CET

CEH2321

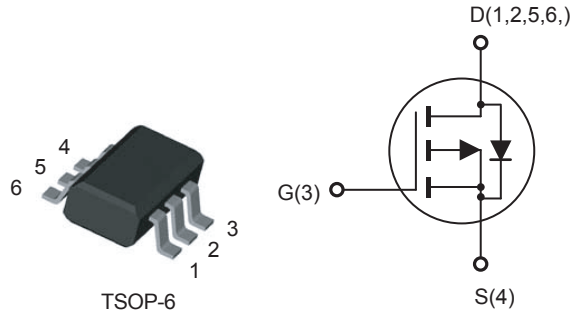## P-Channel Enhancement Mode Field Effect Transistor

FEATURES

■ -20V, -4.8A, $R_{DS(ON)}$ = 55mΩ @V_{GS} = -4.5V.

$R_{DS(ON)}$ = 62mΩ @V_{GS} = -2.5V.

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

■ Rugged and reliable.

■ Lead-free plating ; RoHS compliant.

■ TSOP-6 package.

D(1,2,5,6,)

G(3)

S(4)

TSOP-6

ABSOLUTE MAXIMUM RATINGS T_A = 25°C unless otherwise noted

Parameter	Symbol	Limit	Units
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	±12	V
Drain Current-Continuous	I_D	-4.8	A
Drain Current-Pulsed [a]	I_{DM}	-19.2	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]	$R_{θJA}$	62.5	°C/W

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}	$V_{GS} = 0V$, $I_D = -250\mu A$	-20			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -16V$, $V_{GS} = 0V$			-1	μA
Gate Body Leakage Current, Forward	I_{GSSF}	$V_{GS} = 12V$, $V_{DS} = 0V$			100	nA
Gate Body Leakage Current, Reverse	I_{GSSR}	$V_{GS} = -12V$, $V_{DS} = 0V$			-100	nA
On Characteristics [c]						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS} = V_{DS}$, $I_D = -250\mu A$	-0.6		-1.5	V
Static Drain-Source	$R_{DS(on)}$	$V_{GS} = -4.5V$, $I_D = -4.5A$		39	55	mΩ
On-Resistance		$V_{GS} = -2.5V$, $I_D = -3.6A$		47	62	mΩ
Dynamic Characteristics [d]						
Input Capacitance	C_{iss}	$V_{DS} = -10V$, $V_{GS} = 0V$, f = 1.0 MHz		840		pF
Output Capacitance	C_{oss}			140		pF
Reverse Transfer Capacitance	C_{rss}			105		pF
Switching Characteristics [d]						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -10V$, $I_D = -3.8A$, $V_{GS} = -4.5V$, $R_{GEN} = 3\Omega$		11	22	ns
Turn-On Rise Time	t_r			5	10	ns
Turn-Off Delay Time	$t_{d(off)}$			33	66	ns
Turn-Off Fall Time	t_f			8	16	ns
Total Gate Charge	Q_g	$V_{DS} = -10V$, $I_D = -3.8A$, $V_{GS} = -4.5V$		9	12	nC
Gate-Source Charge	Q_{gs}			1		nC
Gate-Drain Charge	Q_{gd}			2		nC
Drain-Source Diode Characteristics and Maximun Ratings						
Drain-Source Diode Forward Current [b]	I_S				-1.3	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 < 5 sec.
c.Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
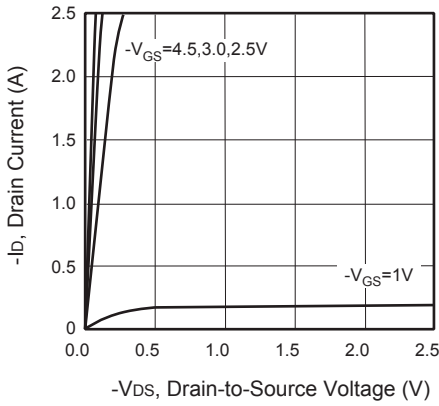d.Guaranteed by design, not subject to production testing.

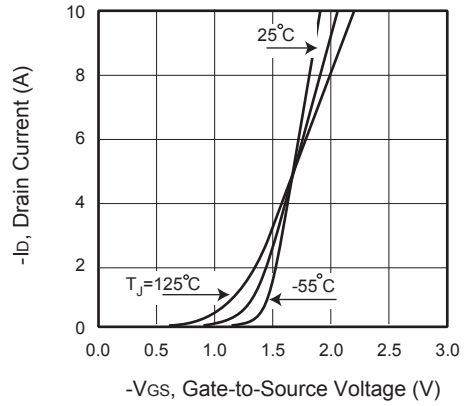Figure 1. Output Characteristics

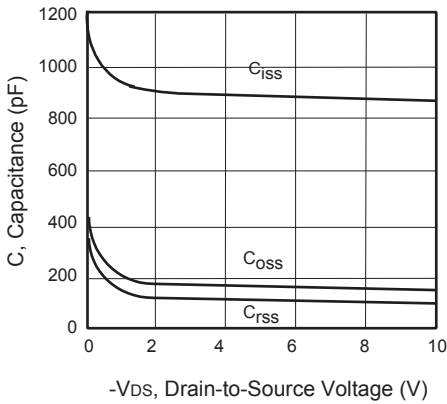Figure 2. Transfer Characteristics

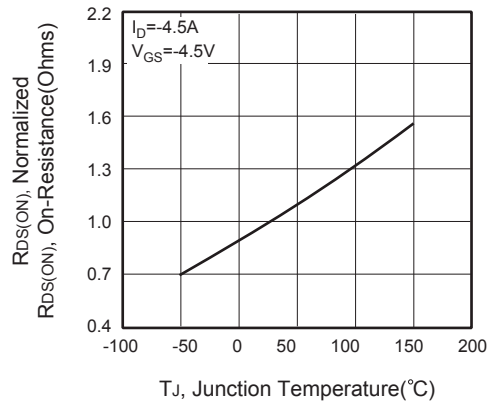

Figure 3. Capacitance

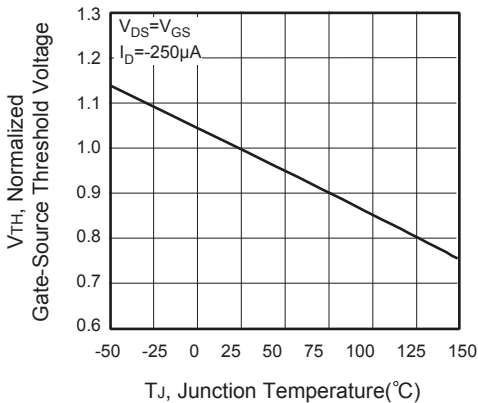Figure 4. On-Resistance Variation
with Temperature

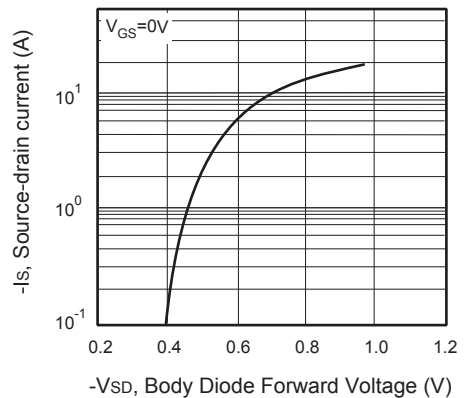Figure 5. Gate Threshold Variation
with Temperature

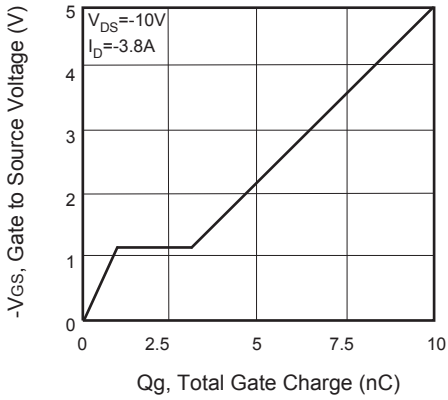Figure 6. Body Diode Forward Voltage
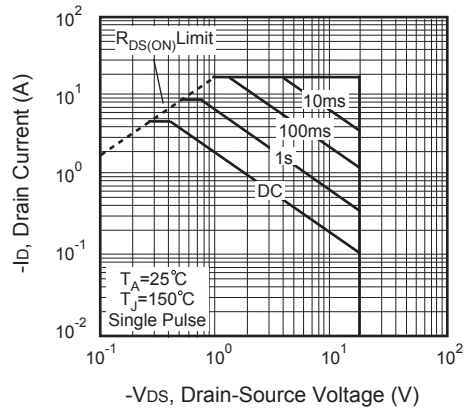Variation with Source Current

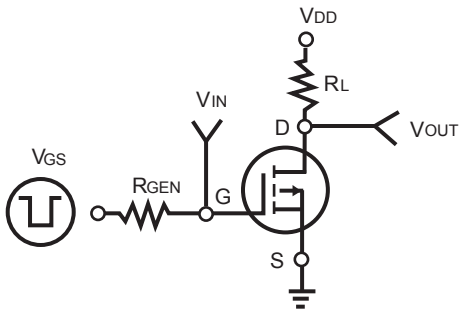**Figure 7. Gate Charge**

Figure 8. Maximum Safe Operating Area

Figure 9. Switching Test Circuit

Figure 10. Switching Waveforms

1. $R_{JA}(t) = r(t) * R_{JA}$
2. R_{JA}=See Datasheet
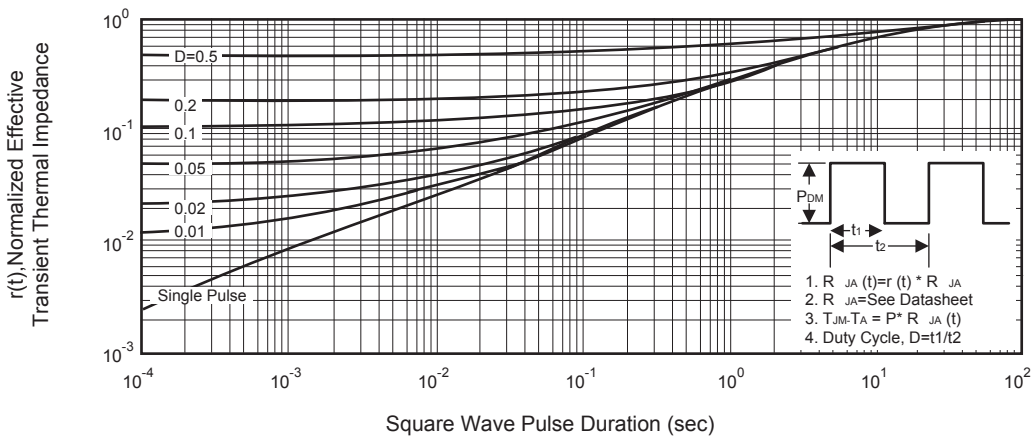3. T_{JM}-T_A = P* $R_{JA}(t)$
4. Duty Cycle, D=t1/t2

Figure 11. Normalized Thermal Transient Impedance Curve