

H04N65E

N-Channel MOSFET

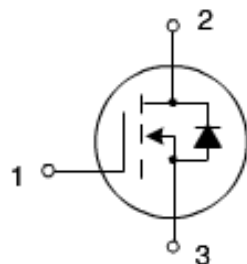
650V, 4A, $R_{DS(ON)} < 2.5\Omega$

General Description and Features

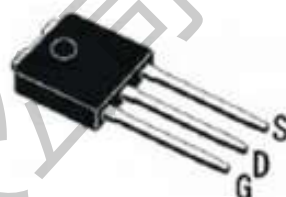
- Superior Avalanche Rugged Technology
- Robust Gate Oxide Technology
- Excellent Switching Characteristics
- Low Gate Charge
- Extended Safe Operating Area
- Lower $R_{DS(ON)}$: 2.21Ω (Typical) @ $V_{GS} = 10V$
- 100% Avalanche Tested
- Improved dv/dt Capability
- RoHS Compliant
- JEDEC Qualification

ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ C$)

Symbol	Parameter	Value	Unit
BV_{DSS}	Drain-Source Voltage	650	V
BV_{GSS}	Gate-Source Voltage	± 30	V
I_D	Drain Current continuous $T_c = 25^\circ C$	4	A
I_{DM}	Drain Current - pulse	16	A
P_D	Power Dissipation	$T_c = 25^\circ C$	50
		Derated above $25^\circ C$	0.4
T_J, T_{STG}	Operating and Storage Temperature Range	$-55 \sim +150$	$^\circ C$
T_L	Maximum Lead Temperature for Soldering	260	$^\circ C$



1. 栅极 2. 漏极 3. 源极



TO-251

Thermal Characteristics

Symbol	Parameter	TO-251	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	2.5	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	110	$^\circ C/W$

Electrical Characteristics ($T_c = 25^\circ C$ unless otherwise specified)

Symbol	Parameter	Test conditions	min	typ	max	unit
Off state characteristics						
BV_{DSS}	Drain to Source breakdown Voltage	$I_D = 250\mu A, V_{GS} = 0V$	650			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 650V, V_{GS} = 0V, T_c = 25^\circ C$			10	μA
I_{GSS}	Gate to Source Leakage Current	$V_{GS} = \pm 30V, V_{DS} = 0V$			± 100	nA



On state characteristics						
V _{GS(th)}	Gate to Source Threshold Voltage	I _D =250εA,V _{GS} =V _{DS}	2.0		4.0	V
R _{DS(on)}	Drain to Source On-Resistance	I _D =2A,V _{GS} =10V		2.0	2.5	q
G _{fs}	Forward Transconductance	V _{DS} =15V,I _D =2A		4		S
Dynamic characteristics						
C _{ISS}	Input Capacitance	V _{DS} =25V,V _{GS} =0V,f=1MHz		520	670	pF
C _{OSS}	Output Capacitance			70	90	pF
C _{RSS}	Reverse Transfer Capacitance			8	11	pF
Switching characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DD} =300V,I _D =4.0A V _{GS} =10V,R _G =25q (Note1,2)		13	35	ns
t _r	Rise Time			45	100	ns
t _{d(off)}	Turn-Off Delay Time			25	60	ns
t _f	Fall Time			35	80	ns
Q _g	Total Gate Charge	V _{DD} =480V,I _D =4A V _{GS} =10V (Note1,2)		15	20	nC
Q _{gs}	Gate to Emitter Charge			3.4	đ	nC
Q _{gd}	Gate to Collector Charge			7.1	đ	nC
Source Drain Diode Characteristics						
Symbol	Parameter	Test conditions	min	typ	max	unit
I _S	Maximum Continuous Drain-Source Diode Forward Current				4.1	A
I _{SM}	Maximum Pulsed Drain-Source Diode Forward Current				16	A
V _{SD}	Drain to Source Diode Forward Voltage	I _S =4A,V _{GS} =0V			1.4	V
t _{rr}	Diode Reverse Recovery Time	I _S =4A,V _{GS} =0V di/dt=100A/εS		250		nS
Q _{rr}	Diode Reverse Recovery Charge				1.5	

Note:

1.Pulse Test:Pulse Width $\leq 300\mu s$, Duty cycle $\leq 2\%$

2.Essentially Independent of operating Temperature Typical Characteristics



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N-Channel MOSFET 4A 650V



Ratings and Characteristic Curves

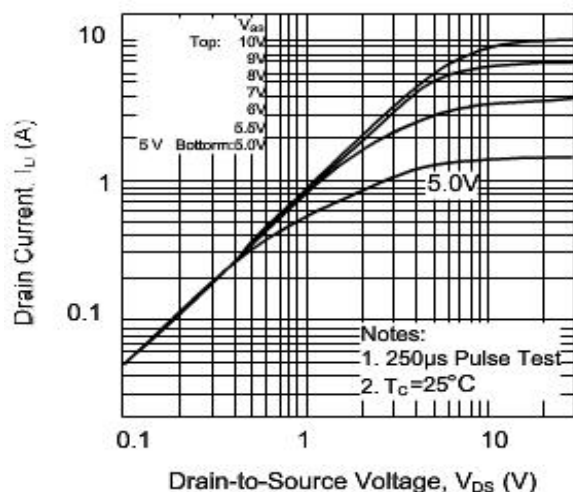


Fig.1 Output Characteristics

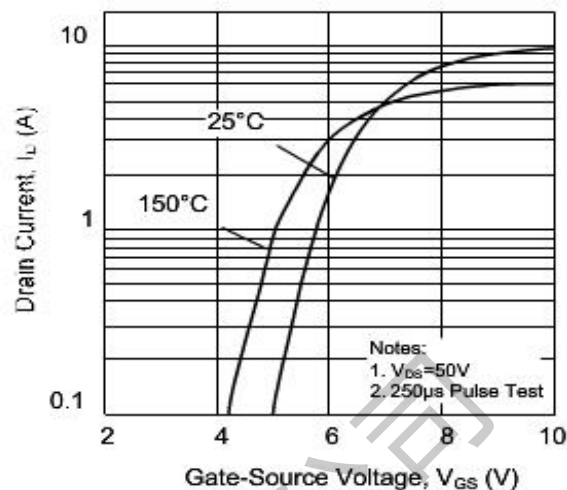


Fig.2 Transfer Characteristics

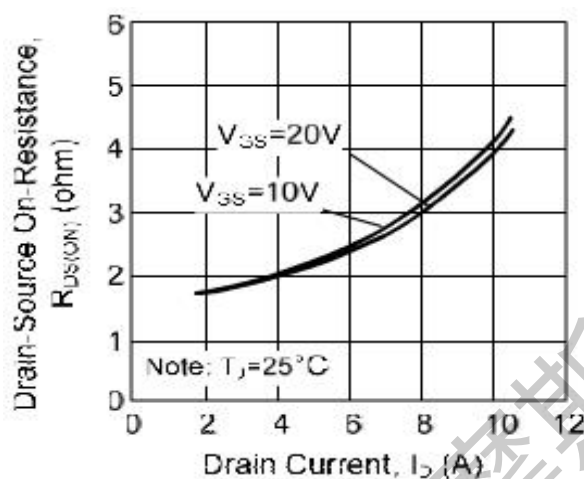


Fig.3 On-Resistance Variation vs. Drain Current and Gate Voltage

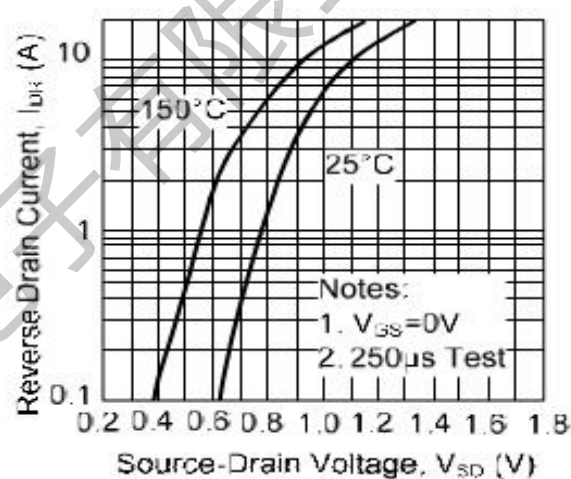


Fig.4 Body Diode Forward Voltage vs. Source Current and Temperature

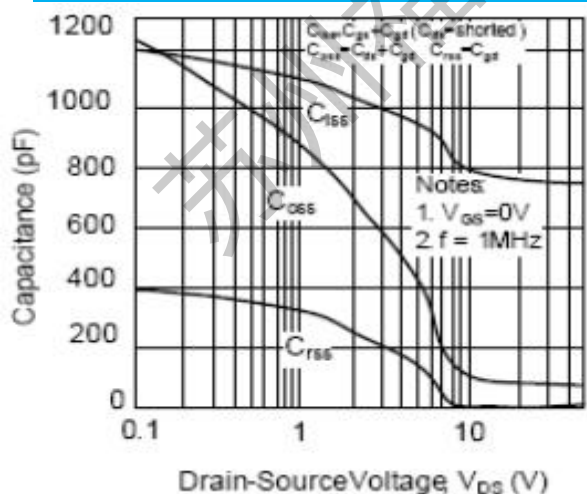


Fig.5 Capacitance Characteristics

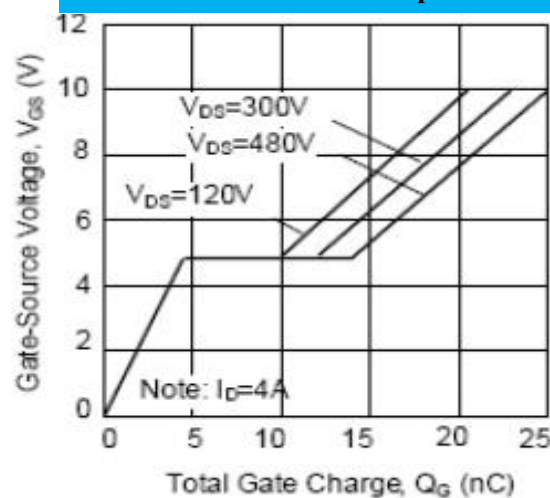


Fig.6 Gate Charge Characteristics

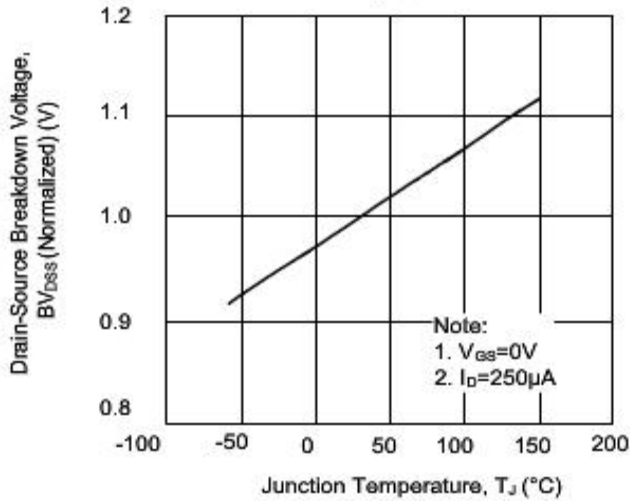


Fig.7 Breakdown Voltage Variation vs. Temperature

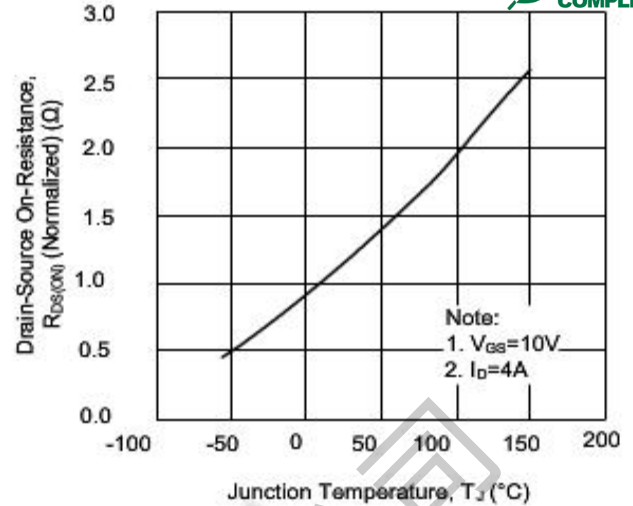


Fig.8 On-Resistance Variation vs. Temperature

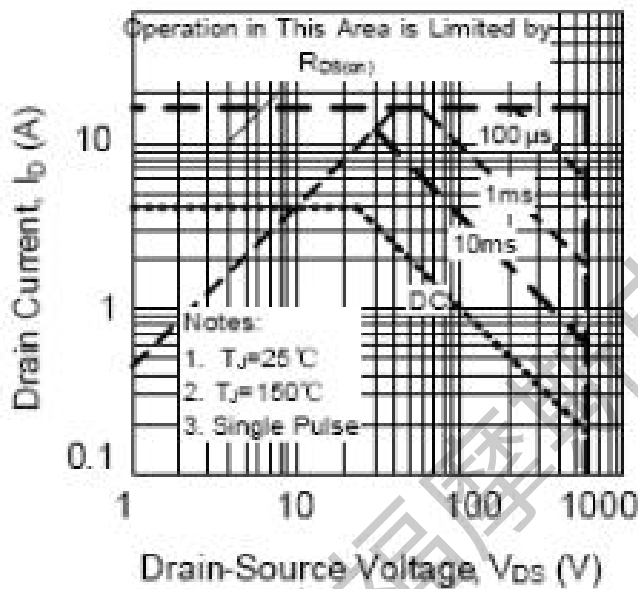


Fig.9 Maximum Safe Operating Area

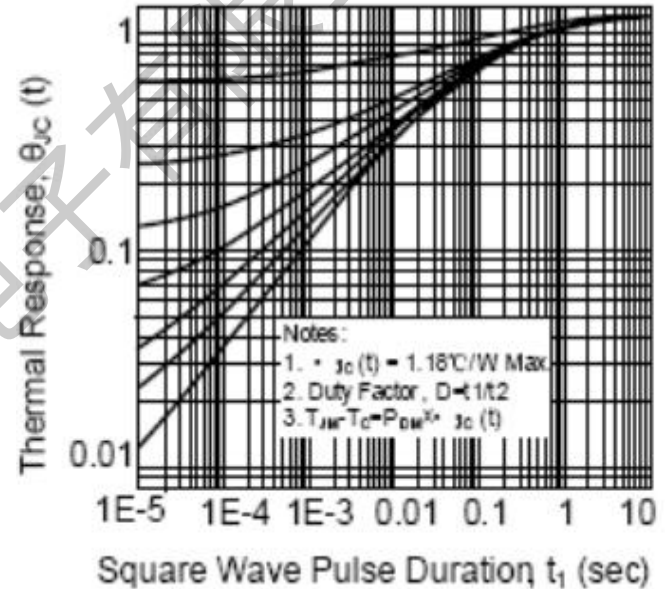
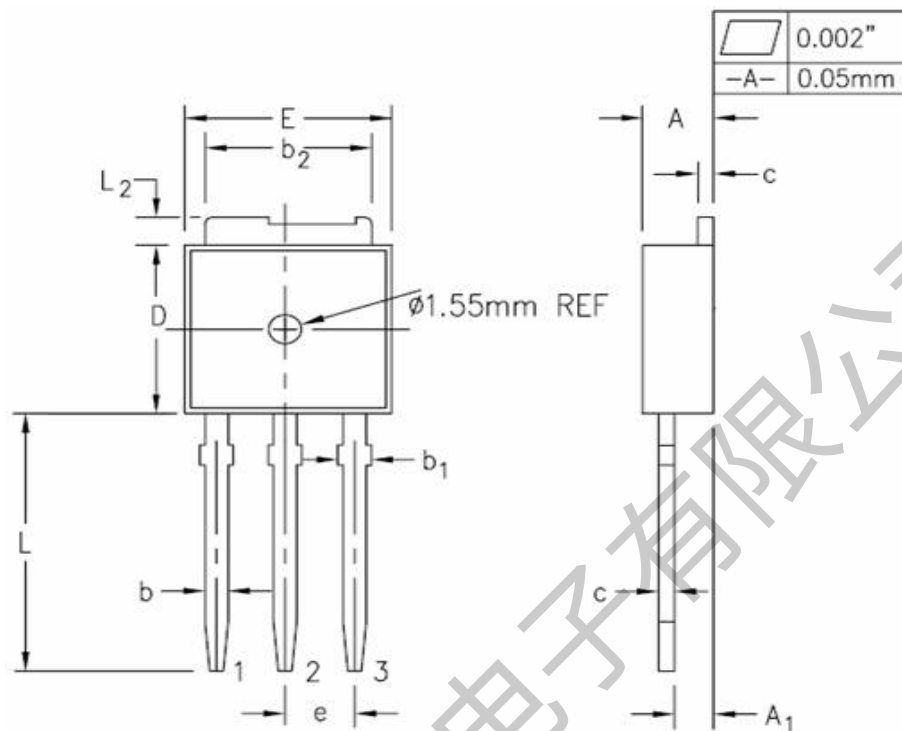


Fig.10 Transient Thermal Response Curve



TO-251 POD



SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	0.086	0.094	2.19	2.38	
A1	0.041	0.048	1.04	1.23	
b	0.025	0.035	0.64	0.89	
b1	0.027	0.039	0.69	0.92	
b2	0.206	0.216	5.23	5.48	
c	0.018	0.024	0.46	0.61	
D	0.235	0.245	5.97	6.22	
E	0.250	0.265	6.35	6.73	
e	0.090 TYP.		2.28 TYP.		
L	0.350	0.380	8.89	9.65	
L2	0.035	0.050	0.89	1.27	