

General Description:

The CS540A4 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-252, which accords with the RoHS standard.

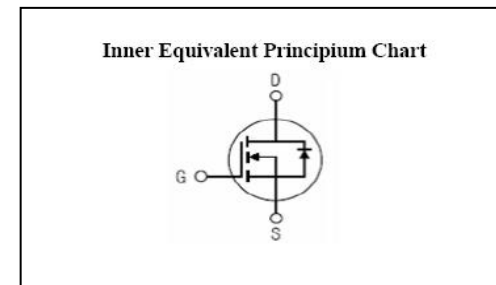
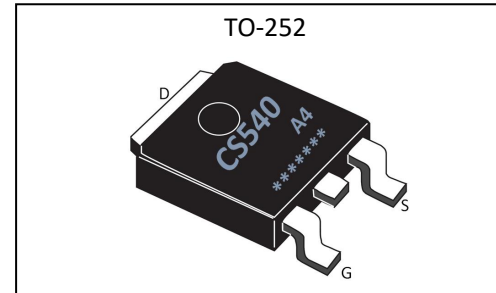
Features:

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

Applications:

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

V_{DSS}	100	V
I_D	30	A
P_D	85	W
$R_{DS(ON)type}$	20	mΩ



Absolute ($T_c = 25^\circ\text{C}$ 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 $T_c = 100^\circ\text{C}$	21	A
I_{DM}	Pulsed Drain Current	120	A
V_{GS}	Gate-to-Source Voltage	± 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	$^\circ\text{C}$



CS540A4

GL Silicon N-Channel Power MOSFET

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

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	$I_D=250\mu A$, Reference 25°C	--	0.1	--	V/°C
I_{DSS}	Drain to Source Leakage Current	$V_{DS}=100V, V_{GS}=0V, T_a=25^\circ C$	--	--	1	μA
		$V_{DS}=80V, V_{GS}=0V, T_a=125^\circ C$	--	--	250	
$I_{GSS(F)}$	Gate to Source Forward Leakage	$V_{GS}=+20V$	--	--	1	μA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	$V_{GS}=-20V$	--	--	-1	μA

ON Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$R_{DS(ON)}$	Drain-to-Source On-Resistance	$V_{GS}=10V, I_D=10A$	--	20	30	mΩ
$V_{GS(TH)}$	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
			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 $t_p \leq 380\mu s, \delta \leq 2\%$

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

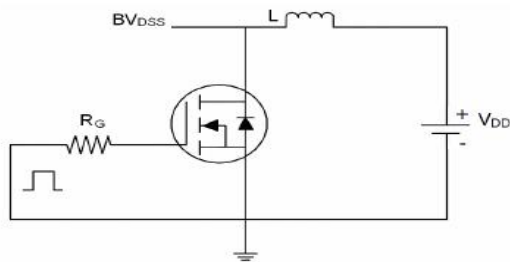
^{a1}: Repetitive rating; pulse width limited by maximum junction temperature

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

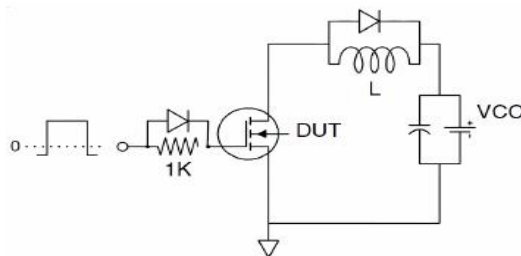
^{a3}: $I_{SD} = 30A, di/dt \leq 100A/us, V_{DD} \leq BV_{DS}, \text{Start } T_j=25^\circ C$

Test Circuit

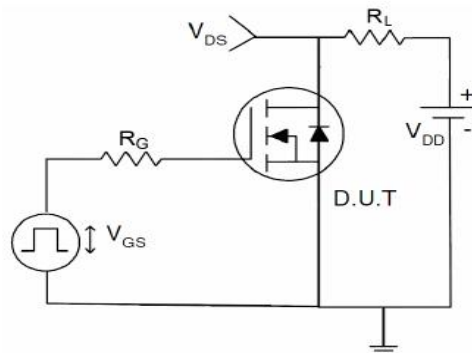
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

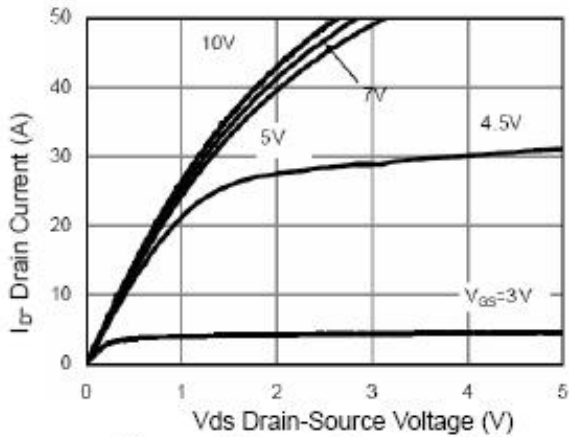


Figure 1 Output Characteristics

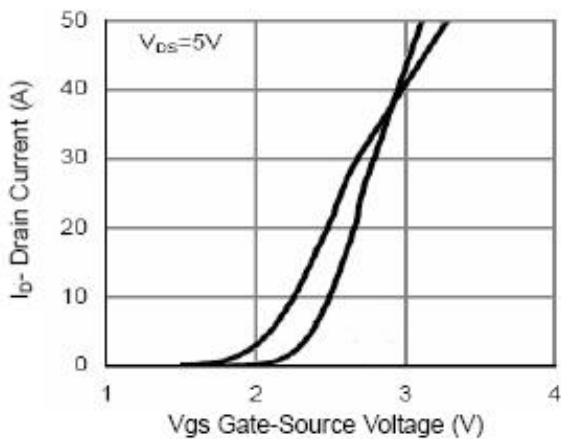


Figure 2 Transfer Characteristics

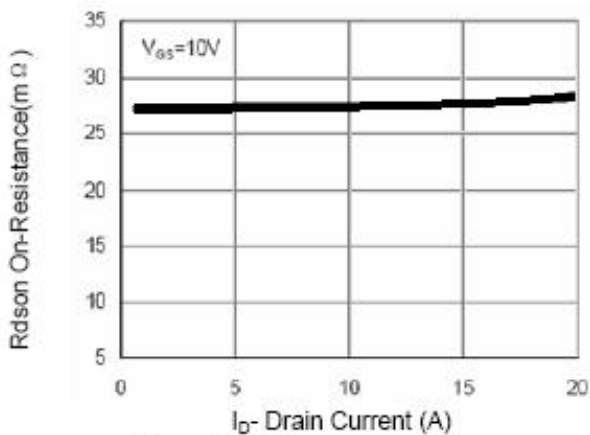


Figure 3 Rdson- Drain Current

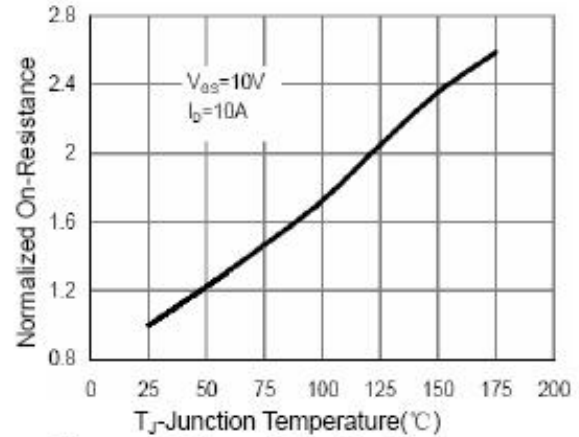


Figure 4 Rdson-Junction Temperature

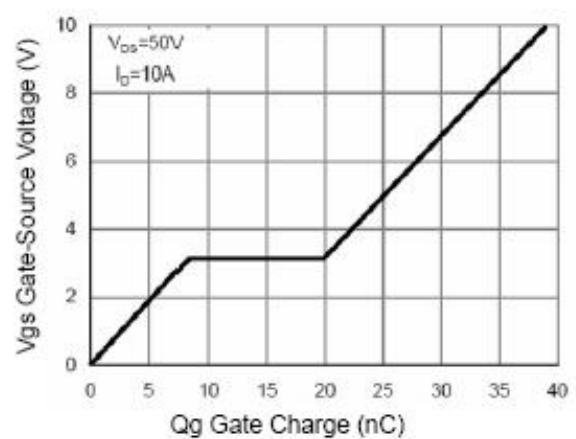


Figure 5 Gate Charge

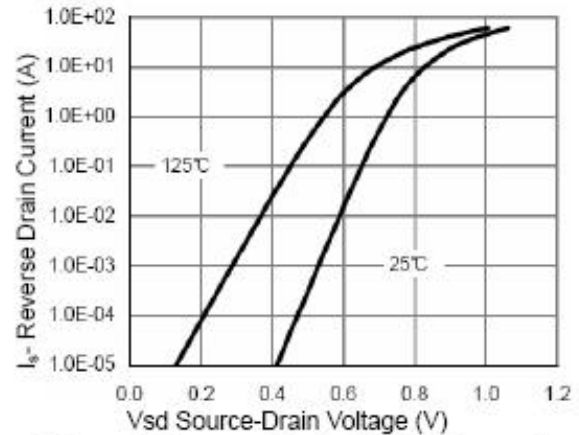


Figure 6 Source- Drain Diode Forward

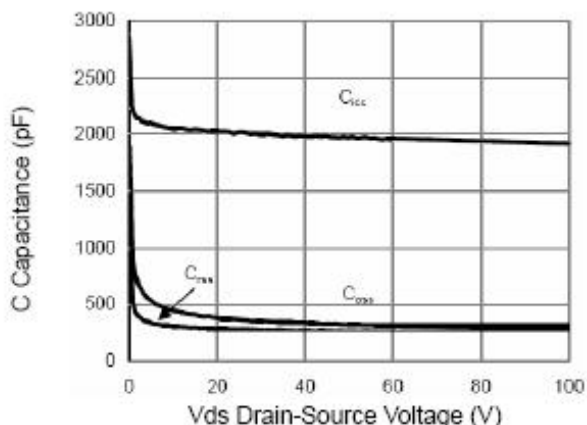


Figure 7 Capacitance vs Vds

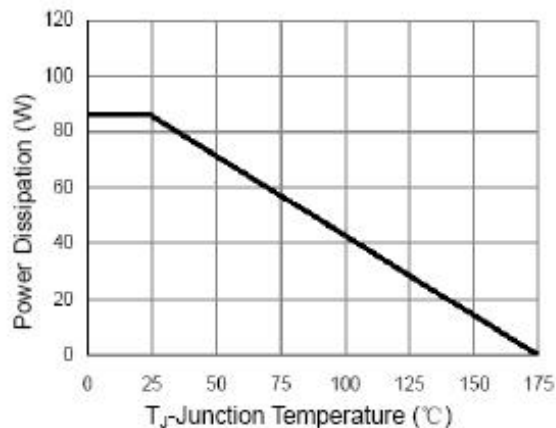


Figure 9 Power De-rating

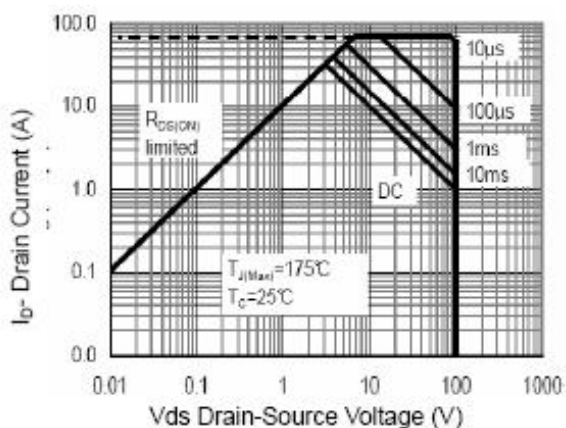


Figure 8 Safe Operation Area

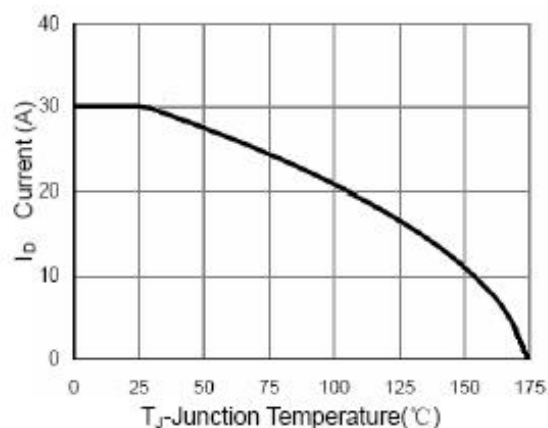


Figure 10 ID Current- Junction Temperature

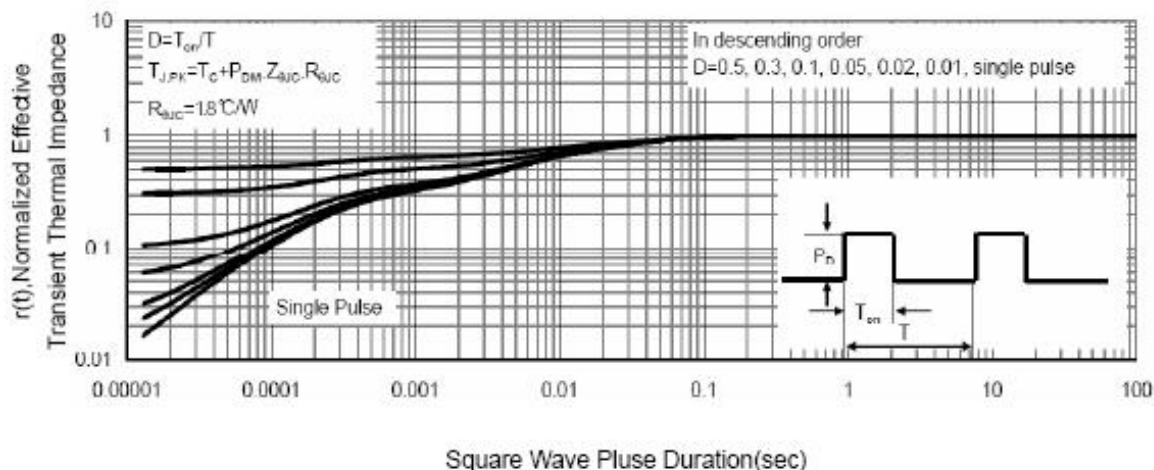


Figure 11 Normalized Maximum Transient Thermal Impedance