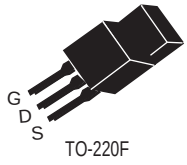
CEF10N4

Sep. 2002

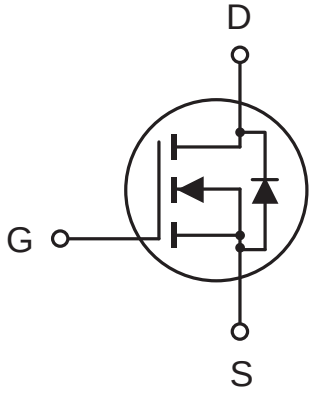
N-Channel Logic Level Enhancement Mode Field Effect Transistor

FEATURES

- 450V ,5.6A ,$R_{DS(ON)}$= 700mΩ @V_{GS}=10V.
- Super high dense cell design for extremely low $R_{DS(ON)}$.
- High power and current handling capability.
- TO-220F full-pak for through hole.



TO-220F



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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	450	V
Gate-Source Voltage	V_{GS}	±30	V
Drain Current-Continuous	I_D	5.6	A
-Pulsed	I_{DM}	17	A
Drain-Source Diode Forward Current	I_S	5.6	A
Maximum Power Dissipation @Tc=25°C	P_D	45	W
Derate above 25°C		0.36	W/°C
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.8	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	65	°C/W

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
DRAIN-SOURCE AVALANCHE RATING[a]						
Single Pulse Drain-Source Avalanche Energy	E_{AS}	V_{DD} =50V, L=9.16mH R_G=25 Ω		450		mJ
Maximum Drain-Source Avalanche Current	I_{AS}			10		A
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V, I_D = 250μA	450			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 450V, V_{GS} = 0V		25	100	μA
Gate-Body Leakage	I_{GSS}	V_{GS} = ±30V, V_{DS} = 0V		±100	±500	nA
ON CHARACTERISTICS[a]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	2		4	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 6A		600	700	mΩ
On-State Drain Current	$I_{D(ON)}$	V_{GS} = 10V, V_{DS} = 10V	10			A
Forward Transconductance	g_{FS}	V_{DS} = 50V, I_D = 6A	3	6		S
SWITCHING CHARACTERISTICS[b]						
Turn-On Delay Time	$t_{D(ON)}$	V_{DD} = 200V, I_D = 10A, V_{GS} = 10V, R_{GEN} = 9.1Ω		14	75	ns
Rise Time	t_r			27	125	ns
Turn-Off Delay Time	$t_{D(OFF)}$			50	100	ns
Fall Time	t_f			24	60	ns
Total Gate Charge	Q_g	V_{DS} = 320V, I_D = 10A, V_{GS} = 10V		48	65	nC
Gate-Source Charge	Q_{gs}			4	7	nC
Gate-Drain Charge	Q_{gd}			15	25	nC

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
DYNAMIC CHARACTERISTICS [b]						
Input Capacitance	C_{ISS}	V_{DS} =25V, V_{GS} = 0V f =1.0MHz		1400		pF
Output Capacitance	C_{OSS}			330		pF
Reverse Transfer Capacitance	C_{RSS}			120		pF
DRAIN-SOURCE DIODE CHARACTERISTICS [a]						
Diode Forward Voltage	V_{SD}	V_{GS} = 0V, Is =10A			2.0	V

Notes

a.Pulse Test:Pulse Width≤300 μs, Duty Cycle ≤ 2%.
b.Guaranteed by design, not subject to production testing.

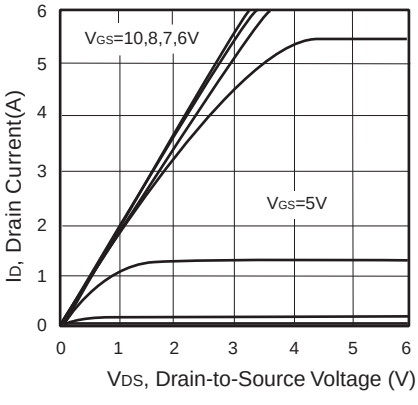

Figure 1. Output Characteristics

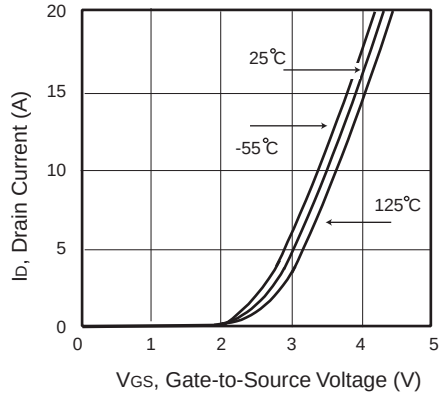

Figure 2. Transfer Characteristics

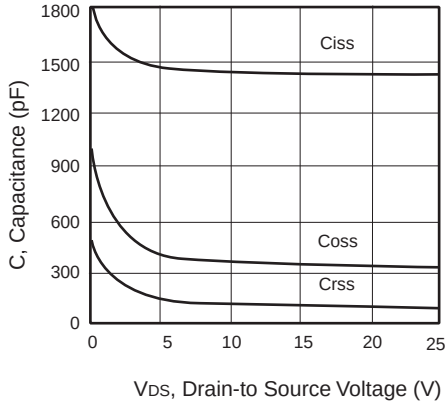

Figure 3. Capacitance

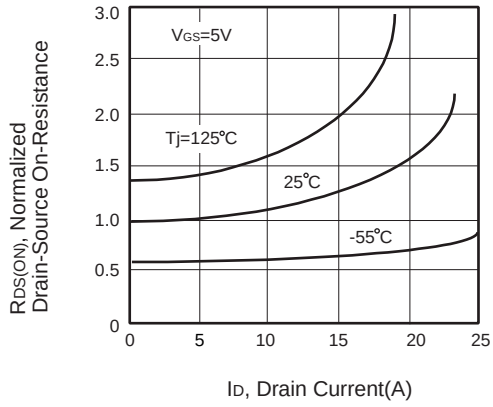

Figure 4. On-Resistance Variation with Drain Current and Temperature

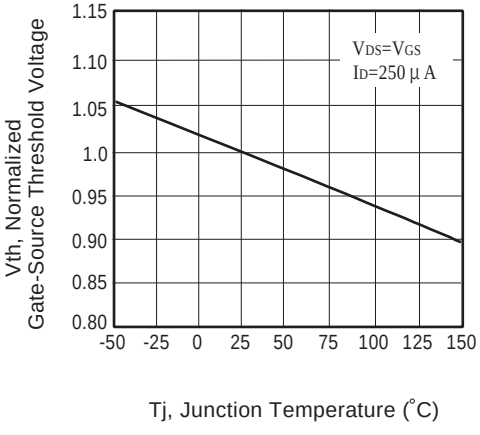

Figure 5. Gate Threshold Variation with Temperature

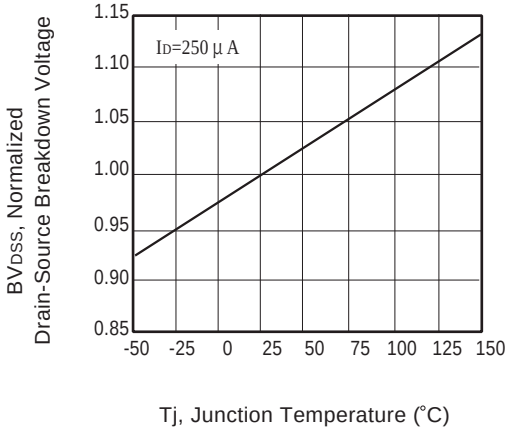

Figure 6. Breakdown Voltage Variation with Temperature

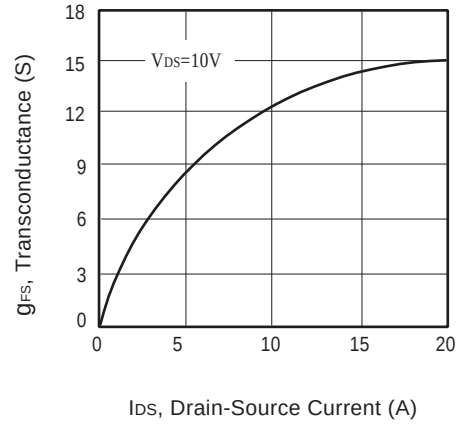

Figure 7. Transconductance Variation with Drain Current

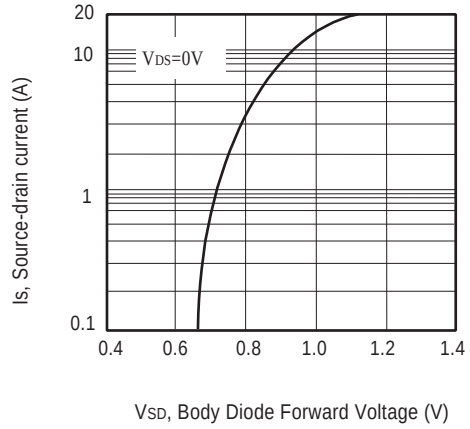

Figure 8. Body Diode Forward Voltage Variation with Source Current

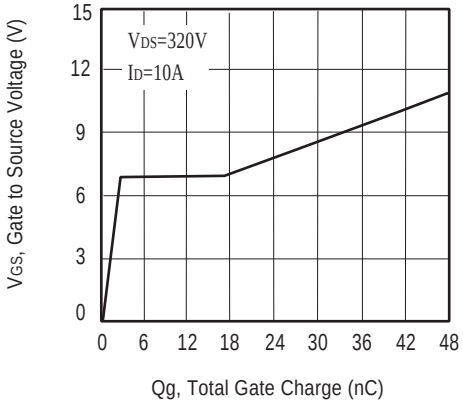

Figure 9. Gate Charge

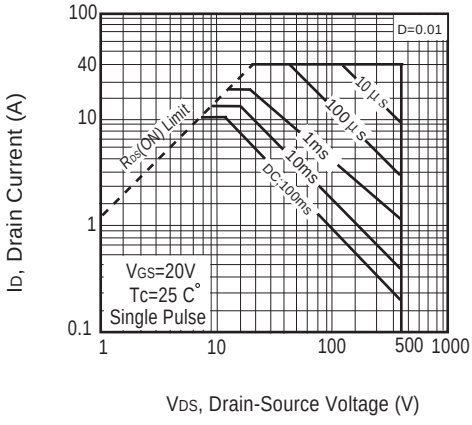

Figure 10. Maximum Safe Operating Area

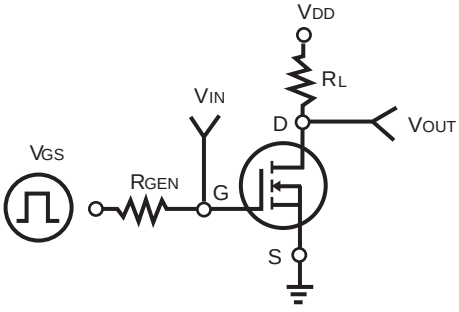

Figure 11. Switching Test Circuit

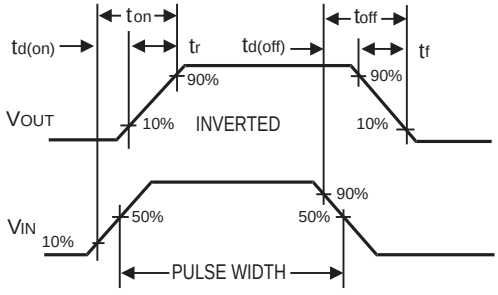

Figure 12. Switching Waveforms

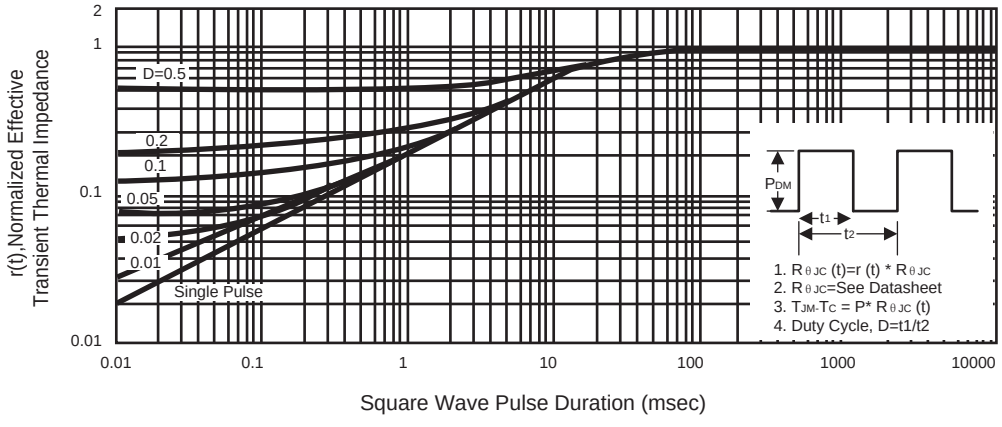

Figure 13. Normalized Thermal Transient Impedance Curve