

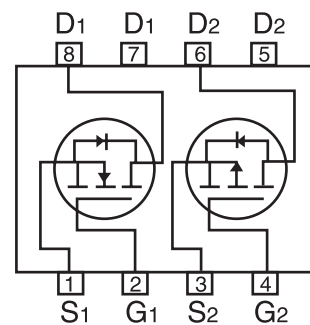
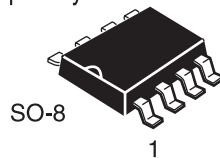
CEM8958

PRELIMINARY

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

FEATURES

- 30V , 5.3A , $R_{DS(ON)}=35m\ \Omega$ @ $V_{GS}=10V$.
 $R_{DS(ON)}=50m\ \Omega$ @ $V_{GS}=4.5V$.
 -30V , -4.0A , $R_{DS(ON)}=65m\ \Omega$ @ $V_{GS}=-10V$.
 $R_{DS(ON)}=100m\ \Omega$ @ $V_{GS}=-4.5V$.
- Super high dense cell design for extremely low $R_{DS(ON)}$.
- High power and current handing capability.
- Surface Mount Package.



ABSOLUTE MAXIMUM RATINGS ($T_A=25^{\circ}C$ unless otherwise noted)

Parameter	Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage	V_{DS}	30	-30	V
Gate-Source Voltage	V_{GS}	± 20	± 20	V
Drain Current-Continuous ^a @ $T_J=125^{\circ}C$ -Pulsed ^b	I_D	± 5.3	± 4.0	A
	I_{DM}	± 20	± 20	A
Drain-Source Diode Forward Current ^a	I_S	2.8	-1.9	A
Maximum Power Dissipation ^a	P_D	2		W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150		$^{\circ}C$

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Ambient ^a	$R_{\theta JA}$	62.5	$^{\circ}C/W$
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N-Channel ELECTRICAL CHARACTERISTICS (T_A=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ ^c	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	30			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =24V, V _{GS} =0V			1	μA
Gate-Body Leakage	I _{GSS}	V _{GS} =±20V, V _{DS} =0V			±100	nA
ON CHARACTERISTICS ^b						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D = 250μA	1	1.5	3	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =5.3A		25	35	mΩ
		V _{GS} =4.5V, I _D =4.3A		38	50	mΩ
On-State Drain Current	I _{D(ON)}	V _{GS} = 10V, V _{DS} = 5V	20			A
Forward Transconductance	g _{FS}	V _{DS} = 15V, I _D =5.3A	6			S
DYNAMIC CHARACTERISTICS ^c						
Input Capacitance	C _{ISS}	V _{DS} =15V, V _{GS} = 0V f =1.0MHz		464	600	pF
Output Capacitance	C _{OSS}			215	280	pF
Reverse Transfer Capacitance	C _{RSS}			66	85	pF
SWITCHING CHARACTERISTICS ^c						
Turn-On Delay Time	t _{D(ON)}	V _{DD} = 25V, I _D = 1A, V _{GEN} = 10V, R _{GEN} = 6Ω		20	30	ns
Rise Time	t _r			40	60	ns
Turn-Off Delay Time	t _{D(OFF)}			80	150	ns
Fall Time	t _f			100	140	ns
Total Gate Charge	Q _g	V _{DS} =15V, I _D = 2A, V _{GS} =10V		17	50	nC
Gate-Source Charge	Q _{gs}			3		nC
Gate-Drain Charge	Q _{gd}			3		nC

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P-Channel ELECTRICAL CHARACTERISTICS (TA=25 °C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ ^c	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =-250μA	-30			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-24V, V _{GS} =0V			-1	μA
Gate-Body Leakage	I _{GSS}	V _{GS} =±20V, V _{DS} =0V			±100	nA
ON CHARACTERISTICS ^b						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D = -250μA	-1		-3	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} = -10V, I _D =-4A		45	65	mΩ
		V _{GS} = -4.5V, I _D = -3.3A		70	100	mΩ
On-State Drain Current	I _{D(ON)}	V _{DS} = -5V, V _{GS} = -10V	-20			A
Forward Transconductance	g _{FS}	V _{DS} = -15V, I _D = - 4A	3			S
DYNAMIC CHARACTERISTICS ^c						
Input Capacitance	C _{ISS}	V _{DS} =-15V, V _{GS} = 0V f =1.0MHz		860	1120	pF
Output Capacitance	C _{OSS}			458	600	pF
Reverse Transfer Capacitance	C _{RSS}			140	190	pF
SWITCHING CHARACTERISTICS ^c						
Turn-On Delay Time	t _{D(ON)}	V _D = -15V, I _D = -1A, V _{GEN} = - 10V, R _{GEN} = 6Ω		9	30	ns
Rise Time	t _r			16	60	ns
Turn-Off Delay Time	t _{D(OFF)}			75	120	ns
Fall Time	t _f			40	100	ns
Total Gate Charge	Q _g	V _{DS} =-15V, I _D = -4A, V _{GS} =-10V		29	40	nC
Gate-Source Charge	Q _{gs}			3		nC
Gate-Drain Charge	Q _{gd}			9		nC

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ELECTRICAL CHARACTERISTICS (T_A=25°C unless otherwise noted)

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Parameter	Symbol	Condition	Min	Typ ^c	Max	Unit
DRAIN-SOURCE DIODE CHARACTERISTICS^b						
Diode Forward Voltage	V _{SD}	V _{GS} = 0V, I _S = 2.0A		0.76	1.1	V
		V _{GS} = 0V, I _S = 1.3A		-0.84	-1.3	

Notes

a. Surface Mounted on FR4 Board, t ≤ 10sec.

b. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.

c. Guaranteed by design, not subject to production testing.

N-Channel

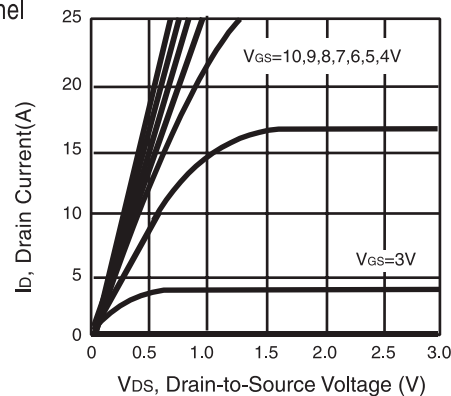


Figure 1. Output Characteristics

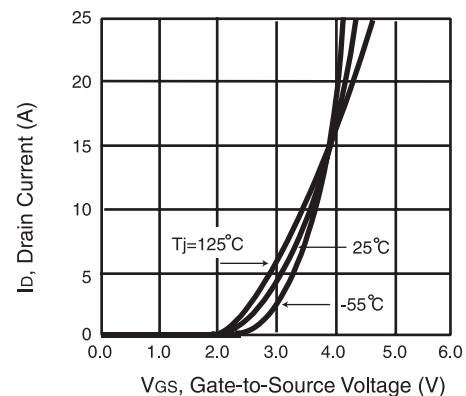
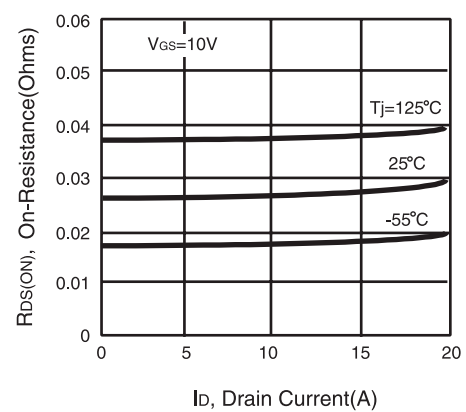
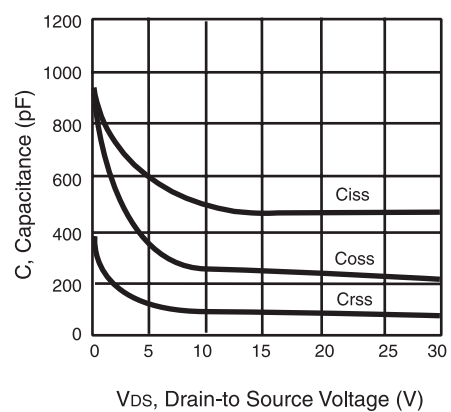


Figure 2. Transfer Characteristics



N-Channel

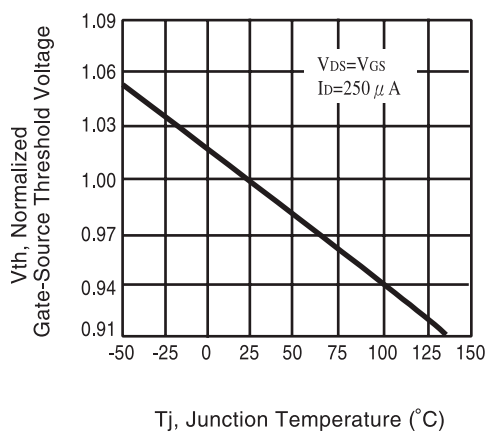


Figure 5. Gate Threshold Variation with Temperature

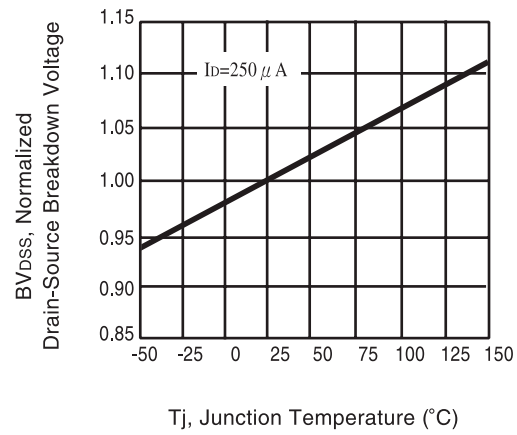


Figure 6. Breakdown Voltage Variation with Temperature

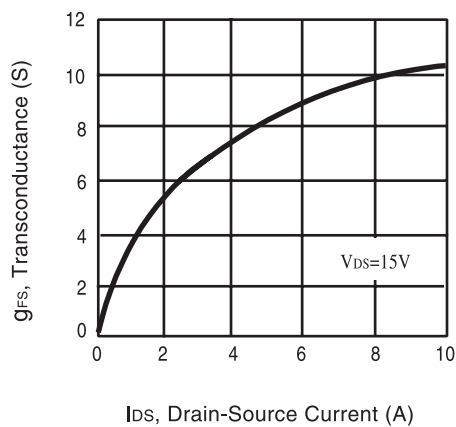


Figure 7. Transconductance Variation with Drain Current

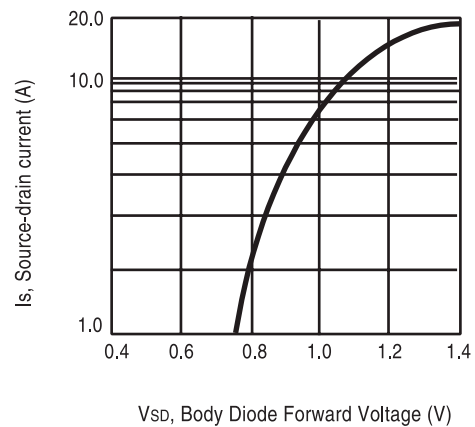


Figure 8. Body Diode Forward Voltage Variation with Source Current

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P-Channel

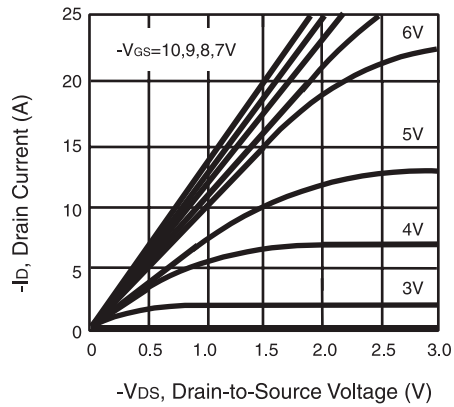


Figure 1. Output Characteristics

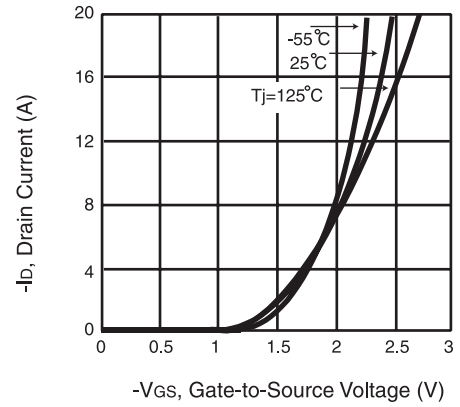


Figure 2. Transfer Characteristics

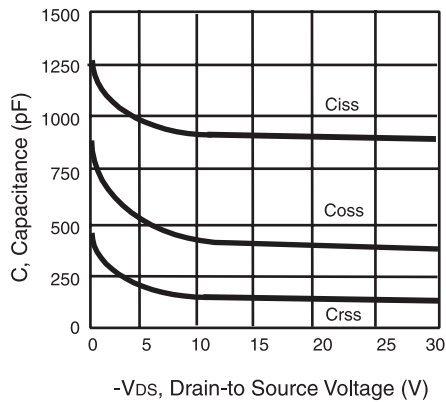


Figure 3. Capacitance

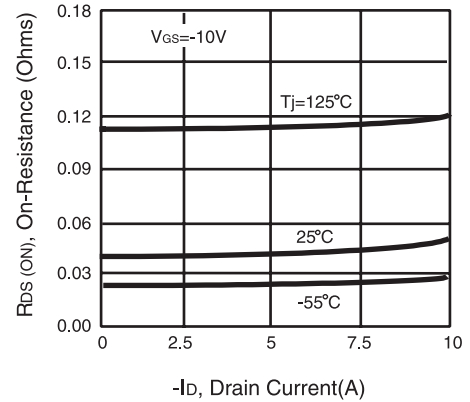


Figure 4. On-Resistance Variation with Drain Current and Temperature

P-Channel

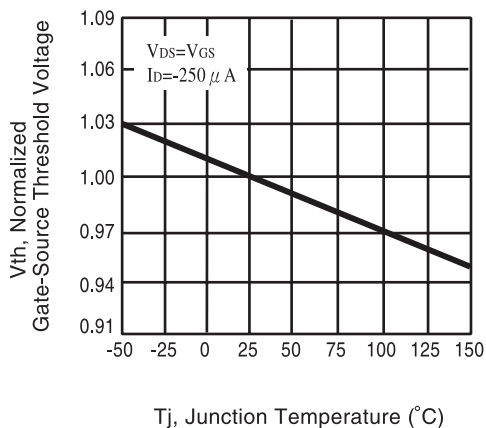


Figure 5. Gate Threshold Variation with Temperature

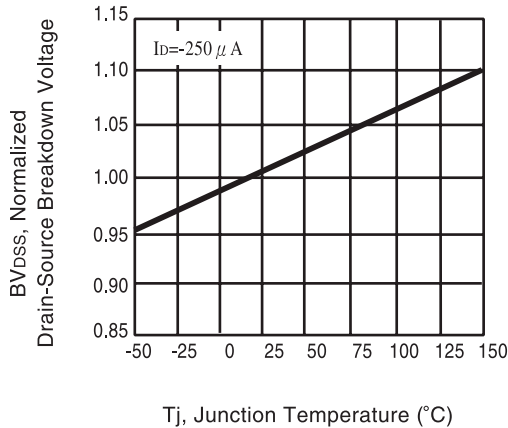


Figure 6. Breakdown Voltage Variation with Temperature

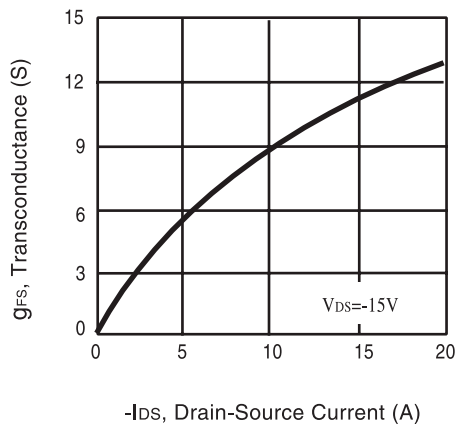


Figure 7. Transconductance Variation with Drain Current

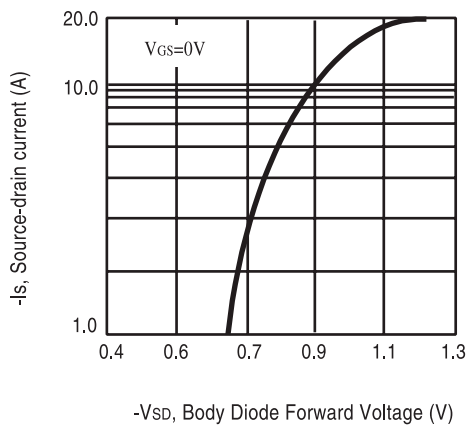


Figure 8. Body Diode Forward Voltage Variation with Source Current

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N-Channel

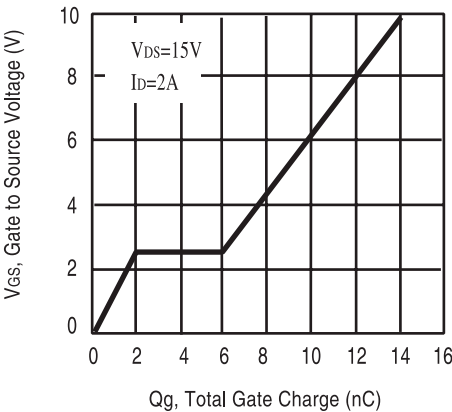


Figure 9. Gate Charge

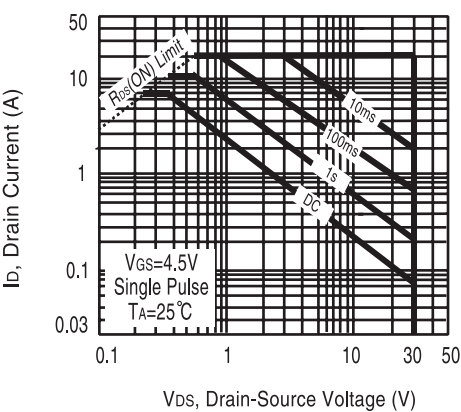


Figure 10. Maximum Safe Operating Area

P-Channel

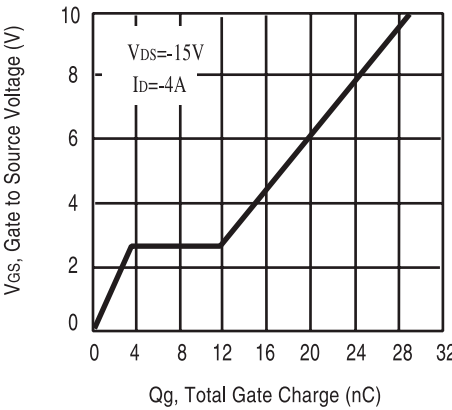


Figure 9. Gate Charge

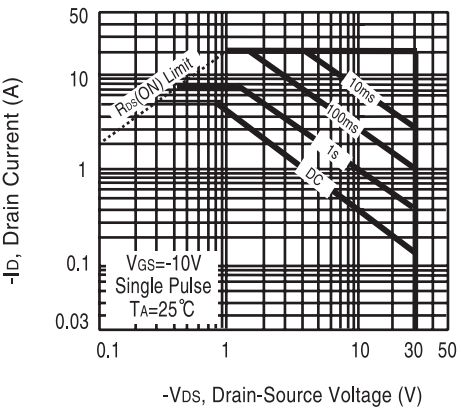


Figure 10. Maximum Safe Operating Area

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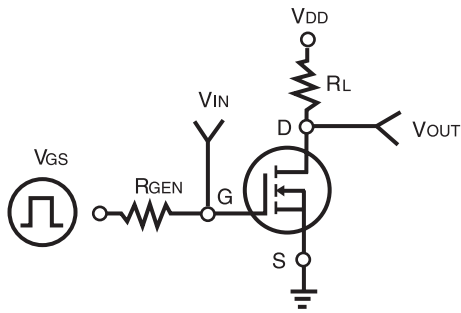


Figure 11. Switching Test Circuit

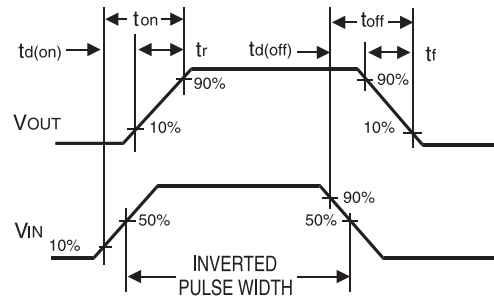


Figure 12. Switching Waveforms

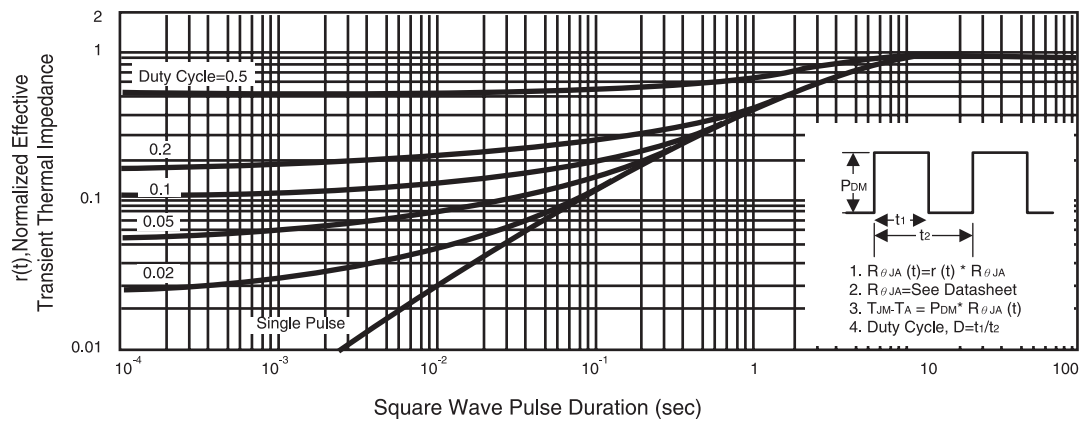


Figure 13. Normalized Thermal Transient Impedance Curve