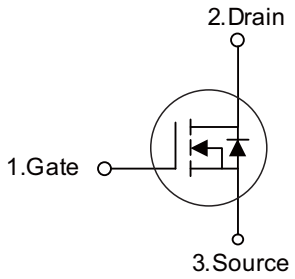
■ PRODUCT CHARACTERISTICS

VDSS	650V
R_{DS}(on)Typ(@V_{GS} =10 V)	0.75Ω
Qg@type	42nC
ID	12A

Symbol



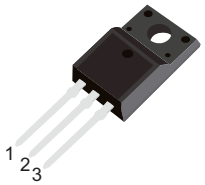
■ APPLICATIONS

- High freq uency switching mode power supply
- Electronic lamp ballasts based on half bridge
- LED power supplies

■ FEATURES

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

TO-220



TO-220F

■ ORDER INFORMATION

Order codes		Package	Packing
Halogen-Free	Halogen		
N/A	MOT12N65F	TO-220F	50 pieces/Tube
N/A	MOT12N65A	TO-220	50 pieces/Tube

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

Parameter		Symbol	Ratings	Unit
Drain to Source Voltage		V_{DSS}	650	V
Gate to Source Voltage		V_{GSS}	±30	V
Avalanche Current (Note 2)		I_{AR}	12	A
Continuous Drain Current	Continuous	I_D	12	A
	Pulsed (Note 2)	I_{DM}	48	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	790	mJ
	Repetitive (Note 2)	E_{AR}	24	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.5	V/ns
Power Dissipation	TO-220F	P_D	51	W
	TO-220AB		225	W
Junction Temperature		T_J	+150	°C
Storage Temperature		T_{STG}	-55 ~ +150	°C

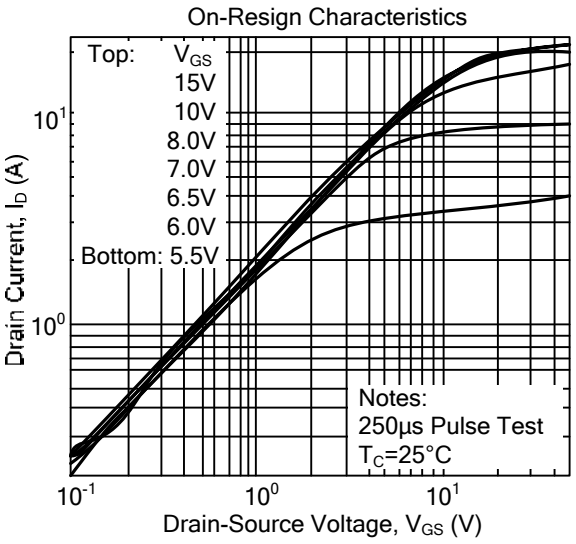
Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. Repetitive Rating : Pulse width limited by maximum junction temperature
3. L = 10mH, I_{AS} = 12A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C
4. I_{SD} ≤ 12A, di/dt ≤200A/s, V_{DD} ≤BV_{DSS} Starting T_J = 25°C

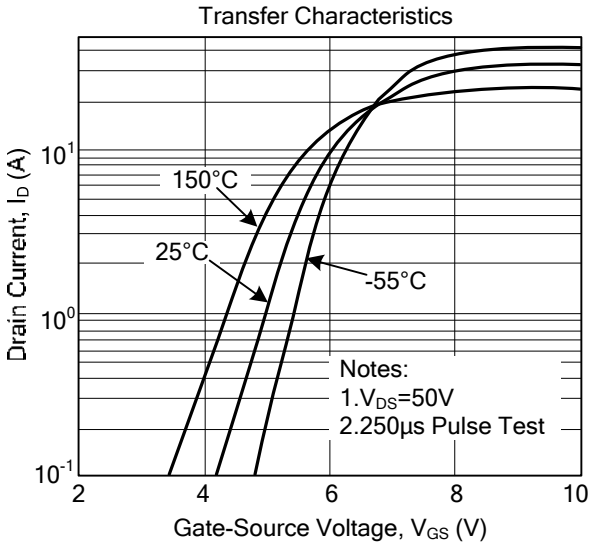
■ ELECTRICAL CHARACTERISTICS (T_C=25°C, unless otherwise noted)

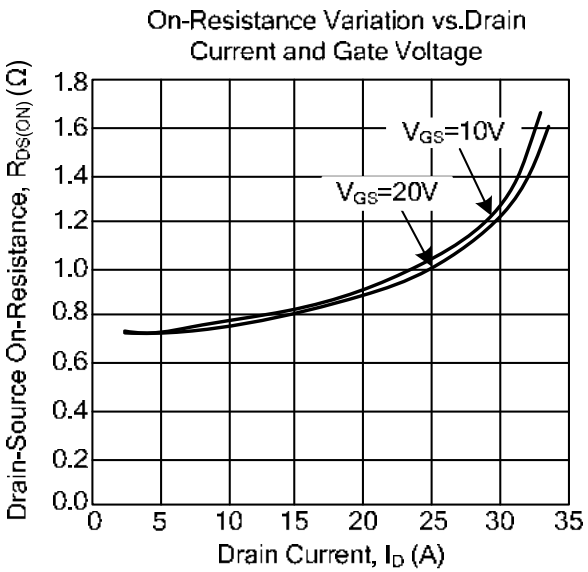
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Off characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0 V, I_D	650	-	-	V
Drain-Source Leakage Current	I_{DSS}	V_{DS} = 650 V, V_{GS} = 0 V	-	-	1	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS} = ±30 V, V_{DS} = 0 V	-	-	±100	nA
Breakdown Voltage Temperature Coefficient	$\triangle BV_{DSS}/\triangle T_J$	I_D=250μA,Referenced to 25°C	-	0.7	-	V/°C
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 = 6.0A	-	0.75	0.8	Ω
Dynamic characteristics						
Input Capacitance	C_{ISS}	V_{DS} = 25 V, V_{GS} = 0 V, f = 1MHz	-	1480	-	pF
Output Capacitance	C_{OSS}		-	200	-	pF
Reverse Transfer Capacitance	C_{RSS}		-	25	-	pF
Switching characteristics						
Turn-On Delay Time	$t_{D(ON)}$	V_{DD} = 325V, I_D = 12A, R_G = 25Ω (Note 1, 2)	-	30	-	ns
Turn-On Rise Time	t_R		-	115	-	ns
Turn-Off Delay Time	$t_{D(OFF)}$		-	95	-	ns
Turn-Off Fall Time	t_F		-	85	-	ns
Total Gate Charge	Q_G	V_{DS}= 520V,I_D= 12A, V_{GS}= 10 V (Note 1, 2)	-	42	-	nC
Gate-Source Charge	Q_{GS}		-	8.6	-	nC
Gate-Drain Charge	Q_{GD}		-	21	-	nC
Source-drain diode ratings and characteristics						
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 12A	-	-	1.4	V
Maximum Continuous Drain-Source Diode Forward Current	I_S		-	-	12	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}		-	-	48	A
Reverse Recovery Time	t_{RR}	V_{GS} = 0 V, I_S = 12A, dI_F/dt = 100 A/μs (Note 1)	-	380	-	ns
Reverse Recovery Charge	Q_{RR}		-	3.5	-	μC

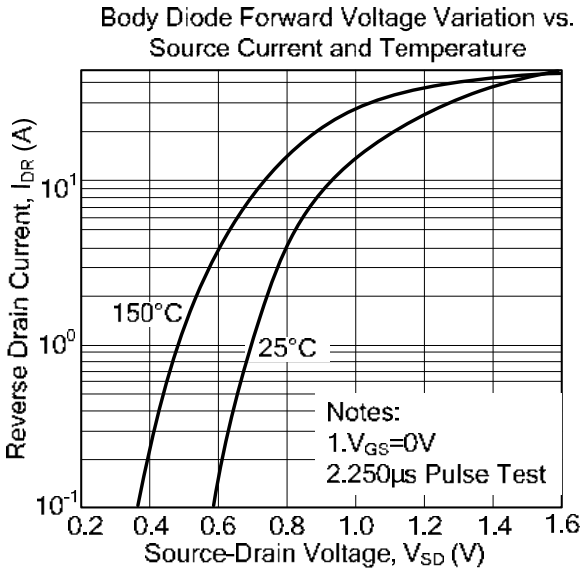
Notes: 1. Pulse Test : Pulse width ≤300μs, Duty cycle ≤ 2%
2. Essentially independent of operating temperature.

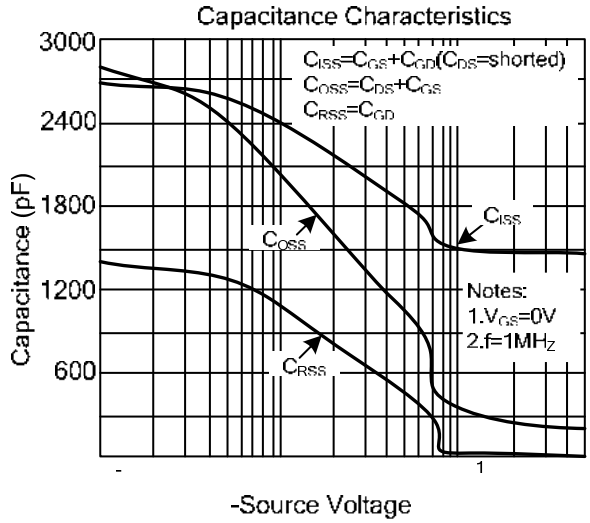
■ TYPICAL CHARACTERISTICS

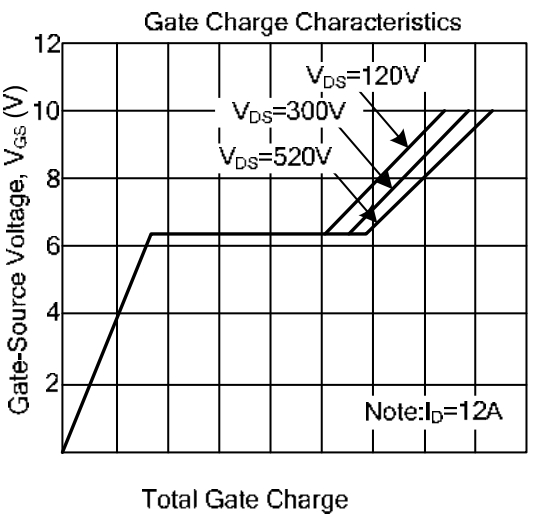




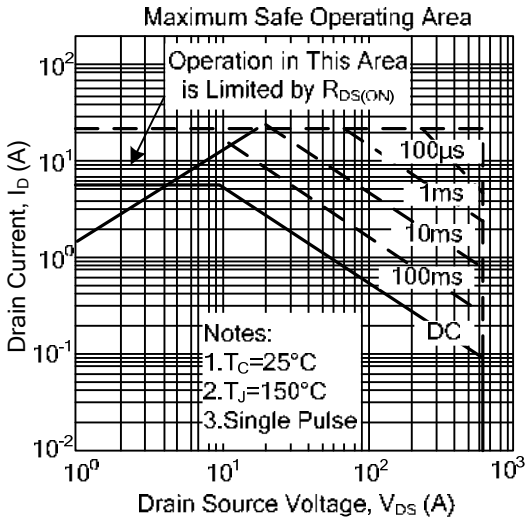


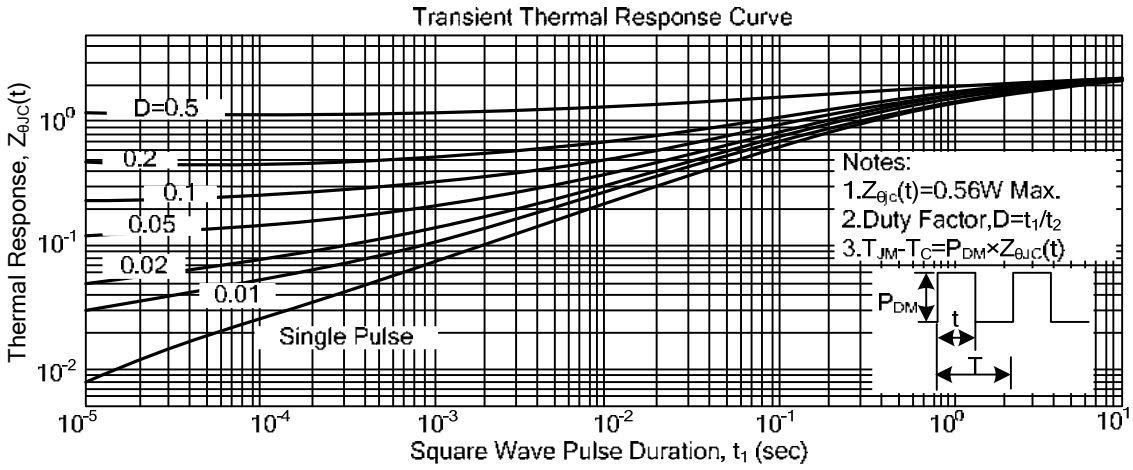




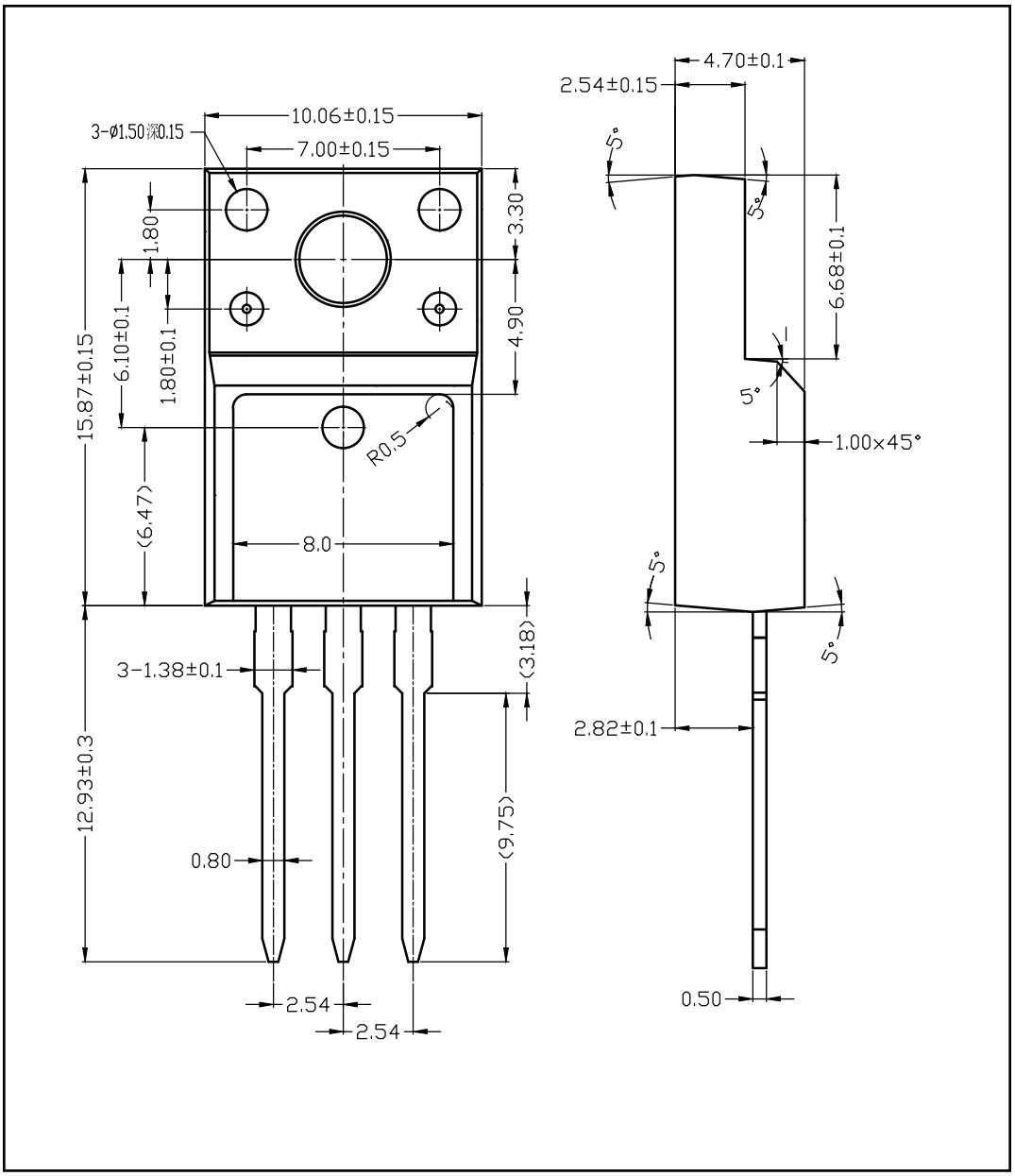


■ TYPICAL CHARACTERISTICS





■ TO-220F PACKAGE OUTLINE DIMENSIONS



■ TO-220 PACKAGE OUTLINE DIMENSIONS