

Silicon Carbide MOSFET

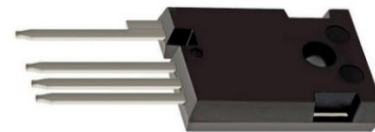
N-Channel 1200V 65A TO-247-4

MFTC120N65T2474

MERITEK

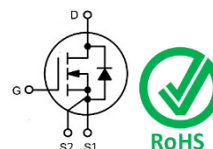
FEATURE

- $R_{DS(ON)} < 34m\Omega$ at $V_{GS}=20V$, $I_D=50A$
- 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, Power Supplies



MECHANICAL DATA

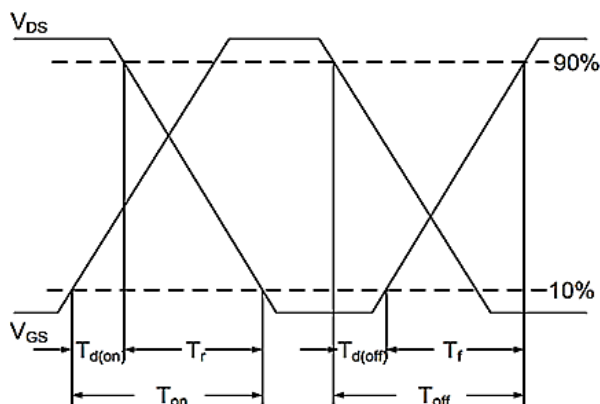
- Case: TO-247-4 Package
- Terminals: Solderable per MIL-STD-750, Method 2026



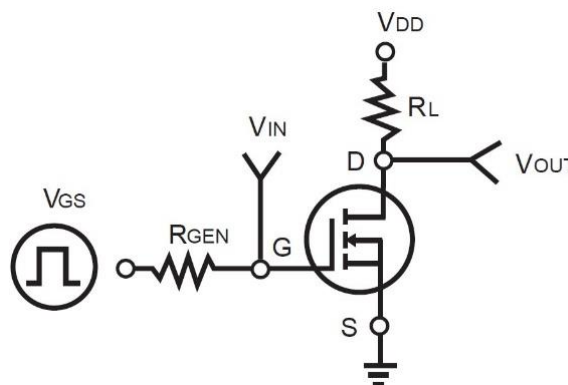
MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Drain-Source Voltage	$V_{GS}=0V$, $I_D=100\mu A$	V_{DS}	1200	V
Gate-Source Voltage	Dynamic ($f > 1Hz$)	V_{GS}	-10/ +25	V
	Static		-5/ +20	
Drain Current – Continuous	$V_{GS}=20V$, $T_C=25^\circ C$	I_D	65	A
	$V_{GS}=20V$, $T_C=100^\circ C$		43	A
Drain Current – Pulse with t_p Limited by T_{jmax}		I_{DM}	200	A
Power Dissipation		P_D	370	W
Thermal Resistance, Junction to Case		$R_{\theta JC}$	0.44	$^\circ C / W$
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	$^\circ C$

Switching Time Waveform



Switching Test Circuit



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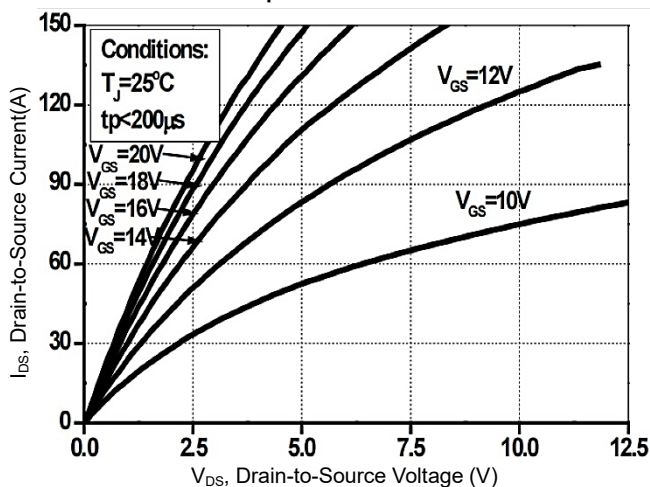
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ELECTRICAL CHARACTERISTICS

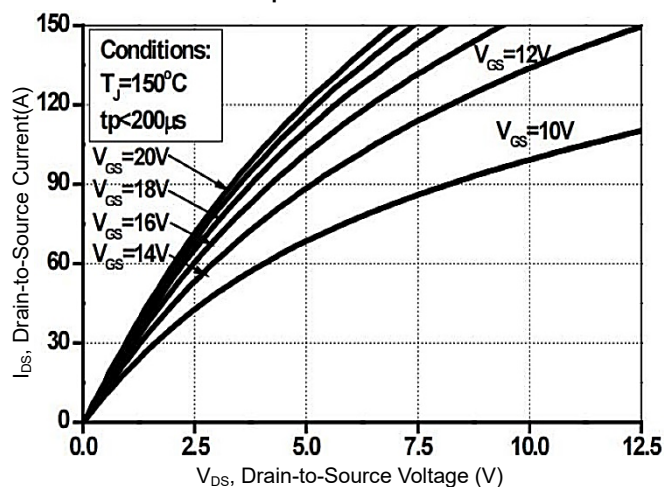
Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=100\mu A$	BV_{DSS}	1200	--	--	V
Zero Gate Voltage Drain Current	$V_{DS}=1200V, V_{GS}=0V$	I_{DSS}	--	--	100	μA
Gate-Source Leakage Current, Forward	$V_{GS}=25V, V_{DS}=0V$	I_{GSSF}	--	--	250	nA
Gate-Source 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	$V_{GS}=20V, I_D=50A$	$R_{DS(ON)}$	--	25	34	m Ω
	$V_{GS}=20V, I_D=50A, T_J=150^\circ C$		--	43	--	
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=15mA$	$V_{GS(th)}$	1.9	2.4	4.0	V
	$V_{GS}=V_{DS}, I_D=15mA, T_J=150^\circ C$		--	1.7	--	
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	$V_{DS}=800V, I_D=20A, V_{GS}= -4/+18V$	Q_g	--	195	--	nC
Gate-Source Charge		Q_{gs}	--	54	--	
Gate-Drain Charge		Q_{gd}	--	29	--	
Turn-On Delay Time	$V_{DS}=800V, I_D=50A, V_{GS}= -5/+20V, R_{GEN}=2.5\Omega, R_L=16\Omega$	$T_{d(on)}$	--	15	--	ns
Rise Time		T_r	--	12	--	
Turn-Off Delay Time		$T_{d(off)}$	--	34	--	
Fall Time		T_f	--	7	--	
Turn-On Switching Loss	$V_{DS}=800V, I_D=50A, L=412\mu H, V_{GS}= -5/+20V, R_{GEN}=2.5\Omega$	E_{ON}	--	1.8	--	mJ
Turn-Off Switching Loss		E_{OFF}	--	0.6	--	
Input Capacitance	$V_{DS}=1000V, V_{GS}=0V, V_{AC}=25mV, f=1MHz$	C_{iss}	--	4200	--	pF
Output Capacitance		C_{oss}	--	250	--	
Reverse Transfer Capacitance		C_{rss}	--	16	--	
C_{OSS} Stored Energy		E_{oss}	--	126	--	μJ
Internal Gate Resistance	$F=1MHz, V_{AC}=25mV$	R_G	--	2.1	--	Ω
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Diode Forward Voltage	$V_{GS}= -5V, I_{SD}=25A$	V_{SD}	--	3.5	--	V
	$V_{GS}= -5V, I_{SD}=25A, T_J=150^\circ C$		--	3.3	--	
Diode Forward Current - Continuous	$T_C=25^\circ C$	I_S	--	--	98	A
Peak Reverse Recovery Current	$V_R=800V, I_{SD}=50A$	I_{rm}	--	7.2	--	A
Reverse Recovery Time		T_{rr}	--	50	--	ns
Reverse Recovery Charge		Q_{rr}	--	216	--	nC

CHARACTERISTIC CURVES

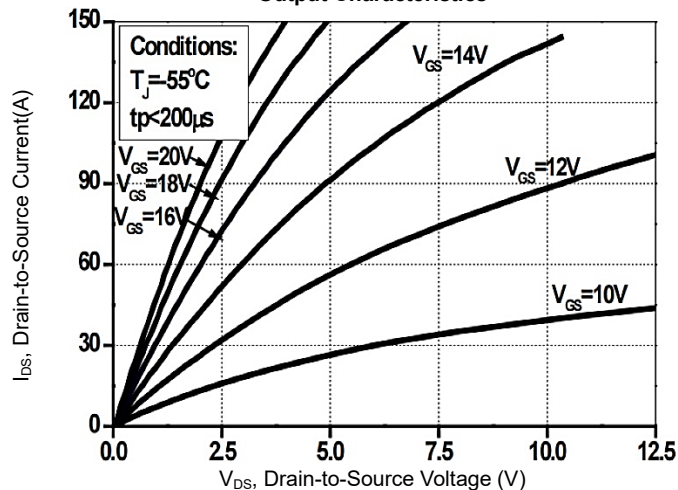
Output Characteristics



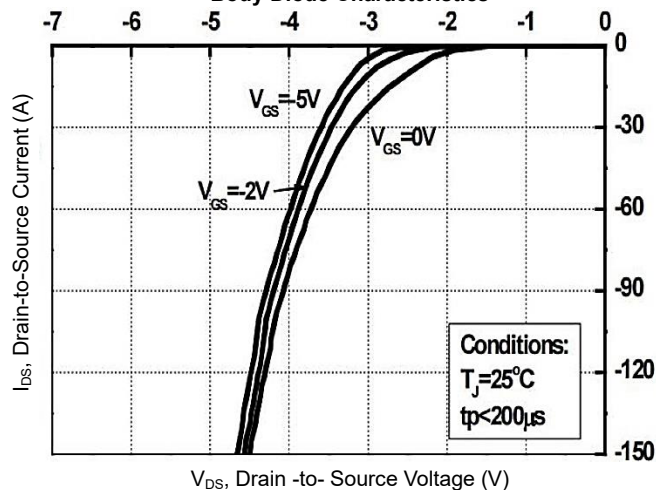
Output Characteristics



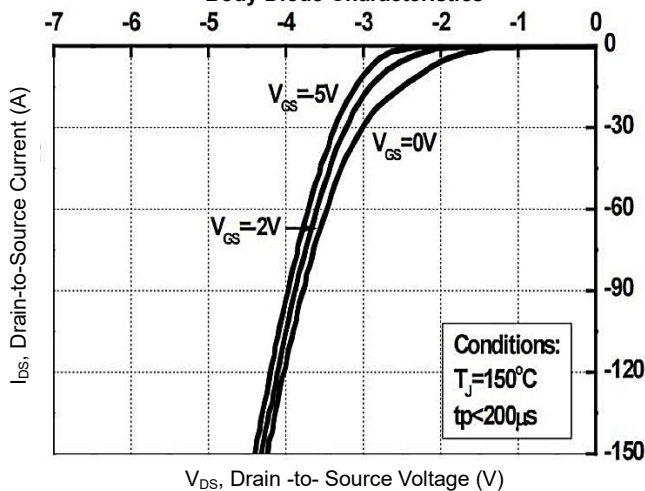
Output Characteristics



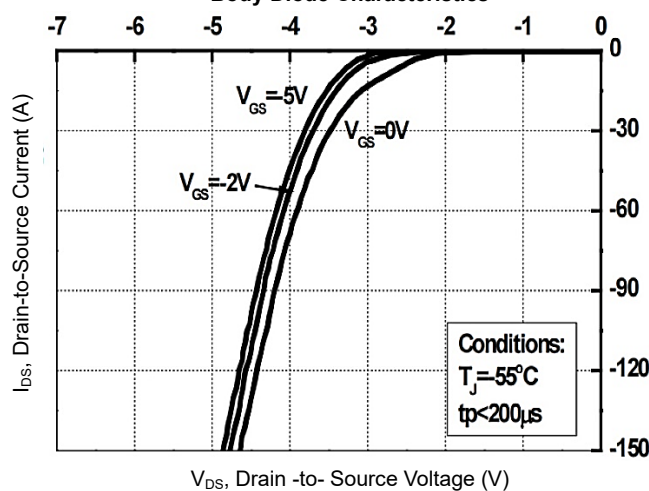
Body Diode Characteristics



Body Diode Characteristics

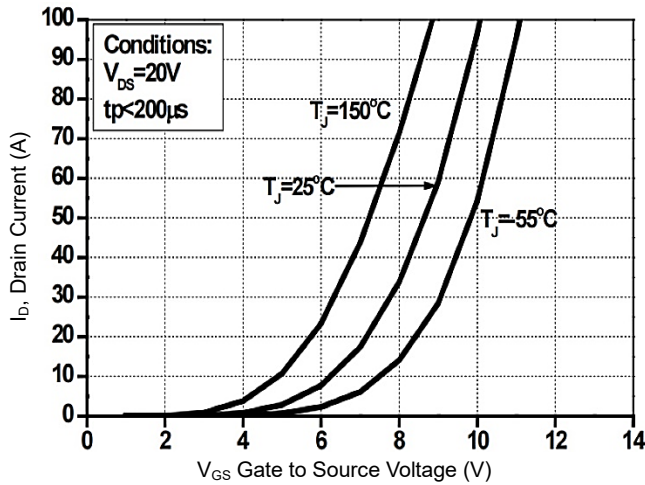


Body Diode Characteristics

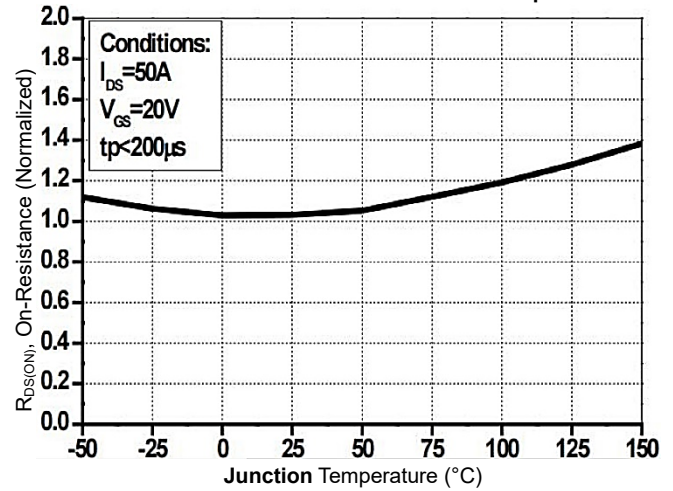


CHARACTERISTIC CURVES

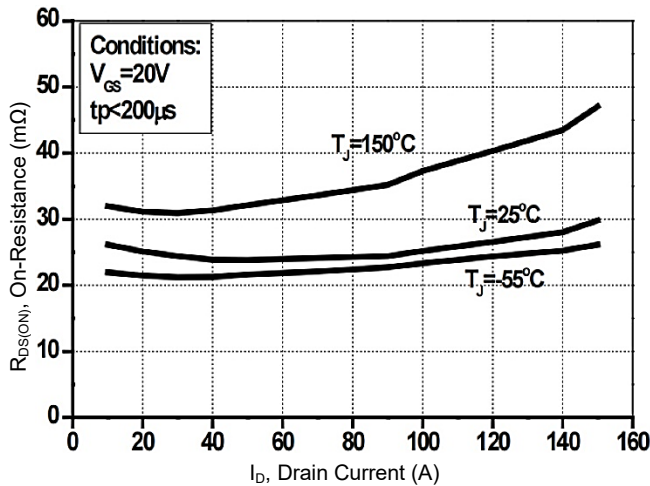
Transfer Characteristic



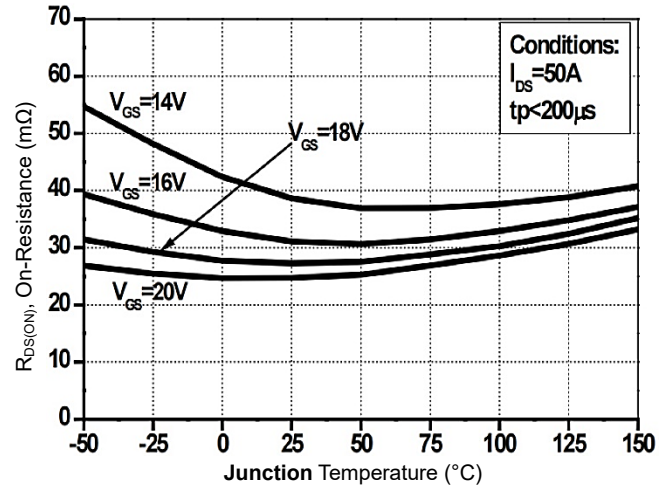
Normalized On-Resistance vs. Junction temperature



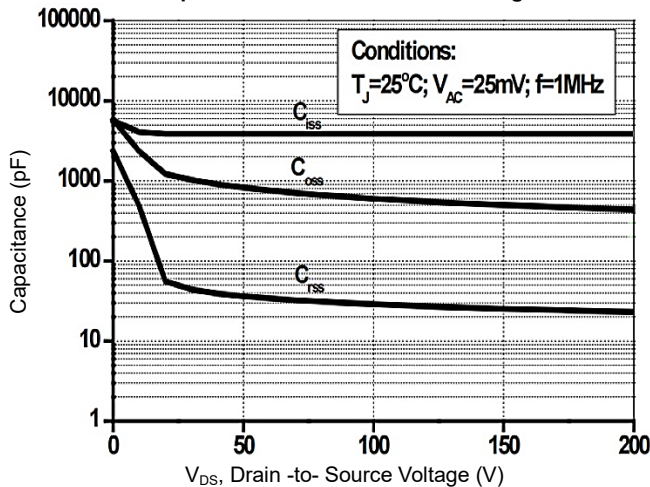
On-Resistance vs. Drain Current



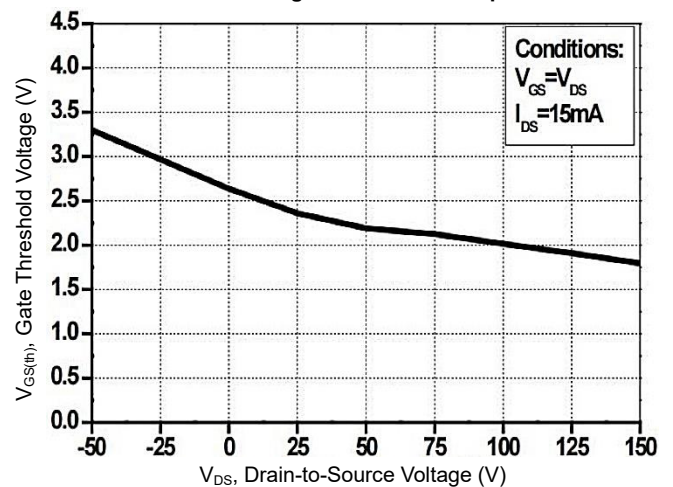
On-Resistance vs. Junction temperature for V_{GS}



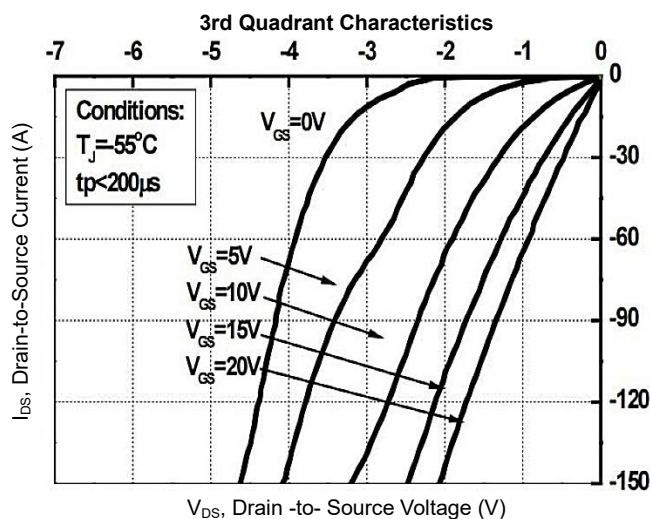
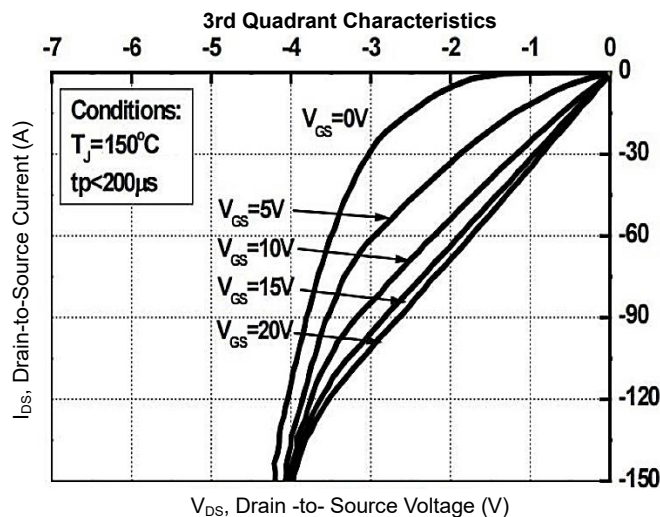
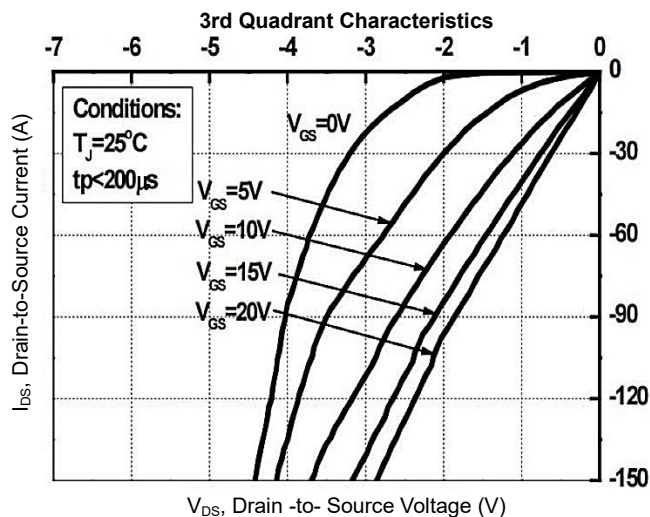
Capacitance vs. Drain-Source Voltage



Threshold Voltage vs. Junction temperature



CHARACTERISTIC CURVES



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DIMENSIONS

DIMENSION	Min (mm)	Max (mm)
A	4.80	5.25
A1	2.25	2.55
A2	1.90	2.20
b	1.05	1.35
b1	1.05	1.60
b2	2.35	2.95
c	0.55	0.70
D	23.20	23.80
D1	16.25	17.65
e	2.54 BSC	
e1	5.08 BSC	
E	15.70	16.20
E1	13.00	14.20
E2	3.65	5.20
L	17.30	19.85
L1	3.95	4.45
p	3.50	3.65
p1	7.18 BSC	
Q	5.45	6.30

Note: Pin Layout: 1: Drain(D), 2: Source(S2), 3: Source (S1), 4: Gate(G)

