

FEATURES

Wide Bandgap SiC MOSFET Technology
Low On-Resistance with High Blocking Voltage
Low Capacitances with High-Speed Switching
Low Reverse Recovery (Qrr)
Easy to Parallel and Simple to Drive

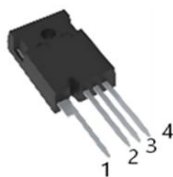
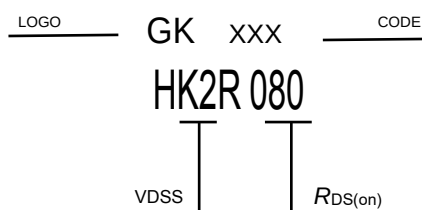
APPLICATION

Reduced Switching Losses
Increased System Switching Frequency
Increased Power Density
Reduction of Heat Sink Requirements
Reduced EMI

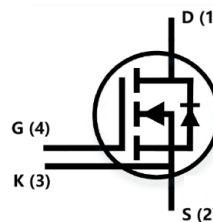
APPLICATION

Power Factor Correction Modules
Switch Mode Power Supplies
DC-AC Inverters
High Voltage DC/DC Converters

V_{DS} 1200V
 I_D 36 A
 $R_{DS(ON)}$ 80 m Ω



TO-247-4L top view



ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Test Condition	Value	Unit
Drain to Source Voltage	V_{DS}	$V_{GS} = 0V, I_D = 100\mu A$	1200	V
Gate to Source Voltage	V_{GS}	Absolute maximum values	-10/+22	V
Recommended Operation Voltage of Gate to Source	V_{GSop}	Recommended operational values	-4/+18	V
Continuous Drain Current	I_D	$V_{GS}=18V, T_C=25^\circ\text{C}$	36	A
		$V_{GS}=18V, T_C=100^\circ\text{C}$	25	
Pulsed Drain Current	I_{DM}	Pulse with T_p limited by T_{jmax}	80	A
Power Dissipation	P_{tot}	$T_C=25^\circ\text{C}, T_j=175^\circ\text{C}$	283	W
Operating and Storage Temperature	T_j, T_{stg}		-55 to +175	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS ($T_C=25^{\circ}\text{C}$, unless otherwise specified)

Static Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min.	Typ.	Max.	
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=500\mu A$	1200			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=5mA, T_J=25^{\circ}\text{C}$	2		4	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS}=0V, V_{DS}=1200V$			10	μA
Gate to Source Leakage Current	I_{GSS}	$V_{GS}=18V, V_{DS}=0V$			100	nA
Drain to Source on Resistance	$R_{DS(on)}$	$V_{GS}=18V, I_D=20A$		80	104	m Ω
		$V_{GS}=18V, I_D=20A, T_J=175^{\circ}\text{C}$		122		

Dynamic Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min.	Typ.	Max.	
Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=800V, f=1MHz, T_J=25^{\circ}\text{C}$		944		pF
Output Capacitance	C_{oss}			42.6		
Reverse Transfer Capacitance	C_{rss}			4.1		
Total Gate Charge	Q_g	$V_{GS}=-4/18V, V_{DS}=800V, I_D=20A, T_J=25^{\circ}\text{C}$		51		nC
Gate-Source Charge	Q_{gs}			13		
Gate-Drain Charge	Q_{gd}			25		
Gate Resistance	R_g	$V_{AC}=25mV, f=1MHz$		4		Ω

Thermal Characteristics

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
Thermal Resistance from Junction to Case	$R_{th(j-c)}$	-	0.529	-	$^{\circ}\text{C/W}$

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$, unless otherwise specified)

Switching Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min.	Typ.	Max.	
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = -4/18\text{V}$, $V_{DD} = 800\text{V}$, $I_b = 20\text{A}$, $R_g = 10\Omega$		38		ns
Rise Time	t_r			46		
Turn-Off Delay Time	$t_{d(off)}$			32		
Fall Time	t_f			41		
Turn-On Energy	E_{on}			108		μJ
Turn-Off Energy	E_{off}			49		

Reverse Diode Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min.	Typ.	Max.	
Diode Forward Voltage	V_{SD}	$V_{GS} = -4\text{V}$, $I_{SD} = 10\text{A}$, $T_j = 25^\circ\text{C}$	-	4.5		V
Continuous Diode Forward Current	I_S	$V_{GS} = -4\text{V}$, $T_j = 25^\circ\text{C}$		36		A
Reverse Recovery Time	t_{rr}	$V_{GS} = -4\text{V}$, $I_{SD} = 20\text{A}$, $V_R = 800\text{V}$, $di/dt = 800\text{A}/\mu\text{s}$, $T_j = 25^\circ\text{C}$		17.5		ns
Reverse Recovery Charge	Q_{rr}			71.4		nC
Peak Reverse Recovery Current	I_{rrm}			6.8		A

RATING AND CHARACTERISTIC CURVES

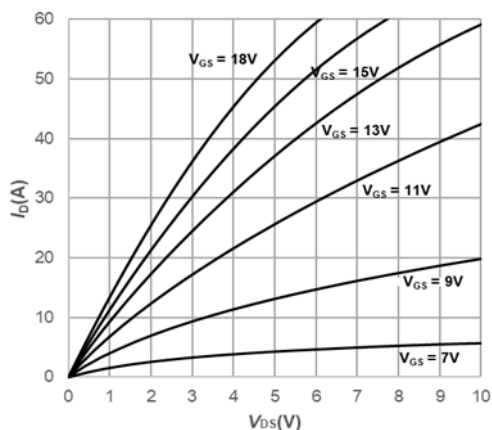


Fig1. Output Characteristics $T_j = 25^\circ\text{C}$

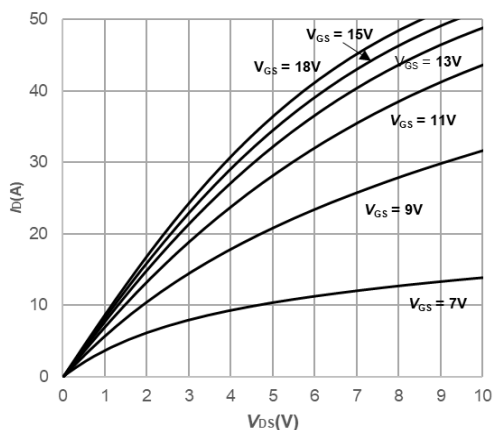


Fig2. Output Characteristics $T_j = 175^\circ\text{C}$

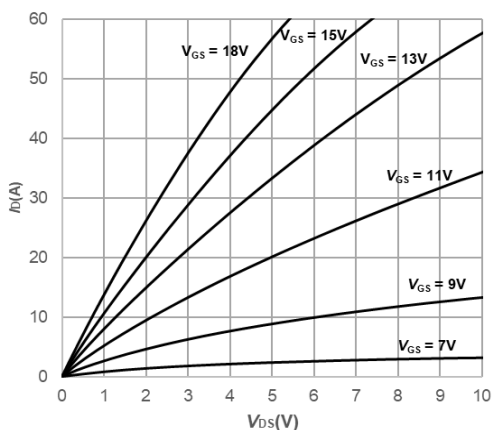


Fig3. Output Characteristics $T_j = -55^\circ\text{C}$

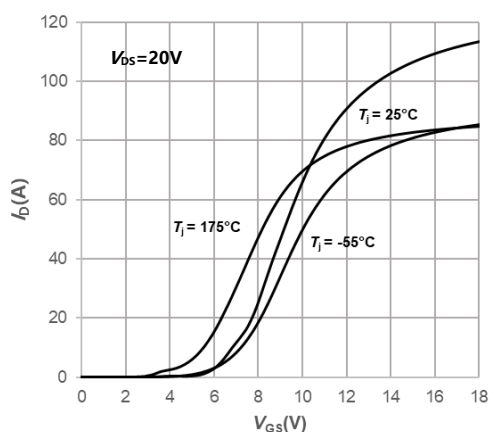


Fig4. Typical Transfer Characteristics

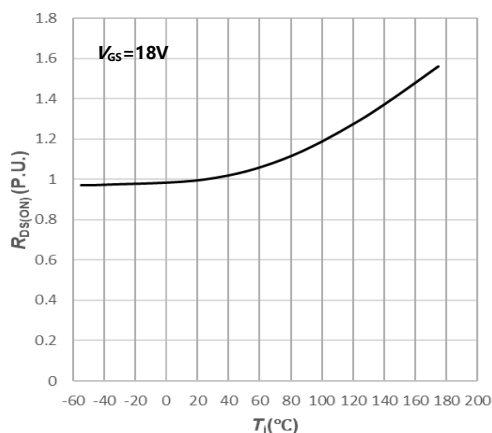


Fig5. Normalized On-Resistance vs. Temperature

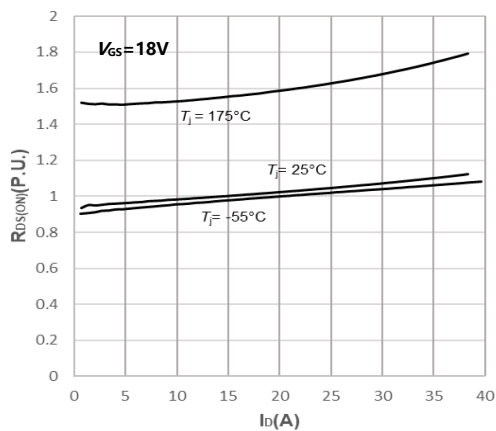


Fig6. Normalized On-Resistance vs. Drain Current for Various Temperatures

RATING AND CHARACTERISTIC CURVES

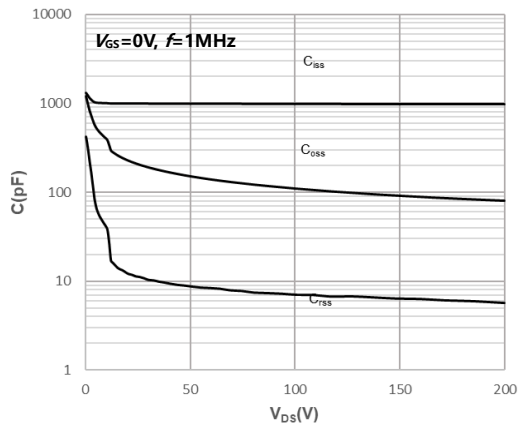


Fig7. Capacitances vs. Drain-Source Voltage (0-200V)

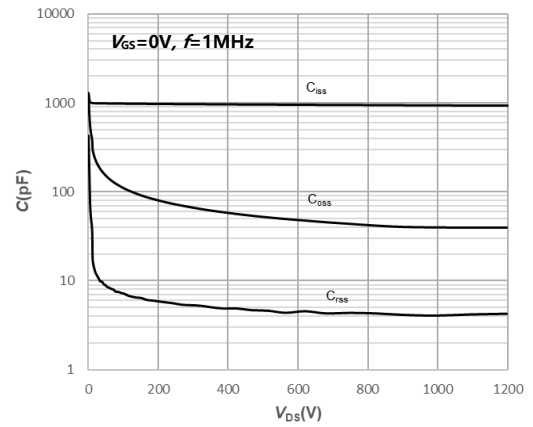


Fig8. Capacitances vs. Drain-Source Voltage (0-1200V)

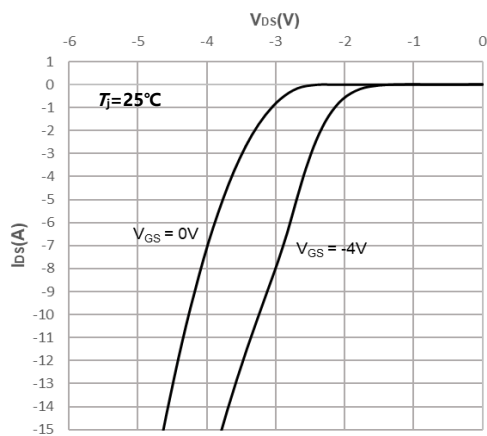


Fig9. Body Diode Characteristics

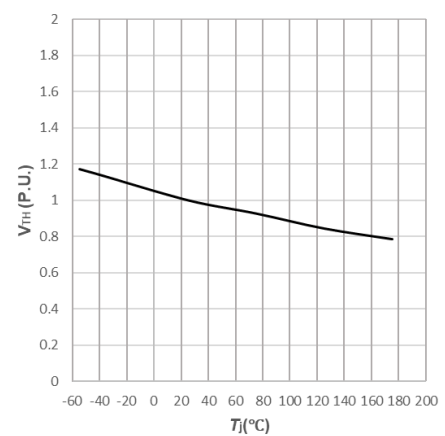


Fig10. Normalized Threshold Voltage vs. Temperature

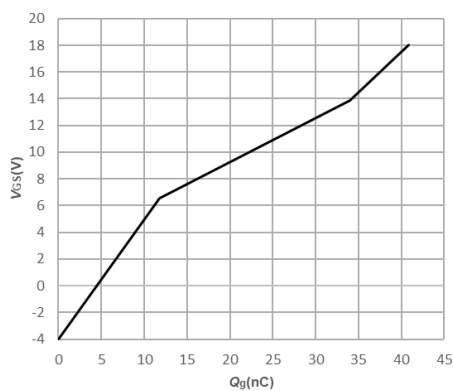


Fig11. Gate Charge Characteristics

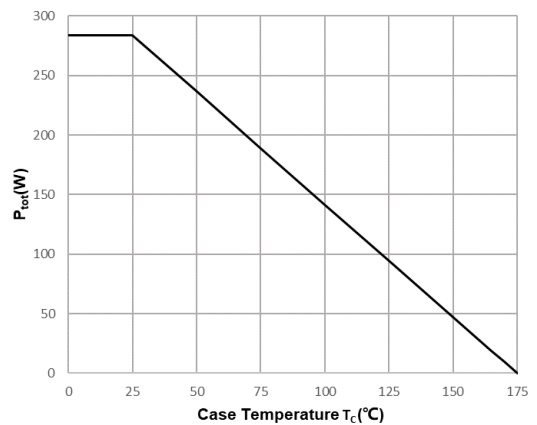


Fig12. Power Dissipation vs. Case Temperature

RATING AND CHARACTERISTIC CURVES

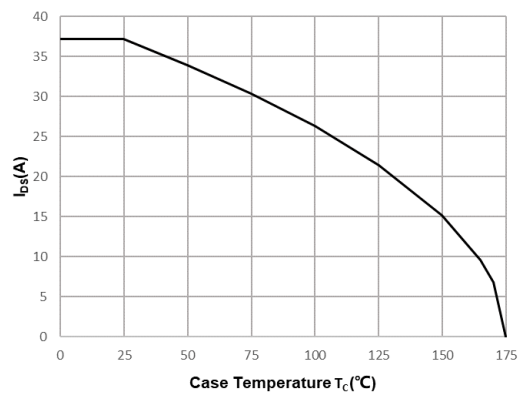
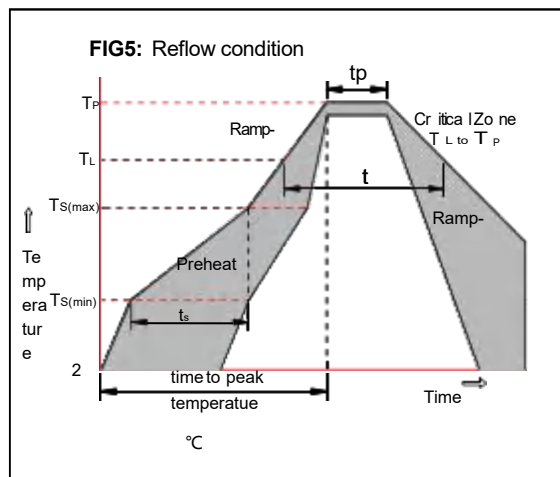


Fig13. Maximum DC Drain to Source Current vs. Case Temperature

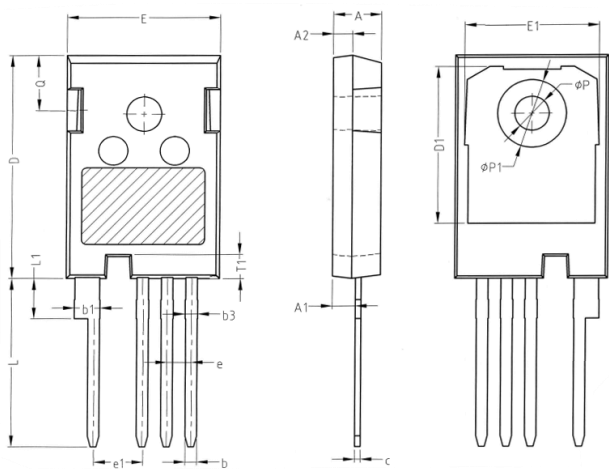
Soldering parameters

Reflow Condition		Pb-Free assembly (see as below)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150 °C
	-Temperature Max ($T_{s(max)}$)	+200 °C
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquid us Temp (T_L) to peak)		3 °C/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3 °C/sec. Max
Reflow	-Temperature (T_L) (Liquid us)	+217 °C
	-Temperature (t_L)	60-150 secs.
Peak Temp (T_P)		+260(+0/-5) °C
Time within 5 °C of actual Peak Temp (t_P)		30 secs. Max
Ramp-down Rate		6 °C/sec. Max
Time 25 °C to Peak Temp (T_P)		8 min. Max
Do not exceed		+260 °C



Package Dimensions & Suggested Pad Layout

TO-247-4



SYMBOL	Unit: mm		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.61
A2	1.80	2.00	2.20
b	1.06	1.21	1.36
b1	2.33	2.63	2.93
b3	1.07	1.30	1.60
c	0.51	0.61	0.75
D	23.30	23.45	23.60
D1	16.25	16.55	16.85
E	15.74	15.94	16.14
E1	13.72	14.02	14.32
T1	2.35	2.50	2.65
e	2.54 BSC		
e1	5.08 BSC		
Q	5.49	5.79	6.09
L	17.27	17.57	17.87
L1	3.99	4.19	4.39
ΦP	3.40	3.60	3.80
ΦP1	7.19 REF		