

# CEP6060LR/CEB6060LR

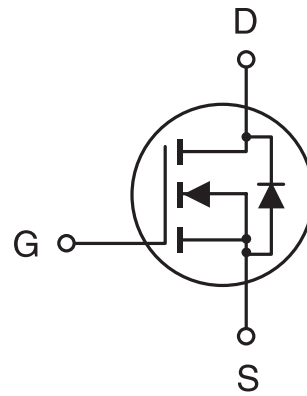
PRELIMINARY

## N-Channel Enhancement Mode Field Effect Transistor

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### FEATURES

- 60V , 60A ,  $R_{DS(ON)}=20m\Omega$  @  $V_{GS}=10V$ .  
 $R_{DS(ON)}=25m\Omega$  @  $V_{GS}=5V$ .
- 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 <sub>DS</sub>	60	V
Gate-Source Voltage	V <sub>GS</sub>	±16	V
Drain Current-Continuous -Pulsed	I <sub>D</sub>	60	A
	I <sub>DM</sub>	144	A
Drain-Source Diode Forward Current	I <sub>S</sub>	60	A
Maximum Power Dissipation @T <sub>c</sub> =25°C Derate above 25°C	P <sub>D</sub>	100	W
		0.67	W/°C
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-65 to 175	°C

### THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Case	R <sub>θJC</sub>	1.5	°C/W
Thermal Resistance, Junction-to-Ambient	R <sub>θJA</sub>	62.5	°C/W

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## ELECTRICAL CHARACTERISTICS (Tc=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>DD</sub> =25V, I <sub>D</sub> =150A		430		mJ
Maximum Drain-Source Avalanche Current	I <sub>AS</sub>	L=25μH		150		A
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	60			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V			25	μA
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>GS</sub> =±16V, V <sub>DS</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	1	1.4	2	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =5V, I <sub>D</sub> =24A		19	25	mΩ
		V <sub>GS</sub> =10V, I <sub>D</sub> =24A		15	20	mΩ
On-State Drain Current	I <sub>D(ON)</sub>	V <sub>GS</sub> =5V, V <sub>DS</sub> =10V	60			A
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =24A		39		S
<b>SWITCHING CHARACTERISTICS<sup>b</sup></b>						
Turn-On Delay Time	t <sub>D(ON)</sub>	V <sub>DD</sub> =30V, I <sub>D</sub> =48A, V <sub>GS</sub> =5V V <sub>GEN</sub> =15V R <sub>GS</sub> =15Ω		20	30	ns
Rise Time	t <sub>r</sub>			400	500	ns
Turn-Off Delay Time	t <sub>D(OFF)</sub>			75	100	ns
Fall Time	t <sub>f</sub>			260	300	ns
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =48V, I <sub>D</sub> =48A, V <sub>GS</sub> =5V		58	60	nC
Gate-Source Charge	Q <sub>gs</sub>			8		nC
Gate-Drain Charge	Q <sub>gd</sub>			13		nC

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

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		1565	400	pF
Output Capacitance	C <sub>oss</sub>			441	200	pF
Reverse Transfer Capacitance	C <sub>rss</sub>			104	50	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> = 24A		0.8	1.3	V

Notes

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

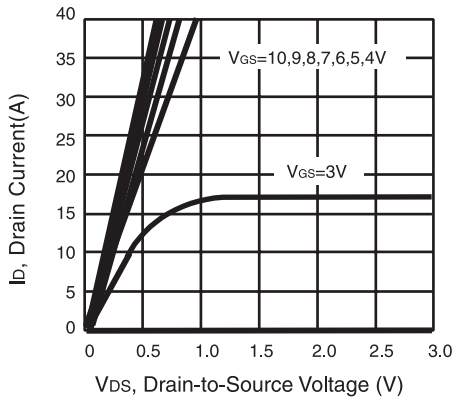


Figure 1. Output Characteristics

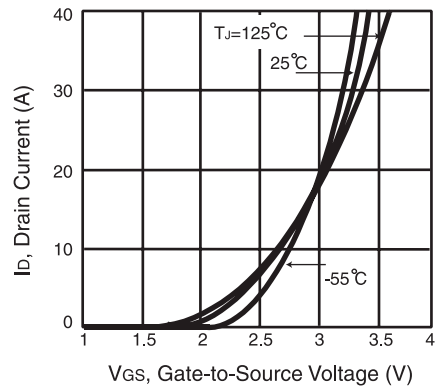


Figure 2. Transfer Characteristics

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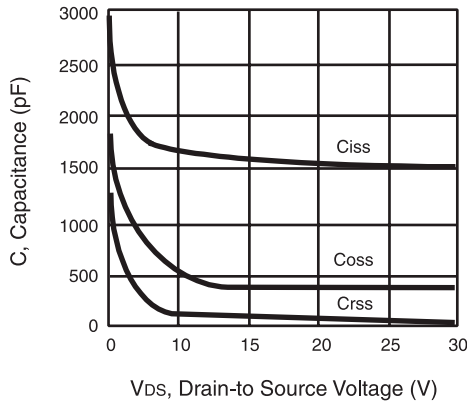


Figure 3. Capacitance

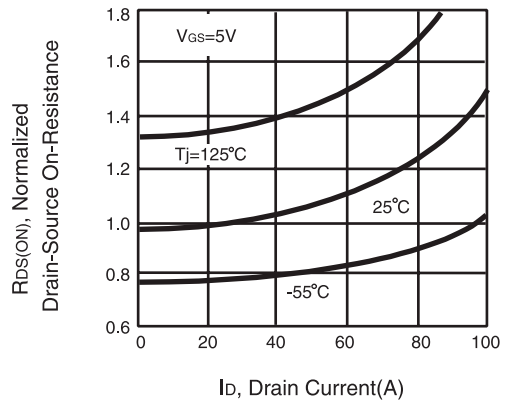


Figure 4. On-Resistance Variation with Drain Current and Temperature

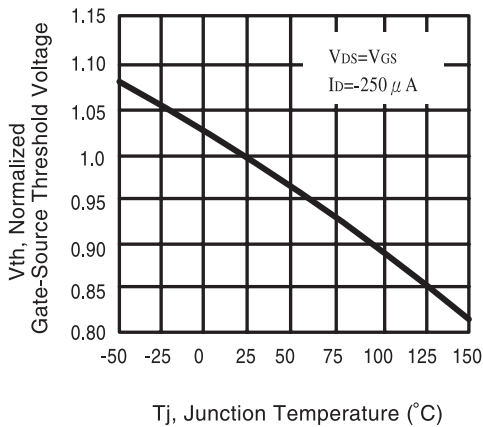


Figure 5. Gate Threshold Variation with Temperature

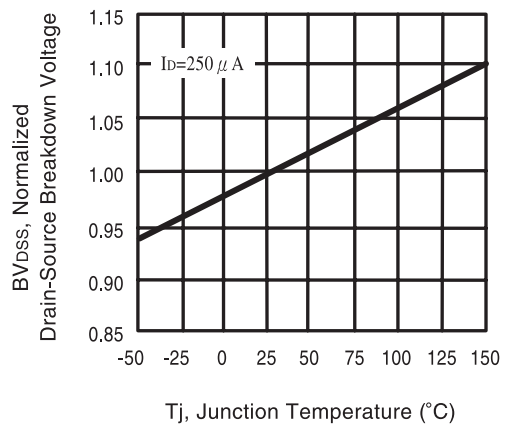


Figure 6. Breakdown Voltage Variation with Temperature

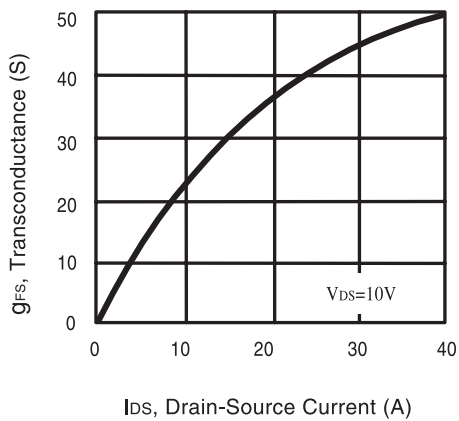


Figure 7. Transconductance Variation with Drain Current

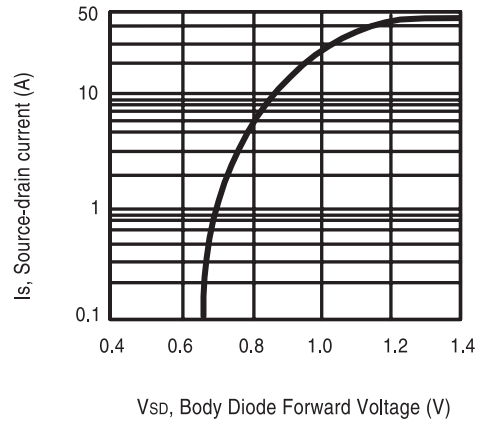


Figure 8. Body Diode Forward Voltage Variation with Source Current

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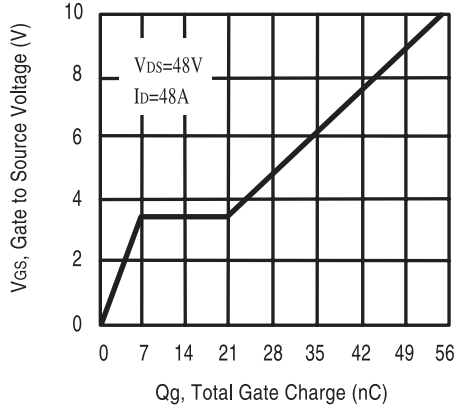


Figure 9. Gate Charge

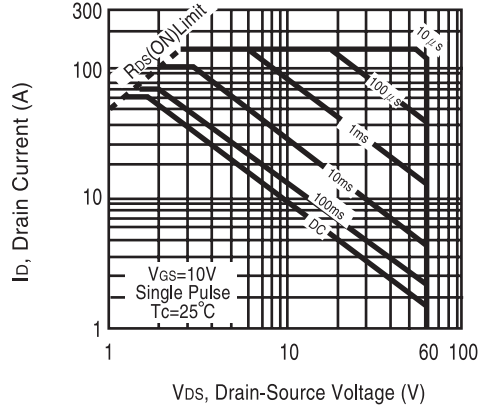


Figure 10. Maximum Safe Operating Area

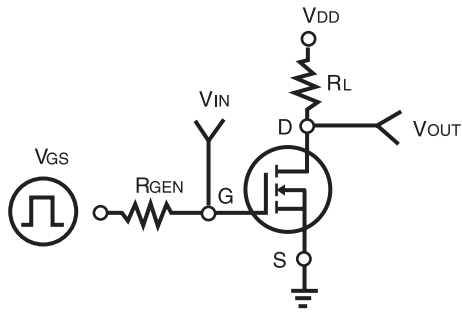


Figure 11. Switching Test Circuit

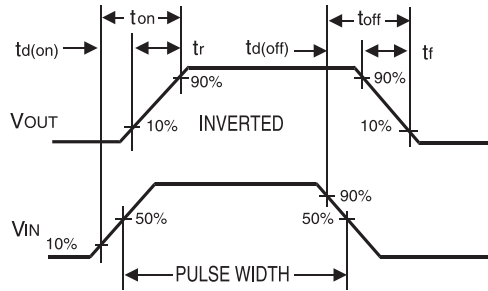


Figure 12. Switching Waveforms

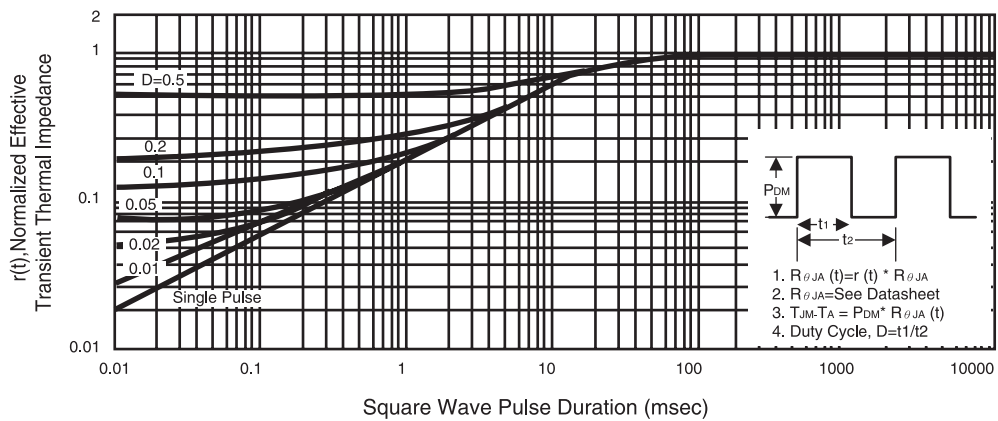


Figure 13. Normalized Thermal Transient Impedance Curve