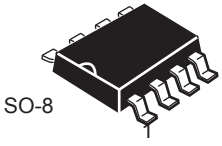
CEM4279

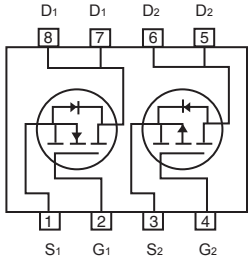
Dual Enhancement Mode Field Effect Transistor (N and P Channel)

5

FEATURES

- 40V, 6.1A, $R_{DS(ON)}$ = 32mΩ @V_{GS} = 10V.
  $R_{DS(ON)}$ = 46mΩ @V_{GS} = 4.5V.
- -40V, -4.3A, $R_{DS(ON)}$ = 66mΩ @V_{GS} = -10V.
  $R_{DS(ON)}$ = 105mΩ @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.
- Surface mount Package.





ABSOLUTE MAXIMUM RATINGS T_A = 25°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	I_D	6.1	-4.3	A
Drain Current-Pulsed [a]	I_{DM}	24	-17	A
Maximum Power Dissipation	P_D	2.0		W
Operating and Store Temperature Range	T_J,T_{stg}	-55 to 150		°C

Thermal Characteristics

Parameter	Symbol	Limit	Units
Thermal Resistance, Junction-to-Ambient [b]	$R_{\theta JA}$	62.5	°C/W

N-Channel Electrical Characteristics $T_A = 25^{\circ}C$ 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	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 [c]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS} = V_{DS}, I_D = 250μA	1		3	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 6.1A		25	32	mΩ
		V_{GS} = 4.5V, I_D = 4.9A		35	46	mΩ
Dynamic Characteristics [d]						
Forward Transconductance	g_{FS}	V_{DS} = 5V, I_D = 6.1A		3		S
Input Capacitance	C_{iss}	V_{DS} = 20V, V_{GS} = 0V, f = 1.0 MHz		1050		pF
Output Capacitance	C_{oss}			155		pF
Reverse Transfer Capacitance	C_{rss}			95		pF
Switching Characteristics [d]						
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 20V, I_D = 6.1A, V_{GS} = 10V, R_{GEN} =3Ω		14	30	ns
Turn-On Rise Time	t_r			10	20	ns
Turn-Off Delay Time	$t_{d(off)}$			17	35	ns
Turn-Off Fall Time	t_f			18	35	ns
Total Gate Charge	Q_g	V_{DS} = 20V, I_D = 6.1A, V_{GS} = 4.5V		10.1	13	nC
Gate-Source Charge	Q_{gs}			3.5		nC
Gate-Drain Charge	Q_{gd}			4.0		nC
Drain-Source Diode Characteristics and Maximun Ratings						
Drain-Source Diode Forward Current [b]	I_S				6.1	A
Drain-Source Diode Forward Voltage [c]	V_{SD}	V_{GS} = 0V, I_S = 1.0A			1.0	V

Notes :
a.Repetitive Rating : Pulse width limited by maximum junction temperature.
b.Surface Mounted on FR4 Board, t ≤ 10 sec.
c.Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
d.Guaranteed by design, not subject to production testing.

P-Channel Electrical Characteristics T_A = 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	-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 [c]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS} = V_{DS}, I_D = -250μA	-1		-3	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = -10V, I_D = -4.3A		55	66	mΩ
		V_{GS} = -4.5V, I_D = -3.7A		85	105	mΩ
Dynamic Characteristics [d]						
Forward Transconductance	g_{FS}	V_{DS} = -5V, I_D = -4.3A		7		S
Input Capacitance	C_{iss}	V_{DS} = -20V, V_{GS} = 0V, f = 1.0 MHz		705		pF
Output Capacitance	C_{oss}			125		pF
Reverse Transfer Capacitance	C_{rss}			75		pF
Switching Characteristics [d]						
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = -15V, I_D = -1A, V_{GS} = -10V, R_{GEN} = 6Ω		13	26	ns
Turn-On Rise Time	t_r			3	6	ns
Turn-Off Delay Time	$t_{d(off)}$			31	62	ns
Turn-Off Fall Time	t_f			5	10	ns
Total Gate Charge	Q_g	V_{DS} = -20V, I_D = -4.3A, V_{GS} = -4.5V		5.6	7.4	nC
Gate-Source Charge	Q_{gs}			2.1		nC
Gate-Drain Charge	Q_{gd}			2.3		nC
Drain-Source Diode Characteristics and Maximun Ratings						
Drain-Source Diode Forward Current [b]	I_S				-4.3	A
Drain-Source Diode Forward Voltage [c]	V_{SD}	V_{GS} = 0V, I_S = -1.3A			-1.2	V

Notes :
a.Repetitive Rating : Pulse width limited by maximum junction temperature.
b.Surface Mounted on FR4 Board, t ≤ 10 sec.
c.Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
d.Guaranteed by design, not subject to production testing.

N-CHANNEL

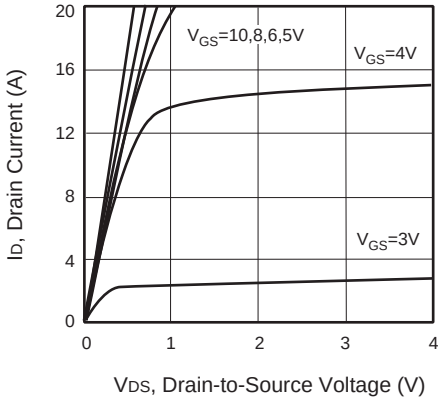


Figure 1. Output Characteristics

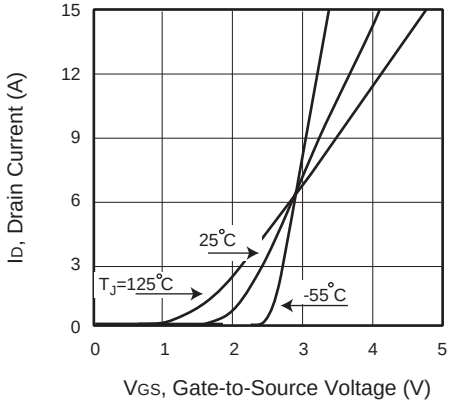


Figure 2. Transfer Characteristics

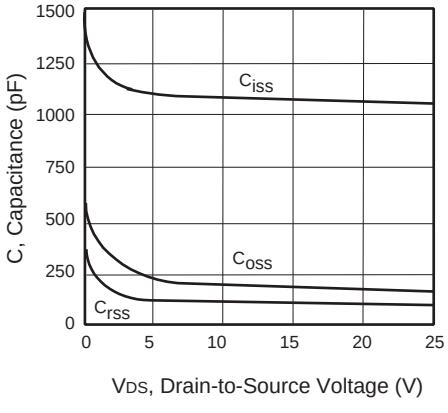


Figure 3. Capacitance

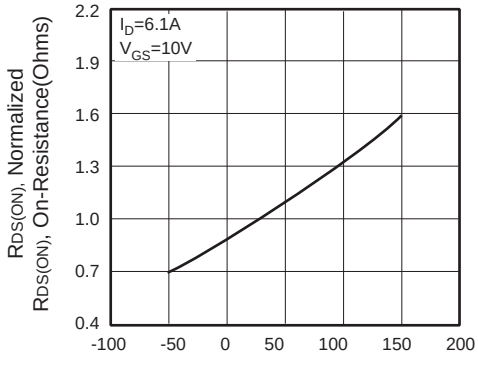


Figure 4. On-Resistance Variation with Temperature

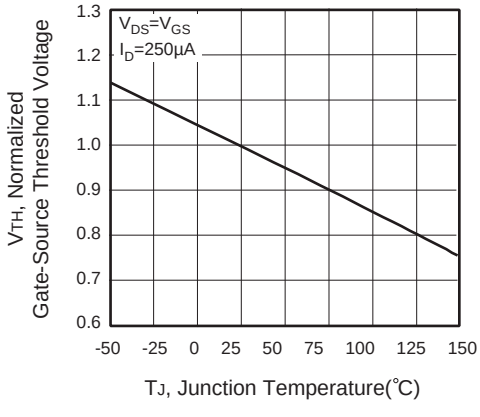


Figure 5. Gate Threshold Variation with Temperature

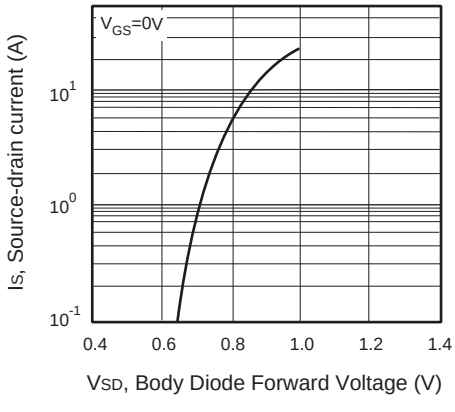


Figure 6. Body Diode Forward Voltage Variation with Source Current

P-CHANNEL

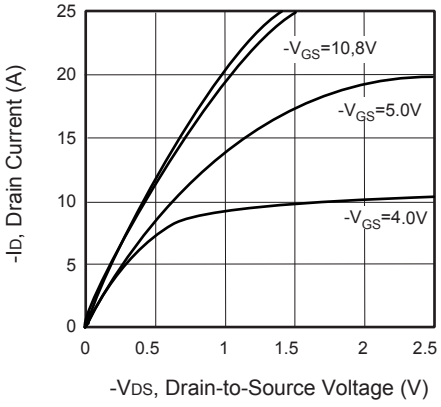


Figure 1. Output Characteristics

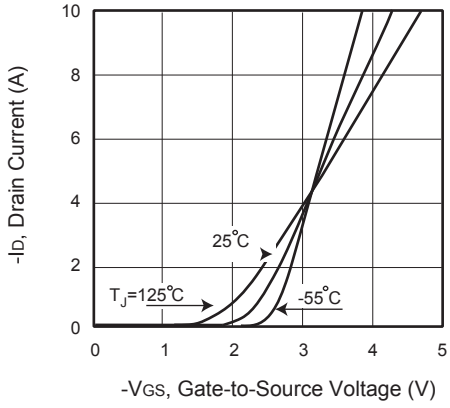


Figure 2. Transfer Characteristics

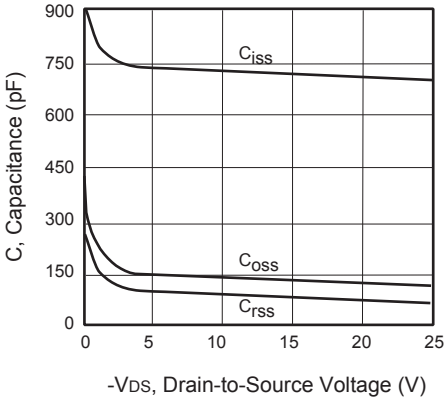


Figure 3. Capacitance

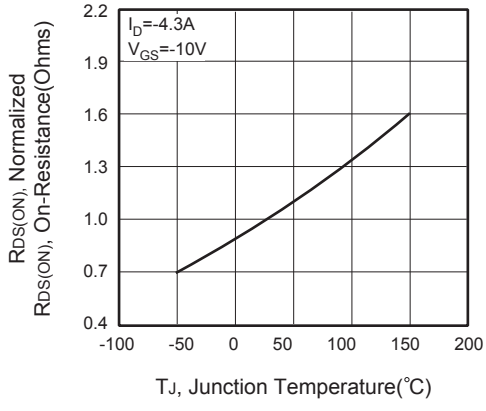


Figure 4. On-Resistance Variation with Temperature

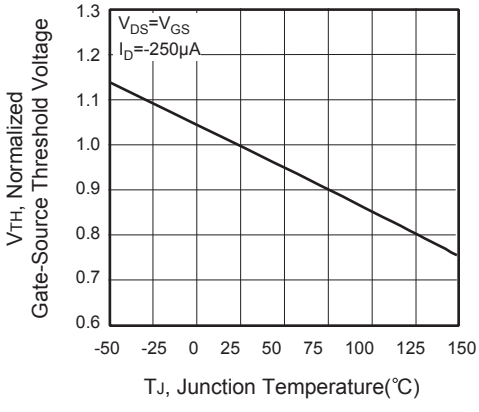


Figure 5. Gate Threshold Variation with Temperature

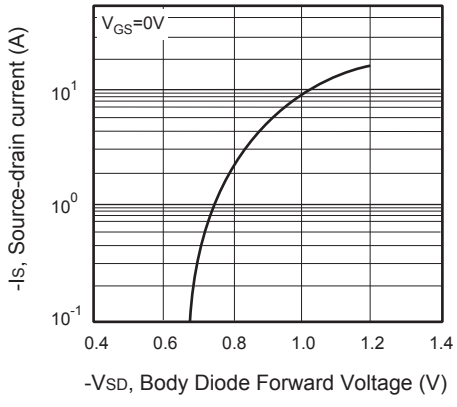


Figure 6. Body Diode Forward Voltage Variation with Source Current

N-CHANNEL

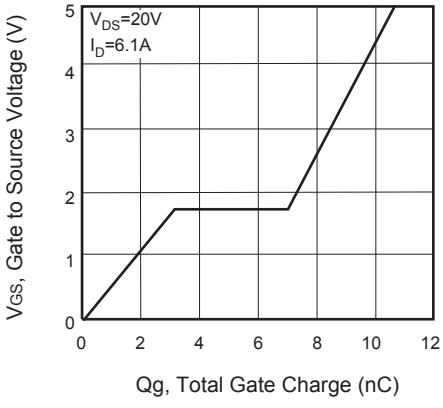


Figure 13. Gate Charge

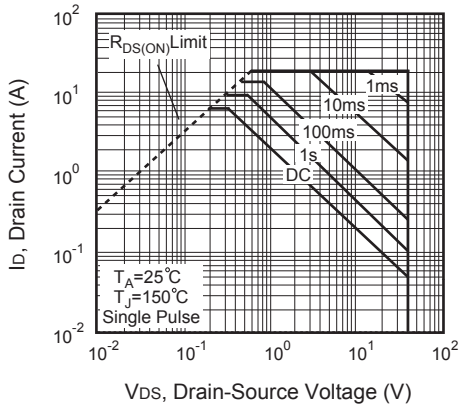


Figure 14. Maximum Safe Operating Area

P-CHANNEL

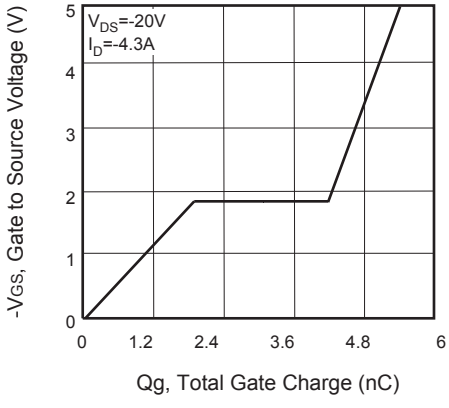


Figure 15. Gate Charge

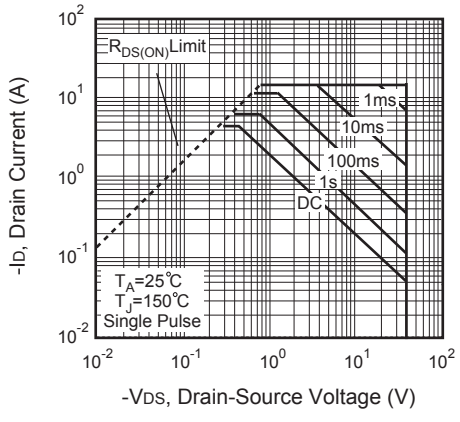


Figure 16. Maximum Safe Operating Area

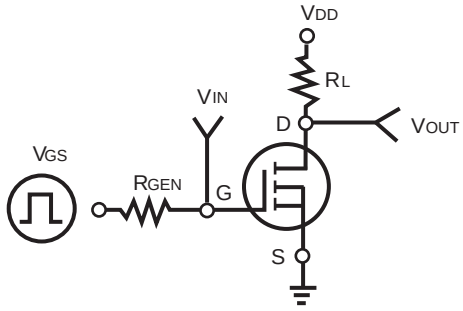


Figure 17. Switching Test Circuit

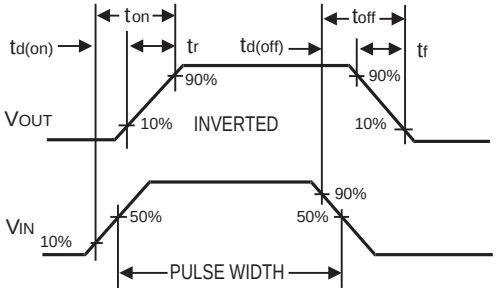


Figure 18. Switching Waveforms

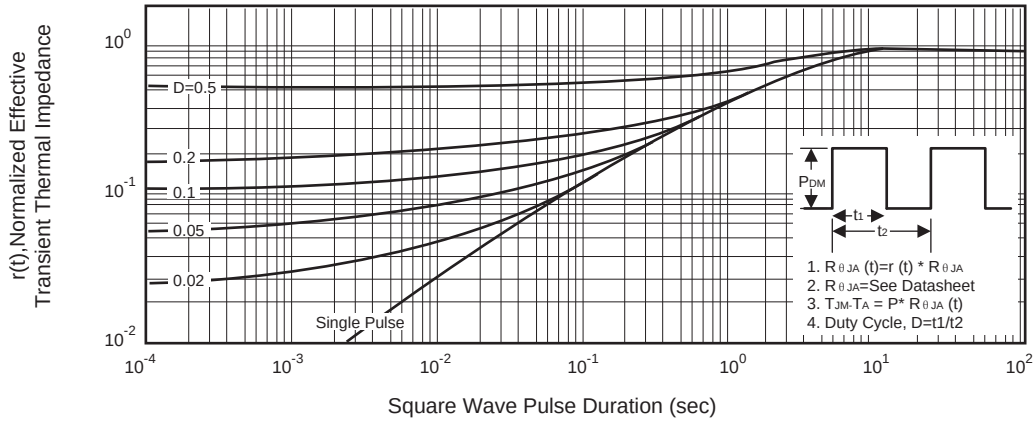


Figure 19. Normalized Thermal Transient Impedance Curve