MOT

■ PRODUCT CHARACTERISTICS

V_{DSS}	30	V
$R_{DS(ON)-Max}$	2.5 at V_{GS}=10V	mΩ
$R_{DS(ON)-Max}$	3.3 at V_{GS}=4.5 V	mΩ
ID	130	A

Symbol

2.Drain

1.Gate

3.Source
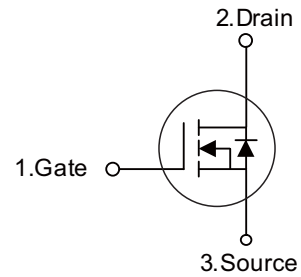
■ APPLICATIONS
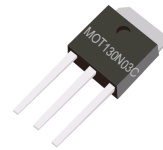
Power switch circuit of adaptor and charger.

■ FEATURES

Fast switching

Low ON fesistance

Low Gate Charge

Low reverse transfer capacitances

TO-252

TO-251

■ ORDER INFORMATION

Order codes		Package	Packing
Halogen-Free	Halogen		
N/A	MOT130N03D	TO-252	2500 pieces /Reel
N/A	MOT130N03C	TO-251	70 pieces/Tube

■ ABSOLITE MAXIMUM RATINGS (T_C =25℃, unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	30	V
I_D	Continuous Drain Current T_C = 25 ℃	130	A
	Continuous Drain Current T_C = 100 ℃ (Package limited)	60	A
I_{DM} [a1]	Pulsed Drain Current T_C = 25 ℃ (Package limited)	240	A
V_{GS}	Gate-to-Source Voltage	±20	V
E_{AS} [a2]	Single Pulse Avalanche Energy	1000	mJ
P_D	Power Dissipation T_C = 25 ℃	83	W
	Derating Factor above 25 ℃	0.666	W/℃
T_J, T_{stg}	Operating Junction and Storage Temperature Range	150，−55 to 150	℃

■ ELECTRICAL CHARACTERISTICS(T_J =25℃, unless otherwise noted)

OFF Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V_{DSS}	Drain to Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	30	--	--	V
I_{DSS}	Drain to Source Leakage Current	V_{DS} =30V, V_{GS}= 0V, T_J = 25℃	--	--	1	μA
		V_{DS} =24V, V_{GS}= 0V, T_J = 125℃	--	--	100	μA
$I_{GSS(F)}$	Gate to Source Forward Leakage	V_{GS} =+20V	--	--	100	nA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	V_{GS} =-20V	--	--	-100	nA

ON Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$R_{DS(ON)}$	Drain-to-Source On-Resistance	V_{GS}=10V,I_D=19A	--	1.9	2.5	mΩ
		V_{GS}=4.5V,I_D=19A		2.6	3.3	mΩ
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	1.0	--	3.0	V

Pulse width tp≤300μs, δ ≤2%

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz	--	5.3	--	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V f=1.0MHz	--	4893	--	pF
C_{oss}	Output Capacitance		--	818	--	
C_{rss}	Reverse Transfer Capacitance		--	482	--	

Resistive Switching Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	V_{GS}=10V，R_G=6Ω V_{DD}=15V，I_D=50A	--	14.8	--	ns
tr	Rise Time		--	15.2	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	119.6	--	
t_f	Fall Time		--	59.2	--	
Q_g	Total Gate Charge	V_{GS}=10V，V_{DD}=15V I_D=50A	--	79.1	--	nC
Q_{gs}	Gate to Source Charge		--	13.6	--	
Q_{gd}	Gate to Drain ("Miller")Charge		--	16.0	--	

■ ELECTRICAL CHARACTERISTICS (T$_J$ =25℃, unless otherwise noted)

Source-Drain Diode Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I$_S$	Continuous Source Current (Body Diode)		--	--	60	A
I$_{SM}$	Maximum Pulsed Current (Body Diode)		--	--	240	A
V$_{SD}$	Diode Forward Voltage	I$_S$=50A,V$_{GS}$=0V	--	--	1.2	V
trr	Reverse Recovery Time	I$_S$=50A,T$_j$ = 25℃ dI$_F$/dt=100A/us,	--	44.4	--	ns
Qrr	Reverse Recovery Charge		--	34.6	--	nC
I$_{RRM}$	Reverse Recovery Current		--	1.6	--	A
Pulse width tp≤300μs, δ ≤2%						

Symbol	Parameter	Max.	Units
R$_{θJC}$	Junction-to-Case	1.5	℃/W
R$_{θJA}$	Junction-to-Ambient	100	℃/W

[a1]：Repetitive rating; pulse width limited by maximum junction temperature
[a2]：L=1mH, I$_D$=44.73A, Start T$_J$=25℃
[a3]：Recommend soldering temperature defined by IPC/JEDEC J-STD 020

■ TEST CIRCUIT AND WAVEFORM
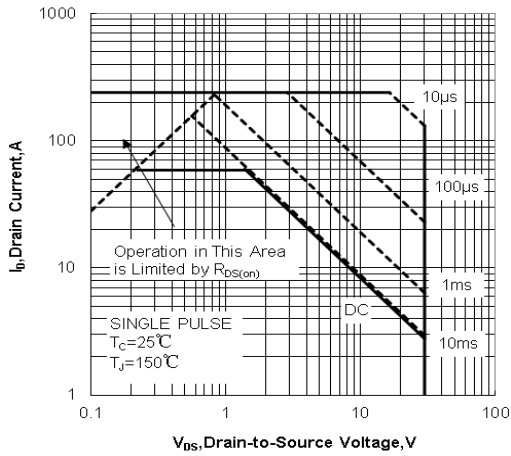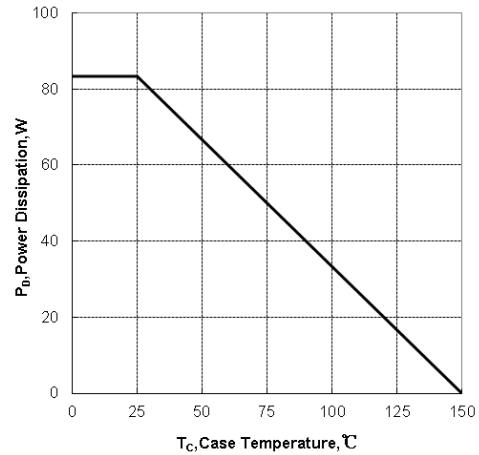

Figure1. Maximum Forward Bias Safe Operating Area

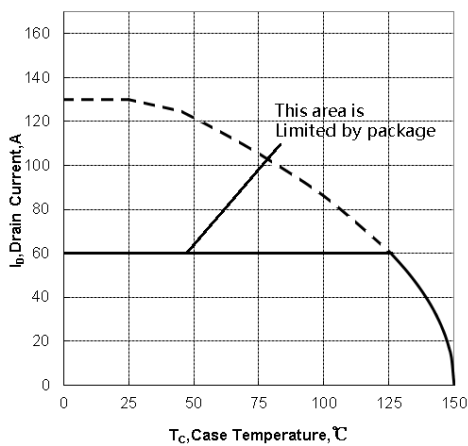**Figure2. Maximum Power Dissipation vs Case Temperature**

Figure3. Maximum Continuous Drain Current vs Case Temperature
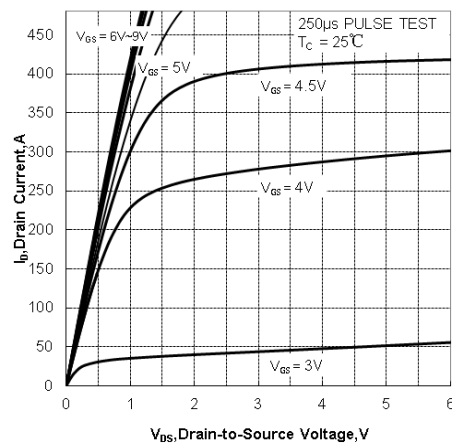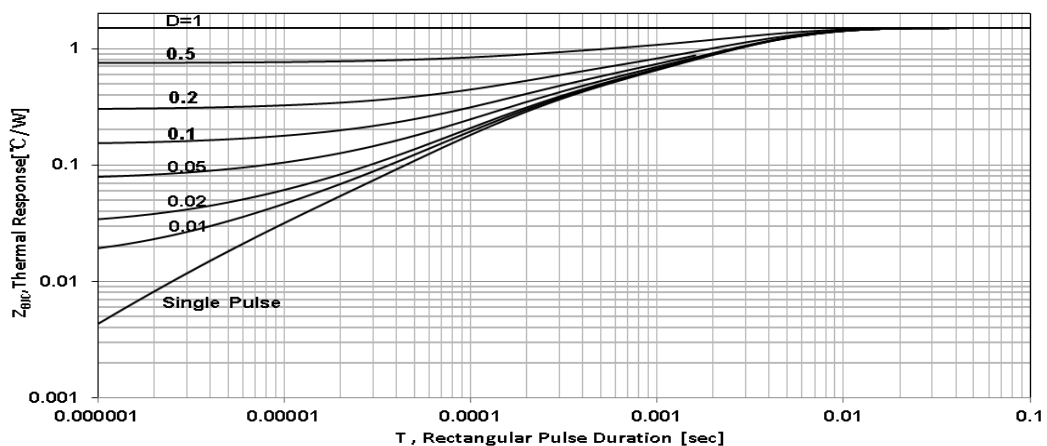

Figure 4. Typical Output   Characteristics

Figure5.   Maximum Effective Transient Thermal Impedance, Junction-to-Case

■ TYPICAL CHARACTERISTICS
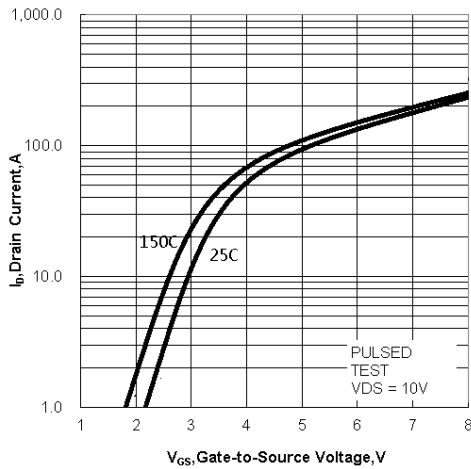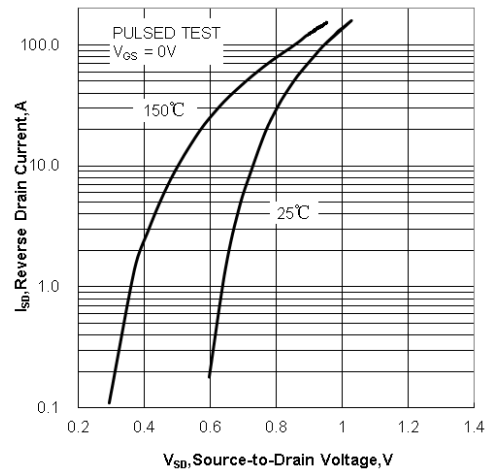

Figure 6. Typical Transfer Characteristics

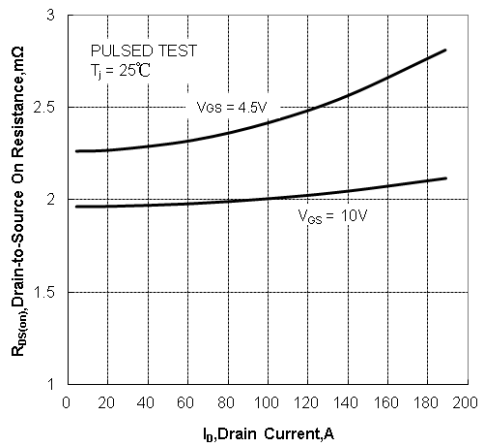**Figure 7. Typical Body Diode Transfer Characteristics**

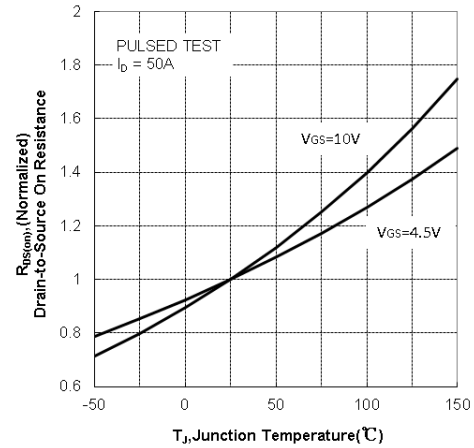**Figure 8. Drain-to-Source On Resistance vs Drain Current**
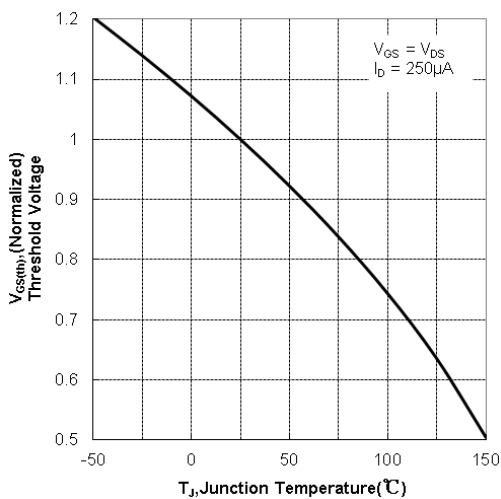

Figure 9. Nomalized on Resistance vs Junction Temperature

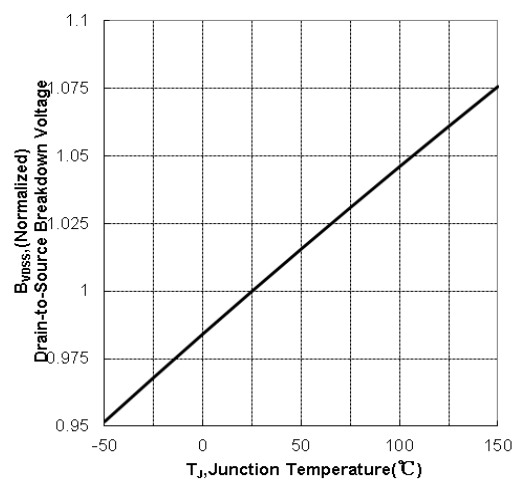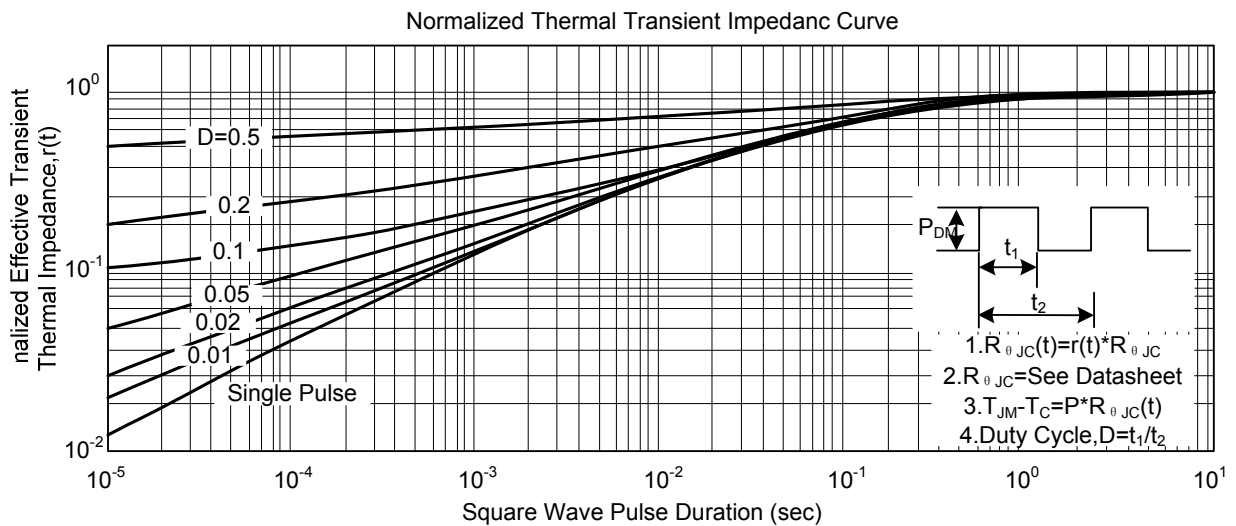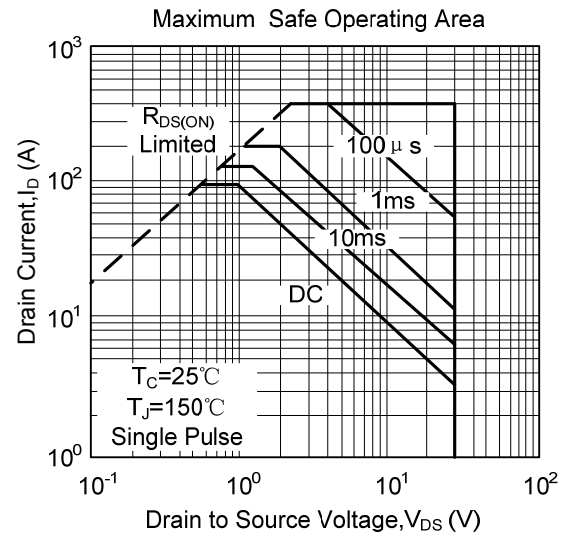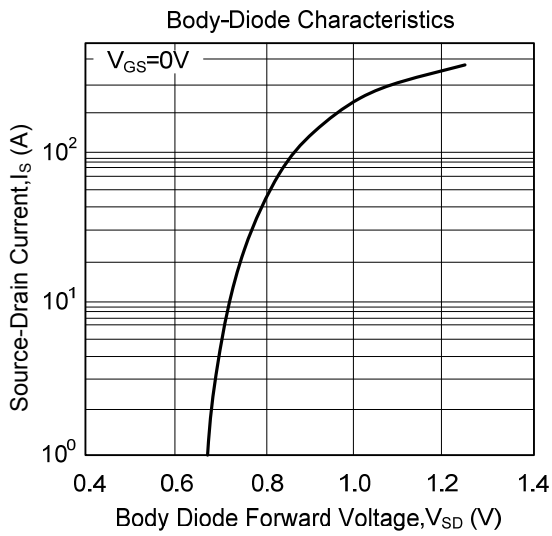**Figure 10. Nomalized Theshold Voltage vs Junction Temperature**

Figure 11. Nomalized Breakdown Voltage vs Junction Temperature

■ TYPICAL CHARACTERISTICS(Cont.)

Body-Diode Characteristics

$V_{GS}=0V$

Source-Drain Current,I_S (A)

Body Diode Forward Voltage,V_{SD} (V)

Maximum Safe Operating Area

$R_{DS(ON)}$ Limited

100 μ s
1ms
10ms
DC

$T_C=25℃$
$T_J=150℃$
Single Pulse

Drain Current,I_D (A)

Drain to Source Voltage,V_{DS} (V)

Normalized Thermal Transient Impedanc Curve

nalized Effective Transient
Thermal Impedance,r(t)

D=0.5
0.2
0.1
0.05
0.02
0.01

Single Pulse

P_{DM}
t_1
t_2

1.$R_{\theta JC}(t)=r(t)*R_{\theta JC}$
2.$R_{\theta JC}=$See Datasheet
3.$T_{JM}-T_C=P*R_{\theta JC}(t)$
4.Duty Cycle,$D=t_1/t_2$

Square Wave Pulse Duration (sec)

■ TO-251 PACKAGE OUTLINE DIMENSIONS

■ TO-252 PACKAGE OUTLINE DIMENSIONS