CET

CED12N10L/CEU12N10L

## N-Channel Enhancement Mode Field Effect Transistor

FEATURES

■ 100V, 11A, $R_{DS(ON)}$ = 175mΩ @V_{GS} = 10V.
        $R_{DS(ON)}$ = 185mΩ @V_{GS} = 5V.

■ Super high dense cell design for extremely low $R_{DS(ON)}$.

■ High power and current handing capability.

■ RoHS compliant.

■ TO-251 & TO-252 package.

CEU SERIES
TO-252(D-PAK)

CED SERIES
TO-251(I-PAK)
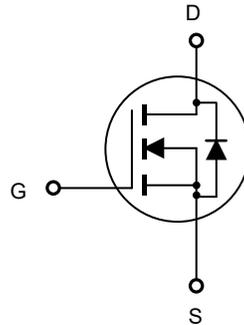
ABSOLUTE MAXIMUM RATINGS T_C = 25°C unless otherwise noted

Parameter	Symbol	Limit	Units
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous @ T_C = 25°C	I_D	11	A
Drain Current-Continuous @ T_C = 100°C		7.5	A
Drain Current-Pulsed [a]	I_{DM}	44	A
Maximum Power Dissipation @ T_C = 25°C	P_D	43	W
- Derate above 25°C		0.29	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	$R_{\theta JC}$	3.5	$^\circ$C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	50	$^\circ$C/W

Details are subject to change without notice .

Electrical Characteristics T_C = 25°C unless otherwise noted

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V, I_D = 250µA	100			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 100, V_{GS} = 0V			1	µA
Gate Body Leakage Current, Forward	I_{GSSF}	V_{GS} = 20V, V_{DS} = 0V			100	nA
Gate Body Leakage Current, Reverse	I_{GSSR}	V_{GS} = -20V, V_{DS} = 0V			-100	nA
On Characteristics [b]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS} = V_{DS}, I_D = 250µA	1		3	V
Static Drain-Source	$R_{DS(on)}$	V_{GS} = 10V, I_D = 6A		140	175	mΩ
On-Resistance		V_{GS} = 5 V, I_D = 5A		150	185	mΩ
Forward Transconductance	g_{FS}	V_{DS} = 10V, I_D = 6A		5		S
Dynamic Characteristics [c]						
Input Capacitance	C_{iss}	V_{DS} = 25V, V_{GS} = 0V, f = 1.0 MHz		450		pF
Output Capacitance	C_{oss}			90		pF
Reverse Transfer Capacitance	C_{rss}			25		pF
Switching Characteristics [c]						
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 80, I_D = 11A, V_{GS} = 10V, R_{GEN} = 9.1Ω		8	16	ns
Turn-On Rise Time	t_r			4	8	ns
Turn-Off Delay Time	$t_{d(off)}$			30	60	ns
Turn-Off Fall Time	t_f			3	6	ns
Total Gate Charge	Q_g	V_{DS} = 80V, I_D = 11A, V_{GS} = 10V		12	24	nC
Gate-Source Charge	Q_{gs}			1.3		nC
Gate-Drain Charge	Q_{gd}			3		nC
Drain-Source Diode Characteristics and Maximun Ratings						
Drain-Source Diode Forward Current	I_S				11	A
Drain-Source Diode Forward Voltage [b]	V_{SD}	V_{GS} = 0V, I_S = 11A			1.2	V

Notes :
a.Repetitive Rating : Pulse width limited by maximum junction temperature
b.Pulse Test : Pulse Width $\leq$ 300µs, Duty Cycle $\leq$ 2%.
c.Guaranteed by design, not subject to production testing.
d. L=0.1mH, I_{AS}=10A, VDD=25V, R_G=25Ω, Starting T_J=25°C
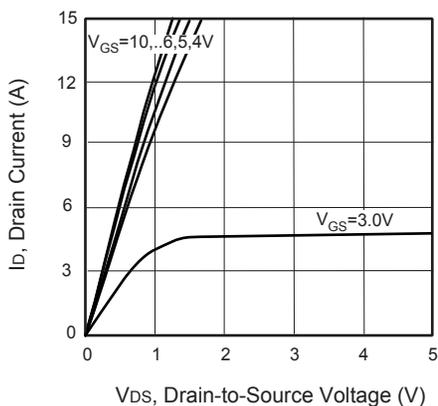
Figure 1. Output Characteristics
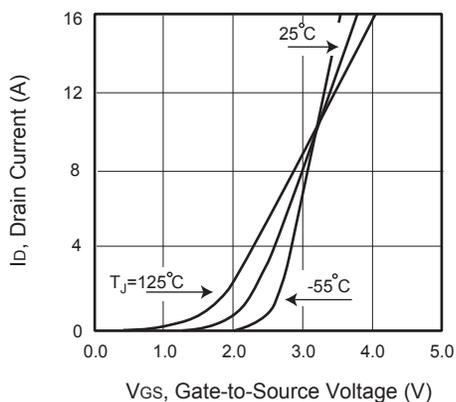
**Figure 2. Transfer Characteristics**
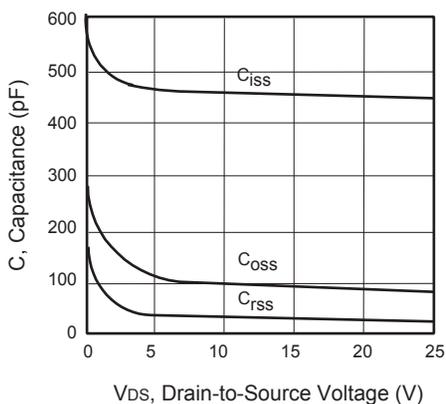
Figure 3. Capacitance
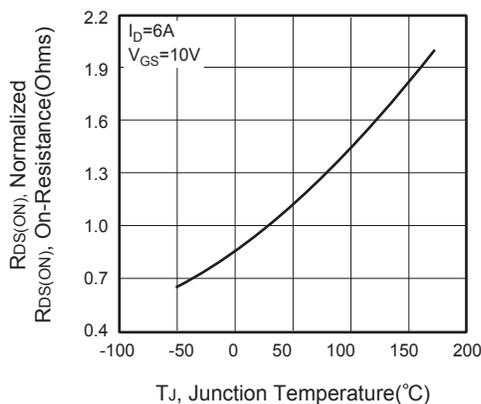
Figure 4. On-Resistance Variation with Temperature
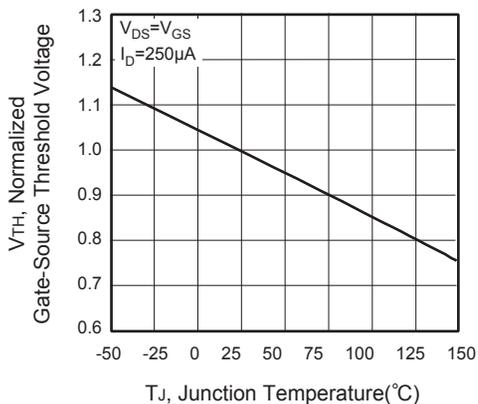
**Figure 5. Gate Threshold Variation with Temperature**
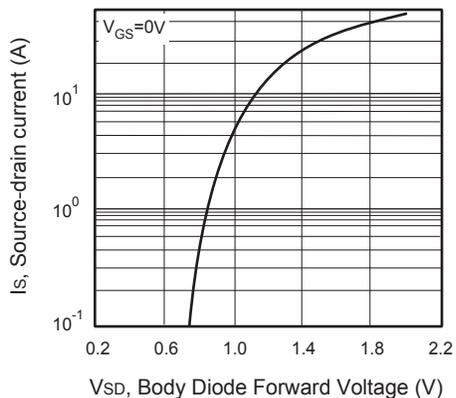
**Figure 6. Body Diode Forward Voltage Variation with Source Current**
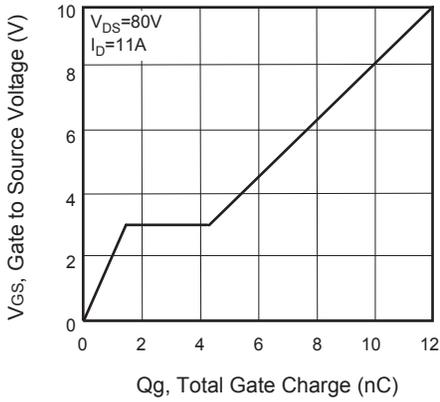
Figure 7. Gate Charge
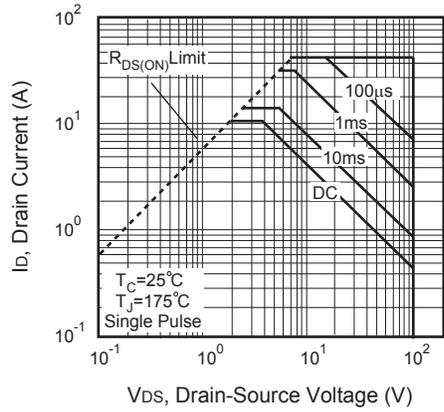
Figure 8. Maximum Safe Operating Area
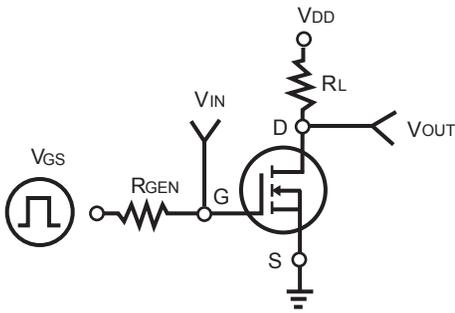
Figure 9. Switching Test Circuit
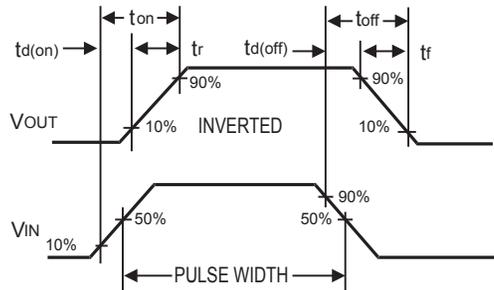
Figure 10. Switching Waveforms

1. $R_{JC}(t) = r(t) * R_{JC}$
2. R_{JC} = See Datasheet
3. $T_{JM} - T_C = P * R_{JC}(t)$
4. Duty Cycle, $D = t1/t2$
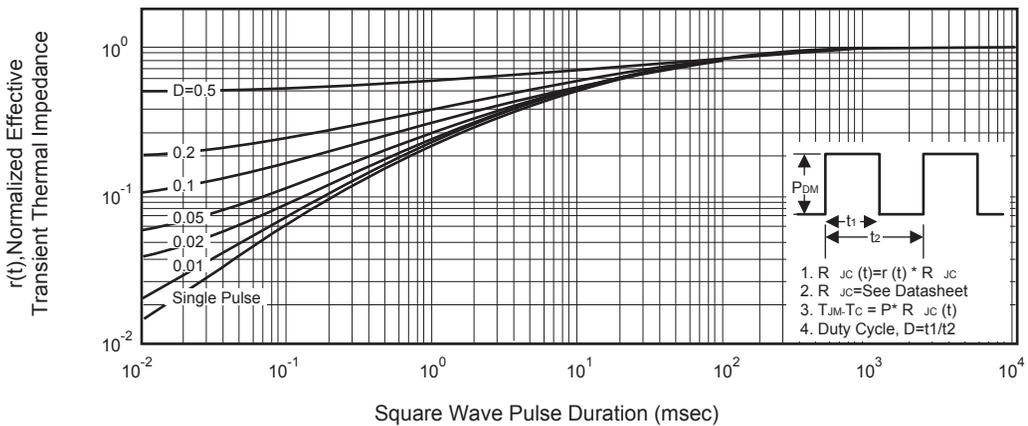
Figure 11. Normalized Thermal Transient Impedance Curve