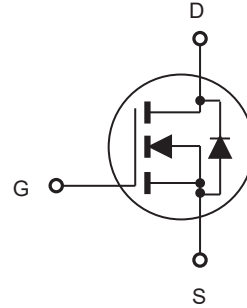
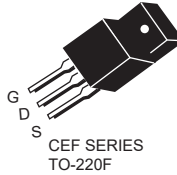


## N-Channel Enhancement Mode Field Effect Transistor

### FEATURES

Type	$V_{DSS}@T_{Jmax}$	$R_{DS(ON)}$	$I_D$	@ $V_{GS}$
CEP02N65B	700V	5Ω	2A	10V
CEB02N65B	700V	5Ω	2A	10V
CEF02N65B	700V	5Ω	2A <sup>d</sup>	10V

- Super high dense cell design for extremely low  $R_{DS(ON)}$ .
- High power and current handling capability.
- Pb-free lead plating ; RoHS compliant.
- Halogen Free.



### ABSOLUTE MAXIMUM RATINGS $T_C = 25^\circ\text{C}$ unless otherwise noted

Parameter	Symbol	Limit		Units
		TO-220/263	TO-220F	
Drain-Source Voltage	$V_{DS}$	650		V
Gate-Source Voltage	$V_{GS}$	±30		V
Drain Current-Continuous @ $T_C = 25^\circ\text{C}$ @ $T_C = 100^\circ\text{C}$	$I_D$	2	2 <sup>d</sup>	A
		1.3	1.3 <sup>d</sup>	A
Drain Current-Pulsed <sup>a</sup>	$I_{DM}^e$	8	8 <sup>d</sup>	A
Maximum Power Dissipation @ $T_C = 25^\circ\text{C}$ - Derate above $25^\circ\text{C}$	$P_D$	52	28	W
		0.41	0.22	W/°C
Single Pulsed Avalanche Energy <sup>g</sup>	$E_{AS}$	11.25		mJ
Single Pulsed Avalanche Current <sup>g</sup>	$I_{AS}$	1.5		A
Operating and Store Temperature Range	$T_J, T_{stg}$	-55 to 150		°C

### Thermal Characteristics

Parameter	Symbol	Limit		Units
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.4	4.5	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	65	°C/W



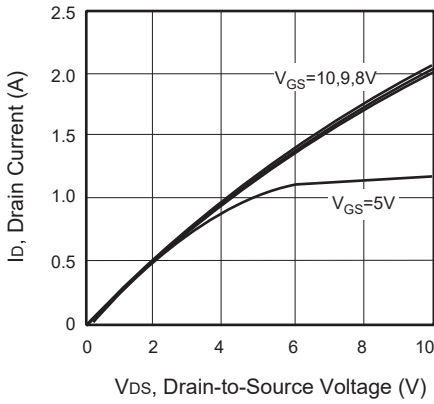
# CEP02N65B/CEB02N65B CEF02N65B

## Electrical Characteristics $T_C = 25^\circ\text{C}$ unless otherwise noted

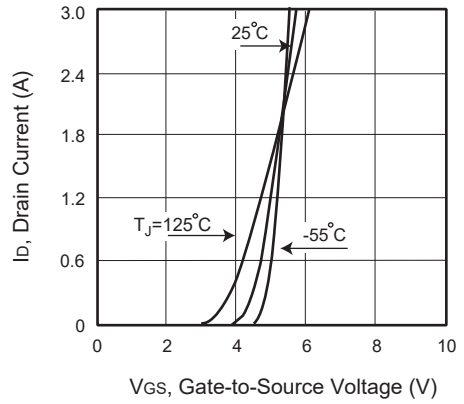
Parameter	Symbol	Test Condition	Min	Typ	Max	Units
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	650			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 650V, V_{GS} = 0V$			1	$\mu A$
Gate Body Leakage Current, Forward	$I_{GSSF}$	$V_{GS} = 30V, V_{DS} = 0V$			100	nA
Gate Body Leakage Current, Reverse	$I_{GSSR}$	$V_{GS} = -30V, V_{DS} = 0V$			-100	nA
<b>On Characteristics<sup>b</sup></b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS} = V_{DS}, I_D = 250\mu A$	2		4	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 1A$		4.2	5	$\Omega$
<b>Dynamic Characteristics<sup>c</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 25V, V_{GS} = 0V,$ $f = 1.0\text{ MHz}$		365		pF
Output Capacitance	$C_{oss}$			65		pF
Reverse Transfer Capacitance	$C_{rss}$			20		pF
<b>Switching Characteristics<sup>c</sup></b>						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 300V, I_D = 1A,$ $V_{GS} = 10V, R_{GEN} = 18\Omega$		22		ns
Turn-On Rise Time	$t_r$			12		ns
Turn-Off Delay Time	$t_{d(off)}$			34		ns
Turn-Off Fall Time	$t_f$			11		ns
Total Gate Charge	$Q_g$	$V_{DS} = 300V, I_D = 0.5A,$ $V_{GS} = 10V$		7.2		nC
Gate-Source Charge	$Q_{gs}$			1.3		nC
Gate-Drain Charge	$Q_{gd}$			2.8		nC
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Drain-Source Diode Forward Current	$I_S^f$				2	A
Drain-Source Diode Forward Voltage <sup>b</sup>	$V_{SD}$	$V_{GS} = 0V, I_S = 1A$			1.5	V
<b>Notes :</b> a.Repetitive Rating : Pulse width limited by maximum junction temperature . b.Pulse Test : Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 2\%$ . c.Guaranteed by design, not subject to production testing. d.Limited only by maximum temperature allowed . e.Pulse width limited by safe operating area . f.Full package $I_{S(max)} = 1.5A$ . g.L = 10mH, $I_{AS} = 1.5A, V_{DD} = 50V, R_G = 25\Omega$ , Starting $T_J = 25^\circ\text{C}$ .						



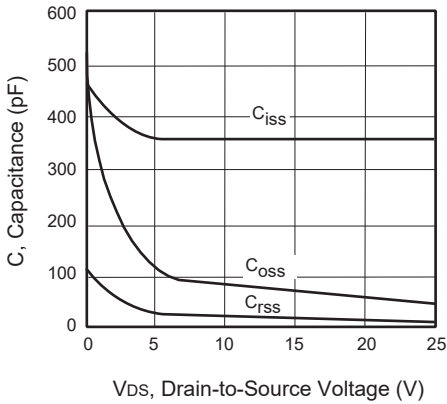
# CEP02N65B/CEB02N65B CEF02N65B



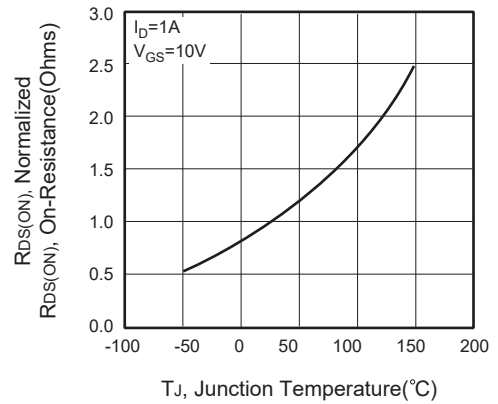
**Figure 1. Output Characteristics**



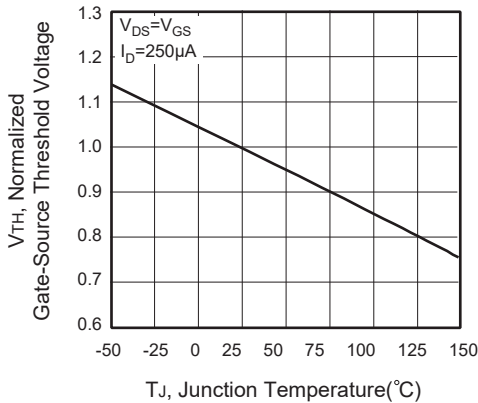
**Figure 2. Transfer Characteristics**



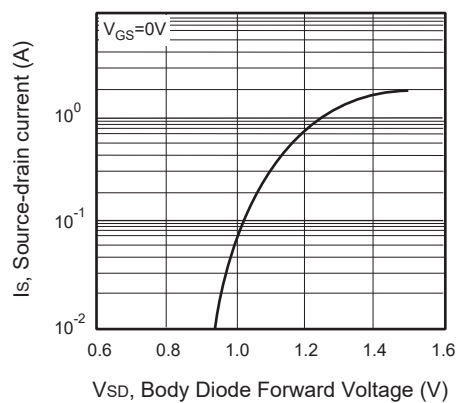
**Figure 3. Capacitance**



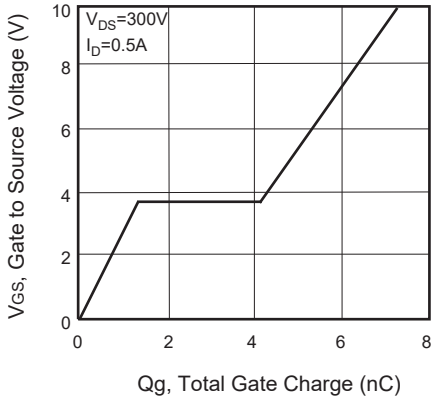
**Figure 4. On-Resistance Variation with Temperature**



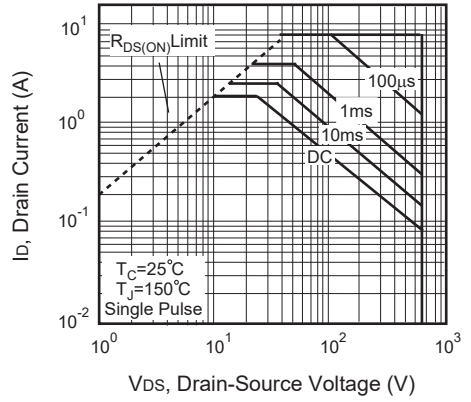
**Figure 5. Gate Threshold Variation with Temperature**



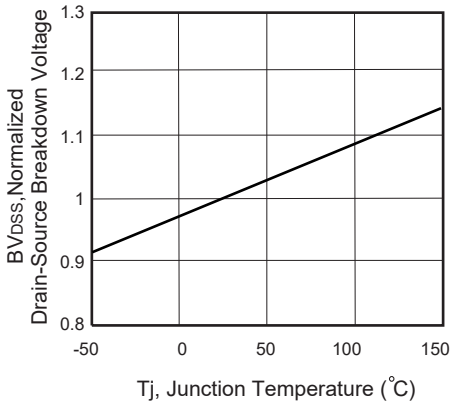
**Figure 6. Body Diode Forward Voltage Variation with Source Current**



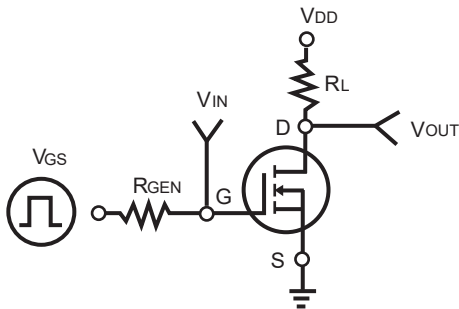
**Figure 7. Gate Charge**



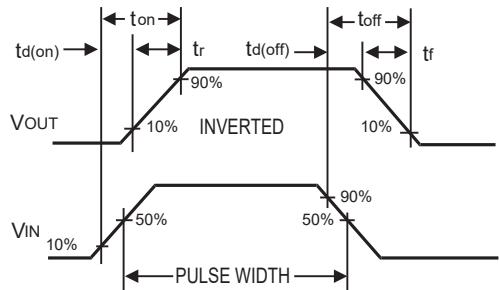
**Figure 8. Maximum Safe Operating Area**



**Figure 9. Breakdown Voltage Variation VS Temperature**



**Figure 10. Switching Test Circuit**



**Figure 11. Switching Waveforms**



# CEP02N65B/CEB02N65B CEF02N65B

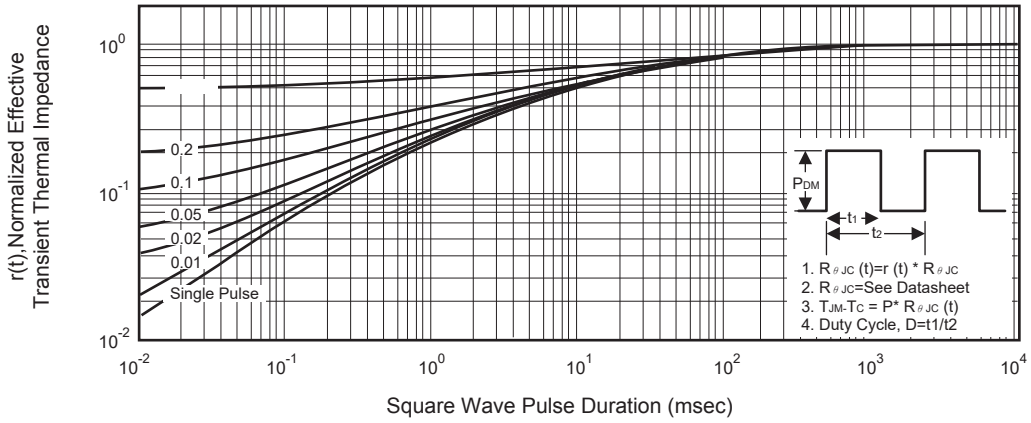


Figure 12. Normalized Thermal Transient Impedance Curve