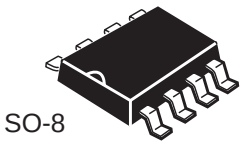
CEM4412S1

PRELIMINARY

N-Channel Enhancement Mode Field Effect Transistor

FEATURES

- 30V , 7A , $R_{DS(ON)}$=28mΩ @V_{GS}=10V.
  $R_{DS(ON)}$=42mΩ @V_{GS}=4.5V.
- Super high dense cell design for extremely low $R_{DS(ON)}$.
- High power and current handling capability.
- Surface mount package.



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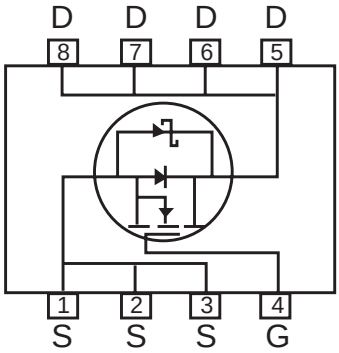

ABSOLUTE MAXIMUM RATINGS (T_A=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous @TJ=125°C	I_D	± 7	A
-Pulsed	I_{DM}	±30	A
Drain-Source Diode Forward Current	I_S	2.3	A
Maximum Power Dissipation	P_D	2.5	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	50	°C/W

ELECTRICAL CHARACTERISTICS (T_A=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V, I_D = 250μA	30			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 30V, V_{GS} = 0V			10	μA
Gate-Body Leakage	I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V			±100	nA
ON CHARACTERISTICS[b]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1	1.5	3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 7A		20	28	mΩ
		V_{GS} = 4.5V, I_D = 3.5A		28	42	mΩ
On-State Drain Current	$I_{D(ON)}$	V_{GS} = 10V, V_{DS} = 5V	30			A
Forward Transconductance	g_{FS}	V_{DS} = 15V, I_D = 7A		16		S
DYNAMIC CHARACTERISTICS[c]						
Input Capacitance	C_{ISS}	V_{DS} = 15V, V_{GS} = 0V f = 1.0MHz		707	920	pF
Output Capacitance	C_{OSS}			355	460	pF
Reverse Transfer Capacitance	C_{RSS}			89	120	pF
SWITCHING CHARACTERISTICS[c]						
Turn-On Delay Time	$t_{D(ON)}$	V_{DD} = 25V, I_D = 1A, V_{GEN} = 10V, R_{GEN} = 6Ω		8	15	ns
Rise Time	t			11	20	ns
Turn-Off Delay Time	$t_{D(OFF)}$			35	55	ns
Fall Time				17	28	ns
Total Gate Charge	Q_g	V_{DS} = 15V, I_D = 2A, V_{GS} = 10V		23	29	nC
Gate-Source Charge	Q_{gs}			3		nC
Gate-Drain Charge	Q_{gd}			4		nC

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BODY DIODE & SCHOTTKY DIODE RATINGS AND CHARACTERISTICS

Parameter	Symbol	Condition	Min	Typ	Max	Unit
DRAIN-SOURCE DIODE CHARACTERISTICS [b]						
Body Diode Forward Voltage	V_{SD}	V_{GS} = 0V, Is =2.0A		0.76	1.1	V
Schottky Forward Voltage	V_F	I_F=2A, Tc=25°C			0.55	V
Average Forward Rectified Current	$I_{F(AV)}$				1	A

Notes

a.Pulse Test:Pulse Width ≤300 μs, Duty Cycle ≤ 2%.

b.Guaranteed by design, not subject to production testing.

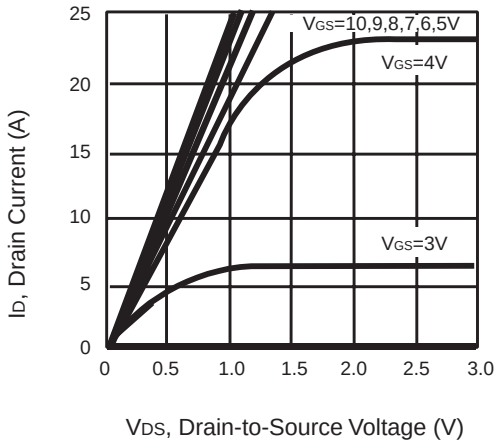

Figure 1. Output Characteristics

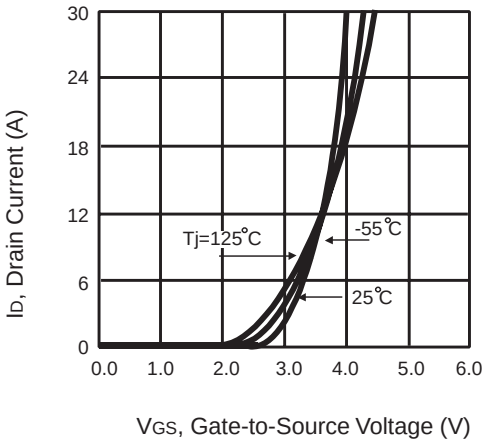

Figure 2. Transfer Characteristics

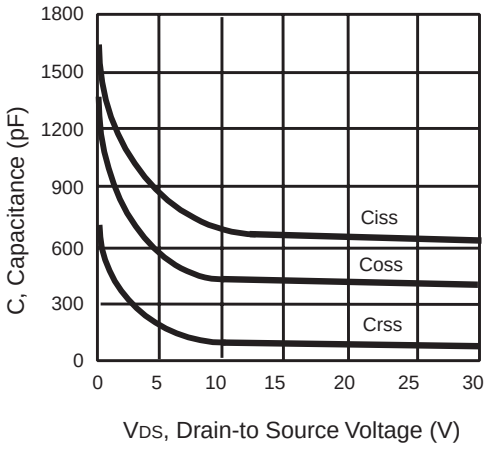

Figure 3. Capacitance

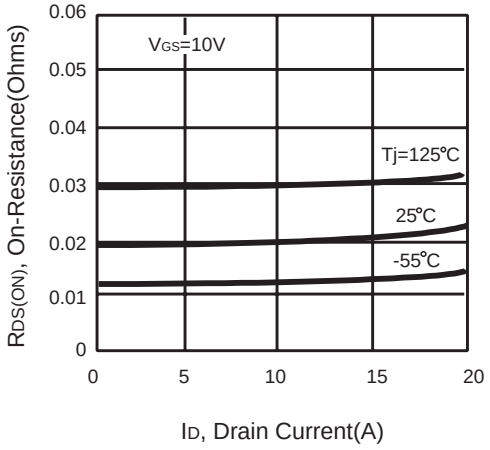

Figure 4. On-Resistance Variation with Drain Current and Temperature

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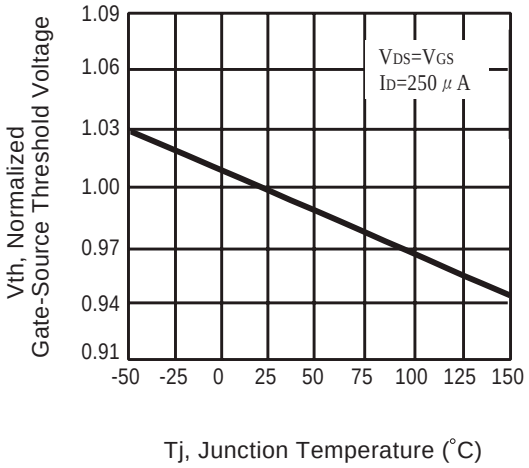

Figure 5. Gate Threshold Variation with Temperature

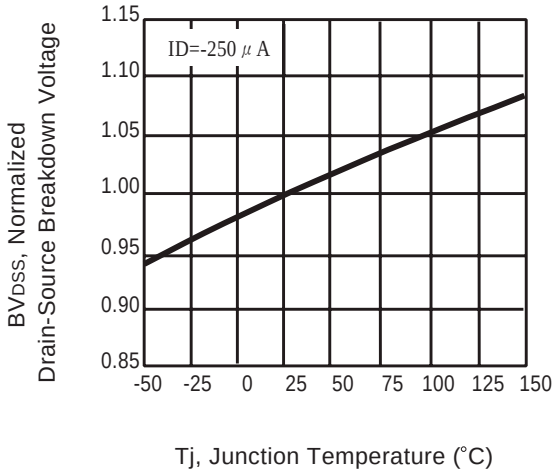

Figure 6. Breakdown Voltage Variation with Temperature

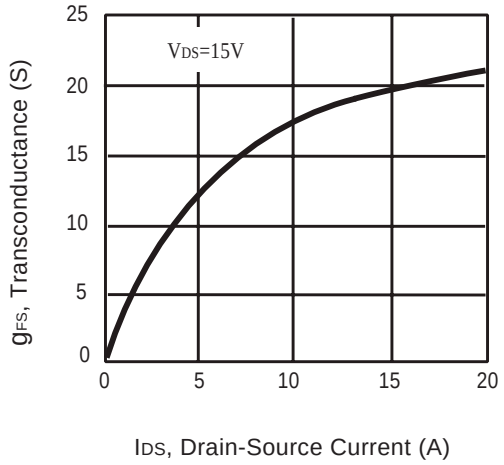

Figure 7. Transconductance Variation with Drain Current

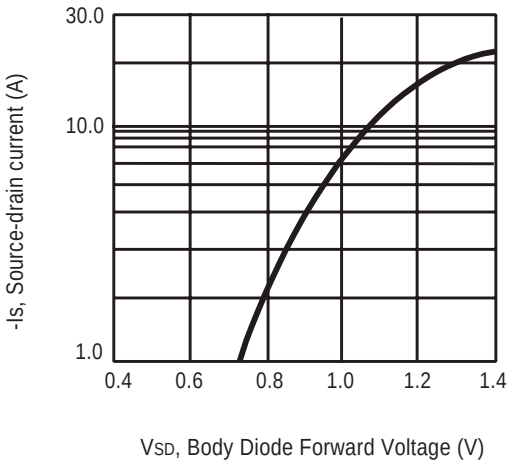

Figure 8. Body Diode Forward Voltage Variation with Source Current

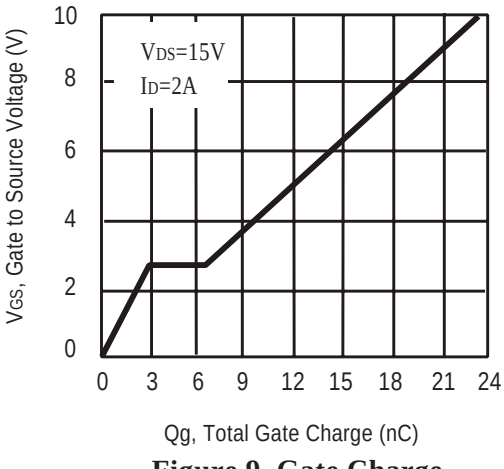

Figure 9. Gate Charge

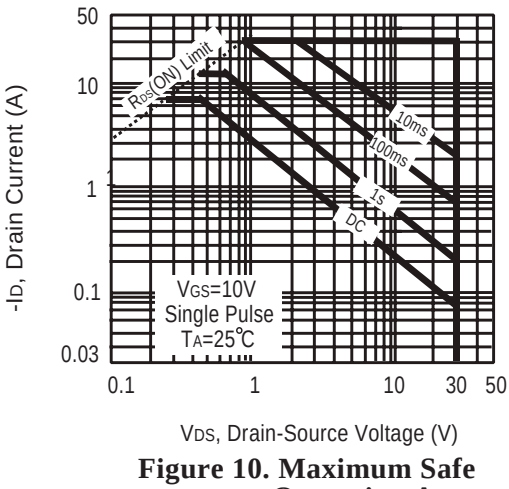

Figure 10. Maximum Safe Operating Area

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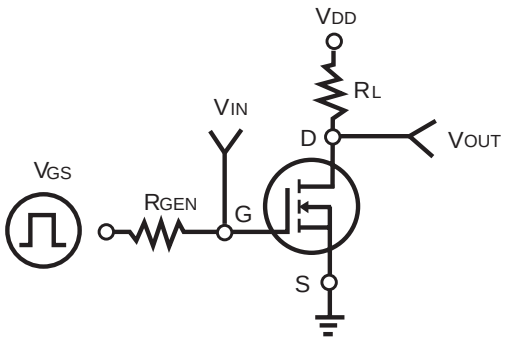

Figure 11. Switching Test Circuit

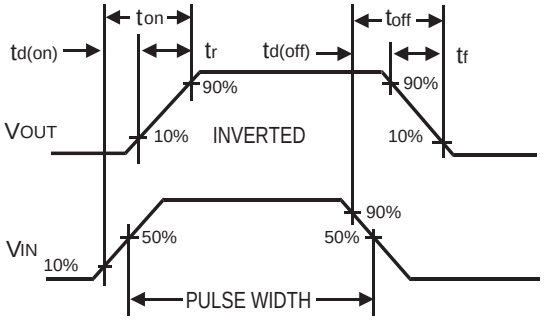

Figure 12. Switching Waveforms

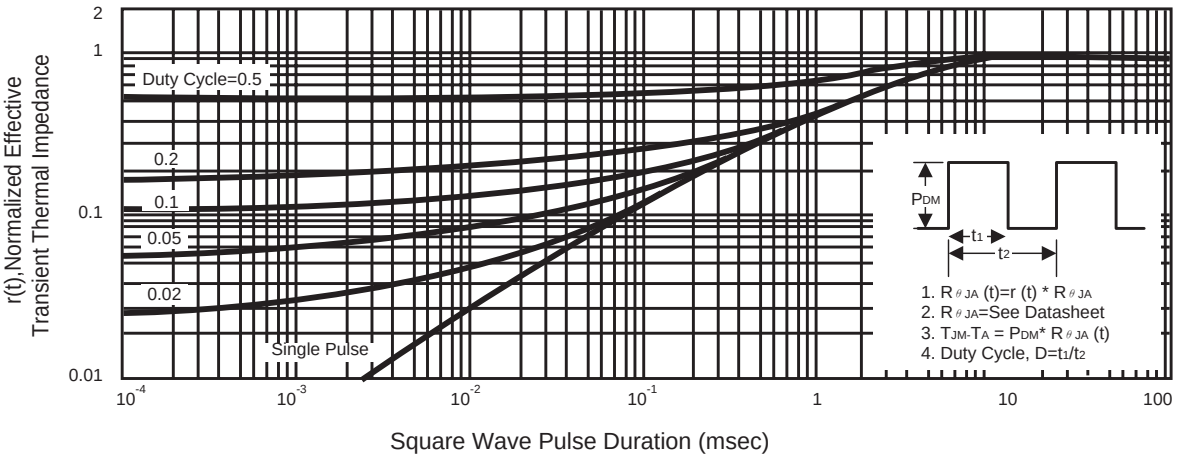

Figure 13. Normalized Thermal Transient Impedance Curve

15