	Units

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			Min.	Typ.	Max.	
$I_S$	Continuous Source Current (Body Diode)		--	--	30	A
$I_{SM}$	Maximum Pulsed Current (Body Diode)		--	--	120	A
$V_{SD}$	Diode Forward Voltage	$I_S=30A, V_{GS}=0V$	--	--	1.5	V
$t_{rr}$	Reverse Recovery Time	$I_S=30A, T_j = 25^\circ C$	--	66	--	ns
$Q_{rr}$	Reverse Recovery Charge	$di_F/dt=100A/us, V_{GS}=0V$	--	130	--	nC

Pulse width  $t_p \leq 380\mu s, \delta \leq 2\%$

### Thermal Characteristics

Symbol	Parameter	Typ.	Units
$R_{\theta JC}$	Junction-to-Case	1.8	$^\circ C/W$

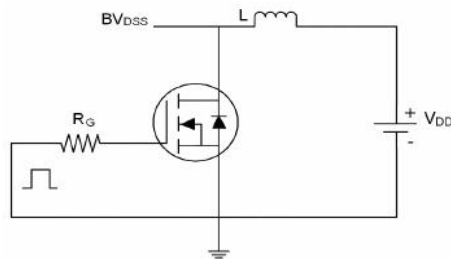
<sup>a1</sup>: Repetitive rating; pulse width limited by maximum junction temperature

<sup>a2</sup>: EAS condition:  $T_j=25^\circ C, V_{DD}=40V, V_G=10V, L=0.5mH, R_g=25\Omega$

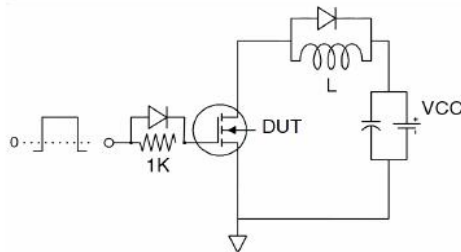
<sup>a3</sup>:  $I_{SD}=30A, di/dt \leq 100A/us, V_{DD} \leq BV_{DS}, \text{Start } T_j=25^\circ C$

### Test Circuits

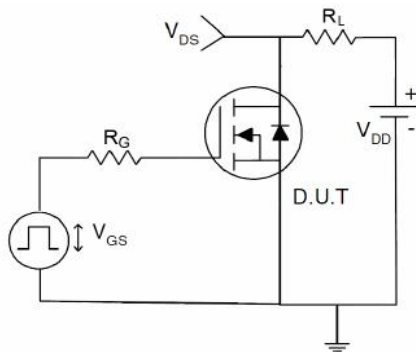
#### 1) EAS test Circuit



#### 2) Gate charge test Circuit



#### 3) Switch Time Test Circuit



### Characteristics Curves



# CS540A3

## GL Silicon N-Channel Power MOSFET

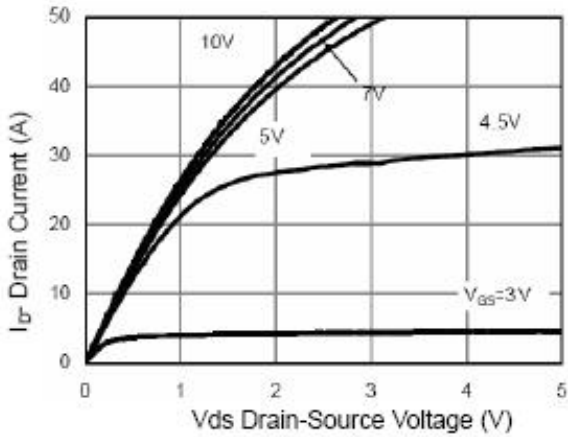


Figure 1 Output Characteristics

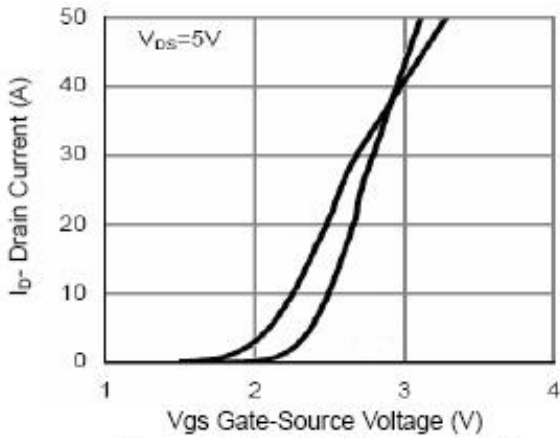


Figure 2 Transfer Characteristics

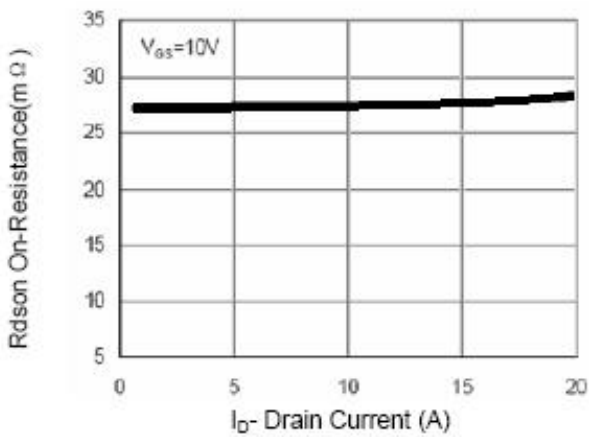


Figure 3 Rdson- Drain Current

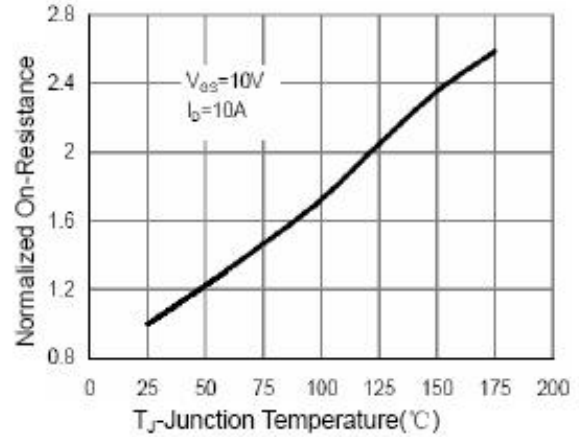


Figure 4 Rdson-Junction Temperature

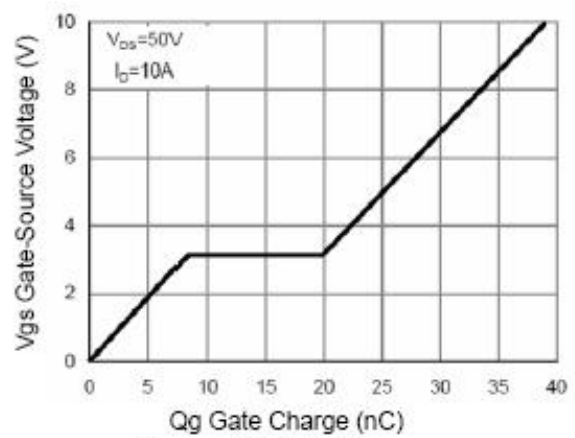


Figure 5 Gate Charge

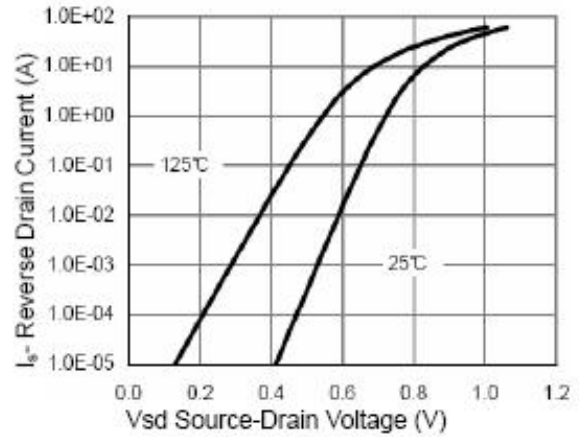


Figure 6 Source- Drain Diode Forward



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## GL Silicon N-Channel Power MOSFET

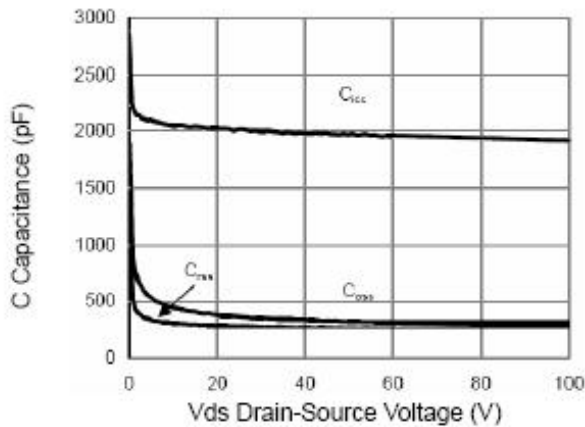


Figure 7 Capacitance vs Vds

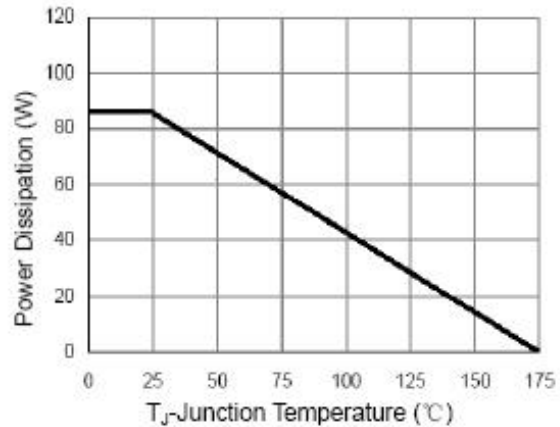


Figure 9 Power De-rating

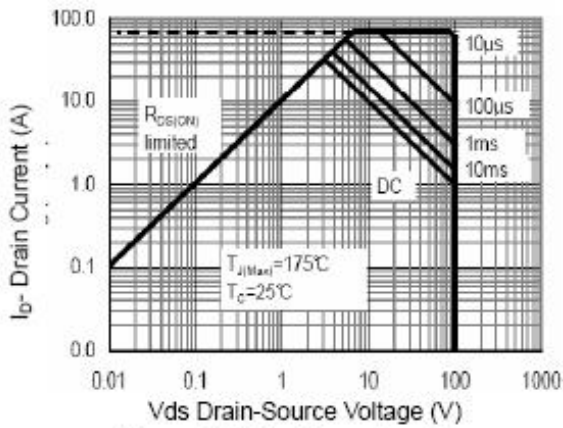


Figure 8 Safe Operation Area

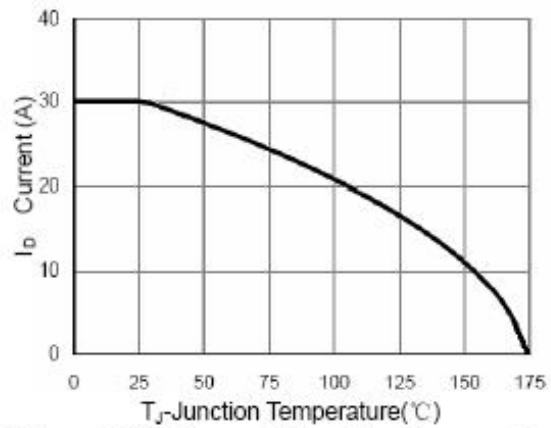


Figure 10 ID Current- Junction Temperature

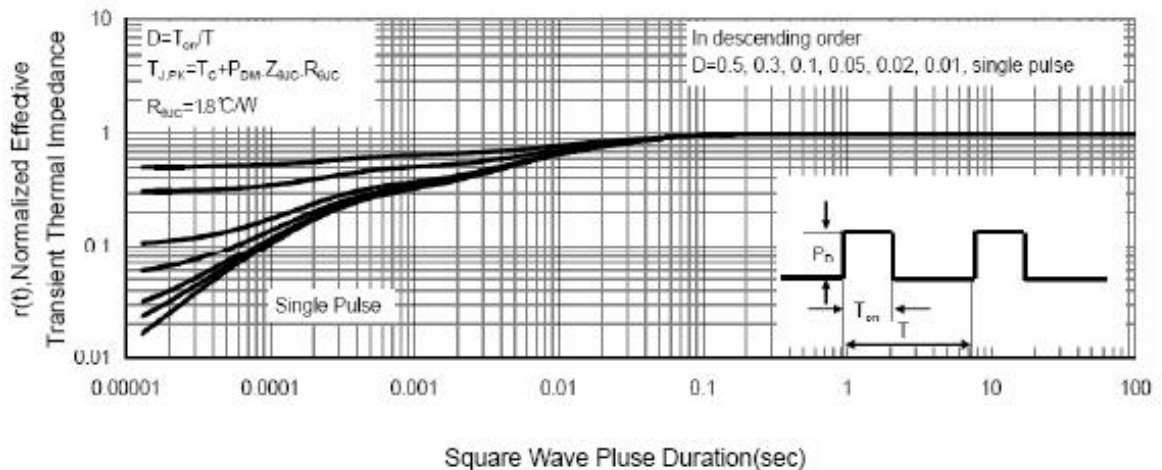


Figure 11 Normalized Maximum Transient Thermal Impedance