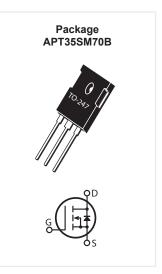


APT35SM70B 700V, 35A, 125mΩ

Silicon Carbide N-Channel Power MOSFET

DESCRIPTION

Silicon carbide (SiC) power MOSFET product line from Microsemi increase your performance over silicon MOSFET and silicon IGBT solutions while lowering your total cost of ownership for high-voltage applications.



FEATURES / TYPICAL APPLICATIONS

SiC MOSFET Features:

- Low on-resistance virtually independent on the ambient temperature
- · Low capacitances and low gate charge
- Fast switching speed due to low internal gate resistance (ESR)
- Stable operation at high junction temperature, Tj(max) = +175C
- · Fast and reliable body diode
- Superior avalanche ruggedness

SiC MOSFET Benefits:

- High efficiency to enable lighter/compact system
- · Simple to drive and easy to parallel
- Improved thermal capabilities and lower switching losses
- Eliminates the need of external Free Wheeling Diode
- · Lower system cost of ownership

Applications:

- PV inverter, converter and industrial motor drives
- Smart grid transmission & distribution
- Induction heating, and welding
- H/EV powertrain and EV charger
- · Power supply and distribution

MAXIMUM RATINGS

Symbol	Parameter	Ratings	Unit
V _{DSS}	Drain Source Voltage	700	V
1	Continuous Drain Current @ T _c = 25°C	35	
и _D	Continuous Drain Current @ T _c = 100°C	25	А
I _{DM}	Pulsed Drain Current ^①	80	
V _{GS}	Gate-Source Voltage	-10 to +25	V
5	Total Power Dissipation @ $T_c = 25^{\circ}C$	176	W
P _D	Linear Derating Factor	1.18	W/°C

THERMAL AND MECHANICAL CHARACTERISTICS

Symbol	Characteristic	Min	Тур	Max	Unit
R _{ejc}	Junction to Case Thermal Resistance		0.75	0.85	°C/W
T	Operating Junction Temperature	-55		175	
T _{stg}	Storage Junction Temperature Range	-55		150	°C
T	Soldering Temperature for 10 Seconds (1.6mm from case)			260	
Tanana	Mounting Torque (TO-247 Package), 6-32 or M3 screw			10	in∙lbf
Torque				1.1	N∙m

STATIC CHARACTERISTICS

Symbol	Parameter	Test Co	Min	Тур	Мах	Unit	
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V,	700			V	
R _{DS(on)}	Drain-Source On Resistance ²	V _{GS} = 20\		125	145	mΩ	
V _{GS(th)}	Gate-Source Threshold Voltage	$V_{GS} = V_{DS}, I_{D} = 1mA$		1.7	2.5		V
$\Delta V_{GS(th)} / \Delta T_J$	Threshold Voltage Temperature Coefficient				-5.5		mV/°C
	Zero Gate Voltage Drain Current	V _{DS} = 700V V _{GS} = 0V	T _J = 25°C			100	
I _{DSS}			T _J = 150°C			250	μA
I _{GSS}	Gate-Source Leakage Current	V _{GS} = +20V / -10V				±100	nA
ESR	Equivalent Series Resistance	f = 1MHz, 25n		2.2		Ω	

T_J = 25°C unless otherwise specified

DYNAMIC CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min	Тур	Мах	Unit
C _{iss}	Input Capacitance		1	1035		
C _{rss}	Reverse Transfer Capacitance	$V_{GS} = 0V, V_{DD} = 700V$		26		pF
C _{oss}	Output Capacitance	f = 1MHz		127		1
Q _g	Total Gate Charge	V _{GS} = 0/20V		67		
Q _{gs}	Gate-Source Charge	V _{DD} = 466V		11		nC
Q _{gd}	Gate-Drain Charge	I _D = 10A		19		
t _{d(on)}	Turn-On Delay Time	V _{DD} = 466V	1	8		ns
t,	Current Rise Time	V _{GS} = 0/20V		4		
t _{d(off)}	Turn-Off Delay Time	$I_{\rm D} = 10A$		24		
t _r	Current Fall Time	$R_{\rm g} = 3.0 \Omega^{3}$		18		
E _{on2}	Turn-On Switching Energy ^④	L = 115 μH T _c = 25°C		71		İ .
E _{off}	Turn-Off Switching Energy	Freewheeling Diode = APT10SCE65B		23		μJ
t _{d(on)}	Turn-On Delay Time	V _{DD} = 466V	V _{DD} = 466V 7	7		
t,	Current Rise Time	V _{GS} = 0/20V		4		ns
t _{d(off)}	Turn-Off Delay Time	$I_{\rm D} = 10A$		27		
t _f	Current Fall Time	$R_{g} = 3.0 \Omega^{3}$		19		1
E _{on2}	Turn-On Switching Energy ^④	L = 115 μH Τ _c = 150°C		67		l .
E _{off}	Turn-Off Switching Energy	Freewheeling Diode = APT10SCE65B		28		μJ

Source-Drain Diode Characteristics

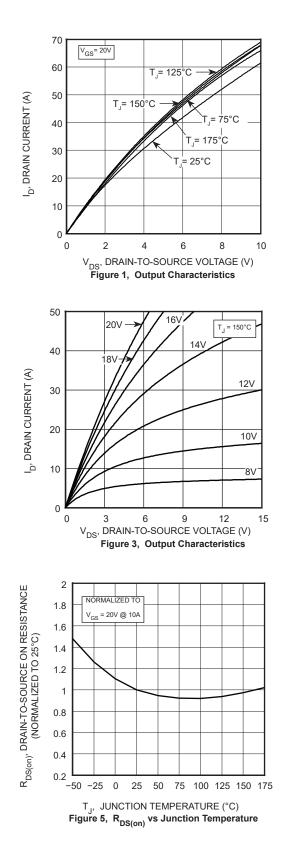
Symbol	Parameter	Test Conditions	Min	Тур	Мах	Unit
V _{SD}	Diode Forward Voltage	I _{SD} = 10A, V _{GS} = 0V		4.25		V
t _{rr}	Reverse Recovery Time	I _{SD} = 10A, V _{DD} = 466V dl/dt = -1000A/µs		35		ns
Q _{rr}	Reverse Recovery Charge			115		nC
I _{rrm}	Reverse Recovery Current			6.6		А

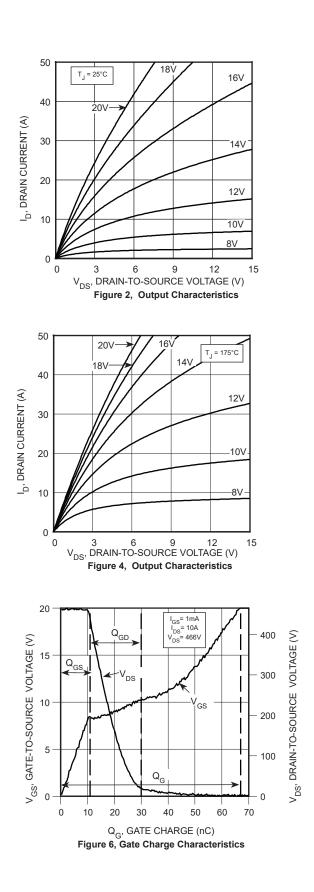
T_J = 25°C unless otherwise specified

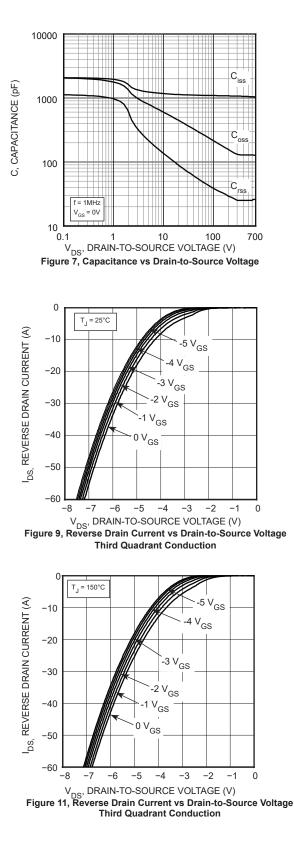
(1) Repetitive Rating: Pulse width and case temperature limited by maximum junction temperature

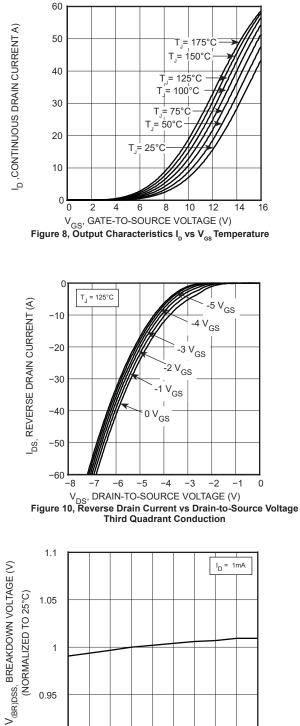
(4) $E_{_{on2}}$ includes energy of APT10SCE65B free wheeling diode.

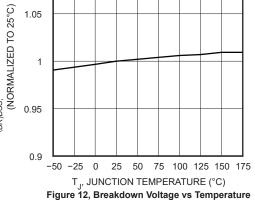




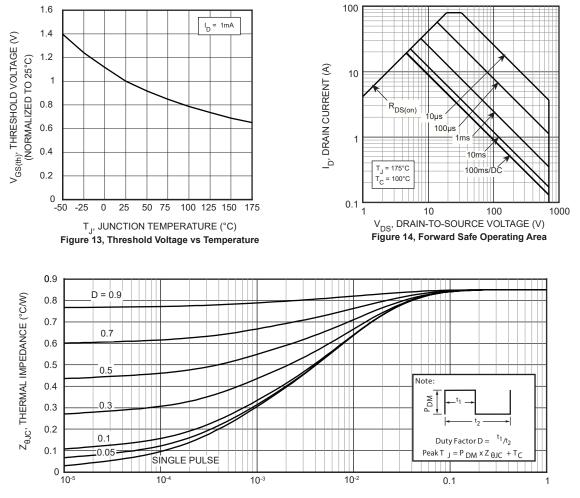






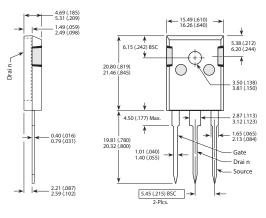






RECTANGULAR PULSE DURATION (SECONDS) Figure 15, Maximum Effective Transient Thermal Impedance, Junction-To-Case vs Pulse Duration

TO-247 (B) Package Outline



Dimensions in Millimeters (Inches)

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