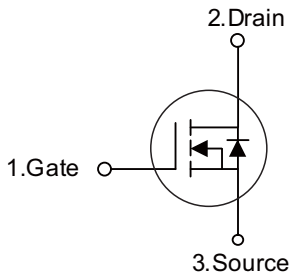
■ PRODUCT CHARACTERISTICS

VDSS	500V
R_{DS}(on)Typ(@V_{GS} =10 V)	1.2Ω
Qg@type	20nC
ID	7A

Symbol



■ APPLICATIONS

- High efficiency switch mode power supplies
- Electronic lamp ballasts based on half bridge
- LED power supplies

■ FEATURES

* Ultra low gate charge
* Low reverse transfer Capacitance
* Fast switching capability
* Avalanche energy tested
* Improved dv/dt capability, high ruggedness

TO-252

TO-251

■ ORDER INFORMATION

Order codes		Package	Packing
Halogen-Free	Halogen		
N/A	MOT7N50SD	TO-252	2500 pieces /Reel
N/A	MOT7N50SC	TO-251	70 pieces/Tube

■ ABSOLUTE MAXIMUM RATINGS (T_C = 25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	500	V
Gate-Source Voltage		V_{GSS}	±30	V
Continuous Drain Current		I_D	7	A
Pulsed Drain Current (Note 2)		I_{DM}	28	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	470	mJ
Peak Diode Recovery dv/dt		dv/dt	4.5	V/ns
Power Dissipation		P_D	56	W
Junction Temperature		T_J	+150	°C
Storage Temperature		T_{STG}	-55 ~ +150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Repetitive Rating: Pulse width limited by maximum junction temperature.
3. V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25°C
4. I_{SD} ≤ 4.0A, di/dt ≤200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

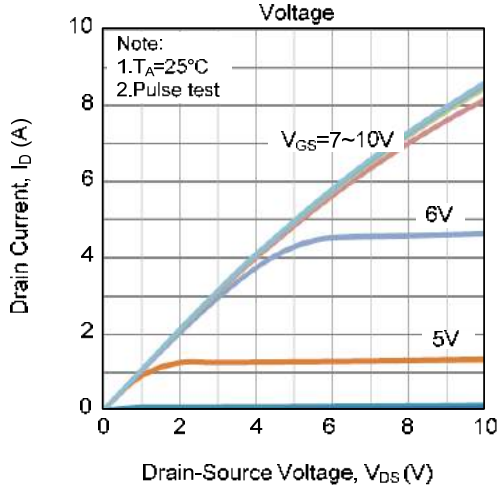
■ ELECTRICAL CHARACTERISTICS (T_C =25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Off characteristics							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS} = 0V, I_D = 250μA	500	-	-	V
Drain-Source Leakage Current		I_{DSS}	V_{DS} = 500V, V_{GS} = 0V	-	-	1	μA
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS} = 30V, V_{DS} = 0V	-	-	100	nA
	Reverse		V_{GS} = -30V, V_{DS} = 0V	-	-	-100	nA
On characteristics							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS} = V_{GS}, I_D = 250μA	2.0	-	4.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS} = 10V, I_D = 3.5A	-	1.2	1.4	Ω
Dynamic characteristics							
Input Capacitance		C_{ISS}	V_{DS}=25V, V_{GS}=0V, f=1.0 MHz	-	641	-	pF
Output Capacitance		C_{OSS}		-	85	-	pF
Reverse Transfer Capacitance		C_{RSS}		-	5	-	pF
Switching characteristics							
Total Gate Charge (Note 1)		Q_G	V_{DS}=100V, V_{GS}=10V, I_D=7A, I_D=1mA (Note 1, 2)	-	20	-	nC
Gate-Source Charge		Q_{GS}		-	7	-	nC
Gate-Drain Charge		Q_{GD}		-	2.7	-	nC
Turn-On Delay Time (Note 1)		$t_{D(ON)}$	V_{DD}=100V, V_{GS}=10V, I_D =5A, R_G =25Ω (Note 1, 2)	-	32	-	ns
Turn-On Rise Time		t_R		-	24	-	ns
Turn-Off Delay Time		$t_{D(OFF)}$		-	47	-	ns
Turn-Off Fall Time		t_F		-	39	-	ns
Drain-source diode characteristics and maximum ratings							
Maximum Body-Diode Continuous Current		I_S		-	-	7	A
Maximum Body-Diode Pulsed Current		I_{SM}		-	-	14	A
Drain-Source Diode Forward Voltage		V_{SD}	I_S=7.0A, V_{GS}=0V	-	-	1.4	V
Body Diode Reverse Recovery Time		t_{rr}	I_S=7.0A, V_{GS}=0V, di/dt=100A/μs	-	87	-	ns
Body Diode Reverse Recovery Charge		Q_{rr}		-	0.2	-	μC

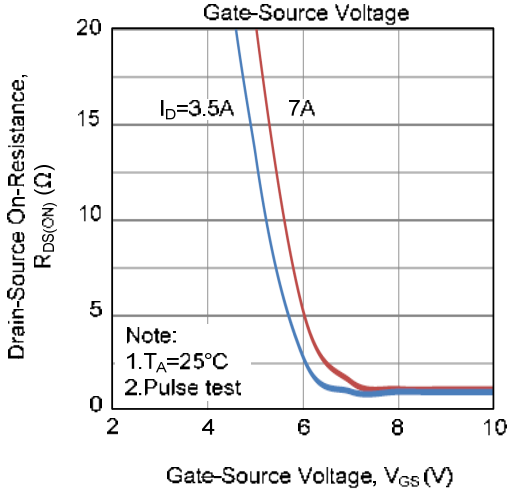
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

■ TYPICAL CHARACTERISTICS

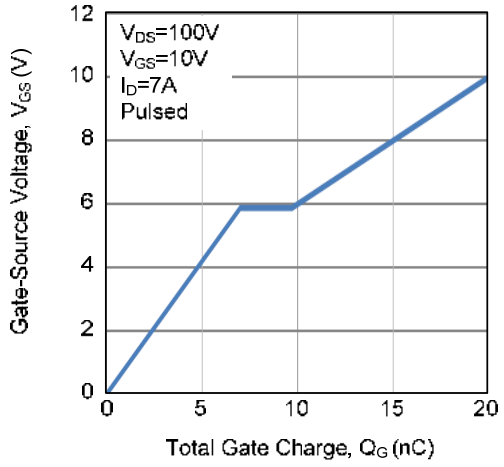
Drain Current vs. Drain-Source Voltage



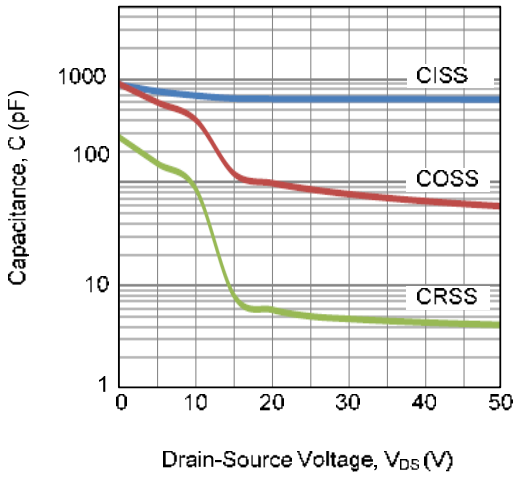
Drain-Source On-Resistance vs. Gate-Source Voltage



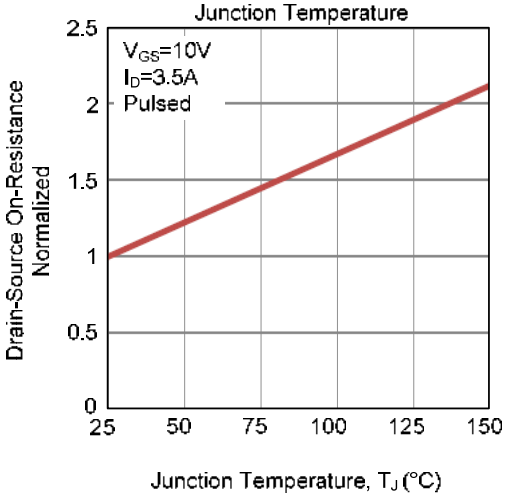
Gate Charge Characteristics



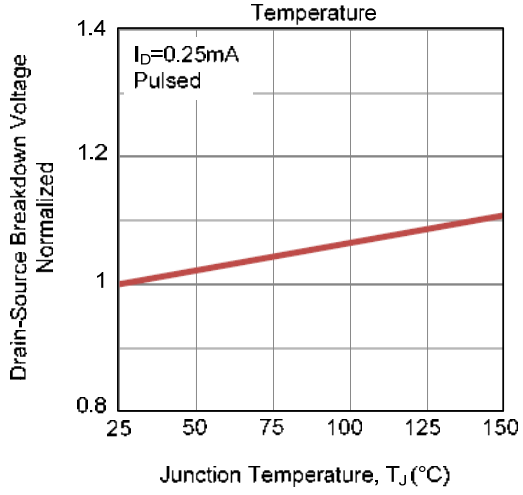
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

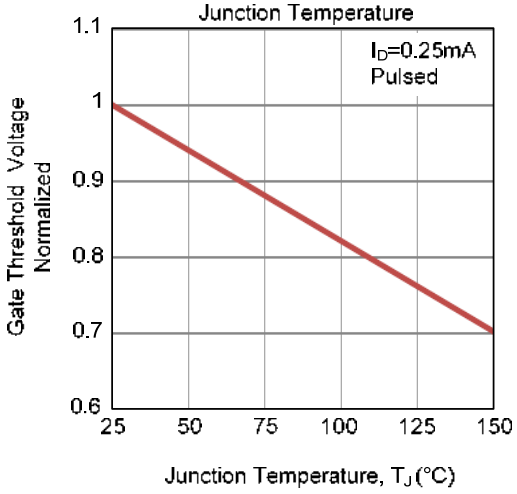


Breakdown Voltage vs. Junction Temperature

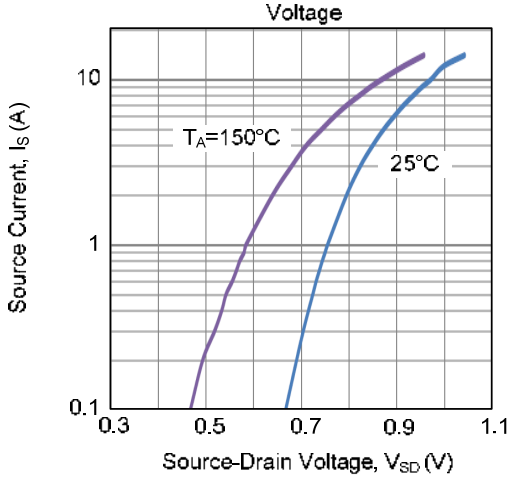


■ TYPICAL CHARACTERISTICS(Cont.)

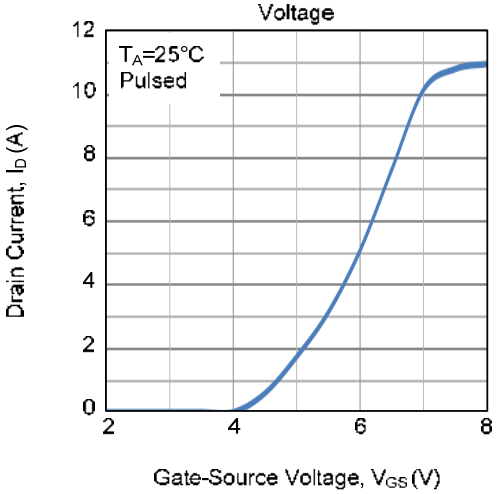
Gate Threshold Voltage vs. Junction Temperature



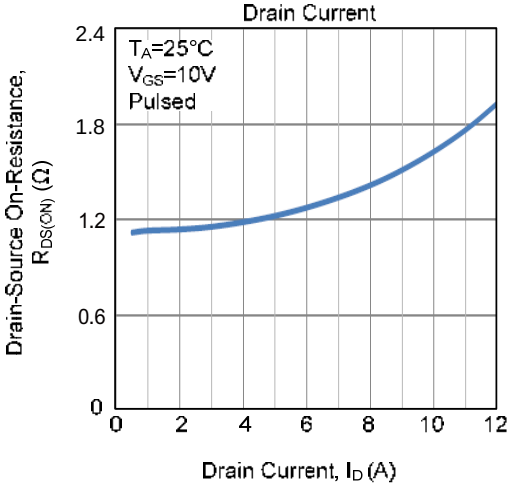
Source Current vs. Source-Drain Voltage



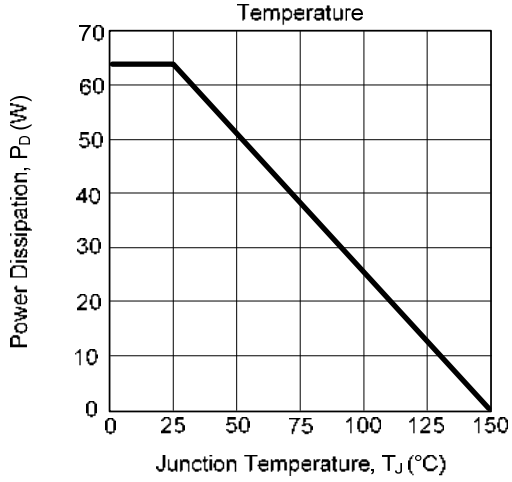
Drain Current vs. Gate-Source Voltage



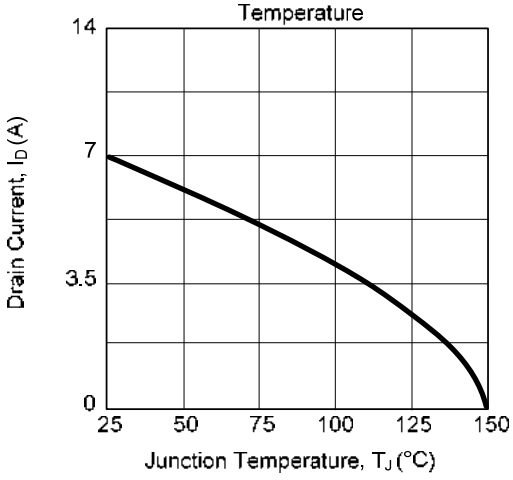
Drain-Source On-Resistance vs. Drain Current



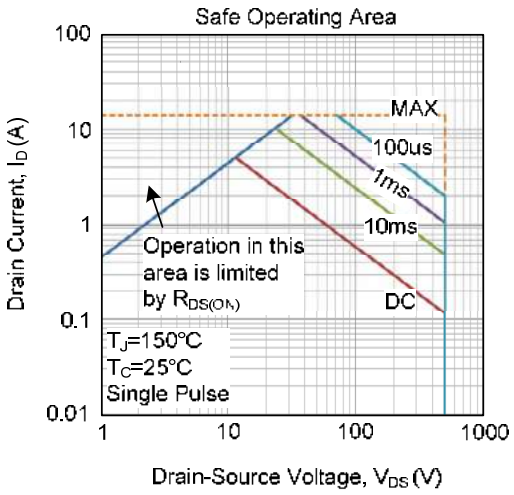
Power Dissipation vs. Junction Temperature



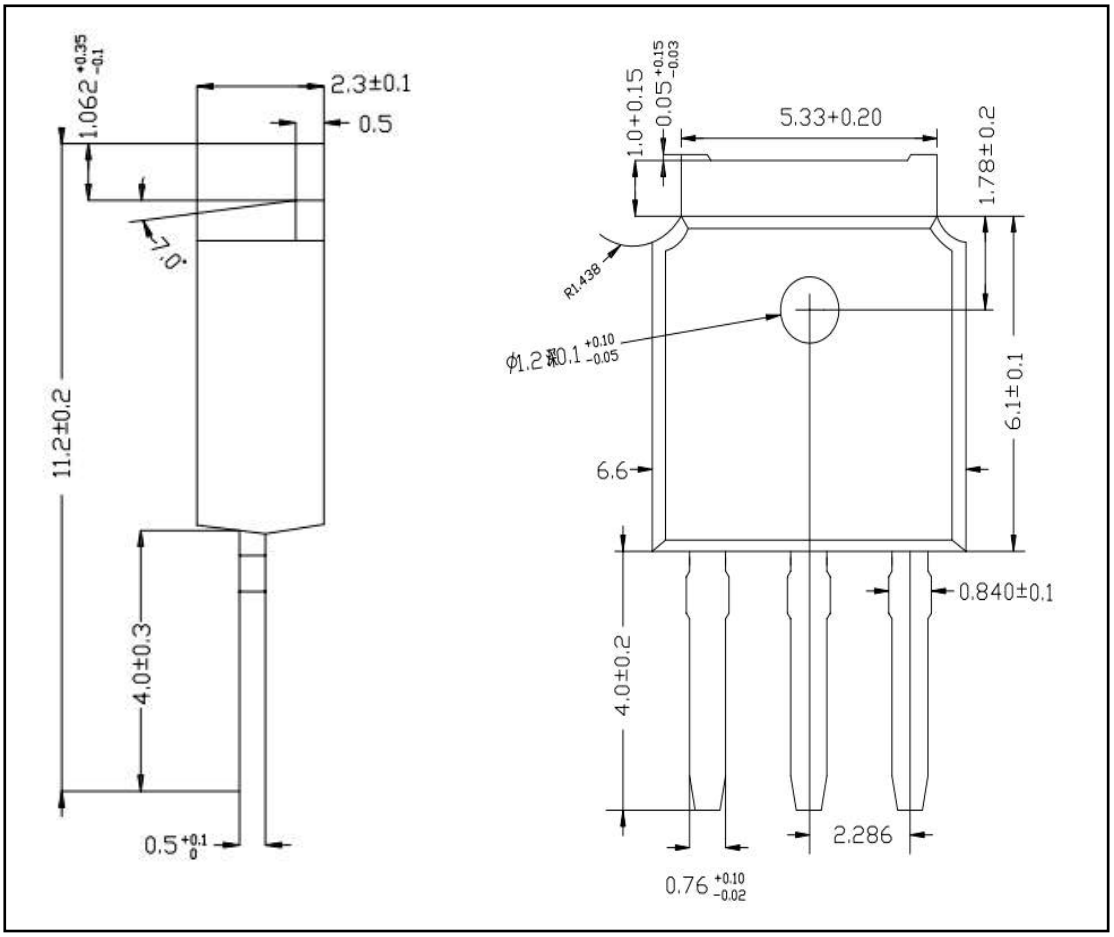
Drain Current vs. Junction Temperature



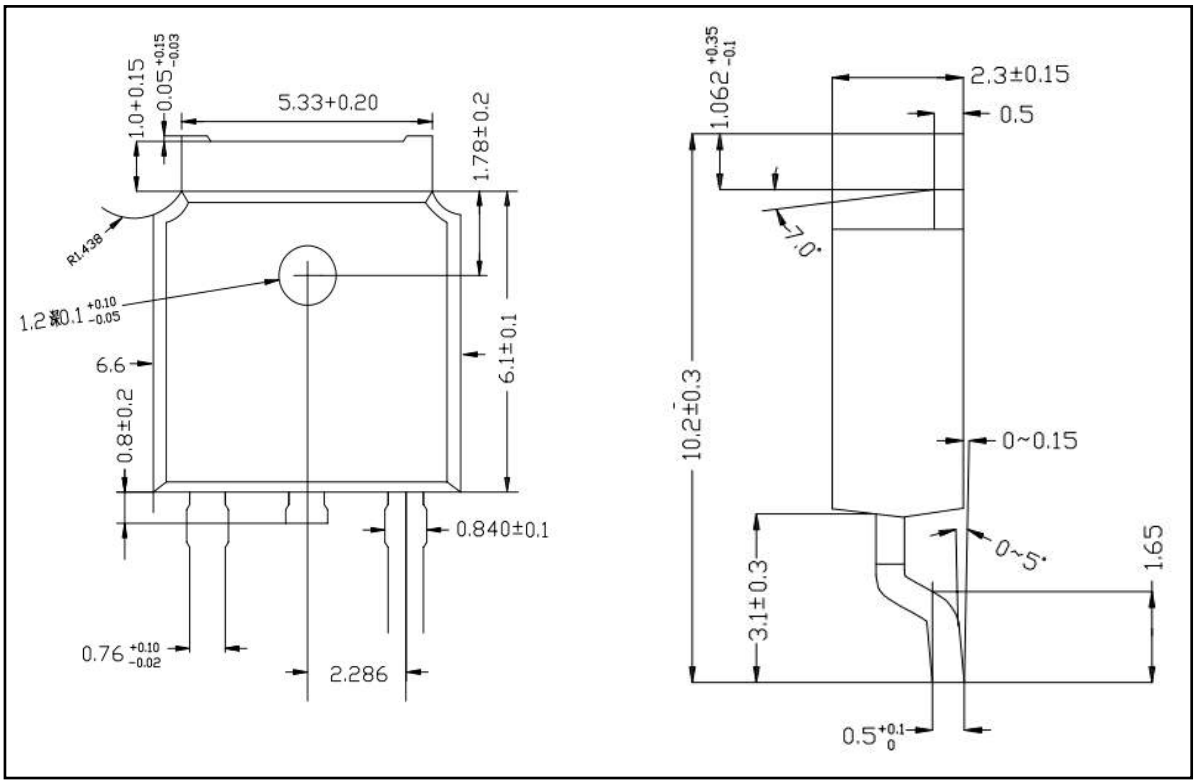
■ TYPICAL CHARACTERISTICS(Cont.)



■ TO-251 PACKAGE OUTLINE DIMENSIONS



■ TO-252 PACKAGE OUTLINE DIMENSIONS



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