

Silicon Carbide MOSFET

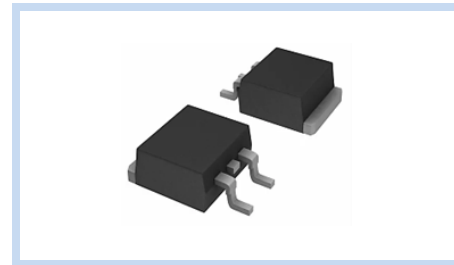
N-Channel 1200V 18A TO-252

MFTC120N18T252

MERITEK

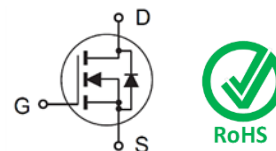
FEATURE

- $R_{DS(ON)} < 196m\Omega$ at $V_{GS}=20V$, $I_D=10A$
- Low On-Resistance with High Blocking Voltage
- Low Capacitances with High-Speed switching
- Low Reverse Recovery Charge
- Applications: High Voltage DC-DC Converter, Switching Mode Power Supplier, Motor Drive, Renewable Energy



MECHANICAL DATA

- Case: TO-252 Package
- Terminals: Solderable per MIL-STD-750, Method 2026

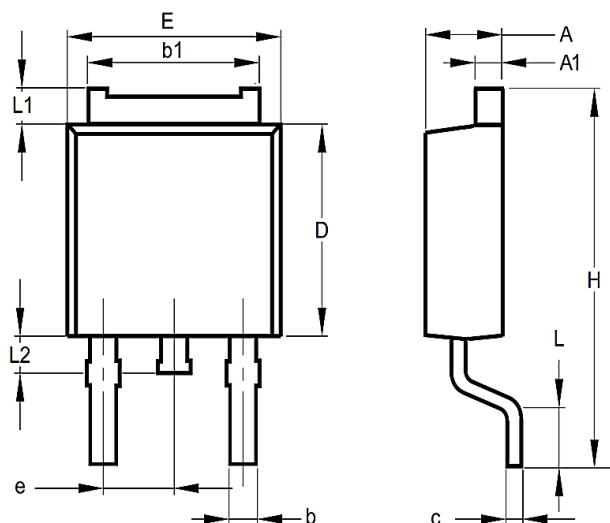


MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Drain-Source Voltage	$V_{GS}=0V$, $I_D=100\mu A$	V_{DS}	1200	V
Gate-Source Voltage	Absolute Maximum Values	V_{GS}	-10/+25	V
	Recommended Operational Values		-5/+20	
Drain Current – Continuous	$V_{GS}=20V$, $T_C=25^\circ C$	I_D	18	A
	$V_{GS}=20V$, $T_C=100^\circ C$		12	A
Drain Current – Pulse with t_p Limited by T_{jmax}		I_{DM}	30	A
Power Dissipation	$T_C=25^\circ C$, $T_J=150^\circ C$	P_D	100	W
Thermal Resistance, Junction to Case		$R_{\theta JC}$	1.2	$^\circ C/W$
Thermal Resistance, Junction to Ambient		$R_{\theta JA}$	40	
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	$^\circ C$

DIMENSIONS

Item	Min (mm)	Max (mm)
A	2.20	2.40
A1	0.46	0.58
b	0.64	0.88
b1	5.15	5.46
c	0.46	0.58
D	6.00	6.25
E	6.40	6.70
e	2.286 BSC	
H	9.40	10.50
L	1.25	1.78
L1	0.85	1.30
L2	0.60	1.00



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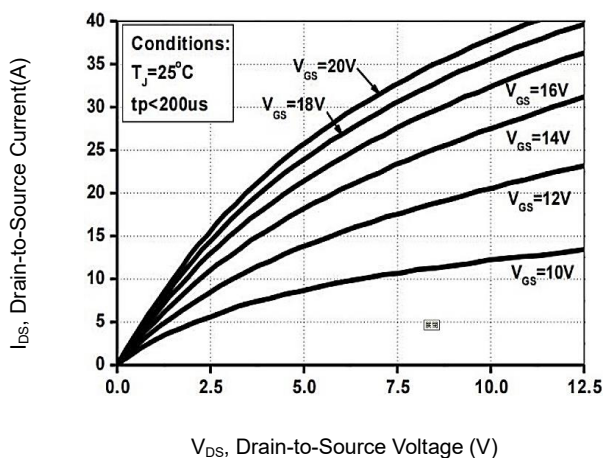
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ELECTRICAL CHARACTERISTICS

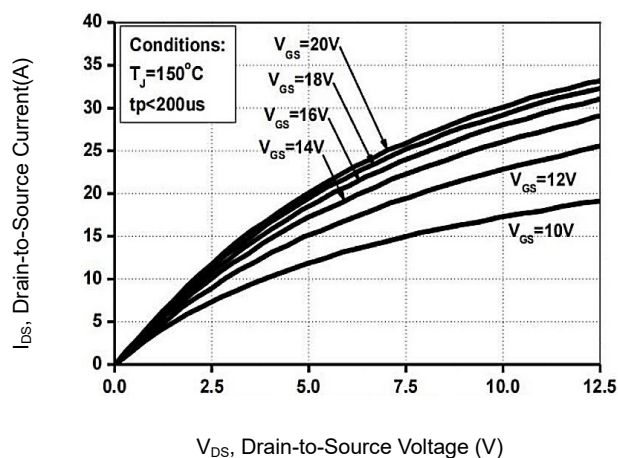
Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=100\mu A$	BV_{DSS}	1200	--	--	V
Zero Gate Voltage Drain Current	$V_{DS}=1200V, V_{GS}=0V$	I_{DSS}	--	--	100	μA
Gate-Body Leakage Current, Forward	$V_{GS}=25V, V_{DS}=0V$	I_{GSSF}	--	--	250	nA
Gate-Body Leakage Current, Reverse	$V_{GS}=-10V, V_{DS}=0V$	I_{GSSR}	--	--	250	nA
On Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Static Drain-Source On-Resistance	$V_{GS}=20V, I_D=10A$	$R_{DS(ON)}$	--	160	196	m Ω
	$V_{GS}=20V, I_D=10A, T_J=150^\circ C$		--	280	--	
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=2.5mA$	$V_{GS(th)}$	2.0	--	4.0	V
	$V_{GS}=V_{DS}, I_D=2.5mA, T_J=175^\circ C$		--	1.8	--	
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	$V_{DS}=800V, I_D=20A, V_{GS}= -5/+20V$	Q_g	--	46	--	nC
Gate-Source Charge		Q_{gs}	--	18	--	
Gate-Drain Charge		Q_{gd}	--	11	--	
Turn-On Delay Time	$V_{DS}=800V, I_D=10A$ $V_{GS}= -5/+20V, R_{GEN}=2.5\Omega,$ $R_L=80\Omega$	$T_{d(on)}$	--	8	--	nS
Rise Time		T_r	--	9	--	
Turn-Off Delay Time		$T_{d(off)}$	--	14	--	
Fall Time		T_f	--	10	--	
Input Capacitance	$V_{DS}=1000V, V_{GS}=0V, V_{AC}=25mV$ $f=1MHz$	C_{iss}	--	890	--	pF
Output Capacitance		C_{oss}	--	54	--	
Reverse Transfer Capacitance		C_{rss}	--	8.5	--	
C_{OSS} Stored Energy		E_{OSS}	--	31	--	
Turn-on Switching Energy	$V_{DS}=800V, I_D=10A, L=80\mu H$ $V_{GS}= -5/+20V, R_{GEN}=2.5\Omega$	E_{ON}	--	330	--	μJ
Turn-off Switching Energy		E_{OFF}	--	60	--	
Internal Gate Resistance	$V_{AC}=25mV, f=1MHz$	R_G	--	5.4	--	Ω
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Diode Forward Voltage	$V_{GS}= -5V, I_F=5A$	V_{SD}	--	4.2	--	V
	$V_{GS}= -5V, I_F=5A, T_J=150^\circ C$		--	3.9	--	
Diode Forward Current - Continuous	$T_C=25^\circ C$	I_S	--	--	18	A
Peak Reverse Recovery Current	$V_R=800V, I_{SD}=20A$	I_{rm}	--	3	--	A
Reverse Recovery Time		T_{rr}	--	28	--	nS
Reverse Recovery Charge		Q_{rr}	--	50	--	nC

CHARACTERISTIC CURVES

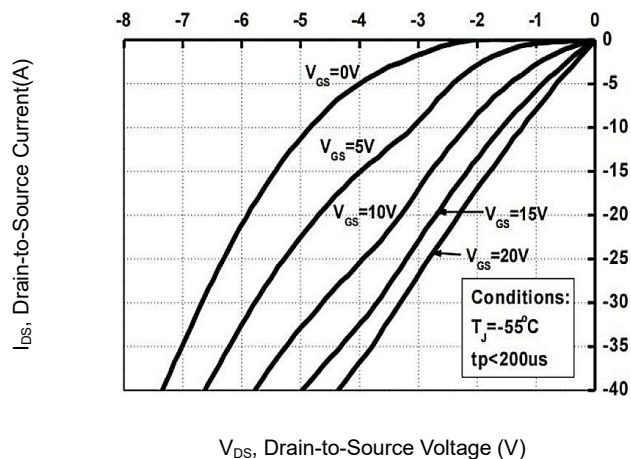
Output Characteristics



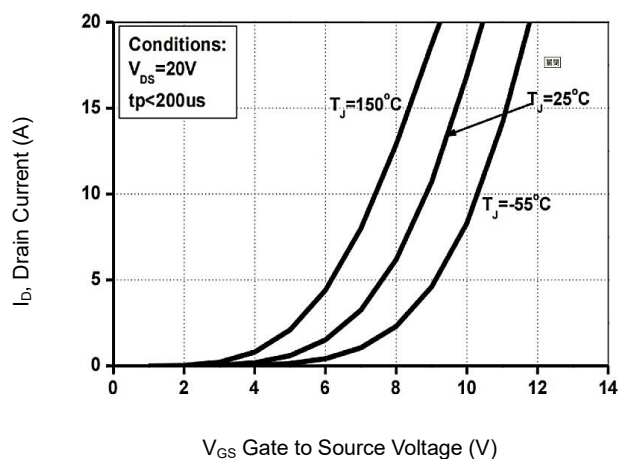
Output Characteristics



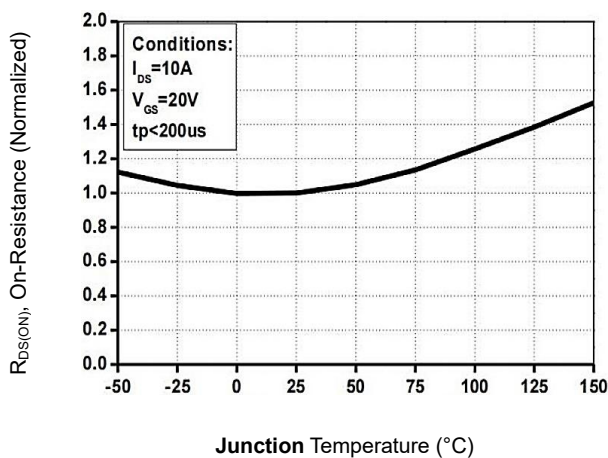
Output Characteristics



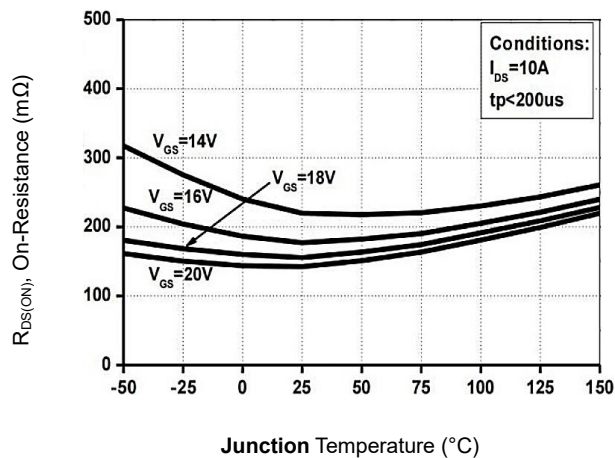
Transfer Characteristic



Normalized On-Resistance vs. Junction temperature

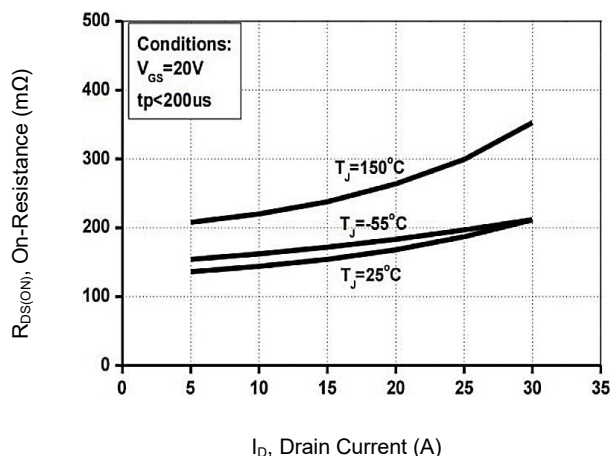


On-Resistance vs. Junction temperature for Vgs

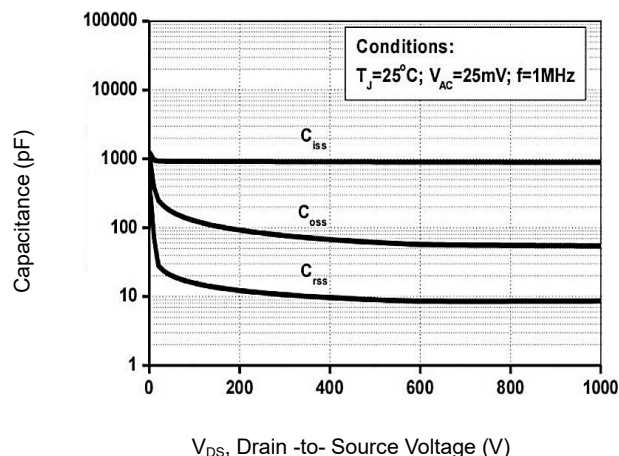


CHARACTERISTIC CURVES

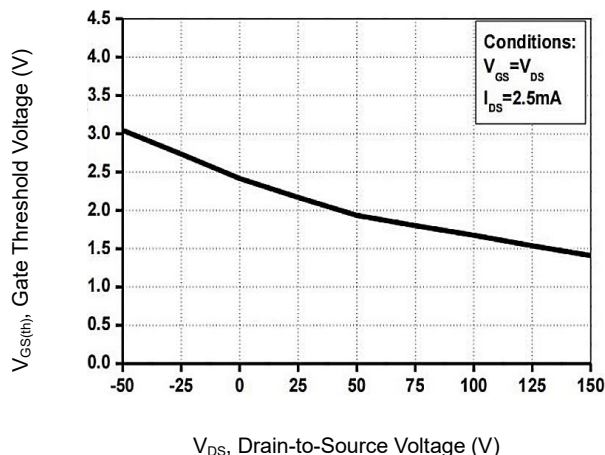
On-Resistance vs. Drain Current



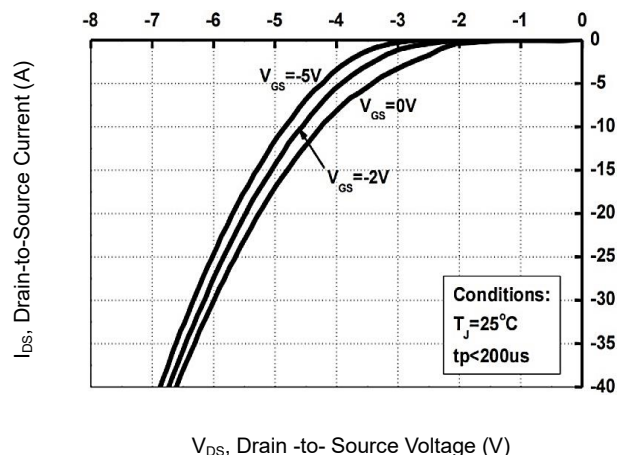
Capacitance vs. Drain-Source Voltage



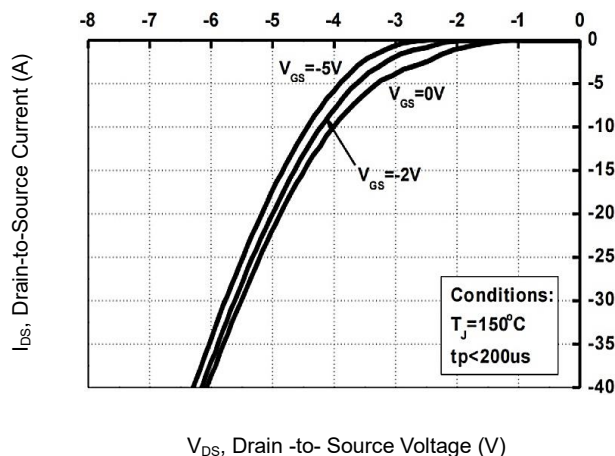
Threshold Voltage vs. Junction temperature



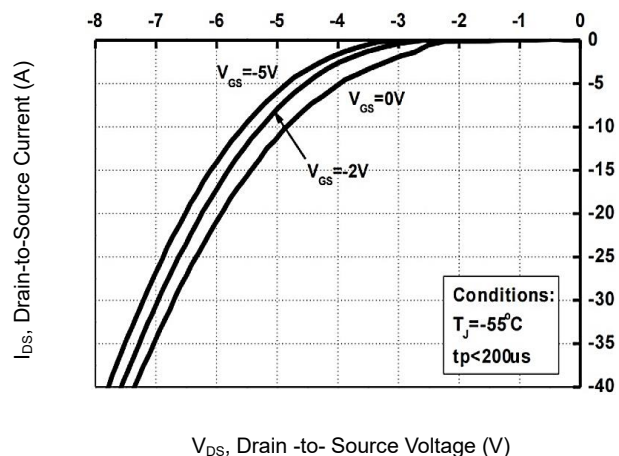
Body Diode Characteristics



Body Diode Characteristics

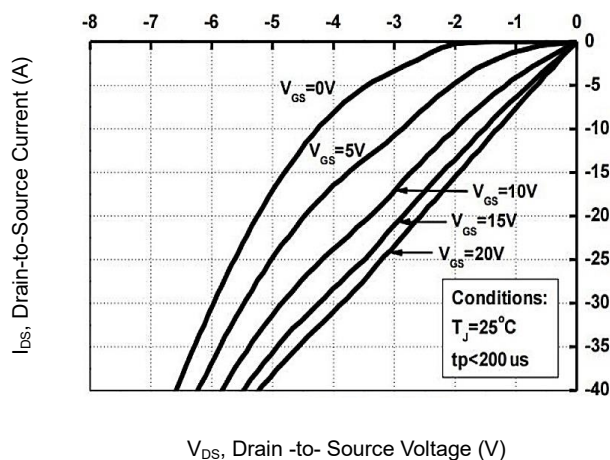


Body Diode Characteristics

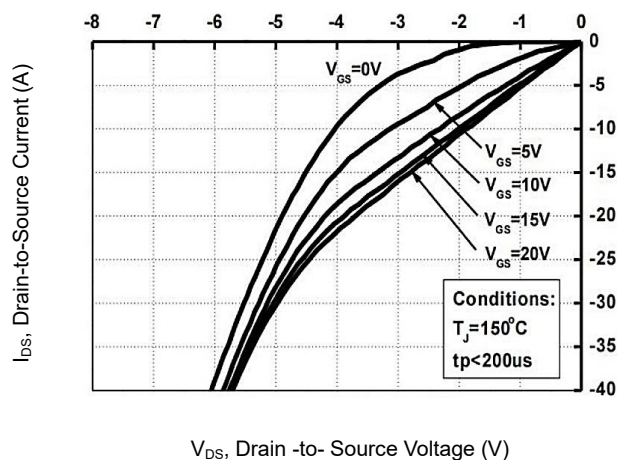


CHARACTERISTIC CURVES

3rd Quadrant Characteristics



3rd Quadrant Characteristics



3rd Quadrant Characteristics

