# CET

CEF02N6

Sep. 2002

N-Channel Logic Level Enhancement Mode Field Effect Transistor

FEATURES

- 600V , 1.5A , $R_{DS(ON)}=5\Omega$ @$V_{GS}=10V$.

- Super high dense cell design for extremely low $R_{DS(ON)}$.

- High power and current handling capability.

- TO-220F full-pak for through hole

6

TO-220F
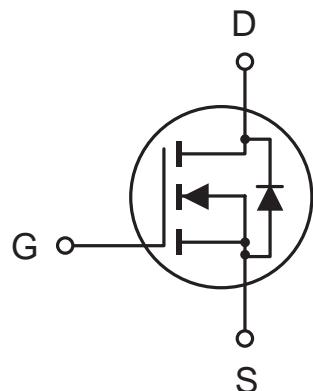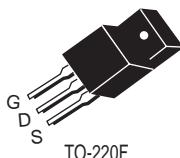
ABSOLUTE MAXIMUM RATINGS (Tc=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	600	V
Gate-Source Voltage	V_{GS}	$\pm$30	V
Drain Current-Continuous	I_D	1.5	A
-Pulsed	I_{DM}	4.5	A
Drain-Source Diode Forward Current	I_S	4.5	A
Maximum Power Dissipation @Tc=25°C	P_D	29	W
Derate above 25°C		0.23	W/$^{\circ}$C
Operating and Storage Temperautre Range	T_J, T_{STG}	-65 to 150	$^{\circ}$C

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Case	$R\theta JC$	4.3	$^{\circ}$C/W
Thermal Resistance, Junction-to-Ambient	$R\theta JA$	65	$^{\circ}$C/W

CEF02N6

ELECTRICAL CHARACTERISTICS (T$_C$=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=60mH R$_G$=9.1Ω		125		mJ
Maximum Drain-Source Avalanche Current	I$_{AS}$			2		A
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV$_{DSS}$	V$_{GS}$ = 0V, I$_D$ = 250µA	600			V
Zero Gate Voltage Drain Current	I$_{DSS}$	V$_{DS}$ = 600V, V$_{GS}$ = 0V			25	µA
Gate-Body Leakage	I$_{GSS}$	V$_{GS}$ = ±30V, V$_{DS}$ = 0V			±100	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$_D$ = 1A		3.8	5.0	Ω
On-State Drain Current	I$_{D(ON)}$	V$_{GS}$ = 10V, V$_{DS}$ = 10V	2			A
Forward Transconductance	g$_{FS}$	V$_{DS}$ = 50V, I$_D$ = 1A		1.2		S
SWITCHING CHARACTERISTICS[b]						
Turn-On Delay Time	t$_{D(ON)}$	V$_{DD}$ = 300V, I$_D$ = 2A, V$_{GS}$ = 10V R$_{GEN}$=18Ω		18	35	ns
Rise Time	t$_r$			18	35	ns
Turn-Off Delay Time	t$_{D(OFF)}$			50	90	ns
Fall Time	t$_f$			16	40	ns
Total Gate Charge	Q$_g$	V$_{DS}$ =480V, I$_D$ = 2A, V$_{GS}$=10V		20	25	nC
Gate-Source Charge	Q$_{gs}$			2		nC
Gate-Drain Charge	Q$_{gd}$			12		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		250		pF
Output Capacitance	C$_{OSS}$			50		pF
Reverse Transfer Capacitance	C$_{RSS}$			30		pF
DRAIN-SOURCE DIODE CHARACTERISTICS [a]						
Diode Forward Voltage	V$_{SD}$	V$_{GS}$ = 0V, Is =1.5A			1.5	V

6

Notes

a.Pulse Test:Pulse Width$\leq$300 μ s, Duty Cycle $\leq$2%.
b.Guaranteed by design, not subject to production testing.
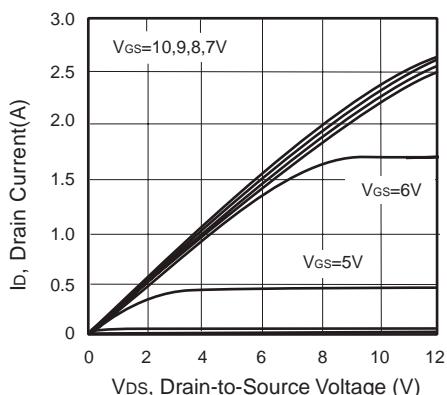
Figure 1. Output Characteristics
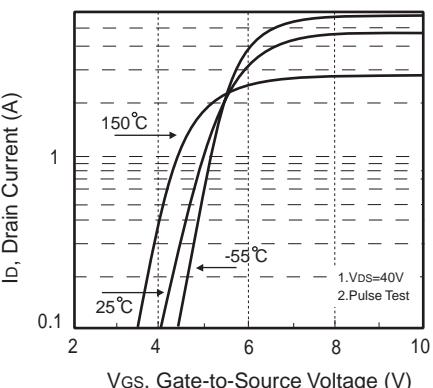
Figure 2. Transfer Characteristics

CEF02N6
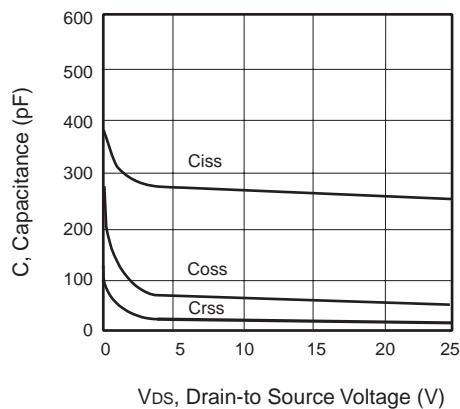
Figure 3. Capacitance
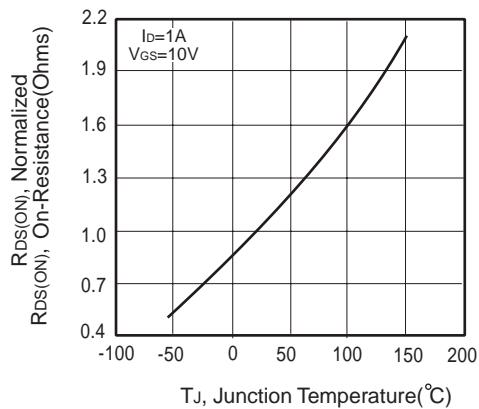
Figure 4. On-Resistance Variation with Temperature
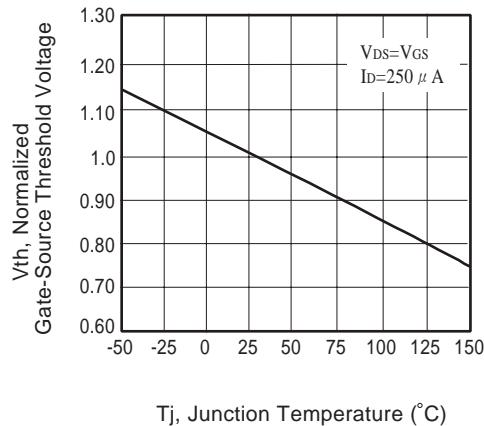
**Figure 5. Gate Threshold Variation with Temperature**
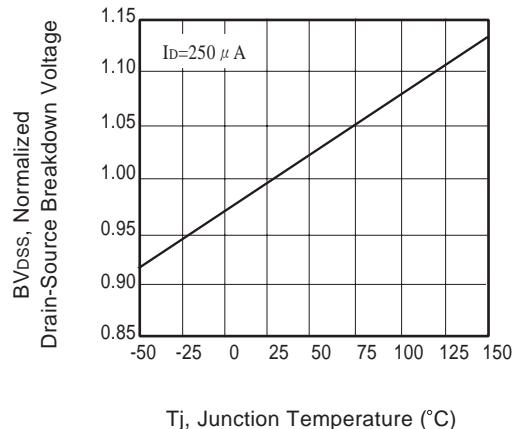
**Figure 6. Breakdown Voltage Variation with Temperature**
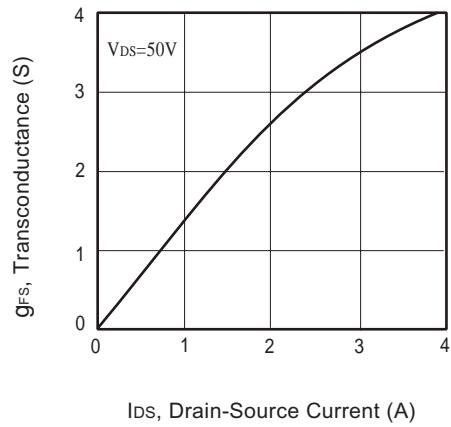
**Figure 7. Transconductance Variation with Drain Current**
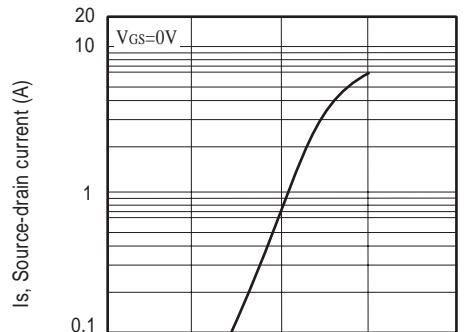
**Figure 8. Body Diode Forward Voltage Variation with Source Current**
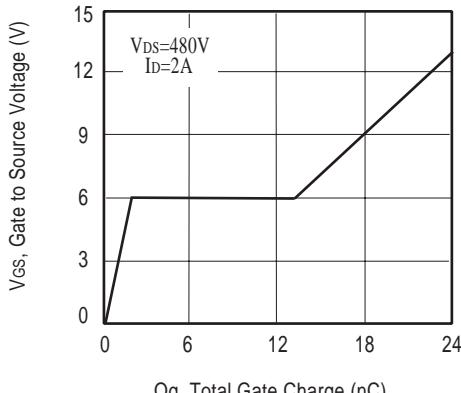
Figure 9. Gate Charge
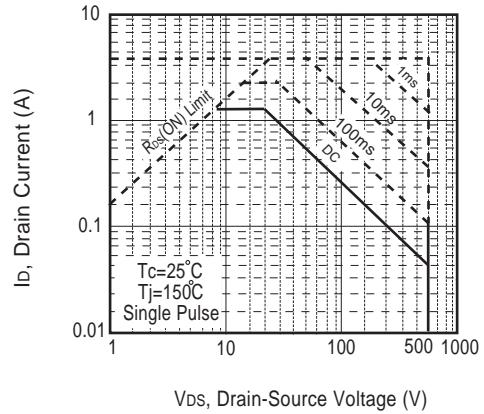
Figure 10. Maximum Safe Operating Area
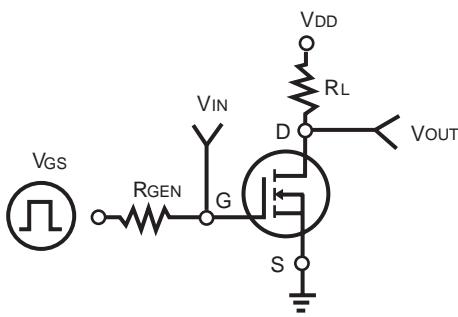
Figure 11. Switching Test Circuit
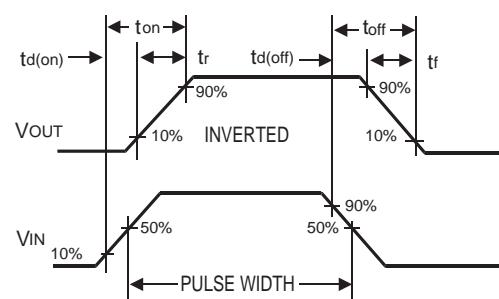
Figure 12. Switching Waveforms
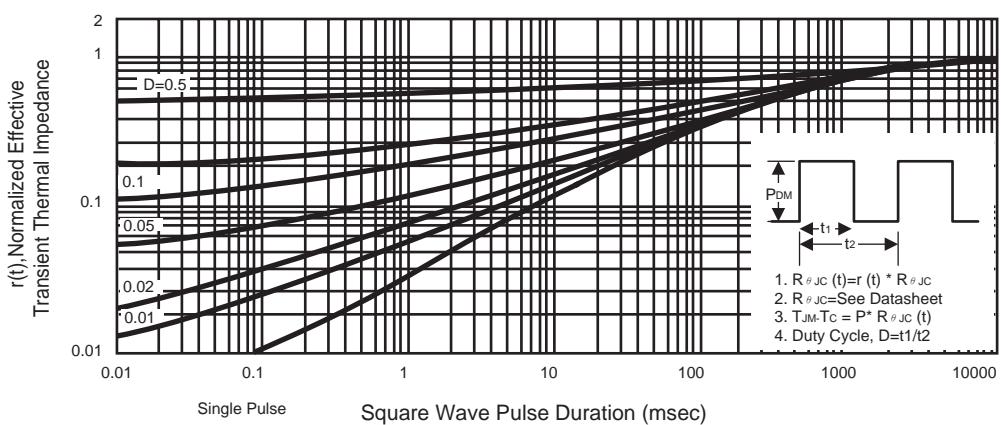
Figure 13. Normalized Thermal Transient Impedance Curve