

# CEP04N6/CEB04N6

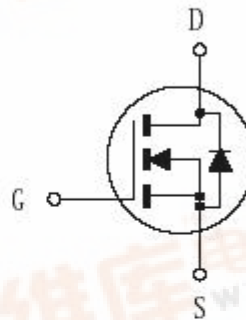
PRELIMINARY

## N-Channel Logic Level Enhancement Mode Field Effect Transistor

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### FEATURES

- ◆ 600V, 4A,  $R_{DS(on)} = 2.5\Omega$  @  $V_{GS} = 10V$ .
- ◆ Super high dense cell design for extremely low  $R_{DS(on)}$ .
- ◆ High power and current handling capability.
- ◆ TO-220 & TO-263 package.



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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	600	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous @ $T_J = 125^\circ\text{C}$	$I_D$	4	A
	$I_{DM}$	16	A
Drain-Source Diode Forward Current	$I_S$	4	A
Maximum Power Dissipation @ $T_c = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	100	W
		0.8	W/ $^\circ\text{C}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	$^\circ\text{C}$

### THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Case <sup>1</sup>	$R_{\theta JC}$	1.2	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Ambient <sup>2</sup>	$R_{\theta JA}$	62	$^\circ\text{C}/\text{W}$

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## ELECTRICAL CHARACTERISTICS (T<sub>C</sub>=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>DRAIN-SOURCE AVALANCHE RATING<sup>a</sup></b>						
Single Pulse Drain-Source Avalanche Energy	E <sub>AS</sub>	V <sub>DS</sub> = 50V, L=27nH R <sub>θ</sub> =9.1 Ω		220		nJ
Maximum Drain-Source Avalanche Current	I <sub>AS</sub>			4		A
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	600			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 600V, V <sub>GS</sub> = 0V			25	μA
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = ±20V, V <sub>GS</sub> = 0V			±100	nA
<b>ON CHARACTERISTICS<sup>a</sup></b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	2		4	V
Drain-Source On-State Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 2A		2.0	2.5	Ω
On-State Drain Current	I <sub>D(on)</sub>	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 10V	4			A
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> = 40V, I <sub>D</sub> = 2A		4.5		S
<b>SWITCHING CHARACTERISTICS<sup>b</sup></b>						
Turn-On Delay Time	t <sub>D(on)</sub>	V <sub>DS</sub> = 300V, I <sub>D</sub> = 4A, V <sub>GS</sub> = 10V R <sub>θDS</sub> =25Ω		25	50	ns
Rise Time	t <sub>r</sub>			65	120	ns
Turn-Off Delay Time	t <sub>D(off)</sub>			75	150	ns
Fall Time	t <sub>f</sub>			65	120	ns
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 480V, I <sub>D</sub> = 4A, V <sub>GS</sub> = 10V		22	28	nC
Gate-Source Charge	Q <sub>gs</sub>			4.0		nC
Gate-Drain Charge	Q <sub>gd</sub>			9.5		nC

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Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>DYNAMIC CHARACTERISTICS<sup>b</sup></b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V f = 1.0MHz		730		pF
Output Capacitance	C <sub>oss</sub>			85		pF
Reverse Transfer Capacitance	C <sub>rss</sub>			20		pF
<b>DRAIN-SOURCE DIODE CHARACTERISTICS<sup>a</sup></b>						
Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> = 0V, I <sub>S</sub> = 4A			1.5	V

### Notes

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

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

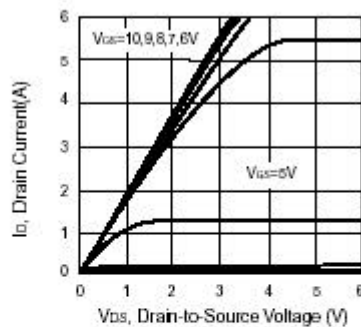


Figure 1. Output Characteristics

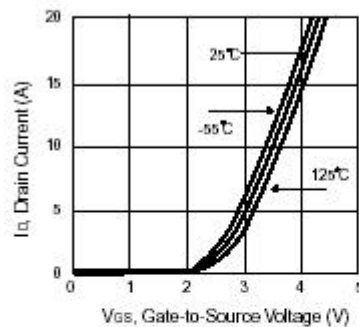


Figure 2. Transfer Characteristics

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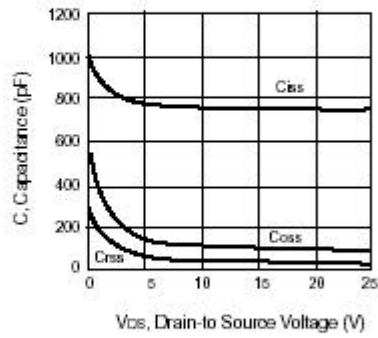


Figure 3. Capacitance

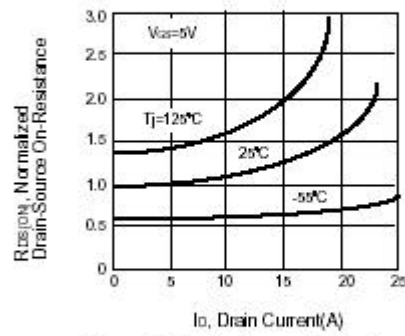


Figure 4. On-Resistance Variation with Drain Current and Temperature

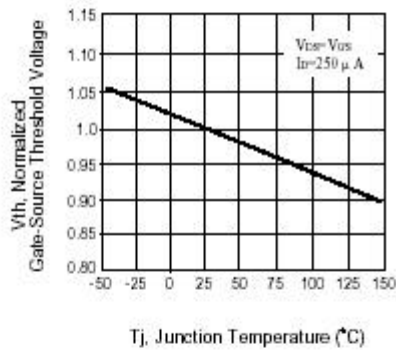


Figure 5. Gate Threshold Variation with Temperature

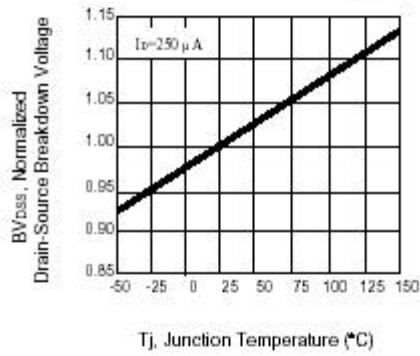


Figure 6. Breakdown Voltage Variation with Temperature

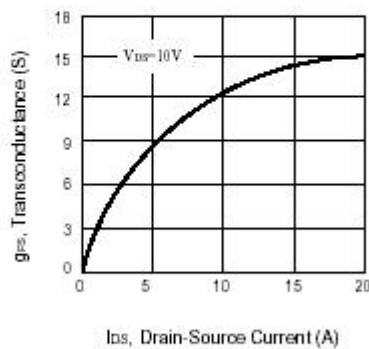


Figure 7. Transconductance Variation with Drain Current

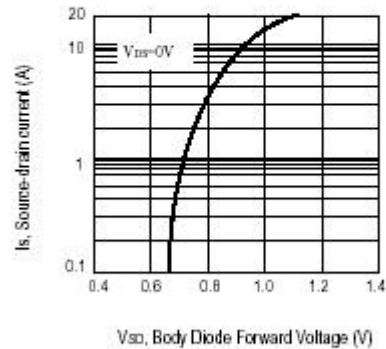


Figure 8. Body Diode Forward Voltage Variation with Source Current