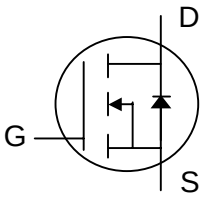
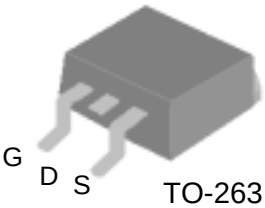
N-channel Enhancement-mode Power MOSFET

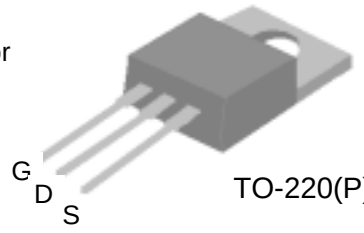
- Low gate-charge
- Simple drive requirement
- Fast switching
- **Pb-free, RoHS compliant.**



BV_{DSS}	30V
$R_{DS(ON)}$	12mΩ
I_D	45A



TO-263 (S)



TO-220(P)

DESCRIPTION

The SSM60T03GS is in a TO-263 package, which is widely used for commercial and industrial surface-mount applications. This device is suitable for low-voltage applications such as DC/DC converters.
The through-hole version, the SSM60T03GP in TO-220, is available for vertical-mounting, where a small footprint is required on the board, and/or an external heatsink is to be attached.
These devices are manufactured with an advanced process, permitting operation up to a maximum junction temperature of 175°C.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D @ T_C=25°C	Continuous Drain Current	45	A
I_D @ T_C=100°C	Continuous Drain Current	32	A
I_{DM}	Pulsed Drain Current[1]	120	A
P_D @ T_C=25°C	Total Power Dissipation	44	W
	Linear Derating Factor	0.352	W/°C
T_{STG}	Storage Temperature Range	-55 to 175	°C
T_J	Operating Junction Temperature Range	-55 to 175	°C

THERMAL DATA

Symbol	Parameter	Value	Units
$R_{\Theta JC}$	Maximum Thermal Resistance Junction-case	3.4	°C/W
$R_{\Theta JA}$	Maximum Thermal Resistance Junction-ambient	62	°C/W

ELECTRICAL CHARACTERISTICS (at Tj=25°C, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	30	-	-	V
$\Delta BV_{DSS}/\Delta Tj$	Breakdown Voltage Temperature Coefficient	Reference to 25°C, I_D=1mA	-	0.03	-	V/°C
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V, I_D=20A	-	-	12	mΩ
		V_{GS}=4.5V, I_D=15A	-	-	25	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	1	-	3	V
g_{fs}	Forward Transconductance[2]	V_{DS}=10V, I_D=10A	-	25	-	S
I_{DSS}	Drain-Source Leakage Current (T_j=25°C)	V_{DS}=30V, V_{GS}=0V	-	-	1	uA
	Drain-Source Leakage Current (T_j=175°C)	V_{DS}=24V ,V_{GS}=0V	-	-	250	uA
I_{GSS}	Gate-Source Leakage	V_{GS}= ±20V	-	-	±100	nA
Q_g	Total Gate Charge[2]	I_D=20A	-	11.6	19	nC
Q_{gs}	Gate-Source Charge	V_{DS}=24V	-	3.9	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=4.5V	-	7	-	nC
$t_{d(on)}$	Turn-on Delay Time[2]	V_{DS}=15V	-	8.8	-	ns
t_r	Rise Time	I_D=20A	-	57.5	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=3.3Ω , V_{GS}=10V	-	18.5	-	ns
t_f	Fall Time	R_D=0.75Ω	-	6.4	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	1135	1816	pF
C_{oss}	Output Capacitance	V_{DS}=25V	-	200	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	135	-	pF

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage[2]	I_S=45A, V_{GS}=0V	-	-	1.3	V
t_{rr}	Reverse Recovery Time[2]	I_S=20A, V_{GS}=0V,	-	23.3	-	ns
Q_{rr}	Reverse Recovery Charge	dI/dt=100A/μs	-	16	-	nC

Notes:

1.Pulse width limited by safe operating area.

2.Pulse width ≤300us, duty cycle ≤2%.

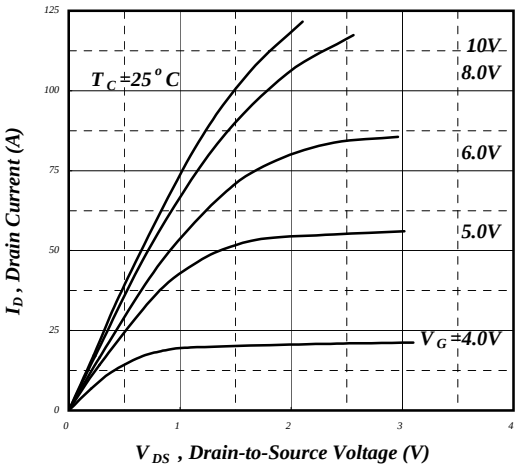


Fig 1. Typical Output Characteristics

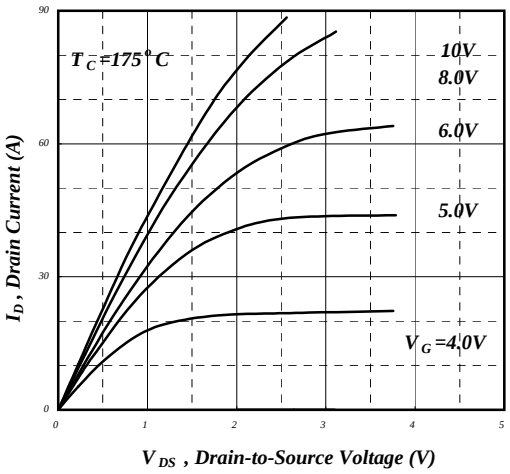


Fig 2. Typical Output Characteristics

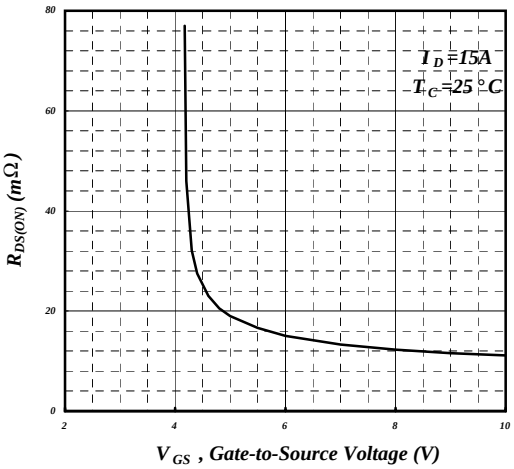


Fig 3. On-Resistance vs. Gate Voltage

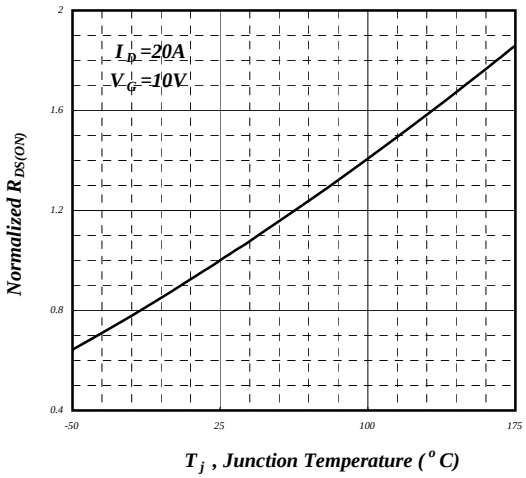


Fig 4. Normalized On-Resistance vs. Junction Temperature

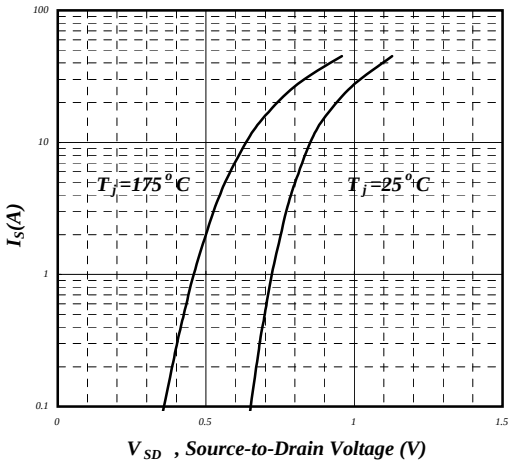


Fig 5. Forward Characteristic of Reverse Diode

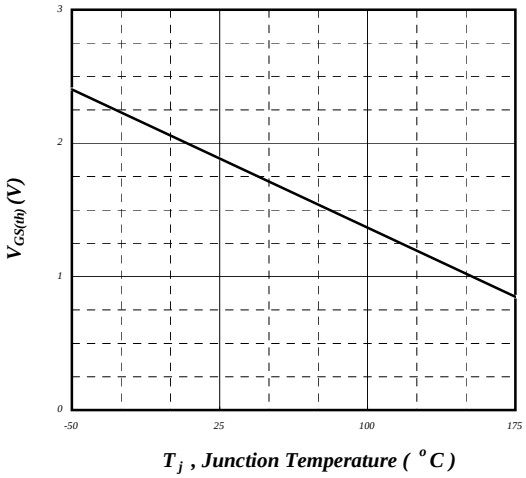


Fig 6. Gate Threshold Voltage vs. Junction Temperature

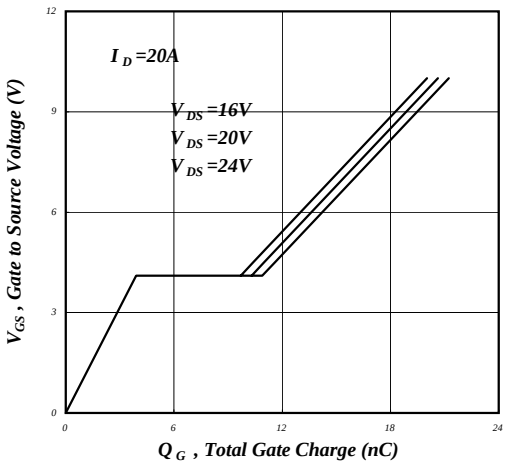


Fig 7. Gate Charge Characteristics

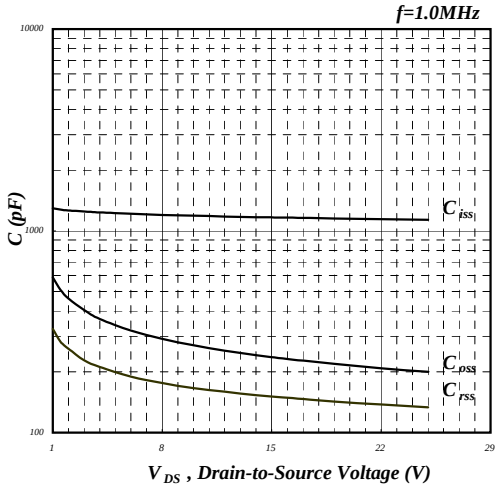


Fig 8. Typical Capacitance Characteristics

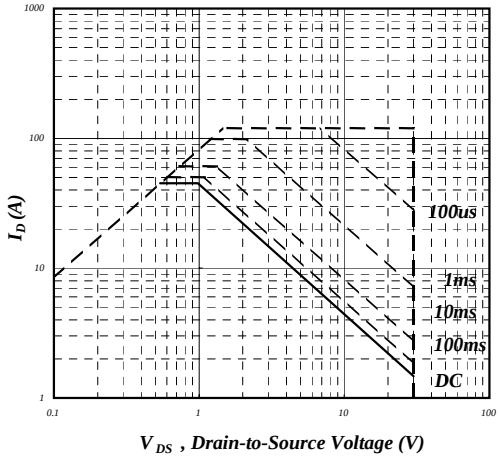


Fig 9. Maximum Safe Operating Area

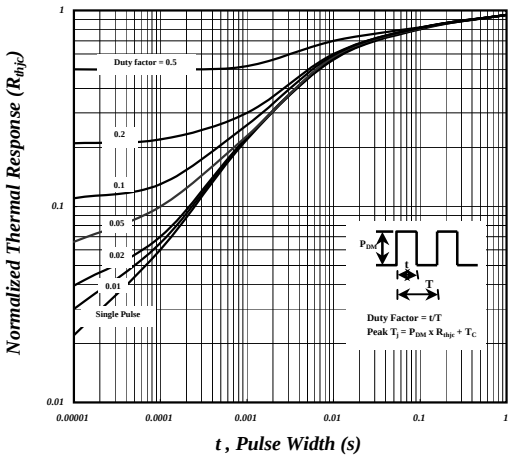


Fig 10. Effective Transient Thermal Impedance

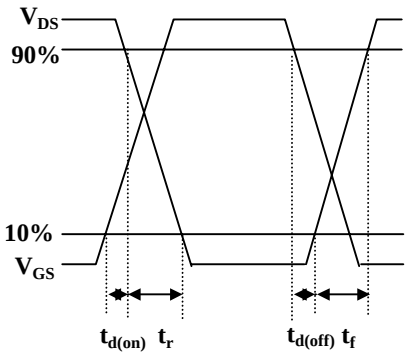


Fig 11. Switching Time Waveform

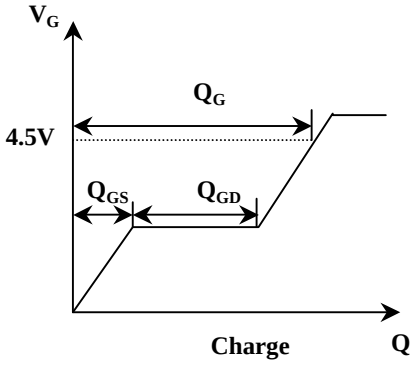


Fig 12. Gate Charge Waveform