

Silicon Carbide MOSFET

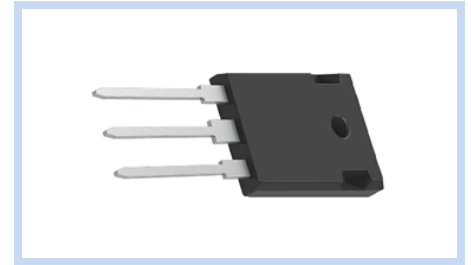
N-Channel 1700V 72A TO-247

MFTC170N72T247

MERITEK

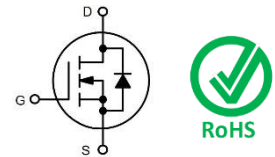
FEATURE

- $R_{DS(ON)} < 70m\Omega$ at $V_{GS}=20V, I_D=50A$
- Low On-Resistance with High Blocking Voltage
- Low Capacitances with High-Speed Switching
- Easy to Parallel and Simple to Drive
- Applications: High Voltage DC/DC Converters, Switching Mode Power Supplier, Solar Inverters, Motor Drivers



MECHANICAL DATA

- Case: TO-247 Package
- Terminals: Solderable per MIL-STD-750, Method 2026



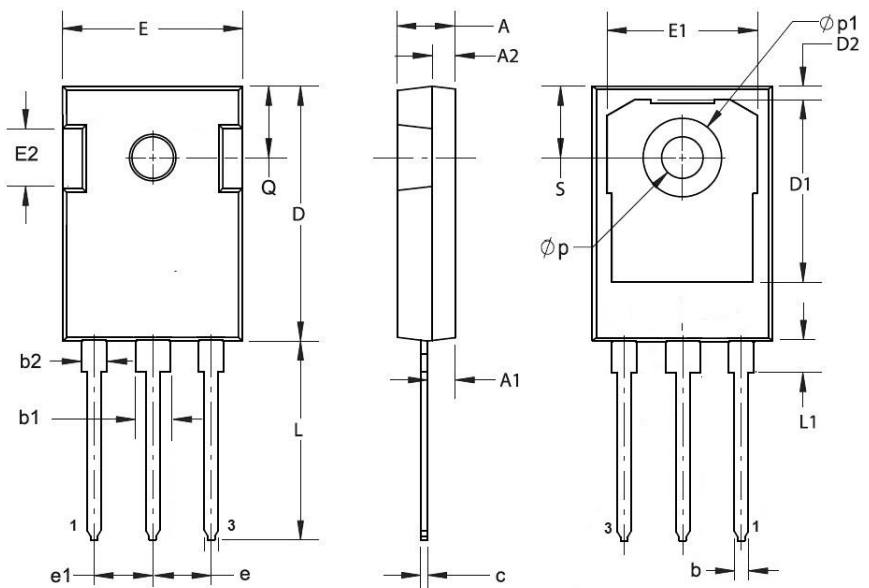
MAXIMUM RATINGS

Parameter	Symbol	Value	Unit	
Drain-Source Voltage	$V_{GS}=0V, I_D=100\mu A$	V_{DS}	1700	V
Gate-Source Voltage	Absolute Maximum Value	V_{GS}	-10/+25	V
	Recommended Operational Values		-5/+20	
Drain Current – Continuous	$V_{GS}=20V, T_C=25^\circ C$	I_D	72	A
	$V_{GS}=20V, T_C=100^\circ C$		48	
Drain Current – Pulse with t_p Limited by T_{jmax}		I_{DM}	160	A
Power Dissipation		P_D	520	W
Thermal Resistance, Junction to Case		$R_{\theta JC}$	0.24	$^\circ C / W$
Thermal Resistance, Junction to Ambient		$R_{\theta JA}$	40	$^\circ C / W$
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	$^\circ C$

DIMENSIONS

DIMENSION	Min	Max
A	4.80	5.20
A1	2.25	2.55
A2	0.55	0.70
b	1.05	1.35
b1	2.85	3.40
b2	1.91	2.21
c	0.55	0.70
D	20.8	21.2
D1	16.25	17.65
e	5.44 BSC	
e1	5.44 BSC	
E	15.70	16.20
L	19.80	20.35
L1	4.00	4.50
p	3.40	3.80
p1	7.180 BSC	
Q	6.15 BSC	

Note: Pin Layout: 1:Gate(G), 2:Drain(D), 3:Source(S)



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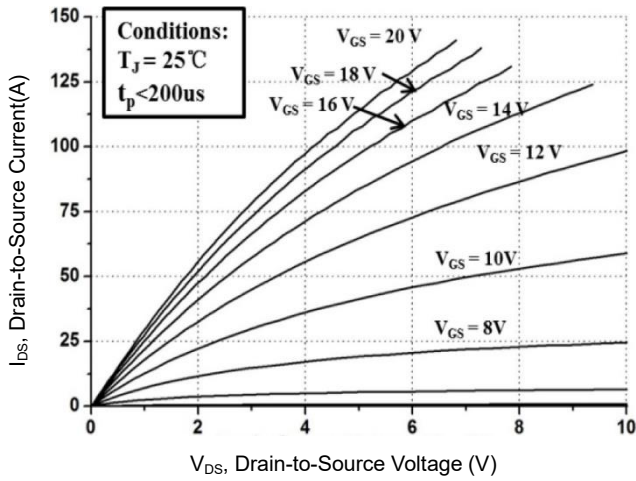
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ELECTRICAL CHARACTERISTICS

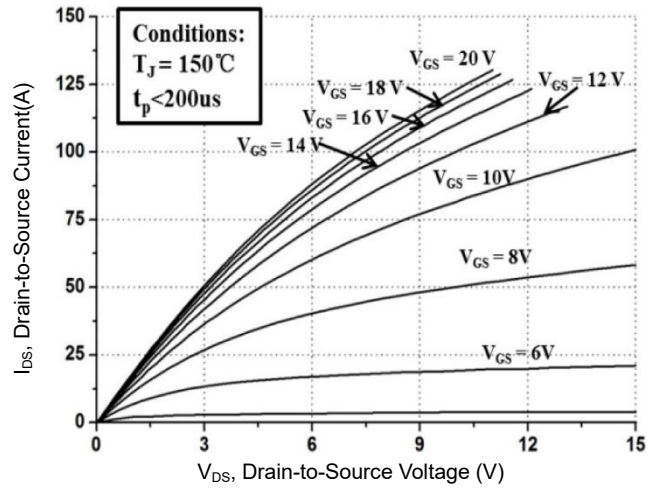
Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=100\mu A$	BV_{DSS}	1700	--	--	V
Zero Gate Voltage Drain Current	$V_{DS}=1700V, V_{GS}=0V$	I_{DSS}	--	--	100	μA
Gate-Body Leakage Current, Forward	$V_{GS}=25V, V_{DS}=0V$	I_{GSSF}	--	--	250	nA
Gate-Body 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	$V_{GS}=20V, I_D=50A$	$R_{DS(ON)}$	--	45	70	m Ω
	$V_{GS}=20V, I_D=50A, T_J=150^\circ C$		--	90	--	
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=18mA$	$V_{GS(th)}$	2.0	--	4.0	V
	$V_{GS}=V_{DS}, I_D=18mA, T_J=150^\circ C$		--	1.8	--	
Transconductance	$V_{GS}=20V, I_D=50A$	g_{FS}	--	25.8	--	S
	$V_{GS}=20V, I_D=50A, T_J=150^\circ C$		--	27	--	
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	$V_{DS}=1200V, I_D=50A, V_{GS}= -5/+20V$	Q_g	--	193	--	nC
Gate-Source Charge		Q_{GS}	--	54	--	
Gate-Drain Charge		Q_{GD}	--	25	--	
Turn-On Delay Time	$V_{DS}=1200V, I_D=30A, R_L=20\Omega$ $V_{GS}= -5/+20V, R_{GEN}=2.5\Omega,$	$T_{d(on)}$	--	27	--	nS
Rise Time		T_r	--	32	--	
Turn-Off Delay Time		$T_{d(off)}$	--	36	--	
Fall Time		T_f	--	10	--	
Turn-On Switching Loss	$V_{DS}=1200V, I_D=30A, L=100\mu H$ $V_{GS}= -5/+20V, R_{GEN}=2.5\Omega,$	E_{ON}	--	3.1	--	mJ
Turn-Off Switching Loss		E_{OFF}	--	1.1	--	
C_{OSS} Stored Loss	$V_{DS}=1000V, V_{GS}=0V, V_{AC}=25mV$ $f=1MHz$	E_{OSS}	--	101	--	μJ
Input Capacitance		C_{iss}	--	3550	--	pF
Output Capacitance		C_{oss}	--	165	--	
Reverse Transfer Capacitance		C_{rfs}	--	6.1	--	
Internal Gate Resistance	$V_{AC}=25mV, f=1MHz$	$R_{G(int)}$	--	2.6	--	Ω
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Diode Forward Current	$T_C=25^\circ C$	I_S	--	--	72	A
Drain-Source Diode Forward Voltage	$V_{GS}= -5V, I_{SD}=25A$	V_{SD}	--	4.5	--	V
	$V_{GS}= -5V, I_{SD}=25A, T_J=150^\circ C$		--	4.2	--	
Peak Reverse Recovery Current	$V_R=1200V, I_{SD}=50A$	I_{rm}	--	6.7	--	A
Reverse Recovery Time		T_{rr}	--	55	--	nS
Reverse Recovery Charge		Q_{rr}	--	220	--	nC

CHARACTERISTIC CURVES

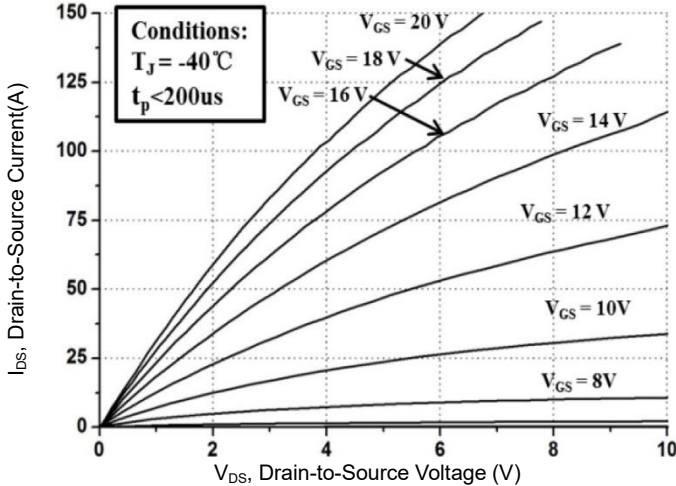
Output Characteristics



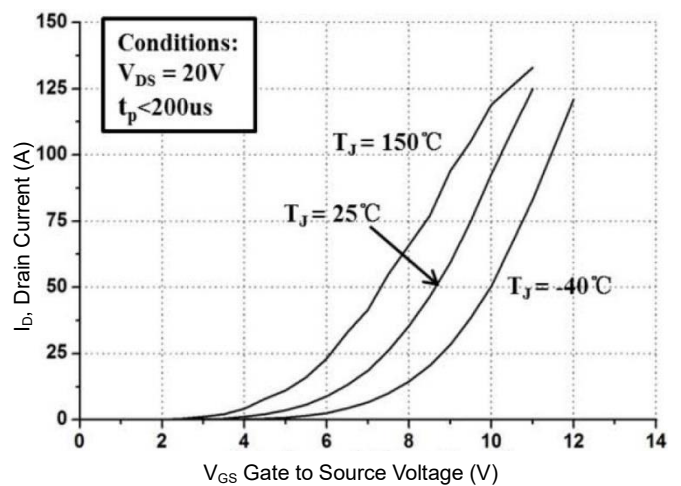
Output Characteristics



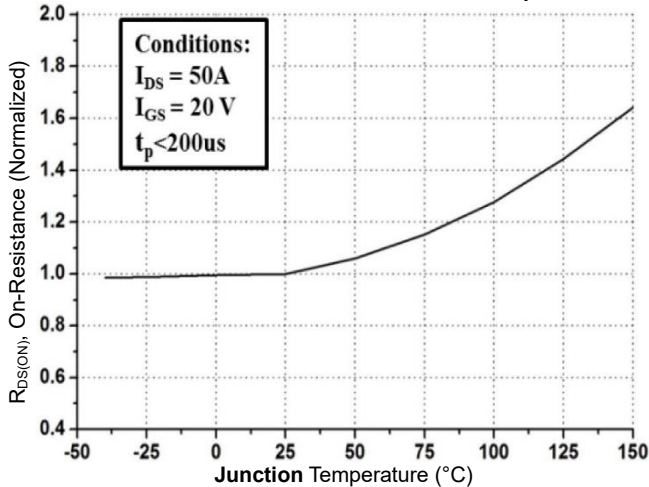
Output Characteristics



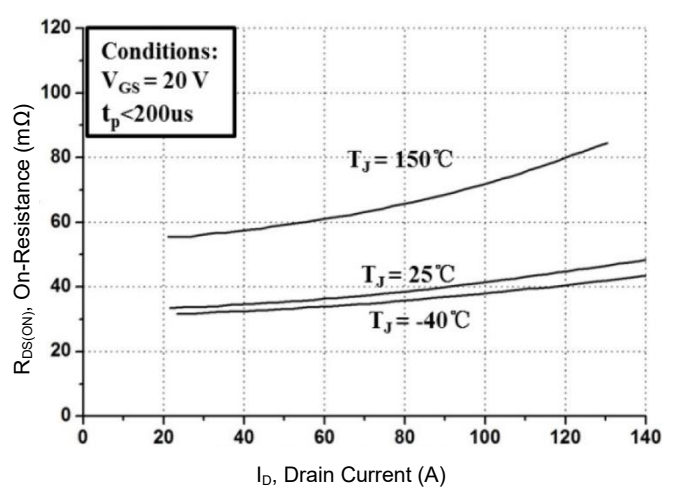
Transfer Characteristic



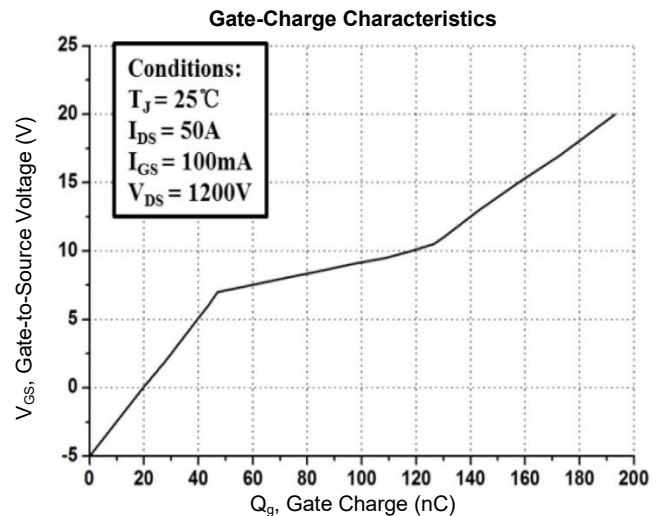
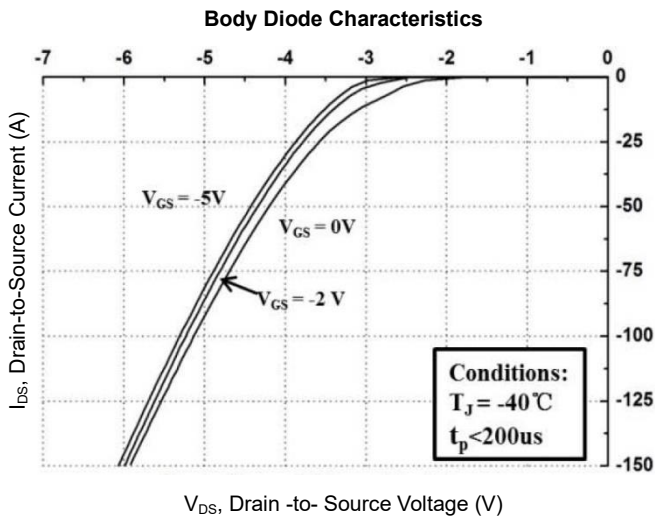
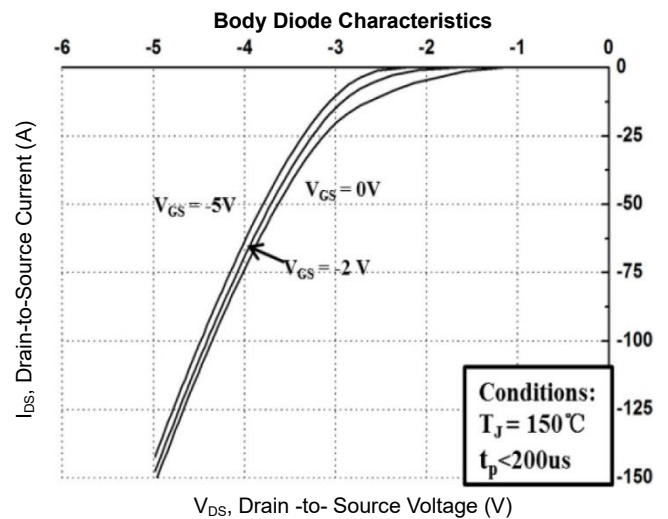
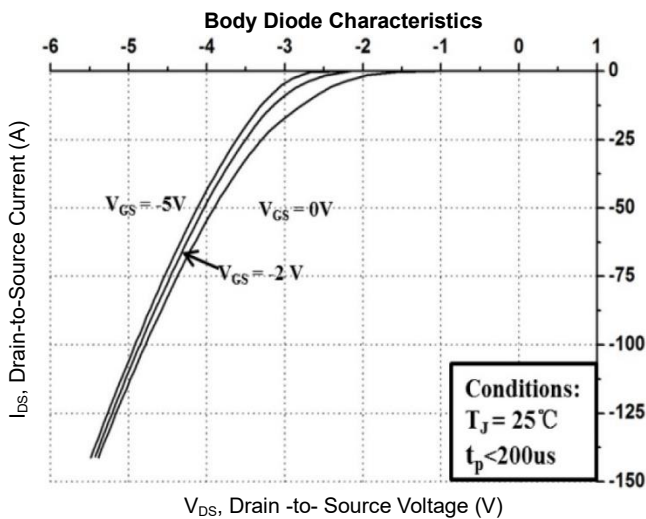
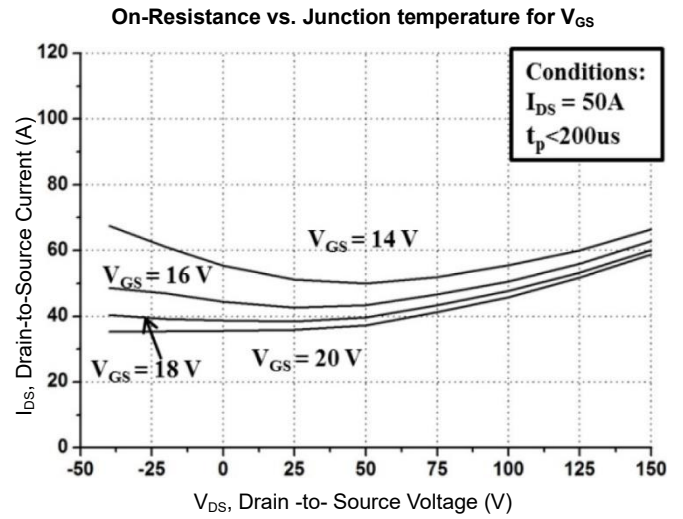
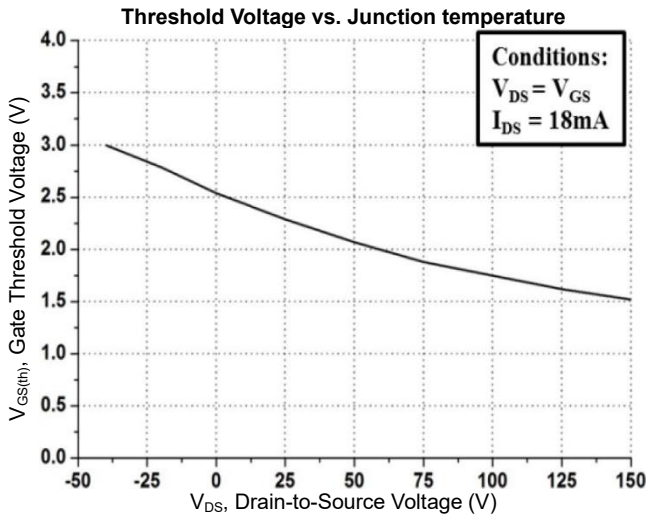
Normalized On-Resistance vs. Junction temperature



On-Resistance vs. Drain Current



CHARACTERISTIC CURVES



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