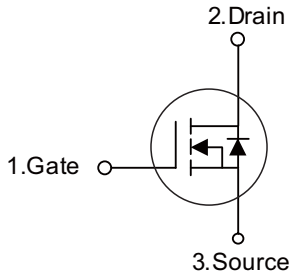
■ PRODUCT CHARACTERISTICS

VDSS	30V
R_{DS}(on)max(@V_{GS} =10 V)	10mΩ
R_{DS} (on)max(@V_{GS}=4.5 V)	13mΩ
ID	50A

Symbol



■ APPLICATIONS

* Switching applications

■ FEATURES

* Low capacitance
* Low gate charge
* Fast switching capability
* Avalanche energy specified

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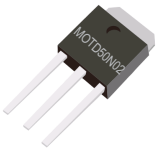

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■ ORDER INFORMATION

Order codes		Package	Packing
Halogen-Free	Halogen		
N/A	MOT50N03D	TO-252	2500 pieces /Reel
N/A	MOT50N03C	TO-251	70 pieces/Tube

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

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	V_{DSS}	30	V
Gate-Source Voltage	V_{GSS}	±20	V
Continuous Drain Current	I_D	50	A
Pulsed Drain Current (Note 2)	I_{DM}	180	A
Single Pulsed Avalanche Energy (Note 3)	E_{AS}	45	mJ
Power Dissipation	P_D	50	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. L = 0.1mH, I_{AS} = 30A, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25°C.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient (Note 3)	θ_{JA}	71.4	°C/W
Junction to Case	θ_{JC}	3.0	°C/W

Note: Surface-mounted on FR4 board using 1 sq in pad, 1 oz Cu

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

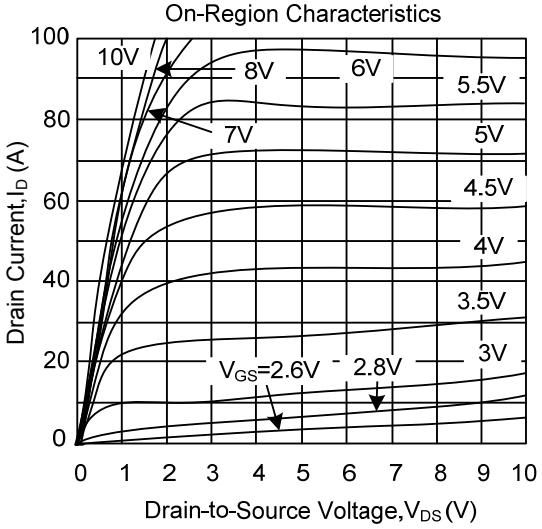
PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} =0V, I_D =250 μA		30			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=20V, V_{GS} =0V				1.5	μA
Gate-Source Leakage Current	I_{GSS}	V_{DS} =0V, V_{GS} = ±20V				±100	nA
ON CHARACTERISTICS							
Gate-Threshold Voltage	$V_{GS(TH)}$	V_{DS} =V_{GS}, I_D =250 μA		1.0	1.7	2.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS} = 10 V	I_D = 15 A		8	10	mΩ
		V_{GS} = 4.5V	I_D = 10 A		10	13	mΩ
DYNAMIC PARAMETERS							
Input Capacitance	C_{ISS}	V_{DS}=12V, V_{GS} =0V, f=1MHz			610	750	pF
Output Capacitance	C_{OSS}				300		pF
Reverse Transfer Capacitance	C_{RSS}				125		pF
SWITCHING PARAMETERS							
Turn-ON Delay Time	$t_{D(ON)}$	V_{GS} = 4.5 V, V_{DS} =15 V, I_D = 30 A, R_G = 3.0Ω			8.2		ns
Turn-ON Rise Time	t_R				9.6		ns
Turn-OFF Delay Time	$t_{D(OFF)}$				11.2		ns
Turn-OFF Fall-Time	t_F				6.8		ns
Turn-ON Delay Time	$t_{D(ON)}$	V_{GS} = 11.5 V, V_{DS} =15 V, I_D = 30 A, R_G = 3.0Ω			5.0		ns
Turn-ON Rise Time	t_R				84		ns
Turn-OFF Delay Time	$t_{D(OFF)}$				15		ns
Turn-OFF Fall-Time	t_F				4.0		ns
Total Gate Charge	Q_G	V_{DS} =15V,V_{GS} =4.5V, I_D =30 A			6.0	10	nC
Gate-to-Source Charge	Q_{GS}				1.9		nC
Gate-to-Drain Charge	Q_{GD}				3.7		nC
Total Gate Charge	Q_G	V_{DS} =15V,V_{GS} =11.5V, I_D =30 A			15		nC
Gate-to-Source Charge	Q_{GS}				1.9		nC
Gate-to-Drain Charge	Q_{GD}				3.9		nC
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Voltage	V_{SD}	I_S=30 A, V_{GS} =0V			0.85	1.1	V
Maximum Continuous Drain-Source Diode Forward Current	I_S					45	A
Reverse Recovery Time	t_{rr}	I_S = 30 A, V_{GS} = 0 V, dI /dt = 100 A/μs			24		ns
Reverse Recovery Charge	Q_{RR}				14		nC

Notes: 1. Pulse width limited by $T_{J(MAX)}$

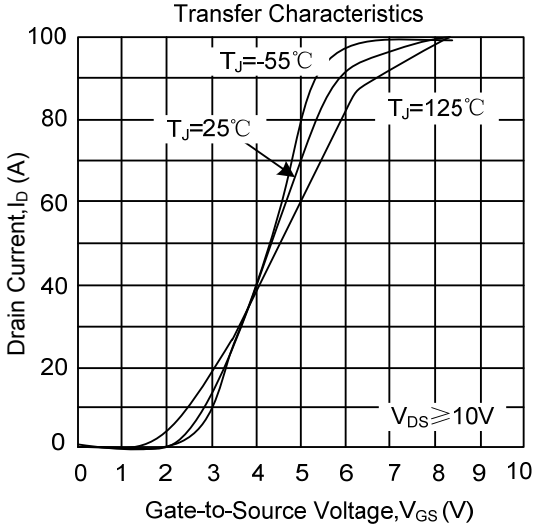
2. Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%

■ TYPICAL CHARACTERISTICS

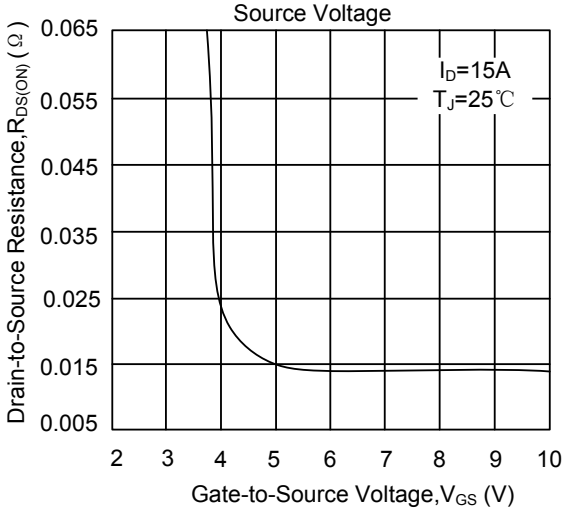
On-Region Characteristics



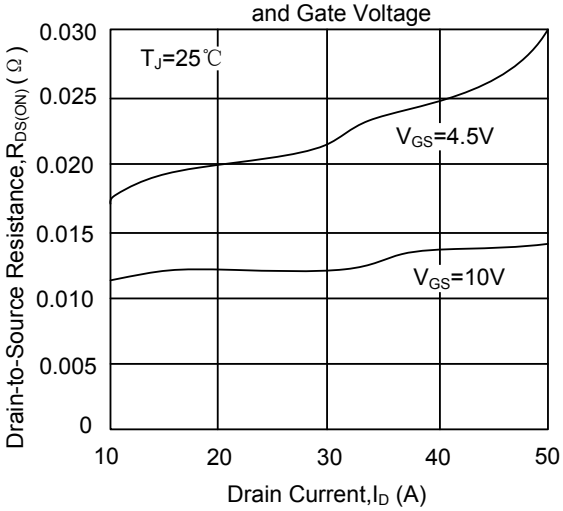
Transfer Characteristics



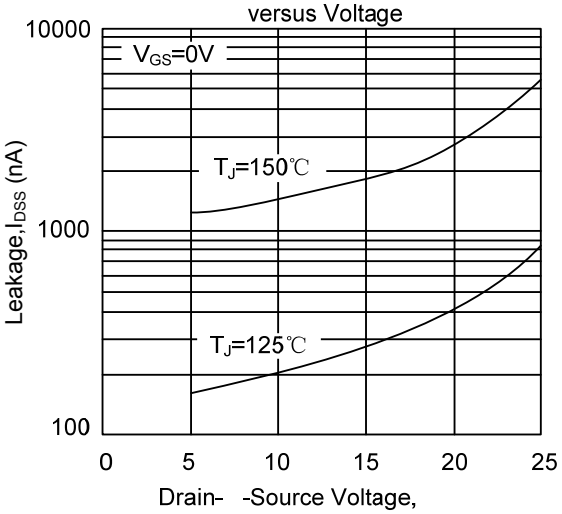
On-Resistance versus Gate-to-Source Voltage



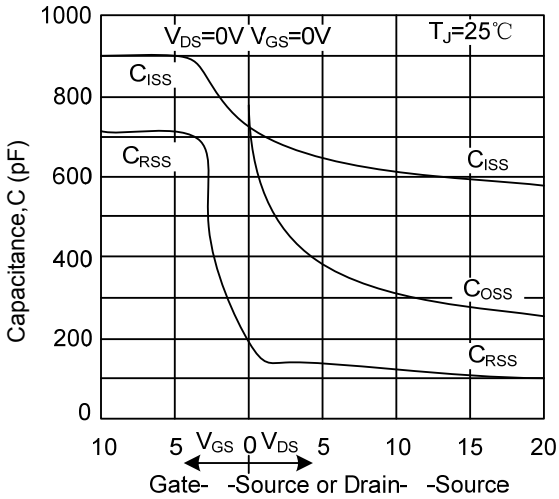
On-Resistance versus Drain Current and Gate Voltage



Drain-to-Source Leakage Current versus Voltage

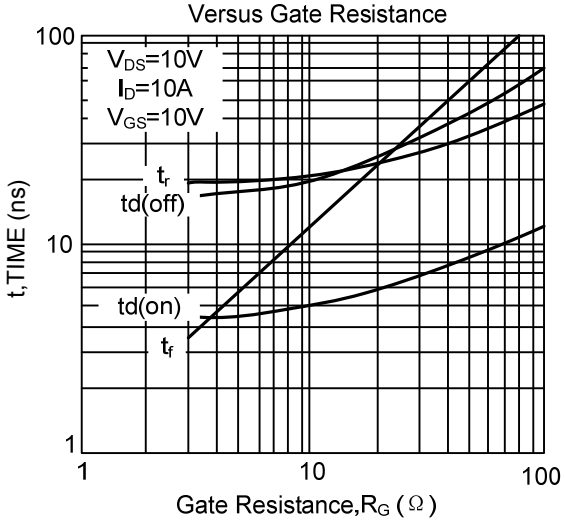


Capacitance Variation

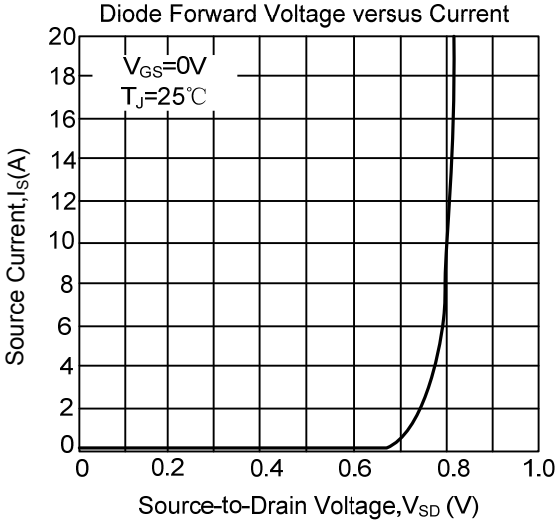


■ TYPICAL CHARACTERISTICS(Cont.)

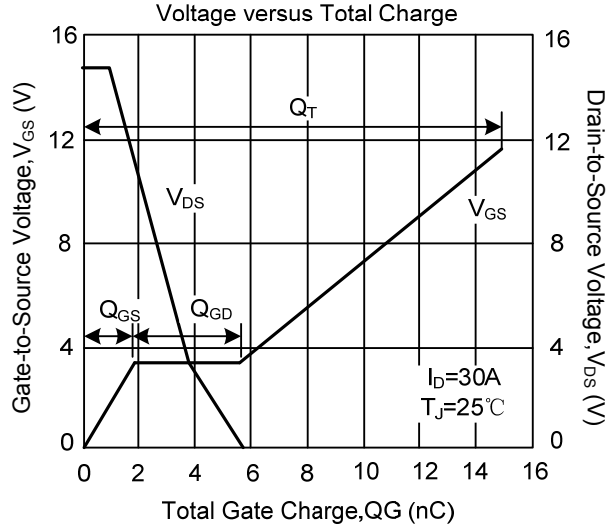
Resistive Switching Time Variation Versus Gate Resistance



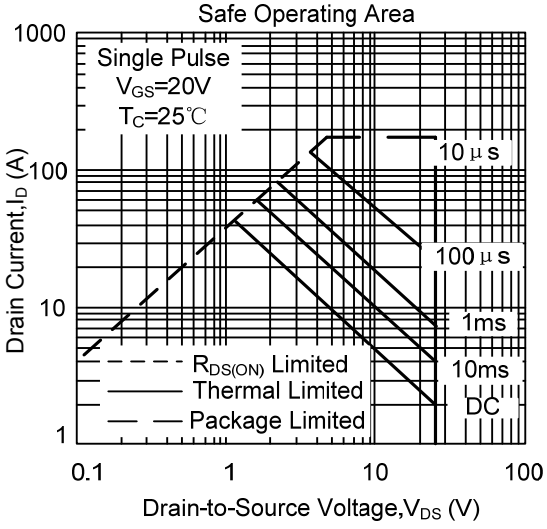
Diode Forward Voltage versus Current



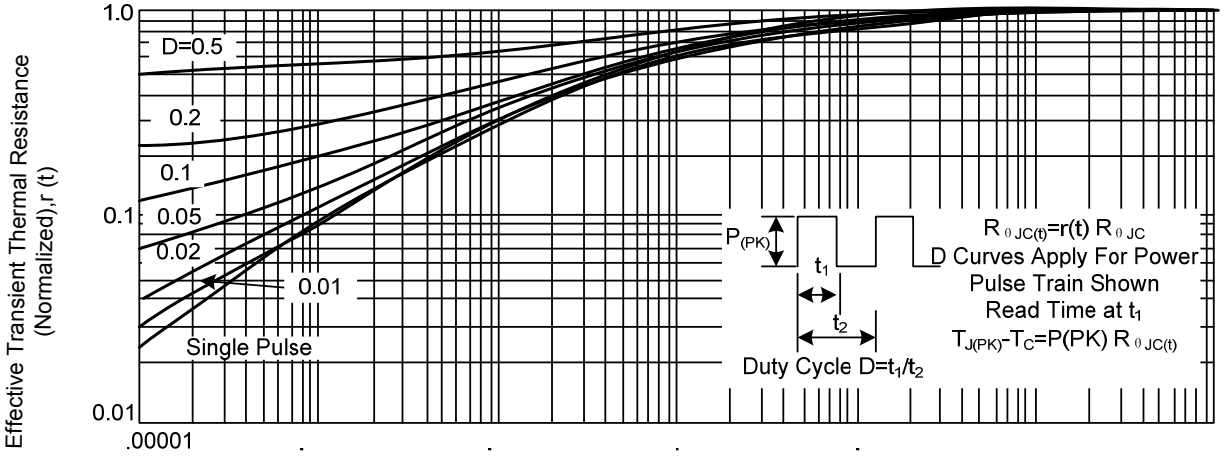
Gate-to-Source and Drain-to-Source Voltage versus Total Charge



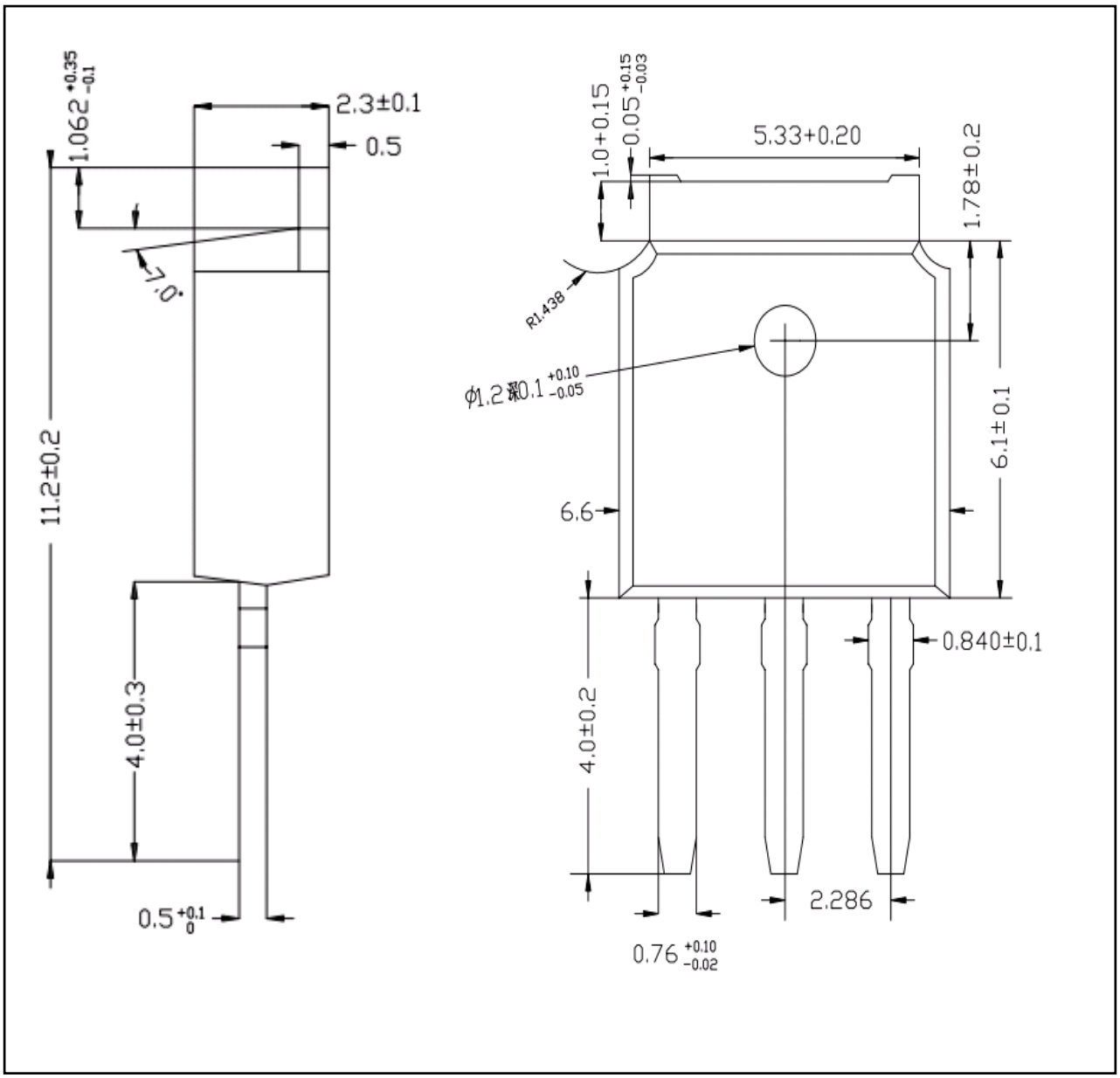
Maximum Rated Forward Biased Safe Operating Area



Thermal Responce



■ TO-251PACKAGE OUTLINE DIMENSIONS



■ TO-252 PACKAGE OUTLINE DIMENSIONS