



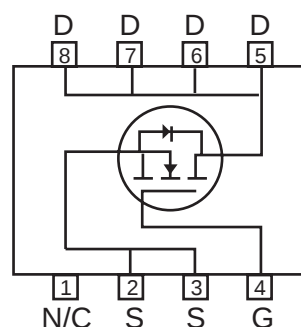
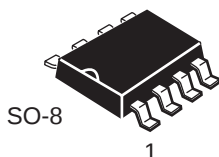
CEM9410

March 1998

N-Channel Enhancement Mode Field Effect Transistor

FEATURES

- 30V , 7A , $R_{DS(ON)}=30m\Omega$ @ $V_{GS}=10V$.
 $R_{DS(ON)}=50m\Omega$ @ $V_{GS}=4.5V$.
- Super high dense cell design for extremely low $R_{DS(ON)}$.
- High power and current handing capability.
- Surface mount Package.



ABSOLUTE MAXIMUM RATINGS ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous ^a @ $T_J=125^\circ\text{C}$ -Pulsed ^b	I_D	± 7	A
	I_{DM}	± 20	A
Drain-Source Diode Forward Current ^a	I_S	2.8	A
Maximum Power Dissipation ^a	P_D	2.5	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Ambient ^a	$R_{\theta JA}$	50	$^\circ\text{C/W}$
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CEM9410

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

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Parameter	Symbol	Condition	Min	Typ ^c	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} =24V, V _{GS} =0V			1	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		25	30	mΩ
		V _{GS} =4.5V, I _D = 3.5A		38	50	mΩ
On-State Drain Current	I _{D(ON)}	V _{GS} = 10V, V _{DS} = 5V	20			A
Forward Transconductance	g _{FS}	V _{DS} = 15V, I _D = 7A		14		S
DYNAMIC CHARACTERISTICS ^c						
Input Capacitance	C _{ISS}	V _{DS} =15V, V _{GS} = 0V f =1.0MHz		500		pF
Output Capacitance	C _{OSS}			270		pF
Reverse Transfer Capacitance	C _{RSS}			95		pF
SWITCHING CHARACTERISTICS ^c						
Turn-On Delay Time	t _{D(ON)}	V _{DD} = 15V, I _D = 1A, V _{GEN} = 10V, R _{GEN} = 6Ω		9	15	ns
Rise Time	t _r			9	20	ns
Turn-Off Delay Time	t _{D(OFF)}			25	50	ns
Fall Time	t _f			20	35	ns
Total Gate Charge	Q _g	V _{DS} =15V, I _D =7A, V _{GS} =10V		16	21	nC
Gate-Source Charge	Q _{gs}			3		nC
Gate-Drain Charge	Q _{gd}			5		nC

CEM9410

ELECTRICAL CHARACTERISTICS ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ ^c	Max	Unit
DRAIN-SOURCE DIODE CHARACTERISTICS^b						
Diode Forward Voltage	V_{SD}	$V_{GS} = 0\text{V}$, $I_S = 2.0\text{A}$		0.76	1.1	V

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Notes

- a. Surface Mounted on FR4 Board, $t \leq 10\text{sec}$.
- b. Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2\%$.
- c. Guaranteed by design, not subject to production testing.

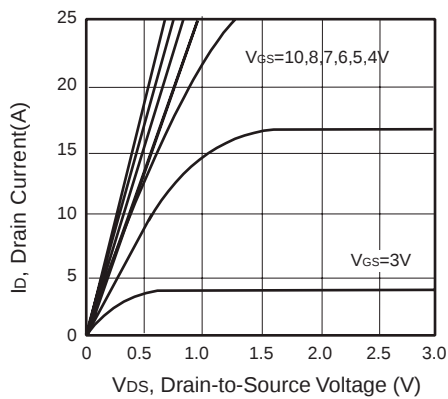


Figure 1. Output Characteristics

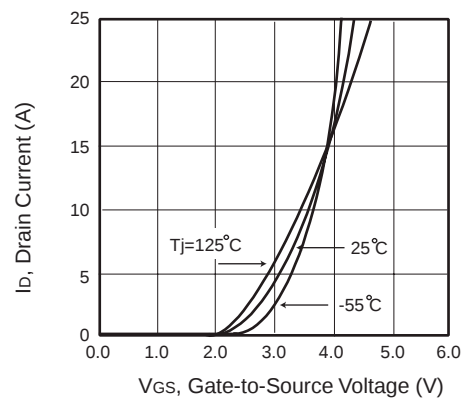


Figure 2. Transfer Characteristics

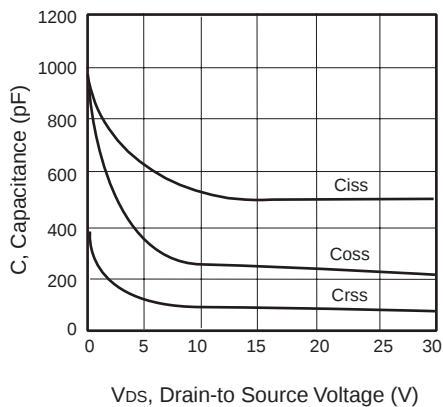


Figure 3. Capacitance

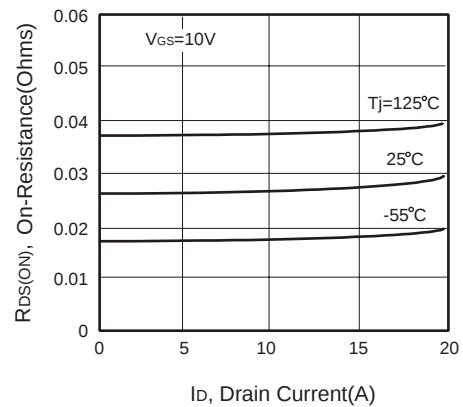


Figure 4. On-Resistance Variation with Drain Current and Temperature

CEM9410

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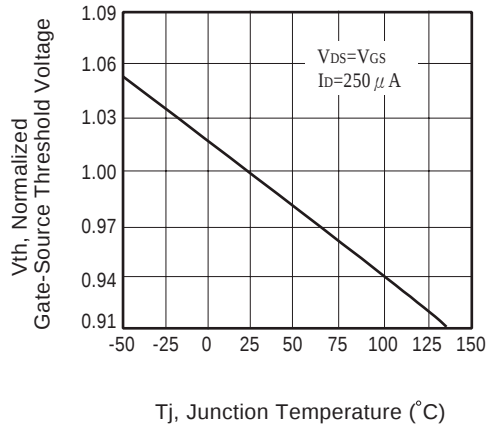


Figure 5. Gate Threshold Variation with Temperature

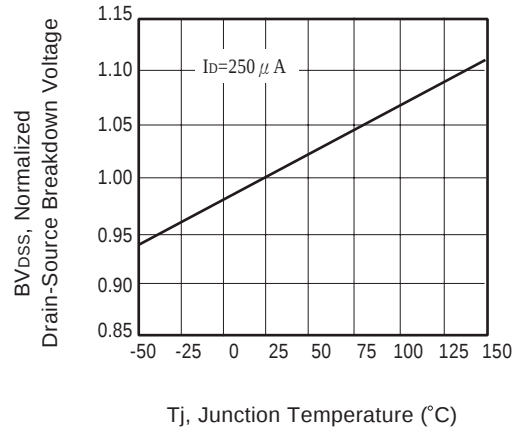


Figure 6. Breakdown Voltage Variation with Temperature

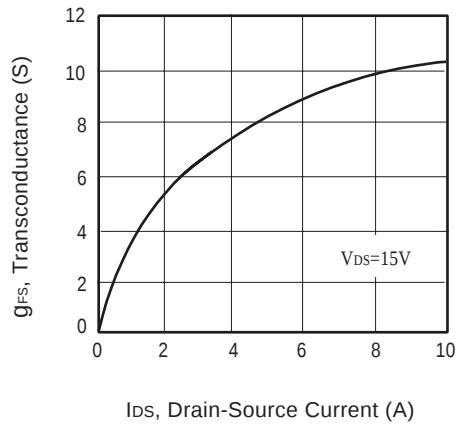


Figure 7. Transconductance Variation with Drain Current

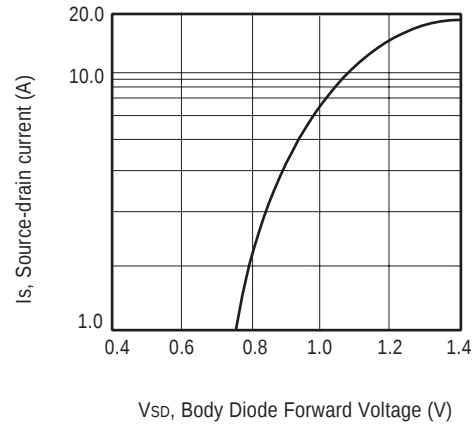


Figure 8. Body Diode Forward Voltage Variation with Source Current

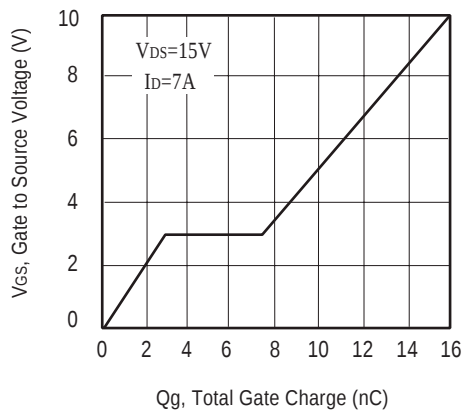


Figure 9. Gate Charge

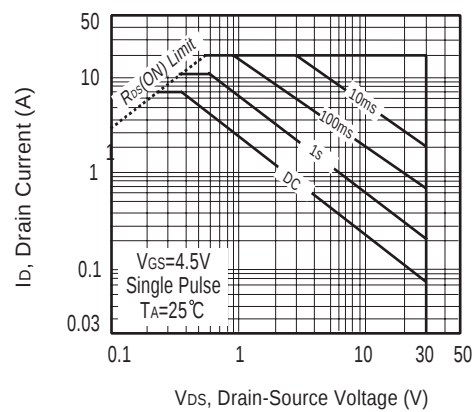


Figure 10. Maximum Safe Operating Area

CEM9410

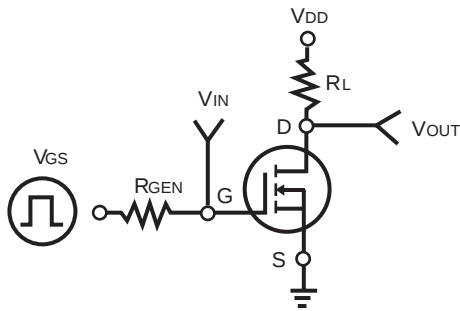


Figure 11. Switching Test Circuit

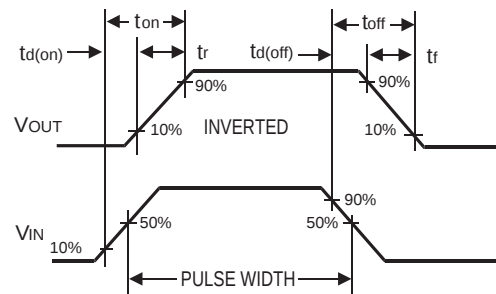


Figure 12. Switching Waveforms

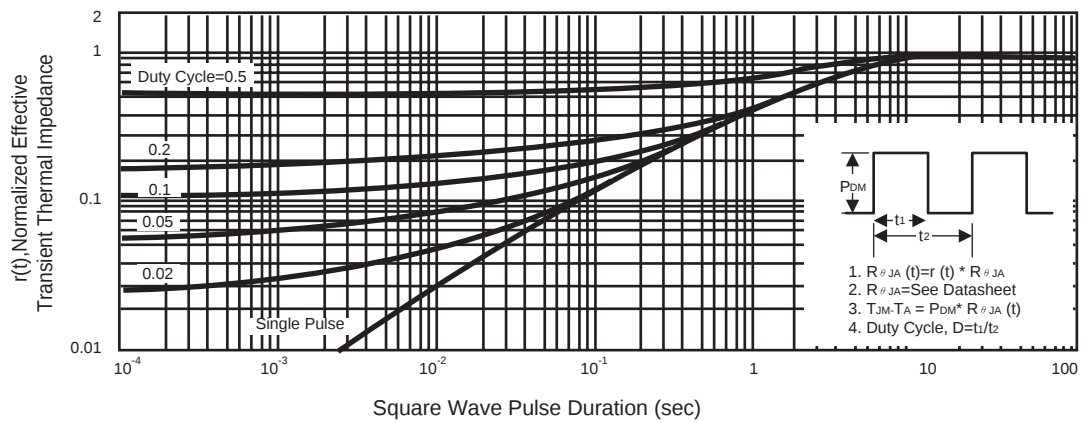


Figure 13. Normalized Thermal Transient Impedance Curve