



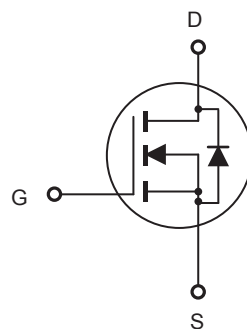
CED93A3/CEU93A3

N-Channel Enhancement Mode Field Effect Transistor

PRELIMINARY

FEATURES

- 30V, 125A, $R_{DS(ON)} = 3.2m\Omega$ @ $V_{GS} = 10V$.
 $R_{DS(ON)} = 7.0m\Omega$ @ $V_{GS} = 4.5V$.
- Super high dense cell design for extremely low $R_{DS(ON)}$.
- High power and current handling capability.
- Lead free product is acquired.
- TO-251 & TO-252 package.



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

Parameter	Symbol	Limit	Units
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	125	A
Drain Current-Pulsed ^a	I_{DM}	500	A
Maximum Power Dissipation @ $T_C = 25^\circ\text{C}$ - Derate above 25°C	P_D	57 0.46	W W/ $^\circ\text{C}$
Single Pulsed Avalanche Energy ^d	E_{AS}	800	mJ
Single Pulsed Avalanche Current ^d	I_{AS}	40	A
Operating and Store Temperature Range	T_J, T_{stg}	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Limit	Units
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.2	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	50	$^\circ\text{C/W}$



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

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	30			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30V, V_{GS} = 0V$			1	μA
Gate Body Leakage Current, Forward	I_{GSSF}	$V_{GS} = 20V, V_{DS} = 0V$			10	μA
Gate Body Leakage Current, Reverse	I_{GSSR}	$V_{GS} = -20V, V_{DS} = 0V$			-10	μA
On Characteristics ^b						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS} = V_{DS}, I_D = 250\mu A$	1		3	V
Static Drain-Source	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 30A$		2.5	3.2	$m\Omega$
On-Resistance		$V_{GS} = 4.5V, I_D = 30A$		5	7	$m\Omega$
Dynamic Characteristics ^c						
Forward Transconductance	g_{FS}	$V_{DS} = 10V, I_D = 15A$		50		S
Input Capacitance	C_{iss}	$V_{DS} = 15V, V_{GS} = 0V, f = 1.0\text{ MHz}$		4100		pF
Output Capacitance	C_{oss}			980		pF
Reverse Transfer Capacitance	C_{rss}			600		pF
Switching Characteristics ^c						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15V, I_D = 1A, V_{GS} = 10V, R_{GEN} = 6\Omega$		24		ns
Turn-On Rise Time	t_r			19		ns
Turn-Off Delay Time	$t_{d(off)}$			128		ns
Turn-Off Fall Time	t_f	$V_{DS} = 15V, I_D = 16A, V_{GS} = 5V$		72		ns
Total Gate Charge	Q_g			60		nC
Gate-Source Charge	Q_{gs}			12		nC
Gate-Drain Charge	Q_{gd}			25		nC
Drain-Source Diode Characteristics and Maximun Ratings						
Drain-Source Diode Forward Current	I_S				125	A
Drain-Source Diode Forward Voltage ^b	V_{SD}	$V_{GS} = 0V, I_S = 20A$			1.5	V
Notes : ^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 L = 1mH, $I_{AS} = 40A, V_{DD} = 24V, R_G = 25\Omega$, Starting $T_J = 25\text{ }^{\circ}C$						

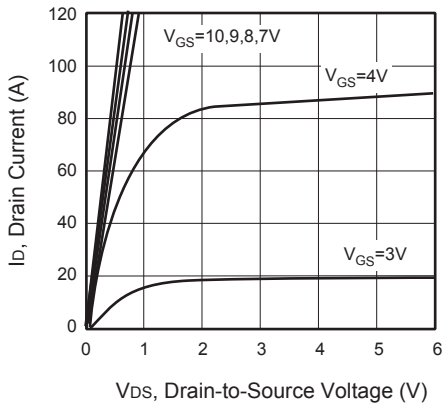


Figure 1. Output Characteristics

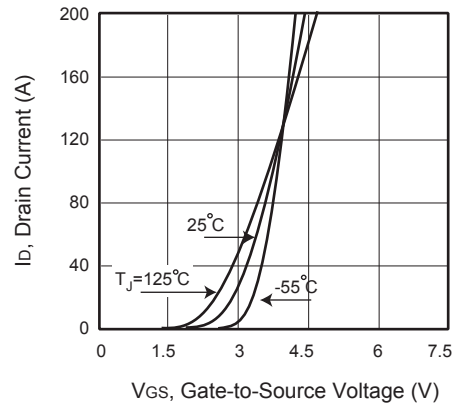


Figure 2. Transfer Characteristics

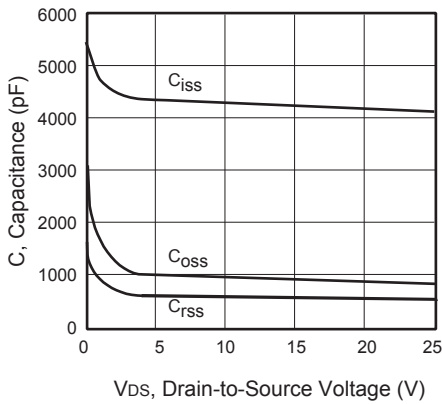


Figure 3. Capacitance

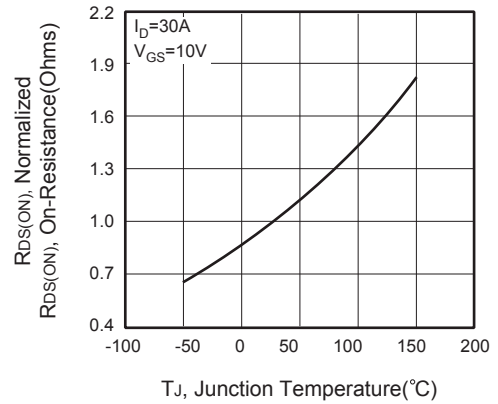


Figure 4. On-Resistance Variation with Temperature

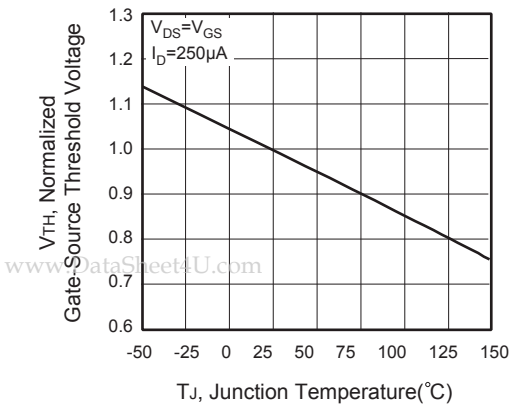


Figure 5. Gate Threshold Variation with Temperature

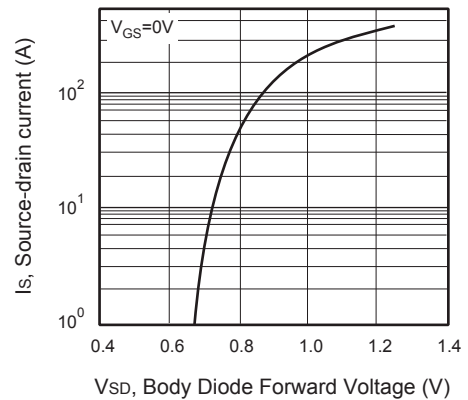


Figure 6. Body Diode Forward Voltage Variation with Source Current



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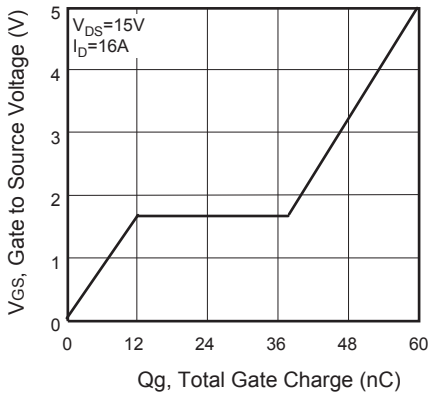


Figure 7. Gate Charge

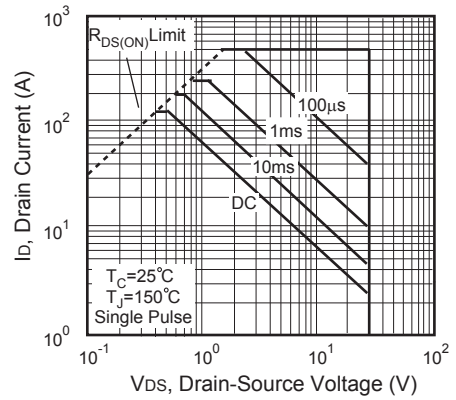


Figure 8. Maximum Safe Operating Area

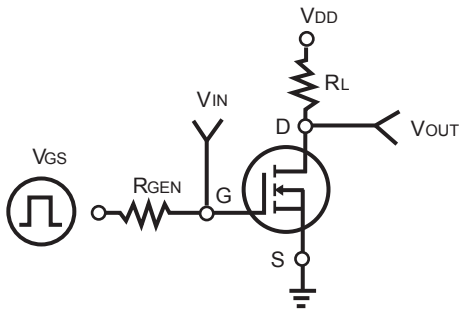


Figure 9. Switching Test Circuit

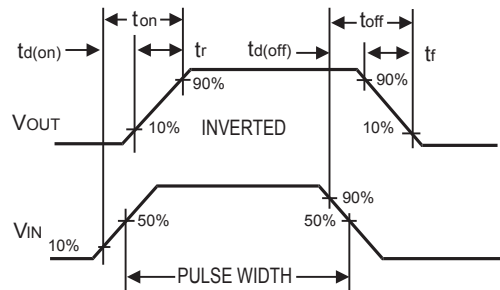


Figure 10. Switching Waveforms

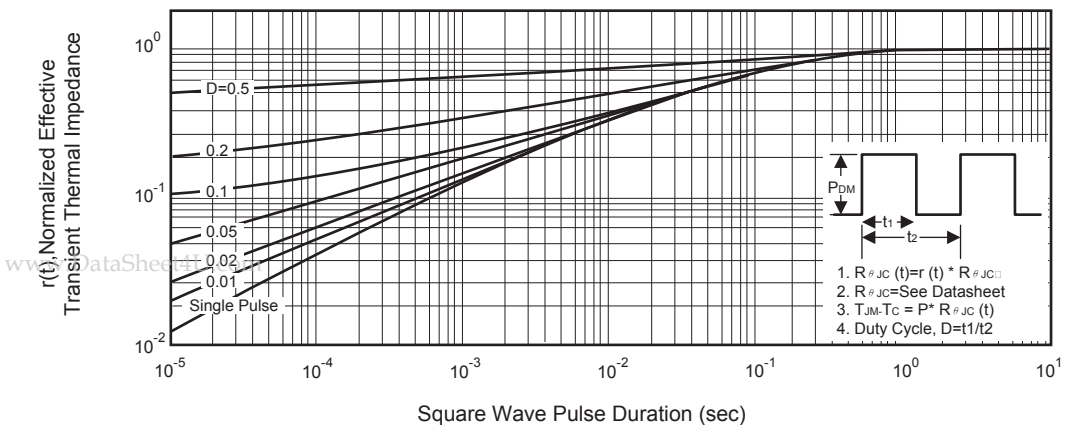


Figure 11. Normalized Thermal Transient Impedance Curve