



# CEP50P03/CEB50P03

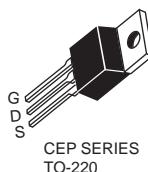
## P-Channel Enhancement Mode Field Effect Transistor

### FEATURES

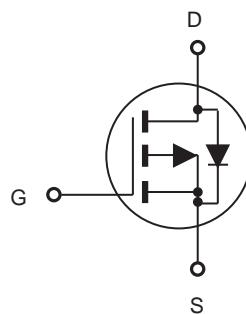
- -30V, -47A,  $R_{DS(ON)} = 20m\Omega$  @  $V_{GS} = -10V$ .  
 $R_{DS(ON)} = 32m\Omega$  @  $V_{GS} = -4.5V$ .
- Super high dense cell design for extremely low  $R_{DS(ON)}$ .
- High power and current handing capability.
- Lead free product is acquired.
- TO-220 & TO-263 package.



CEB SERIES  
TO-263(DD-PAK)



CEP SERIES  
TO-220



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

Parameter	Symbol	Limit	Units
Drain-Source Voltage	$V_{DS}$	-30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous	$I_D$	-47	A
Drain Current-Pulsed <sup>a</sup>	$I_{DM}$	-188	A
Maximum Power Dissipation @ $T_C = 25^\circ C$ - Derate above $25^\circ C$	$P_D$	79 0.53	W W/ $^\circ C$
Operating and Store Temperature Range	$T_J, T_{stg}$	-55 to 175	$^\circ C$

### Thermal Characteristics

Parameter	Symbol	Limit	Units
Thermal Resistance, Junction-to-Case	$R_{JC}$	1.9	$^\circ C/W$
Thermal Resistance, Junction-to-Ambient	$R_{JA}$	62.5	$^\circ C/W$



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

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$\text{BV}_{\text{DSS}}$	$V_{\text{GS}} = 0\text{V}, I_D = -250\mu\text{A}$	-30			V
Zero Gate Voltage Drain Current	$I_{\text{DSS}}$	$V_{\text{DS}} = -24\text{V}, V_{\text{GS}} = 0\text{V}$			-1	$\mu\text{A}$
Gate Body Leakage Current, Forward	$I_{\text{GSSF}}$	$V_{\text{GS}} = 20\text{V}, V_{\text{DS}} = 0\text{V}$			100	nA
Gate Body Leakage Current, Reverse	$I_{\text{GSSR}}$	$V_{\text{GS}} = -20\text{V}, V_{\text{DS}} = 0\text{V}$			-100	nA
<b>On Characteristics<sup>c</sup></b>						
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{GS}} = V_{\text{DS}}, I_D = -250\mu\text{A}$	-1		-3	V
Static Drain-Source On-Resistance	$R_{\text{DS}(\text{on})}$	$V_{\text{GS}} = -10\text{V}, I_D = -25\text{A}$		17	20	$\text{m}\Omega$
Forward Transconductance	$g_{\text{FS}}$	$V_{\text{DS}} = -15\text{V}, I_D = -25\text{A}$		25	32	$\text{m}\Omega$
<b>Dynamic Characteristics<sup>d</sup></b>						
Input Capacitance	$C_{\text{iss}}$	$V_{\text{DS}} = -15\text{V}, V_{\text{GS}} = 0\text{V}, f = 1.0 \text{ MHz}$		2220		pF
Output Capacitance	$C_{\text{oss}}$			550		pF
Reverse Transfer Capacitance	$C_{\text{rss}}$			230		pF
<b>Switching Characteristics<sup>d</sup></b>						
Turn-On Delay Time	$t_{\text{d}(\text{on})}$	$V_{\text{DD}} = -15\text{V}, I_D = -1\text{A}, V_{\text{GS}} = -10\text{V}, R_{\text{GEN}} = 6\Omega$		12	24	ns
Turn-On Rise Time	$t_r$			6	18	ns
Turn-Off Delay Time	$t_{\text{d}(\text{off})}$			110	140	ns
Turn-Off Fall Time	$t_f$			35	70	ns
Total Gate Charge	$Q_g$	$V_{\text{DS}} = -15\text{V}, I_D = -25\text{A}, V_{\text{GS}} = -5\text{V}$		22	28	nC
Gate-Source Charge	$Q_{\text{gs}}$			7		nC
Gate-Drain Charge	$Q_{\text{gd}}$			8		nC
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Drain-Source Diode Forward Current <sup>b</sup>	$I_S$				-2.1	A
Drain-Source Diode Forward Voltage <sup>c</sup>	$V_{\text{SD}}$	$V_{\text{GS}} = 0\text{V}, I_S = -2.1\text{A}$			-1.2	V

Notes :

- a.Repetitive Rating : Pulse width limited by maximum junction temperature.
- b.Surface Mounted on FR4 Board,  $t \leq 10 \text{ sec}$ .
- c.Pulse Test : Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .
- d.Guaranteed by design, not subject to production testing.



# CEP50P03/CEB50P03

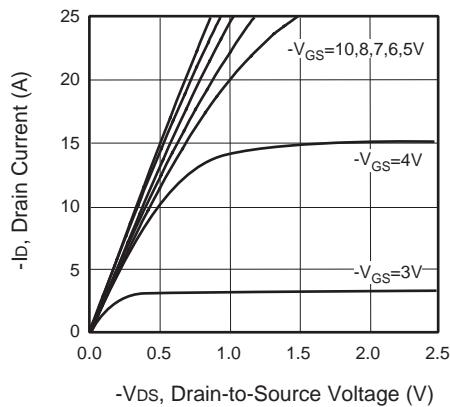


Figure 1. Output Characteristics

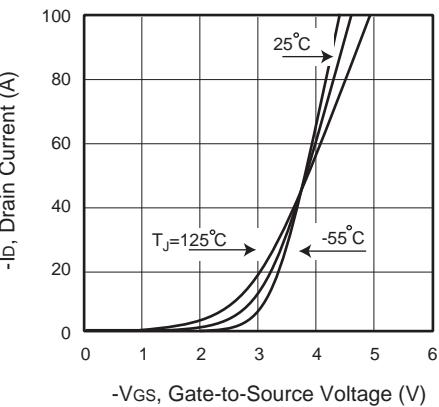


Figure 2. Transfer Characteristics

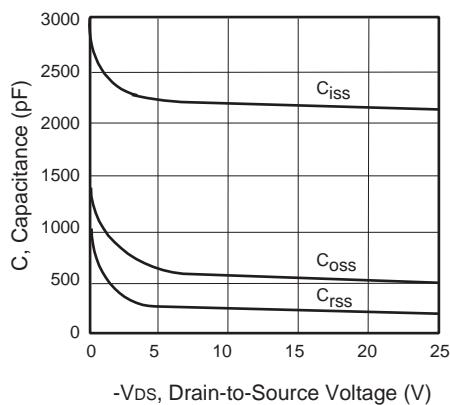


Figure 3. Capacitance

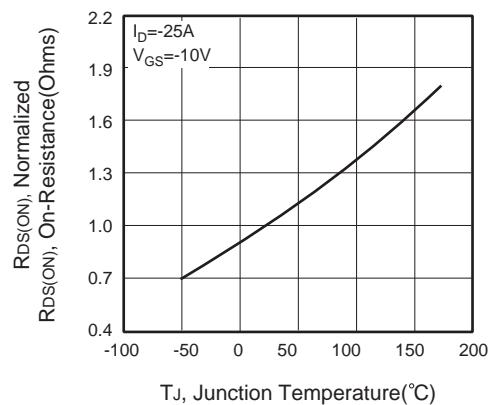


Figure 4. On-Resistance Variation with Temperature

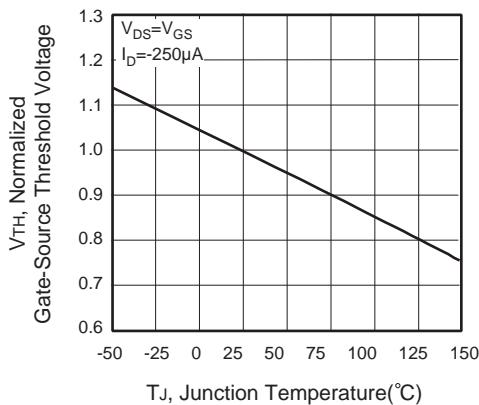


Figure 5. Gate Threshold Variation with Temperature

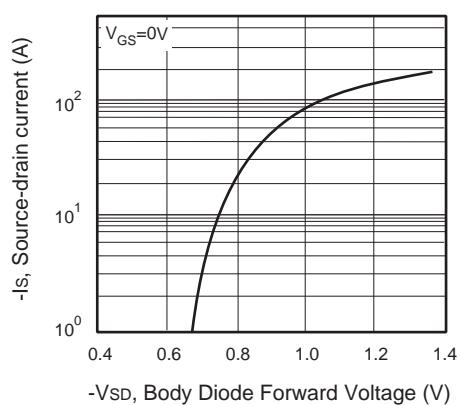


Figure 6. Body Diode Forward Voltage Variation with Source Current



# CEP50P03/CEB50P03

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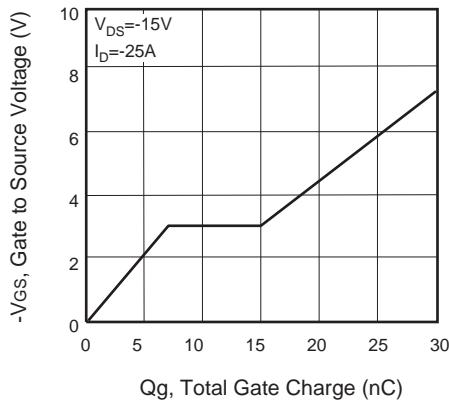


Figure 7. Gate Charge

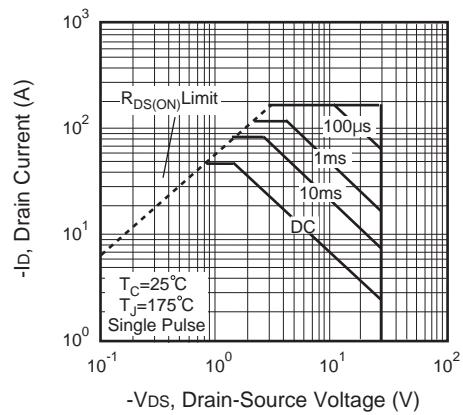


Figure 8. Maximum Safe Operating Area

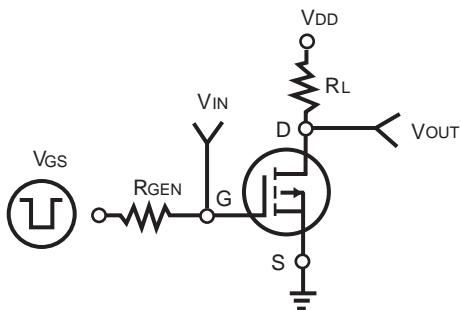


Figure 9. Switching Test Circuit

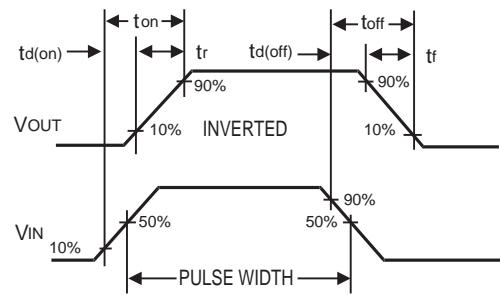


Figure 10. Switching Waveforms

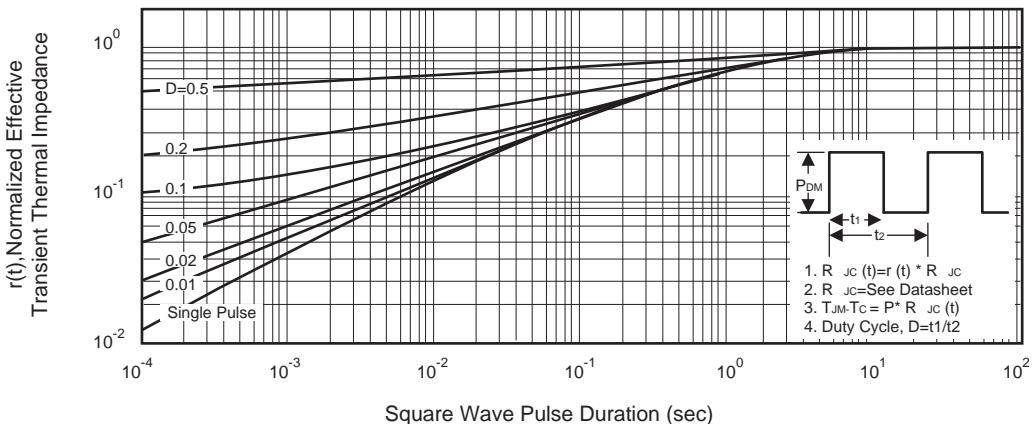


Figure 11. Normalized Thermal Transient Impedance Curve