

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
650V	19mΩ@10V	78A



合肥矽普半导体

Siliup Semiconductor Technology Co., Ltd

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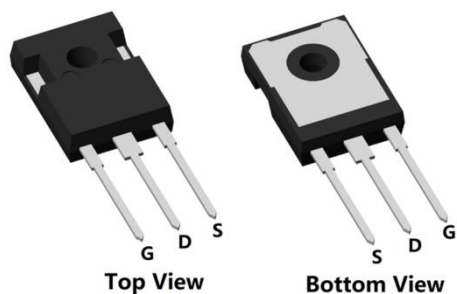
Feature

- Fast Switching
- Low Gate Charge and Rdson
- 100% Single Pulse avalanche energy Test

Applications

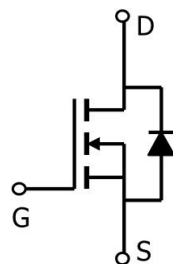
- PWM Application
- Hard switched and high frequency circuits
- Power Management

Package

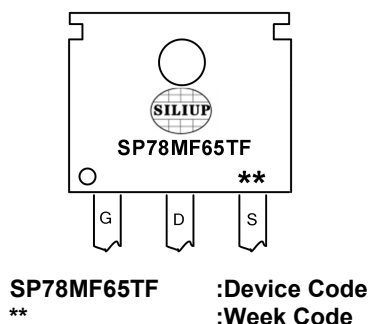


TO-247(1:G 2:D 3:S)

Circuit diagram



Marking



Order Information

Device	Package	Unit/Tube
SP78MF65TF	TO-247	30

Absolute maximum ratings (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	± 30	V
Continuous Drain Current (Tc=25°C)	I_D	78	A
Continuous Drain Current (Tc=100°C)	I_D	52	A
Pulsed Drain Current	I_{DM}	312	A
Single Pulse Avalanche Energy ¹	E_{AS}	455	mJ
Power Dissipation (Tc=25°C)	P_D	368	W
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	0.34	°C/W
Storage Temperature Range	T_{STG}	-55 to 150	°C
Operating Junction Temperature Range	T_J	-55 to 150	°C

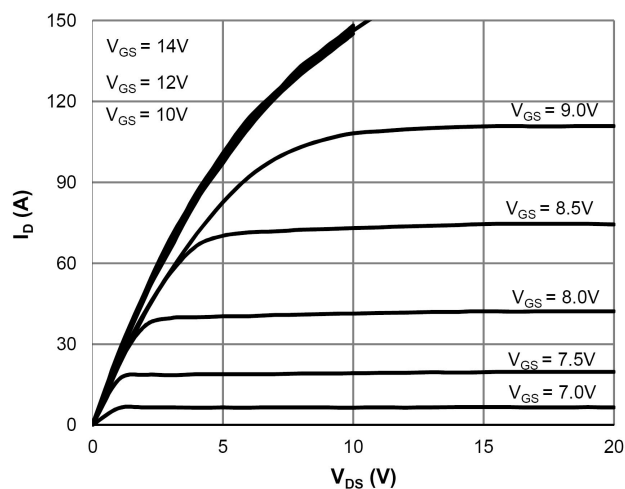
Electrical characteristics (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D = 250μA, V _{GS} = 0V	650	-	-	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} = 520V, V _{GS} = 0V	-	-	1	uA
Gate-Source Leakage Current	I _{GSS}	V _{GS} = ±30V, V _{DS} = 0V	-	-	±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	2	3	4	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} = 10V, I _D = 30A	-	19	23.5	mΩ
Dynamic characteristics						
Input Capacitance	C _{iSS}	VDS=100V , VGS=0V , f=1MHz	-	9305	-	pF
Output Capacitance	C _{oss}		-	132	-	
Reverse Transfer Capacitance	C _{rSS}		-	81	-	
Total Gate Charge	Q _g	VDS=400V , VGS=10V , ID=22A	-	196	-	nC
Gate-Source Charge	Q _{gs}		-	53	-	
Gate-Drain Charge	Q _{gd}		-	61	-	
Switching Characteristics						
Turn-On Delay Time	T _{d(on)}	VDD=400V, VGS=10V , RG=2Ω, ID=20A	-	55	-	nS
Rise Time	T _r		-	15	-	
Turn-Off Delay Time	T _{d(off)}		-	178	-	
Fall Time	T _f		-	5	-	
Diode Characteristics						
Diode Forward Voltage	V _{SD}	VGS=0V , IS=1A , TJ=25℃	-	-	1.2	V
Maximum Body-Diode Continuous Current	I _S		-	-	78	A
Reverse recover time	T _{rr}	Is=20A, di/dt=100A/us, Tj=25℃	-	191	-	nS
Reverse recovery charge	Q _{rr}		-	2.1	-	uC

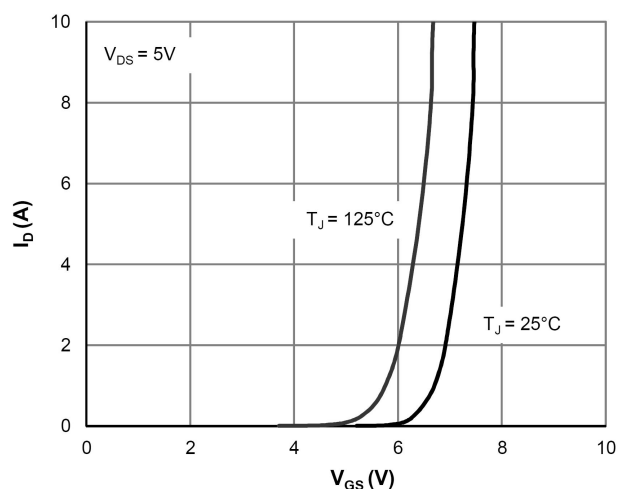
Note :

1. The test condition is $V_{DD}=100V, V_{GS}=10V, L=60mH, R_G=25\Omega$

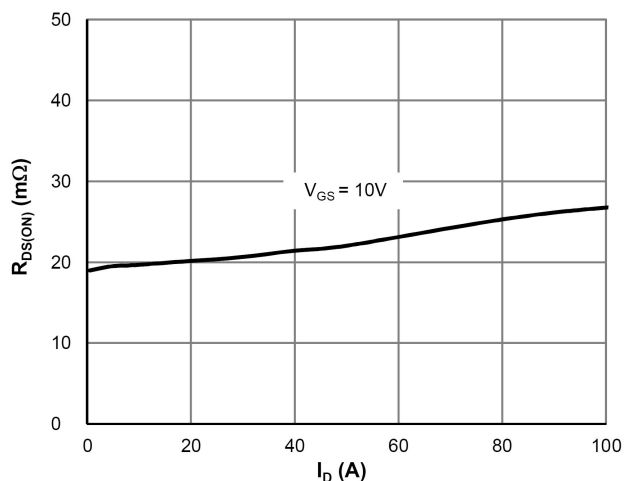
Typical Characteristics



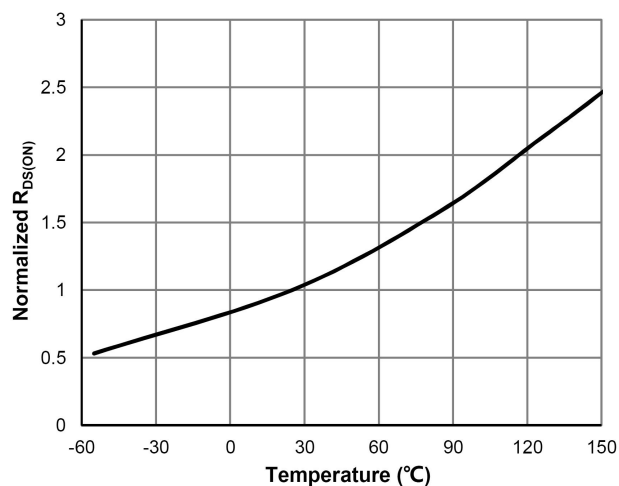
Saturation Characteristics



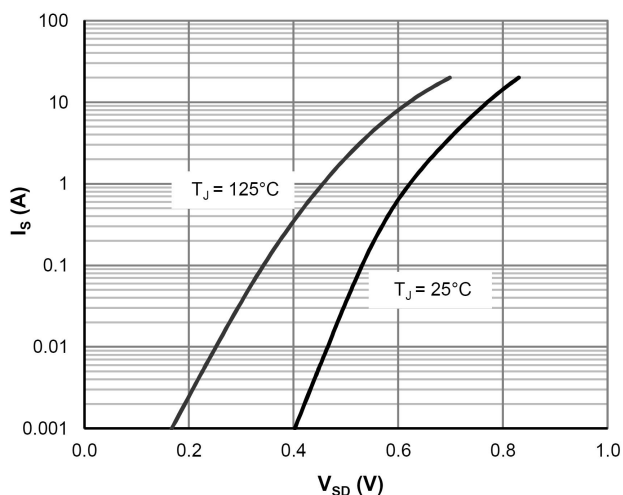
Transfer Characteristics



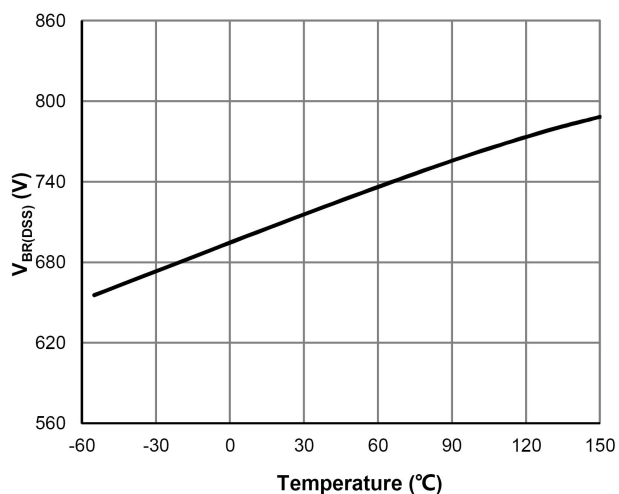
$R_{DS(ON)}$ vs. Drain Current



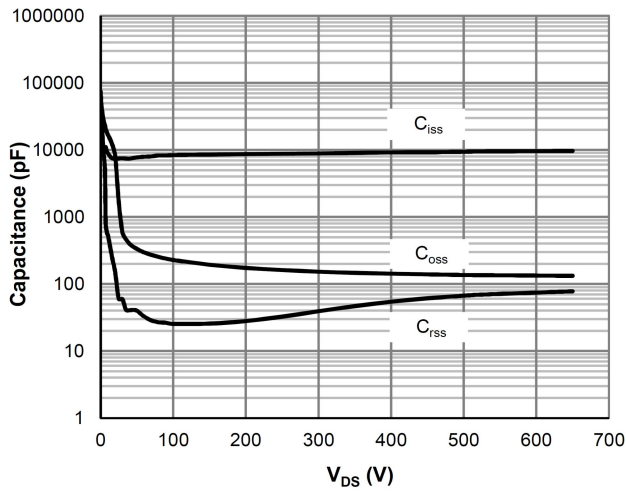
$R_{DS(ON)}$ vs. Junction Temperature



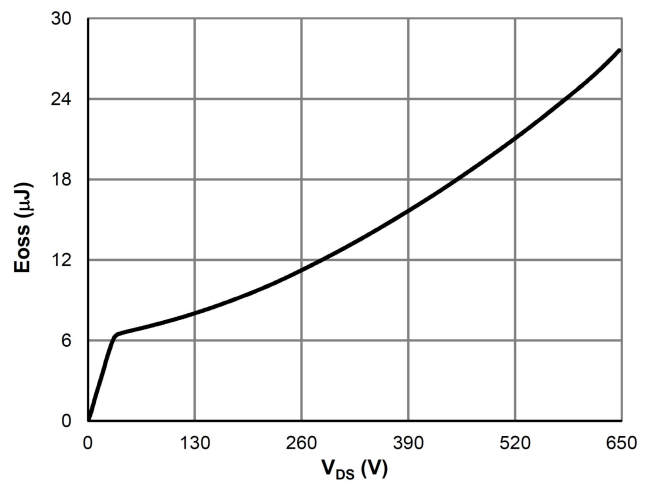
Body-Diode Characteristics



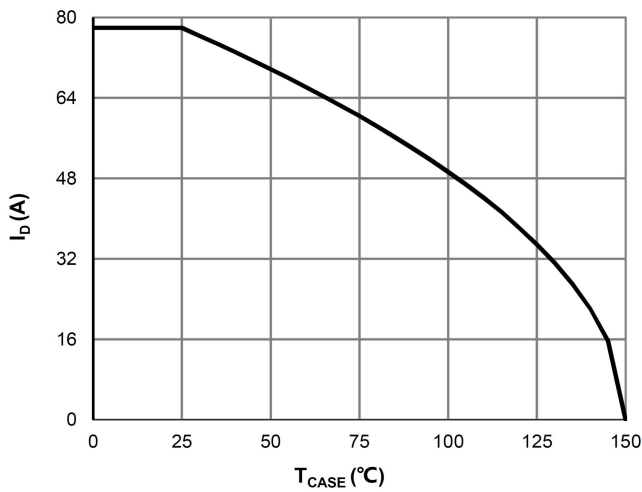
$V_{BR(DSS)}$ vs. Junction Temperature



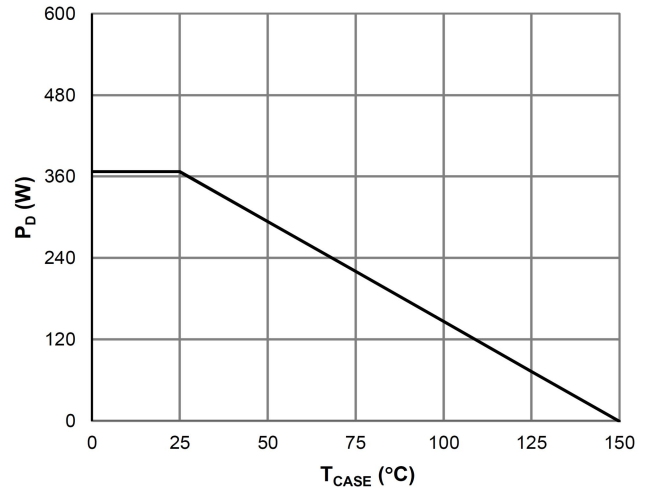
Capacitance Characteristics



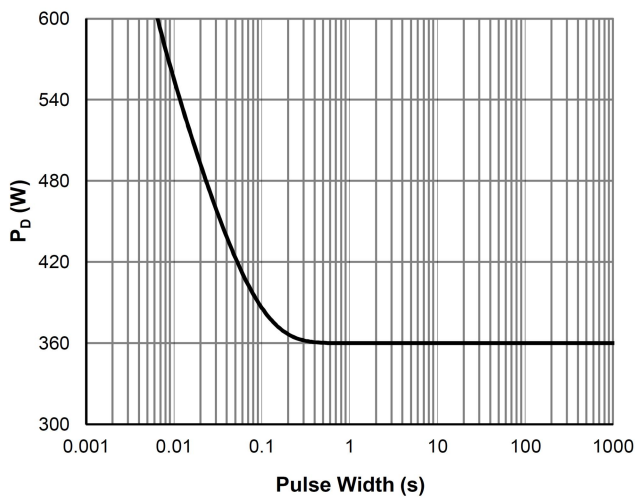
C_{oss} Stored Energy



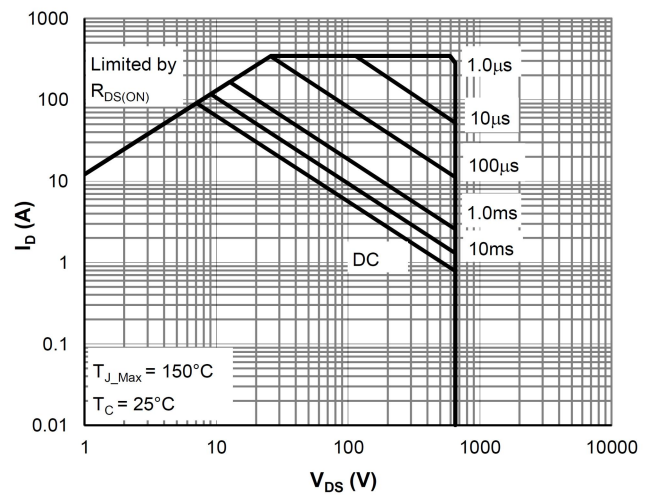
Current De-rating



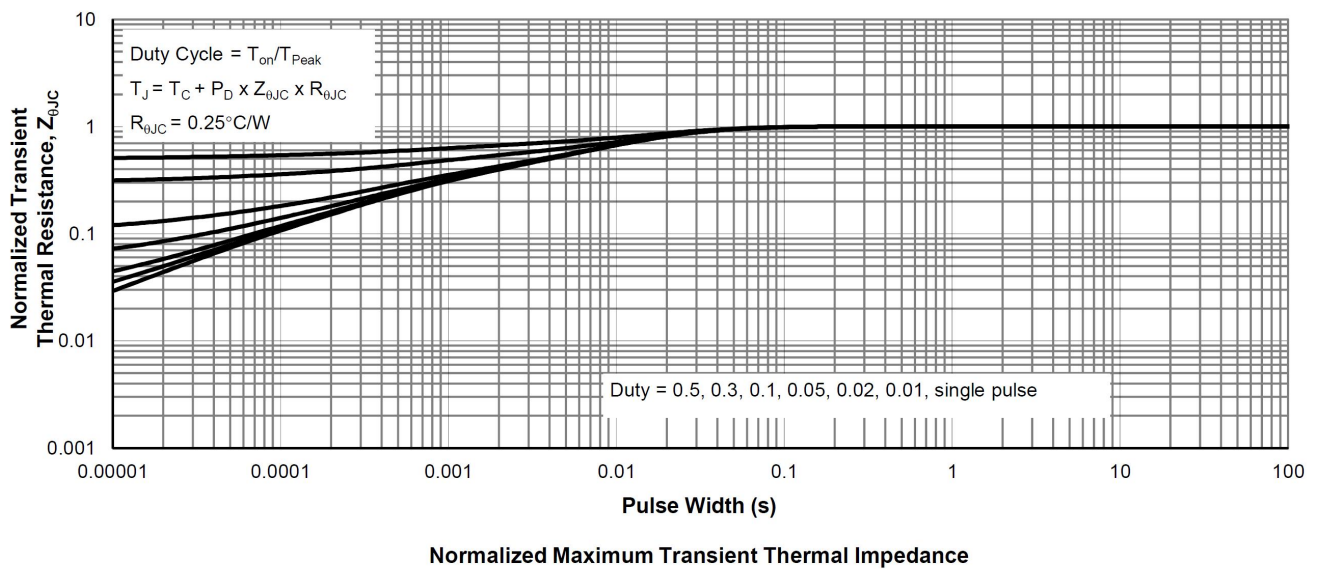
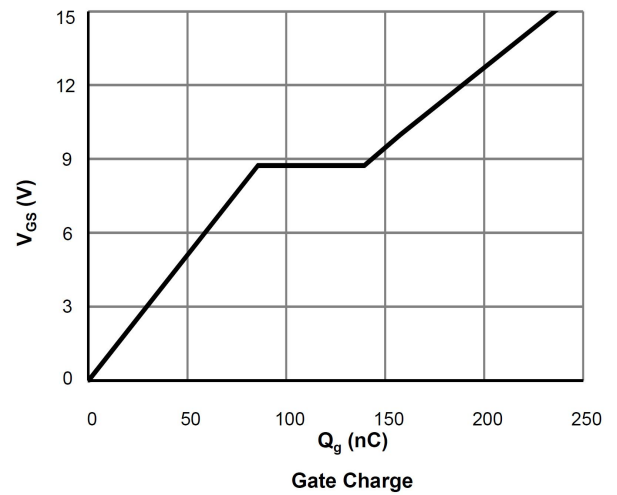
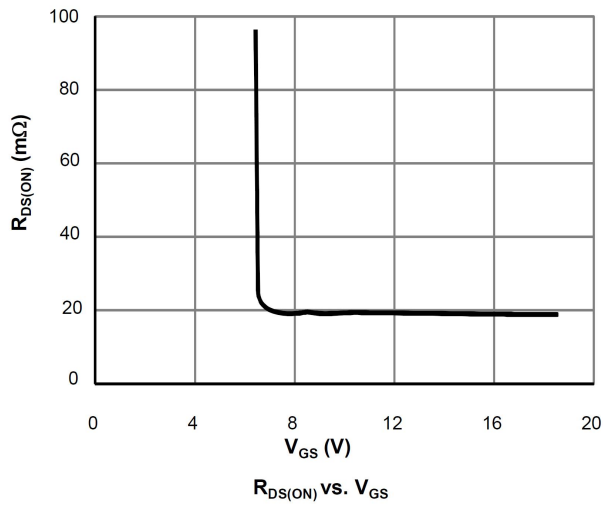
Power De-rating



Single Pulse Power Rating, Junction-to-Case

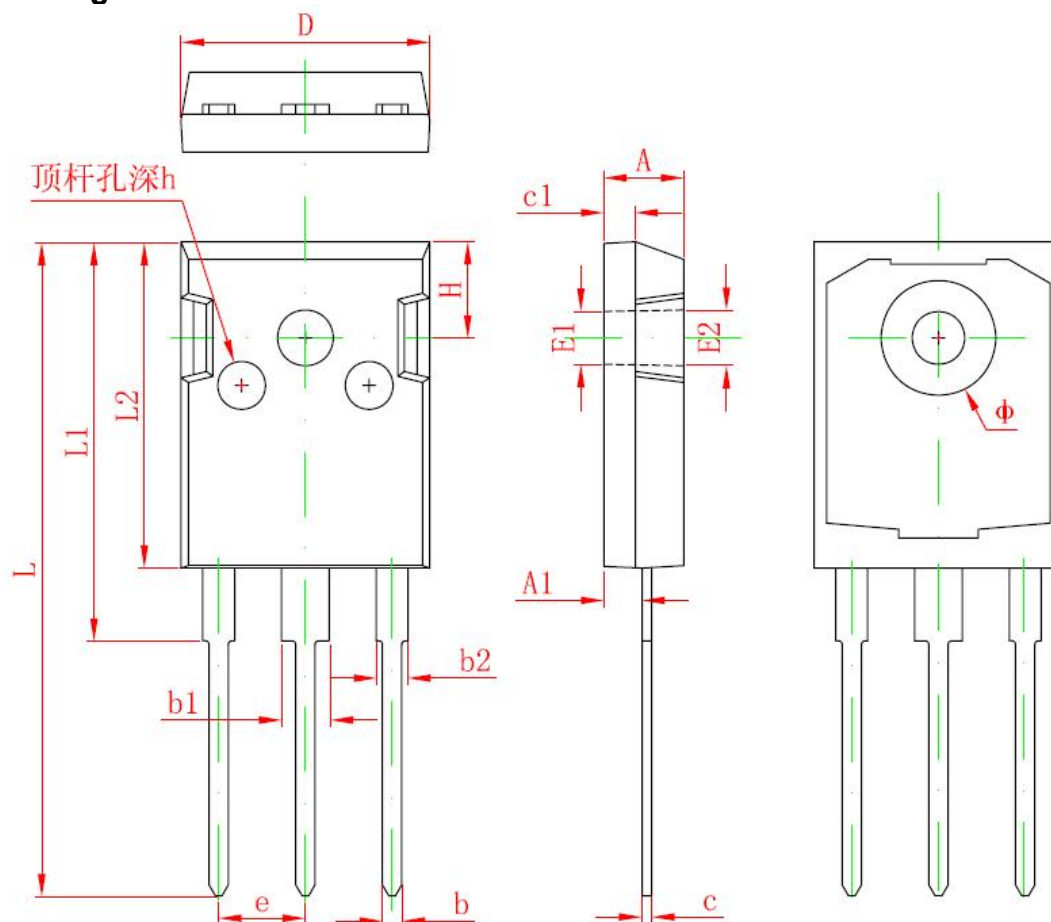


Maximum Safe Operating Area





TO-247 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.850	5.150	0.191	0.200
A1	2.200	2.600	0.087	0.102
b2	1.800	2.200	0.071	0.087
b	1.000	1.400	0.039	0.055
b1	2.800	3.200	0.110	0.126
c	0.500	0.700	0.020	0.028
c1	1.900	2.100	0.075	0.083
D	15.450	15.750	0.608	0.620
E1	3.500 REF.		0.138 REF.	
E2	3.600 REF.		0.142 REF.	
L	40.900	41.300	1.610	1.626
L1	24.800	25.100	0.976	0.988
L2	20.300	20.600	0.799	0.811
Φ	7.100	7.300	0.280	0.287
e	5.450 TYP.		0.215 TYP.	
H1	5.980 REF.		0.235 REF.	
h	0.000	0.300	0.000	0.012