CEF06N5

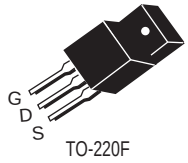
Oct. 2002

N-Channel Logic Level Enhancement Mode Field Effect Transistor

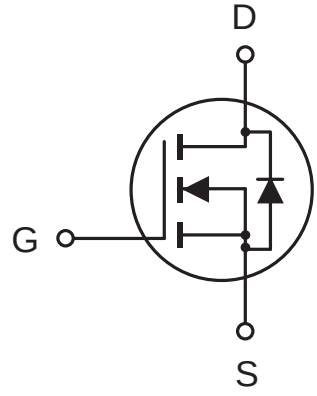
6

FEATURES

- 500V , 4.5A , $R_{DS(ON)}$=1Ω @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}	500	V
Gate-Source Voltage	V_{GS}	±30	V
Drain Current-Continuous	I_D	4.5	A
-Pulsed	I_{DM}	13.5	A
Drain-Source Diode Forward Current	I_S	4.5	A
Maximum Power Dissipation @Tc=25°C	P_D	45	W
Derate above 25°C		0.36	W/ °C
Operating and Storage Temperautre Range	T_J, T_{STG}	-65 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

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=24mH R_G=25Ω		500		mJ
Maximum Drain-Source Avalanche Current	I_{AS}			6		A
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V,I_D = 250μA	500			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 500V, 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 = 4A		0.85	1.0	Ω
On-State Drain Current	$I_{D(ON)}$	V_{GS} = 10V, V_{DS} = 10V	6			A
Forward Transconductance	g_{FS}	V_{DS} = 50V, I_D = 4A		4		S
SWITCHING CHARACTERISTICS[b]						
Turn-On Delay Time	$t_{D(ON)}$	V_{DD} =250V, I_D = 6A, V_{GS} = 10V R_{GEN}=18Ω		23	45	ns
Rise Time	t_r			35	70	ns
Turn-Off Delay Time	$t_{D(OFF)}$			162	240	ns
Fall Time	t_f			44	90	ns
Total Gate Charge	Q_g	V_{DS} =400V, I_D = 6A, V_{GS} =10V		54	65	nC
Gate-Source Charge	Q_{gs}			9		nC
Gate-Drain Charge	Q_{gd}			27		nC

CEF06N5

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		823		pF
Output Capacitance	C_{OSS}			110		pF
Reverse Transfer Capacitance	C_{RSS}			64		pF
DRAIN-SOURCE DIODE CHARACTERISTICS [a]						
Diode Forward Voltage	V_{SD}	V_{GS} = 0V, Is =6A			1.5	V

Notes

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

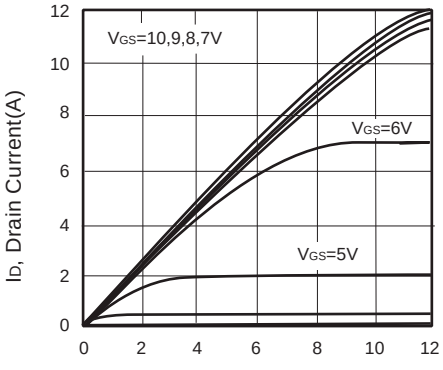


Figure 1. Output Characteristics

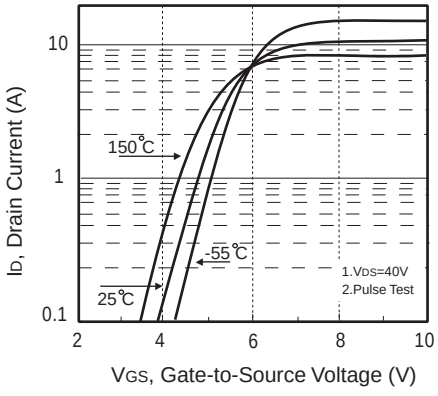


Figure 2. Transfer Characteristics

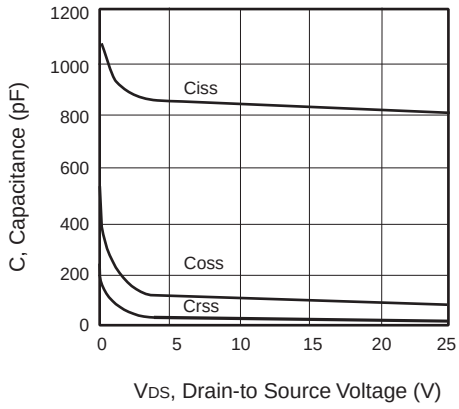


Figure 3. Capacitance

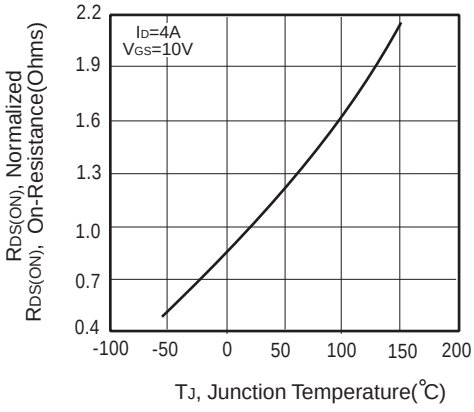


Figure 4. On-Resistance Variation with Temperature

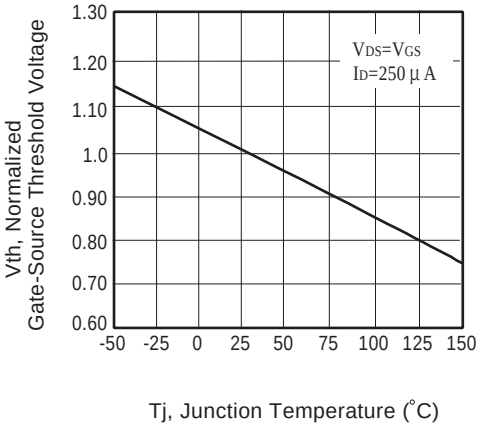


Figure 5. Gate Threshold Variation with Temperature

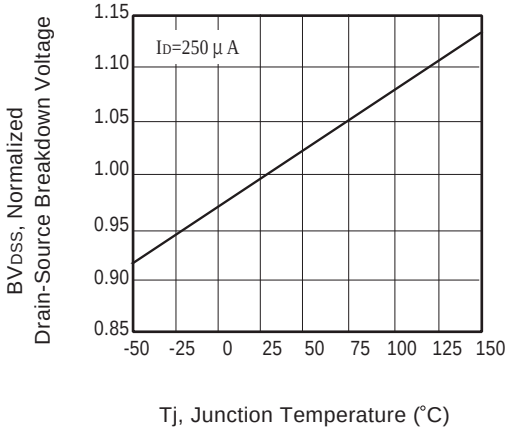


Figure 6. Breakdown Voltage Variation with Temperature

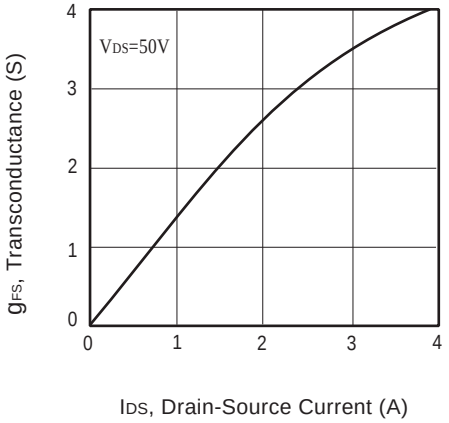


Figure 7. Transconductance Variation with Drain Current

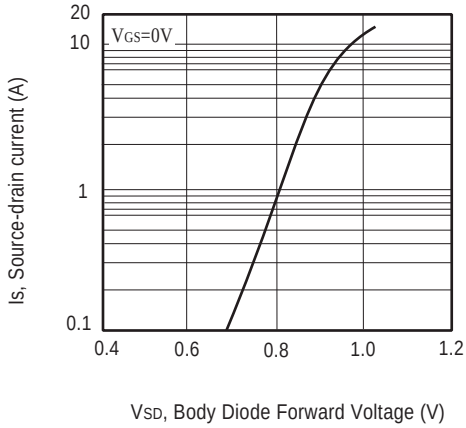


Figure 8. Body Diode Forward Voltage Variation with Source Current

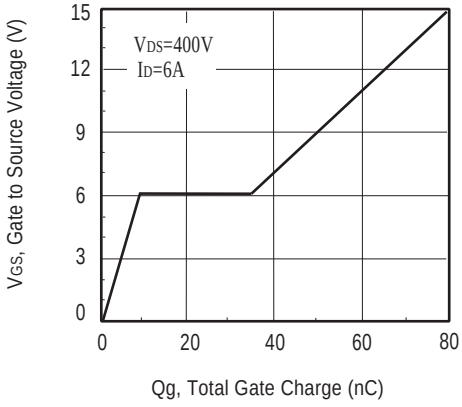


Figure 9. Gate Charge

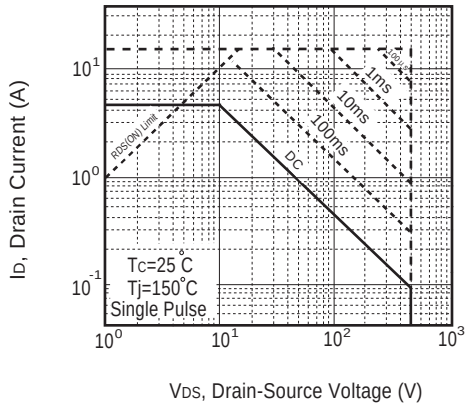


Figure 10. Maximum Safe Operating Area

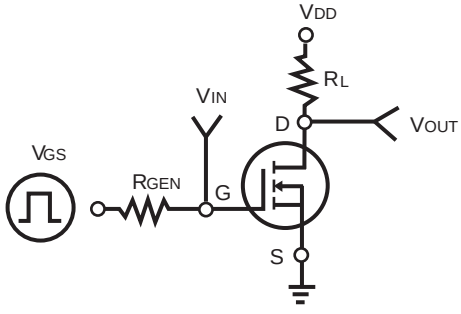


Figure 11. Switching Test Circuit

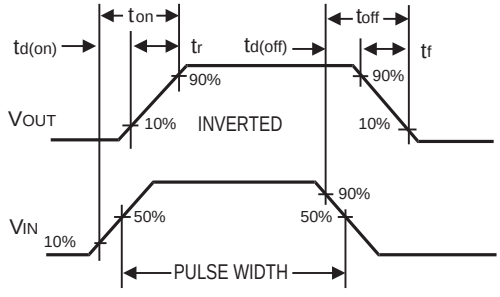


Figure 12. Switching Waveforms

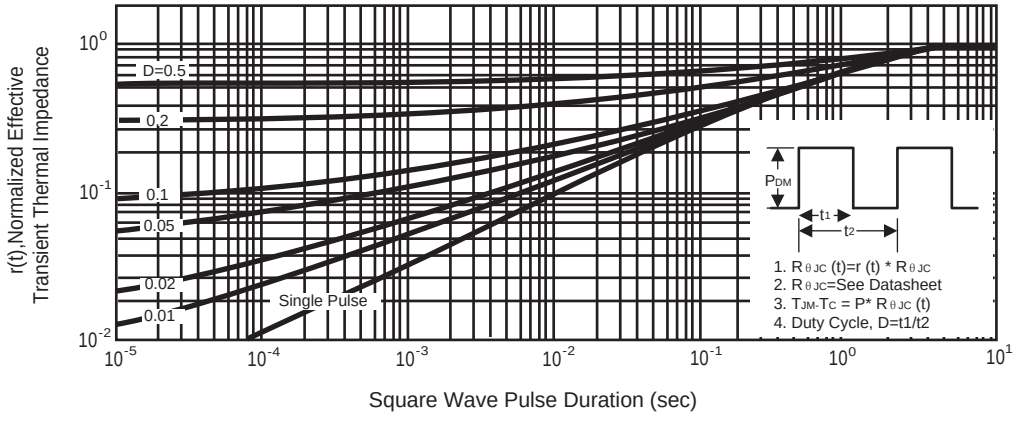


Figure 13. Normalized Thermal Transient Impedance Curve