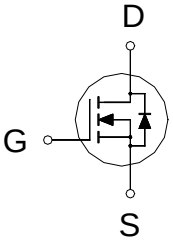
杰力科技股份有限公司
Excelliance MOS Corporation

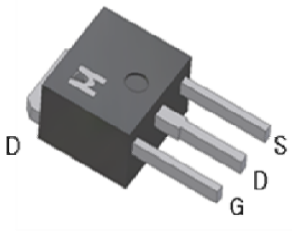
EMD04N60CSK

N-Channel Logic Level Enhancement Mode Field Effect Transistor

Product Summary:

BV_{DSS}	600V
$R_{DSON\ (MAX.)}$	3.3Ω
I_D	4A





UIS, 100% Tested

Pb-Free Lead Plating & Halogen Free

GP
GREEN PRODUCT

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C Unless Otherwise Noted)

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNIT
Gate-Source Voltage		V_{GS}	±30	V
Continuous Drain Current	T_C = 25 °C	I_D	4	A
	T_C = 100 °C		3.2	
Pulsed Drain Current[1]		I_{DM}	16	
Avalanche Current		I_{AS}	4	
Avalanche Energy	L = 3mH, I_D=4A, R_G=25Ω	E_{AS}	24	mJ
Repetitive Avalanche Energy[2]	L = 0.5mH	E_{AR}	4	
Power Dissipation	T_C = 25 °C	P_D	30	W
	T_C = 100 °C		12	
Operating Junction & Storage Temperature Range		T_j, T_{stg}	-55 to 150	°C

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNIT
Junction-to-Case	$R_{\theta JC}$		4.2	°C / W
Junction-to-Ambient	$R_{\theta JA}$		110	

[1]Pulse width limited by maximum junction temperature.

[2]Duty cycle ≤ 1%

ELECTRICAL CHARACTERISTICS (T_J = 25 °C, Unless Otherwise Noted)

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	600			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	2	3	4	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±30V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 600V, V_{GS} = 0V			10	μA
		V_{DS} = 480V, V_{GS} = 0V, T_J = 125 °C			25	
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 2A		3.0	3.3	Ω
Forward Transconductance[1]	g_{fs}	V_{DS} = 25V, I_D = 2A		2		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		539		pF
Output Capacitance	C_{oss}			44		
Reverse Transfer Capacitance	C_{rss}			8.1		
Gate Resistance	R_g	V_{GS} = 15mV, V_{DS} = 0V, f = 1MHz		3.0	6.0	Ω
Total Gate Charge[1,2]	Q_g	V_{DS} = 300V, V_{GS} = 10V, I_D = 2A		10.6		nC
Gate-Source Charge[1,2]	Q_{gs}			5.0		
Gate-Drain Charge[1,2]	Q_{gd}			3.9		
Turn-On Delay Time[1,2]	$t_{d(on)}$	V_{DS} = 300V, I_D = 1A, V_{GS} = 10V, R_G = 20Ω		20		nS
Rise Time[1,2]	t_r			30		
Turn-Off Delay Time[1,2]	$t_{d(off)}$			20		
Fall Time[1,2]	t_f			30		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C = 25 °C)						
Continuous Current	I_S				4	A
Pulsed Current[3]	I_{SM}				16	
Forward Voltage[1]	V_{SD}	I_F = 2A, V_{GS} = 0V			1.4	V
Reverse Recovery Time	t_{rr}	I_F = I_S, dI_F/dt = 100A / μS		0.3		μS
Reverse Recovery Charge	Q_{rr}			1.0		μC

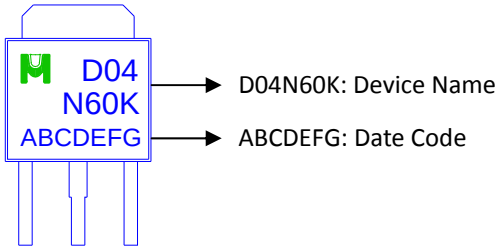
[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

[2]Independent of operating temperature.

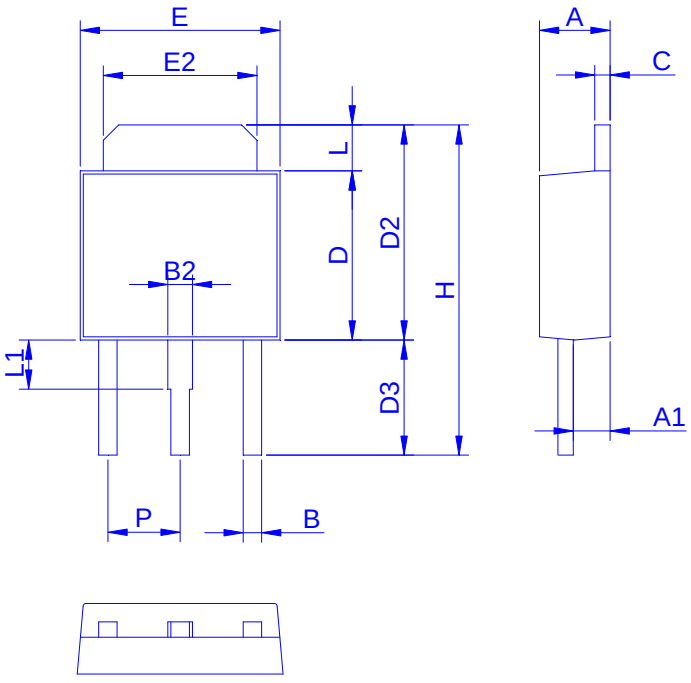
[3]Pulse width limited by maximum junction temperature.

Ordering & Marking Information:

Device Name: EMD04N60CSK for IPAK (TO-251)



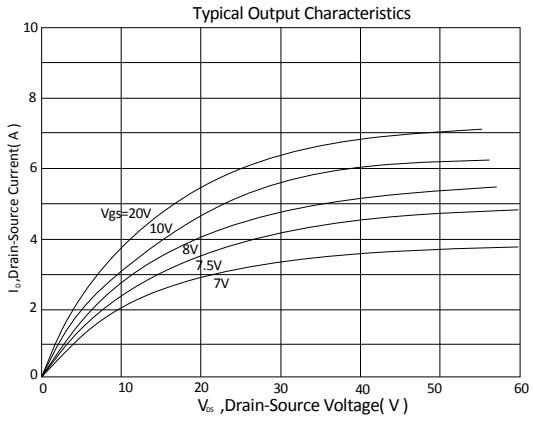
Outline Drawing

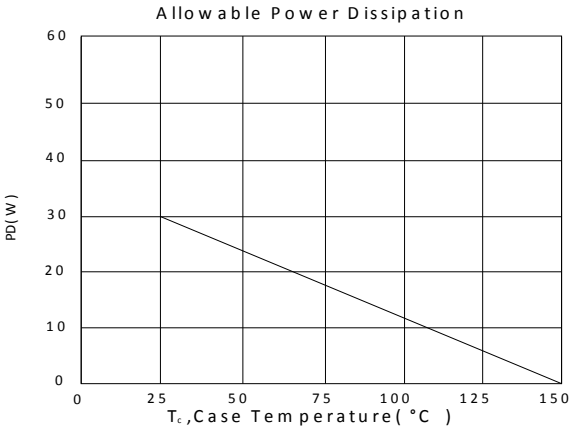


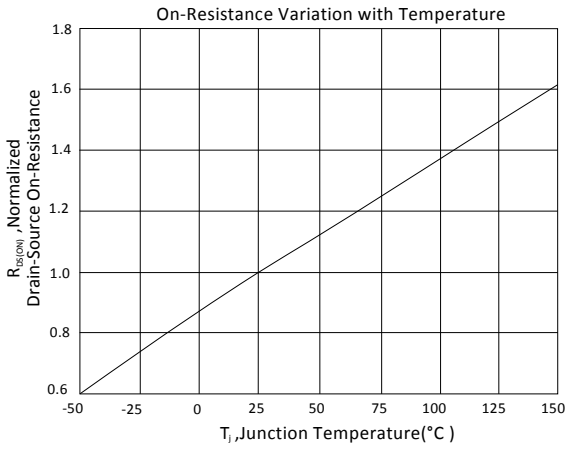
Dimension in mm

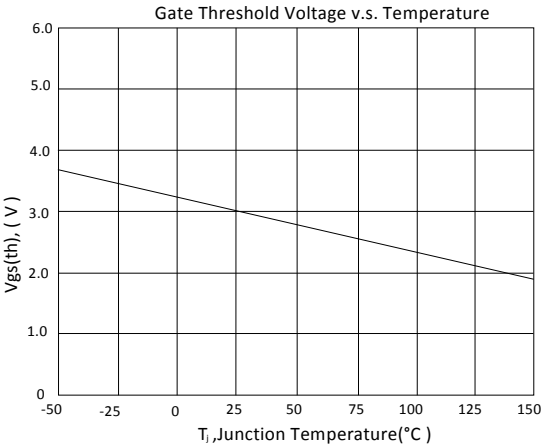
Dimension	A	A1	B	B2	C	D	D2	D3	E	E2	H	L	L1	P
Min.	2.10	0.90	0.40	0.60	0.40	5.30	6.70	3.40	6.30	4.80	10.2	0.89	0.90	2.10
Max.	2.50	1.50	0.90	1.15	0.60	6.25	7.30	4.30	6.80	5.50	11.5	1.40	1.80	2.50

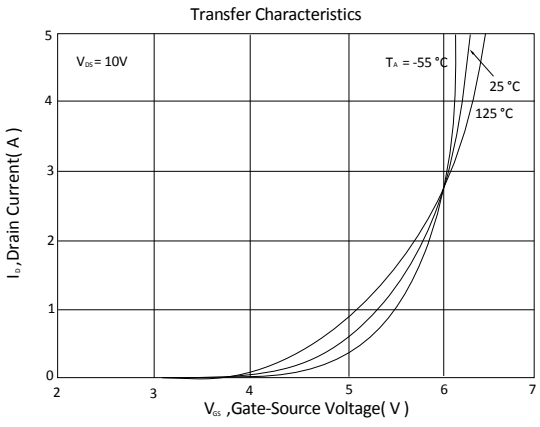
TYPICAL CHARACTERISTICS

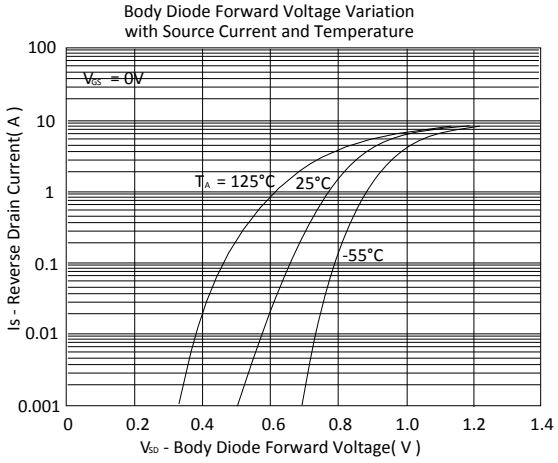


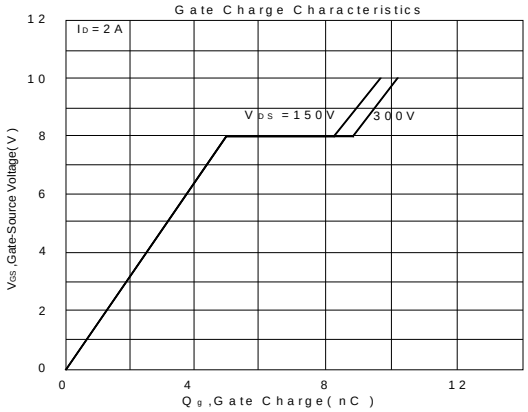


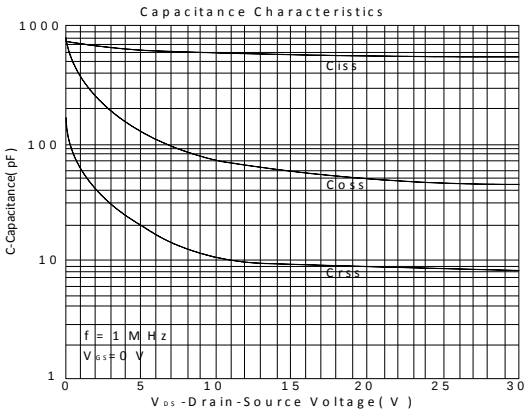


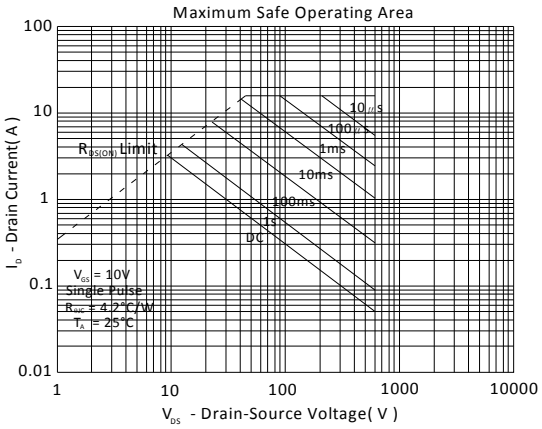


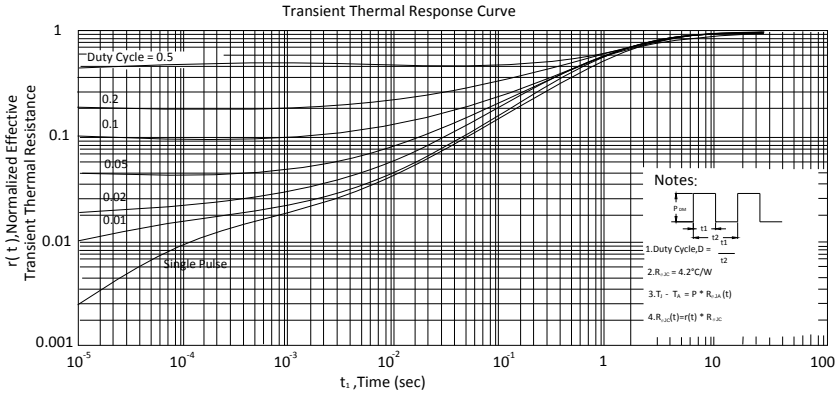





Gate Charge Characteristics
ID = 2 A
VDS = 150V
300V
VGS ,Gate-Source Voltage(V)
Qg ,Gate Charge(nC)


Capacitance Characteristics
Ciss
Coss
Crss
f = 1 MHz
VGS = 0 V
C-Capacitance(pF)
VDS -Drain-Source Voltage(V)


Maximum Safe Operating Area
RDS(ON) Limit
10μs
100μs
1ms
10ms
100ms
1s
DC
VGS = 10V
Single Pulse
RθJC = 4.2°C/W
TA = 25°C
ID - Drain Current(A)
VDS - Drain-Source Voltage(V)


Transient Thermal Response Curve
Duty Cycle = 0.5
0.2
0.1
0.05
0.02
0.01
Single Pulse
Notes:
1.Duty Cycle,D = t1/t2
2.RθJC = 4.2°C/W
3.TJ - TA = P * RθJA(t)
4.RθJC(t)=r(t) * RθJC
r(t),Normalized Effective Transient Thermal Resistance
t1 ,Time (sec)