

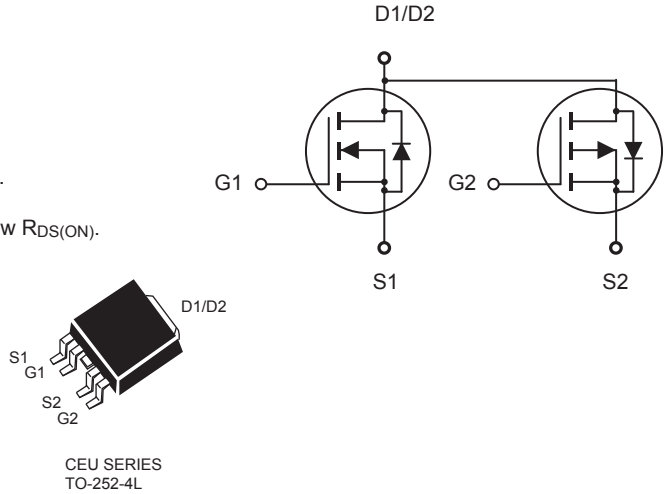


CED4279/CEU4279

Dual Enhancement Mode Field Effect Transistor (N and P Channel)

FEATURES

- 40V , 14A , $R_{DS(ON)} = 32m\Omega$ @ $V_{GS} = 10V$.
 $R_{DS(ON)} = 46m\Omega$ @ $V_{GS} = 4.5V$.
- -40V , -9A , $R_{DS(ON)} = 72m\Omega$ @ $V_{GS} = 10V$.
 $R_{DS(ON)} = 110m\Omega$ @ $V_{GS} = 4.5V$.
- Super high dense cell design for extremely low $R_{DS(ON)}$.
- High power and current handling capability.
- Lead free product is acquired.
- TO-252-4L package.



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

Parameter	Symbol	N-Channel	P-Channel	Units
Drain-Source Voltage	V_{DS}	40	40	V
Gate-Source Voltage	V_{GS}	± 20	± 20	V
Drain Current-Continuous ^e	I_D^e	14	-9	A
Drain Current-Pulsed ^a	I_{DM}	56	-36	A
Maximum Power Dissipation @ $T_C = 25^\circ C$ - Derate above $25^\circ C$	P_D	10.4		W
		0.08		W/ $^\circ C$
Operating and Store Temperature Range	T_J, T_{stg}	-55 to 150		$^\circ C$

Thermal Characteristics

Parameter	Symbol	Limit	Units
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	12	$^\circ C/W$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	50	$^\circ C/W$



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

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	40			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 40V, V_{GS} = 0V$			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						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS} = V_{DS}, I_D = 250\mu A$	1		3	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 8A$		25	32	$m\Omega$
		$V_{GS} = 4.5V, I_D = 6A$		35	46	$m\Omega$
Dynamic Characteristics ^d						
Forward Transconductance	g_{FS}^c	$V_{DS} = 5V, I_D = 8A$		10		S
Input Capacitance	C_{iss}	$V_{DS} = 20V, V_{GS} = 0V, f = 1.0\text{ MHz}$		1055		pF
Output Capacitance	C_{oss}			160		pF
Reverse Transfer Capacitance	C_{rss}			100		pF
Switching Characteristics ^d						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 20V, I_D = 6A, V_{GS} = 10V, R_{GEN} = 3\Omega$		15	30	ns
Turn-On Rise Time	t_r			11	22	ns
Turn-Off Delay Time	$t_{d(off)}$			18	36	ns
Turn-Off Fall Time	t_f			19	38	ns
Total Gate Charge	Q_g	$V_{DS} = 20V, I_D = 6A, V_{GS} = 4.5V$		10	13.3	nC
Gate-Source Charge	Q_{gs}			3.7		nC
Gate-Drain Charge	Q_{gd}			4.2		nC
Drain-Source Diode Characteristics and Maximum Ratings						
Drain-Source Diode Forward Current ^b	I_S				8	A
Drain-Source Diode Forward Voltage ^c	V_{SD}	$V_{GS} = 0V, I_S = 1A$			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 $\leq 300\mu s$, Duty Cycle $\leq 2\%$. □ d. Guaranteed by design, not subject to production testing. □ e. Calculated continuous current based on the maximum allowable junction temperature. Package limitation current=8A.						



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

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = -250\mu A$	-40			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -40V, V_{GS} = 0V$			-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						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS} = V_{DS}, I_D = -250\mu A$	-2		-4	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = -10V, I_D = -8A$		60	72	$m\Omega$
		$V_{GS} = -4.5V, I_D = -6A$		90	110	$m\Omega$
Dynamic Characteristics ^d						
Forward Transconductance ^c	g_{FS}^c	$V_{DS} = -5V, I_D = -8A$		10		S
Input Capacitance	C_{iss}	$V_{DS} = -20V, V_{GS} = 0V, f = 1.0\text{ MHz}$		710		pF
Output Capacitance	C_{oss}			130		pF
Reverse Transfer Capacitance	C_{rss}			80		pF
Switching Characteristics ^d						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -15V, I_D = -1A, V_{GS} = -10V, R_{GEN} = 6\Omega$		11	22	ns
Turn-On Rise Time	t_r			3	6	ns
Turn-Off Delay Time	$t_{d(off)}$			32	64	ns
Turn-On Fall Time	t_f			5	10	ns
Total Gate Charge	Q_g	$V_{DS} = -20V, I_D = -4.5A, V_{GS} = -4.5V$		5.8	7.7	nC
Gate-Source Charge	Q_{gs}			1.9		nC
Gate-Drain Charge	Q_{gd}			2.5		nC
Drain-Source Diode Characteristics and Maximum Ratings						
Drain-Source Diode Forward Current ^b	I_S				-8	A
Drain-Source Diode Forward Voltage ^c	V_{SD}	$V_{GS} = 0V, I_S = -1A$			-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 $\leq 300\mu s$, Duty Cycle $\leq 2\%$.□ d.Guaranteed by design, not subject to production testing.□ e.Calculated continuous current based on the maximum allowable junction temperature. Package limitation current=8A.						



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N-CHANNEL

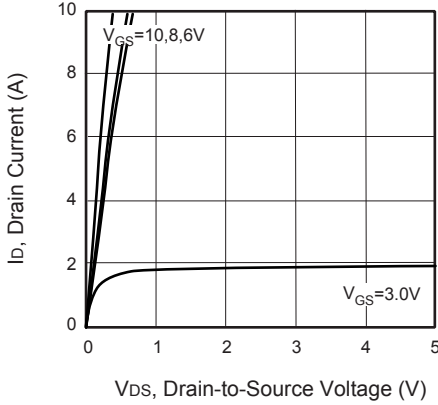


Figure 1. Output Characteristics

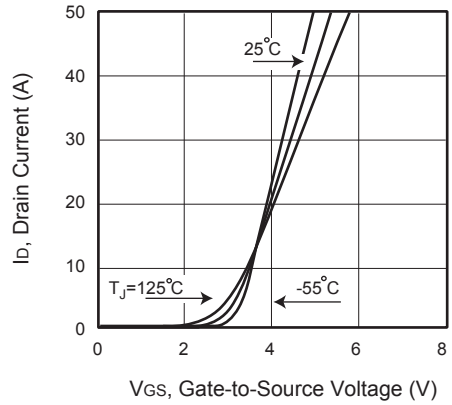


Figure 2. Transfer Characteristics

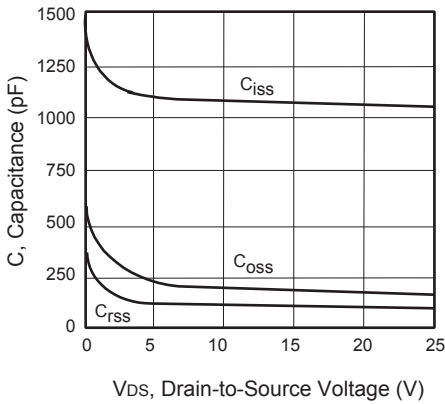


Figure 3. Capacitance

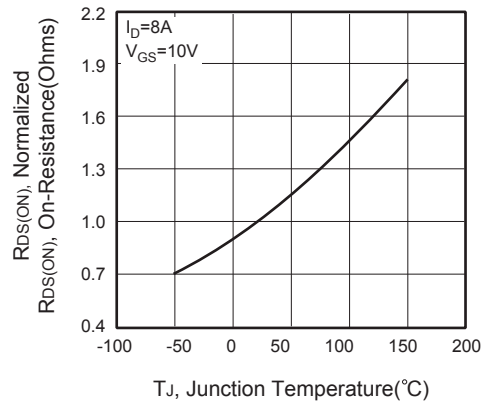


Figure 4. On-Resistance Variation with Temperature

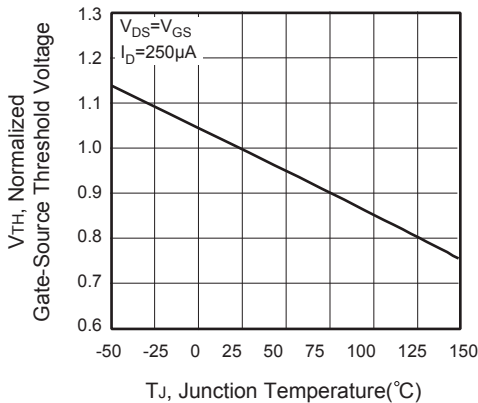


Figure 5. Gate Threshold Variation with Temperature

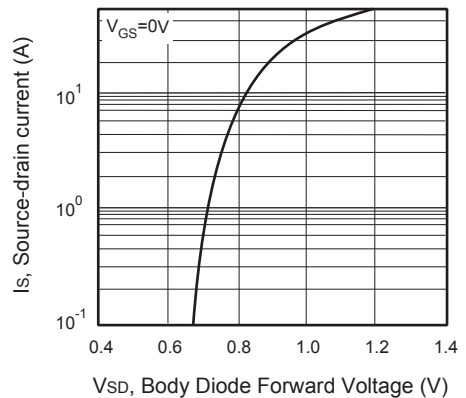


Figure 6. Body Diode Forward Voltage Variation with Source Current



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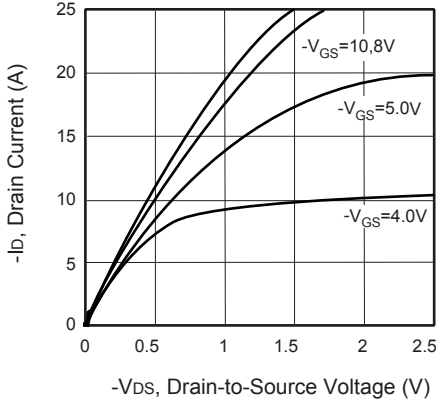


Figure 7. Output Characteristics

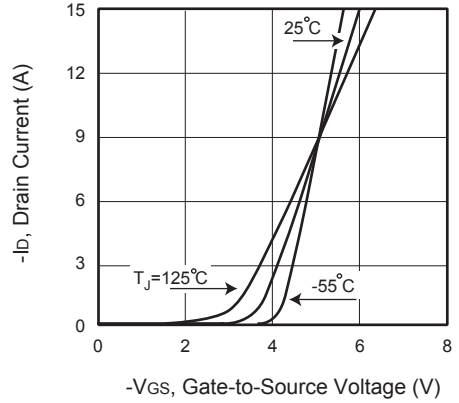


Figure 8. Transfer Characteristics

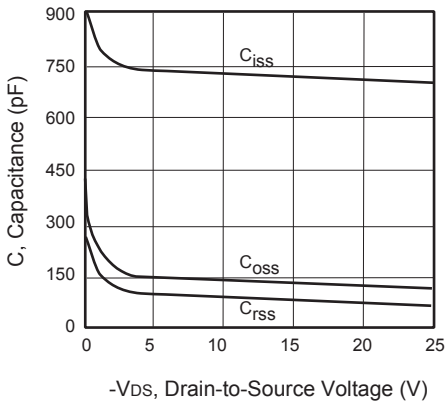


Figure 9. Capacitance

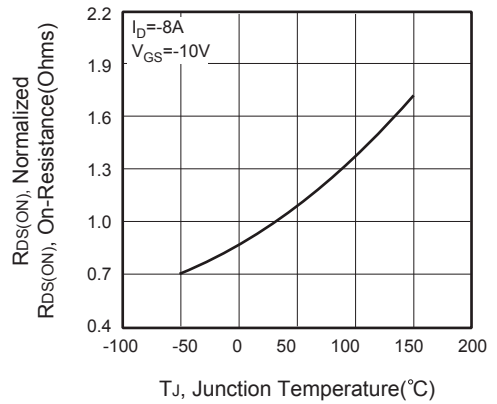


Figure 10. On-Resistance Variation with Temperature

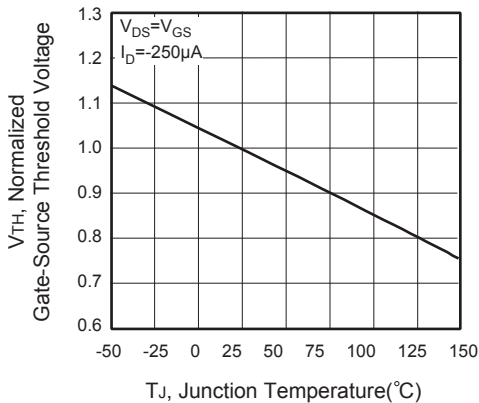


Figure 11. Gate Threshold Variation with Temperature

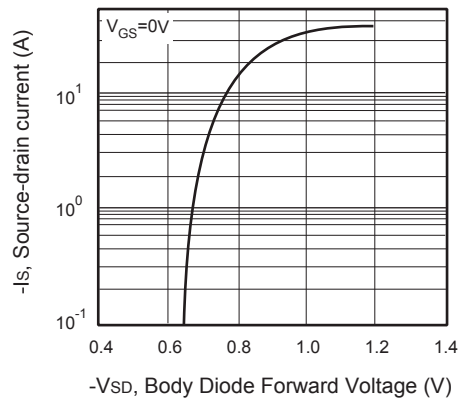


Figure 12. Body Diode Forward Voltage Variation with Source Current



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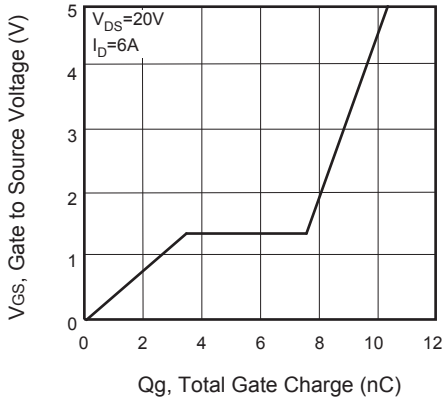


Figure 13. Gate Charge

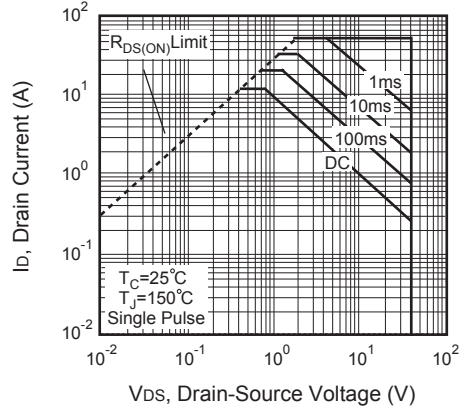


Figure 14. Maximum Safe Operating Area

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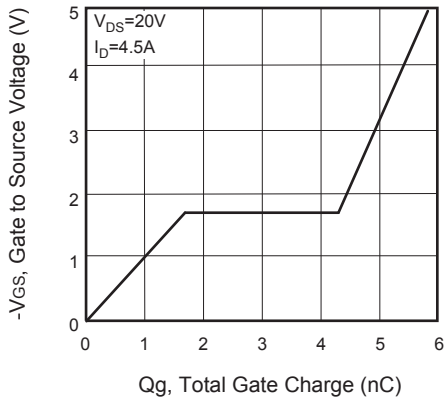


Figure 15. Gate Charge

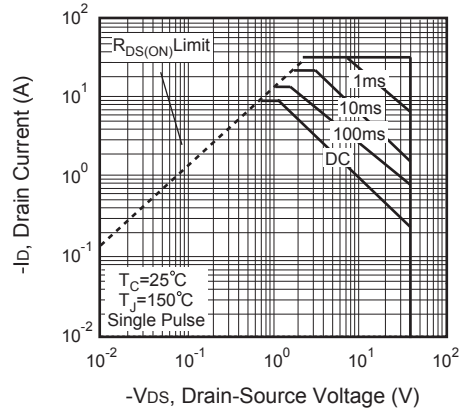


Figure 16. Maximum Safe Operating Area



Figure 17. Switching Test Circuit

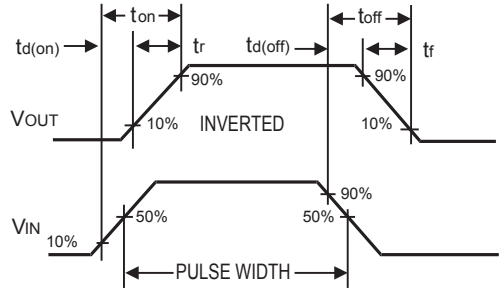


Figure 18. Switching Waveforms

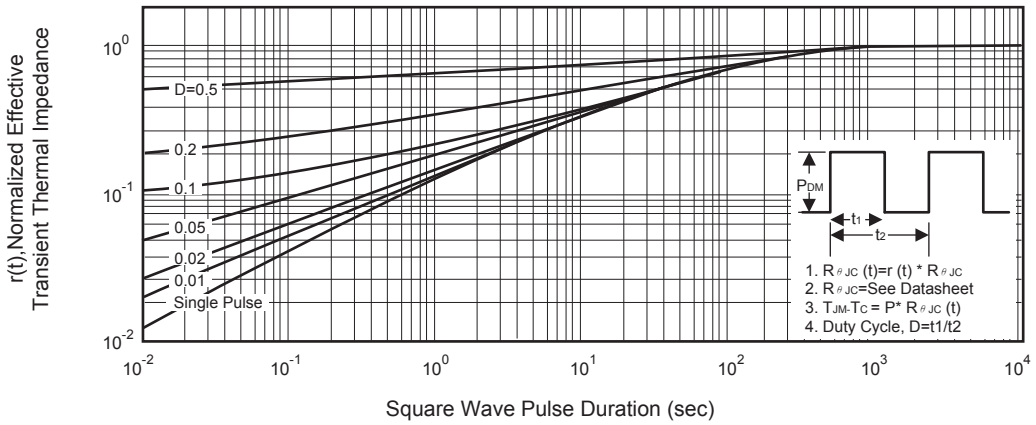


Figure 19. Normalized Thermal Transient Impedance Curve