MOSPEC

MIM037N120D

1200V SiC N-Channel MOSFET

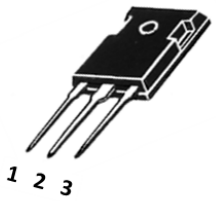
DESCRIPTION：

- High Speed Switching
- High Blocking Voltage with Low $R_{DS(ON)}$
- Easy to Parallel
- Simple to Drive
- RoHS compliant.

V_{DS}	1200V
I_D	74A (Tc=25℃)
$R_{DS(ON)_typ.}$	37mΩ

TYPICAL APPLICATIONS：

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



TO-247-3L

MAXIMUM RATINGS (at T_J = 25 °C, unless otherwise specified)

Characteristic	Condition	Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	1200	V
Continuous Drain Current	Tc=25℃ Tc=100℃	I_D	74 52	A
Peak Drain Current	Pulse width tp limited by T_{jmax}	I_{DM}	150	A
Gate-Source Voltage		V_{GSmax}	-8/+22	V
Recommend Gate-Source Voltage		V_{GSop}	-4/+18	V
Power Dissipation	Tc=25℃ Tc=100℃	P_{TOT}	312 156	W
Operation Junction temperature		Tj	-40~+175	℃
Storage temperature		T_{STG}	-40~+150	℃

ELECTRICAL CHARATERISTICS (at T_J = 25 °C, unless otherwise specified)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage VGS = 0V, ID = 100μA	$V_{(BR)DSS}$	1200			V
Zero Gate Voltage Drain Current VDS = 1200V, VGS = 0 V	I_{DSS}		1		uA
Gate-Source Leakage Current VGS = 18V, VDS = 0V	I_{GSS}			250	nA
Gate-Source Threshold Voltage VDS = VGS, ID = 10mA Tj=25℃ VDS = VGS, ID = 10mA Tj=175℃	$V_{GS(th)}$	2	2.6 2.0	4	V
Drain-Source On-State Resistance VGS = 18V, ID = 40A Tj=25℃ VGS = 18V, ID = 40A Tj=175℃	$R_{DS(on)}$		37 47		mΩ
Input capacitance f=100KHz, VDS=1000 V, VGS=0 V	C_{iss}		2975		pF
Output capacitance f=100KHz, VDS=1000 V, VGS=0 V	C_{oss}		119		pF
Reverse transfer capacitance f=100KHz, VDS=1000 V, VGS=0 V	C_{rss}		12		pF
Internal Gate Resistance f=1MHz	$R_{G(INT)}$		2.1		Ω
Total Gate Charge VDS= 800V, ID= 40A,VGS= -4/18V	Q_G		117		nC
Gate to Source Charge VDS= 800V, ID= 40A,VGS= -4/18V	Q_{GS}		38		nC
Gate to Drain Charge VDS= 800V, ID= 40A,VGS= -4/18V	Q_{GD}		27		nC
Turn-on Delay Time VDD=800 V,ID=40A,VGS= -4/18V, RG=2.5Ω,L=200μH	$td_{(ON)}$		22		ns
Rise Time VDD=800 V,ID=40A,VGS= -4/18V, RG=2.5Ω,L=200μH	tr		30		ns
Turn-off Delay Time VDD=800 V,ID=40A,VGS= -4/18V, RG=2.5Ω,L=200μH	$td_{(OFF)}$		33		ns
Fall Time VDD=800 V,ID=40A,VGS= -4/18V, RG=2.5Ω,L=200μH	tf		11		ns
Turn-on Switching Energy VDD=800 V,ID=40A,VGS= -4/18V, RG=2.5Ω,L=200μH	$E_{(ON)}$		701		uJ
Turn-off Switching Energy VDD=800 V,ID=40A,VGS= -4/18V, RG=2.5Ω,L=200μH	$E_{(OFF)}$		80		uJ

THERMAL CHARACTERISTICS

Characteristic	Condition	Symbol	Typical	Unit
Thermal resistance, junction - case		$R_{th(j-C)}$	0.48	℃/W

Body Diode

ELECTRICAL CHARATERISTICS (at T_J = 25 °C, unless otherwise specified)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Diode Forward Voltage VGS = -4V, ISD = 20A Tj=25℃ VGS = -4V, ISD = 20A Tj=175℃	V_{SD}		5.0 4.4		V
Continuous Diode Forward Current VGS = -4V, Tc=25℃ VGS = -4V, Tc=100℃	I_S		45 20		A
Revers Recovery Time VR=800 V, ISD=40A, VGS= -4V,di/dt = 3900A/us	Trr		20		ns
Revers Recovery Charge VR=800 V, ISD=40A, VGS= -4V,di/dt = 3900A/us	Qrr		540		nC
Peak Revers Recovery Current VR=800 V, ISD=40A, VGS= -4V,di/dt = 3900A/us	I_{rrm}		52		A

Typical Characteristics

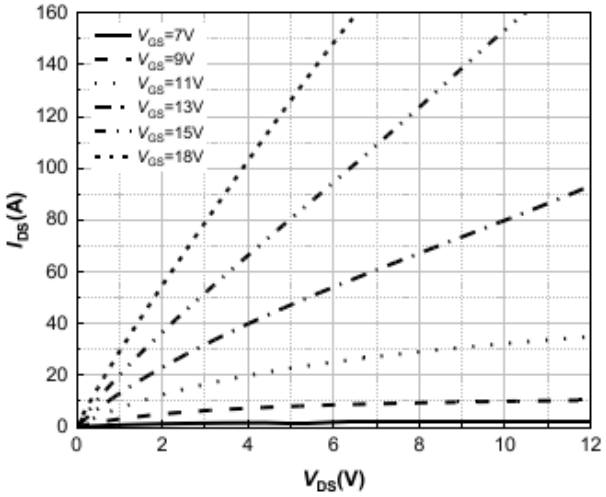


Figure 1. Output Characteristics (Tj=-40℃)

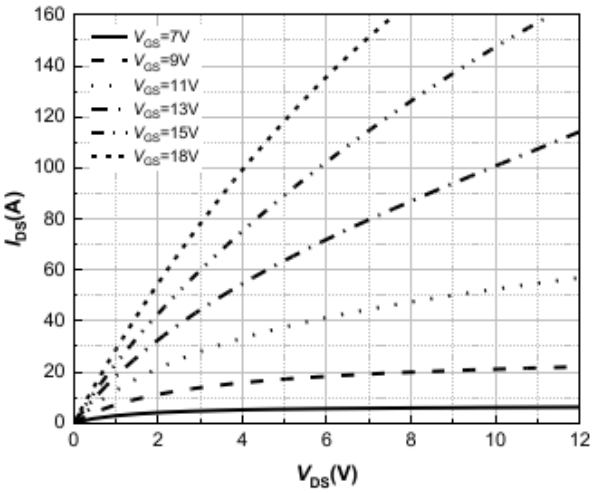


Figure 2. Output Characteristics (Tj=25℃)

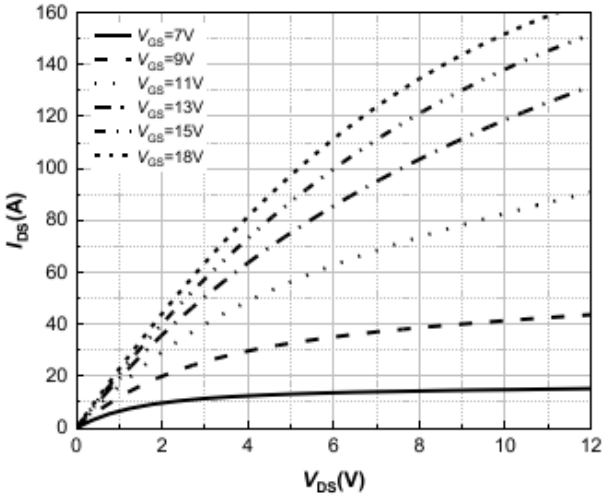


Figure 3. Output Characteristics(Tj=175℃)

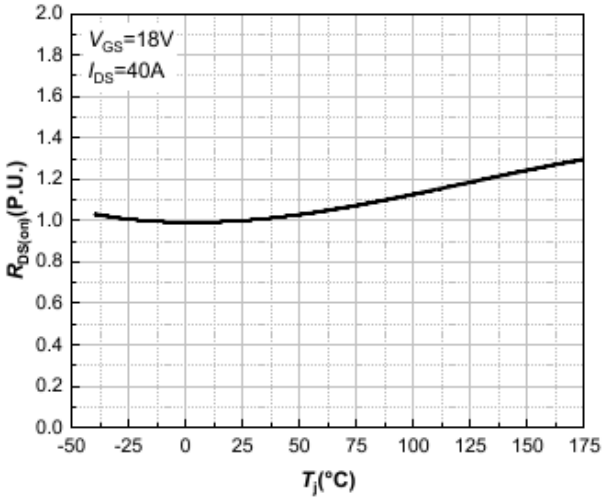


Figure 4. Normalized On-Resistance vs. Temperature

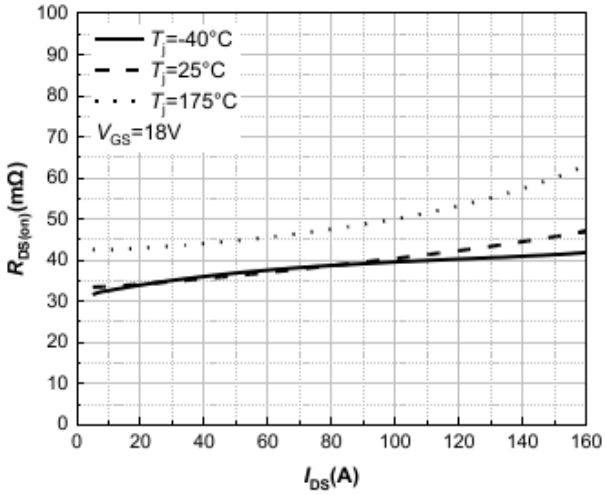


Figure 5. On-Resistance vs. Drain Current For Various Temperatures

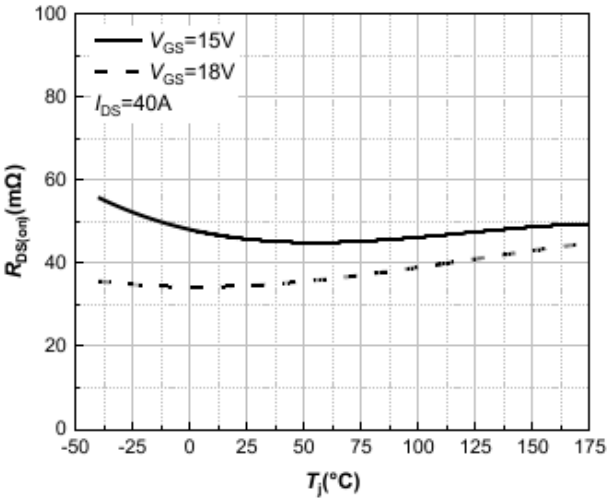


Figure 6. On-Resistance vs. Temperature For Various Gate Voltage

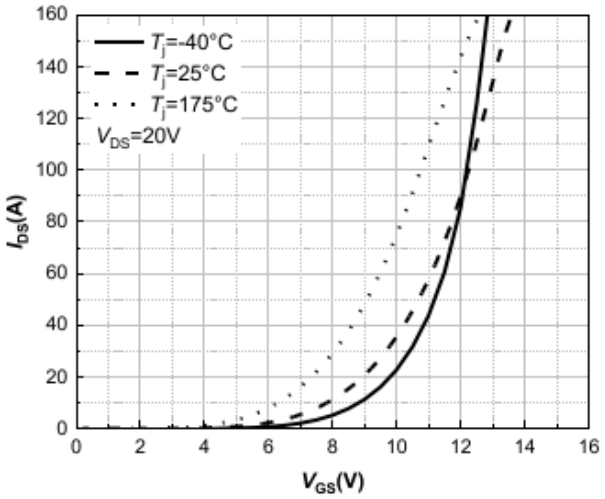


Figure 7. Transfer Characteristic for Various Junction Temperatures

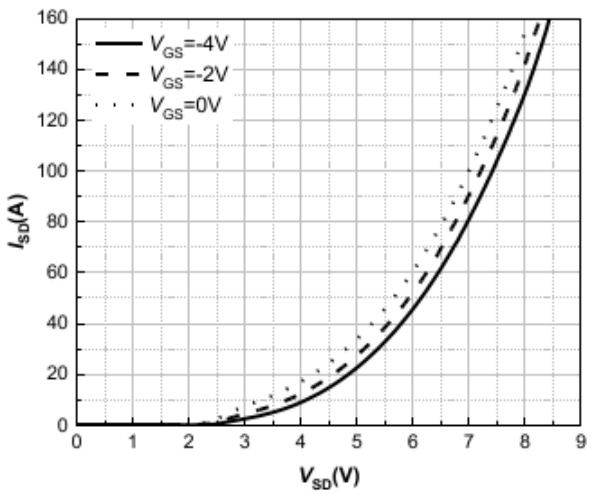


Figure 8. Body Diode Characteristic Tj=-40°C

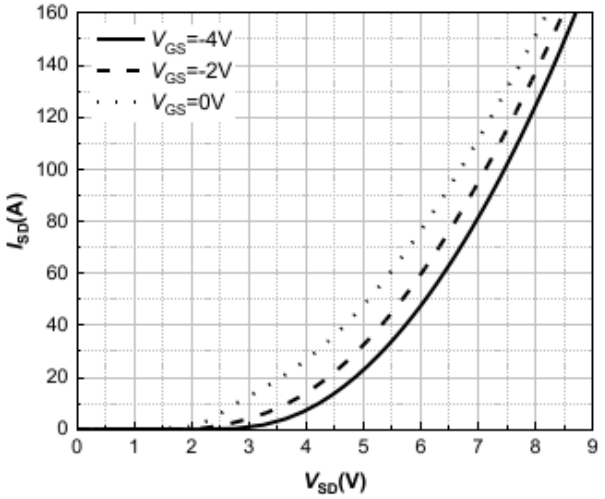


Figure 9. Body Diode Characteristic (Tj=25°C)

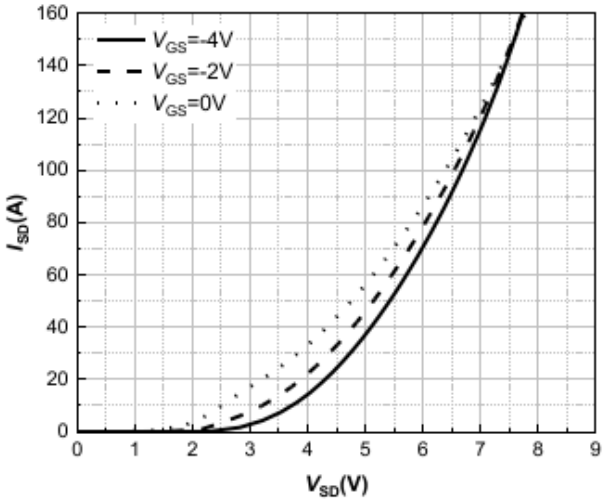


Figure 10. Body Diode Characteristic (Tj=175°C)

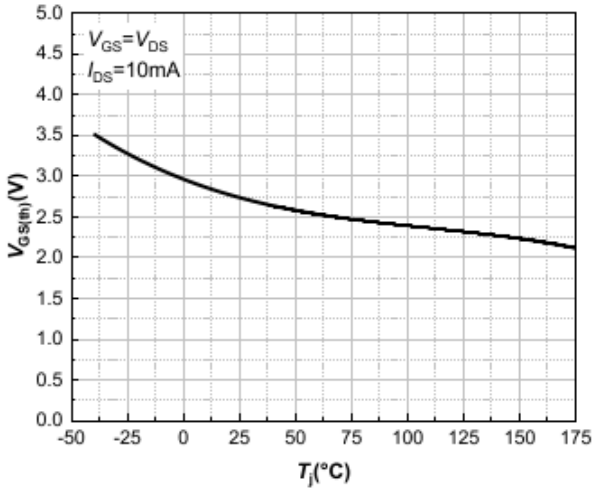


Figure 11. Threshold Voltage vs. Temperature

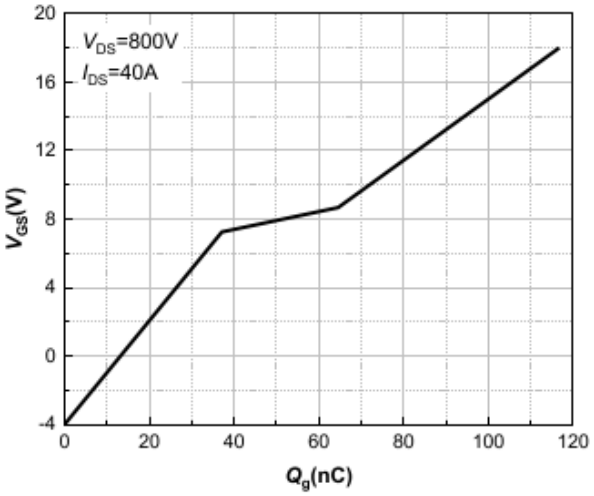


Figure 12. Gate Charge Characteristics

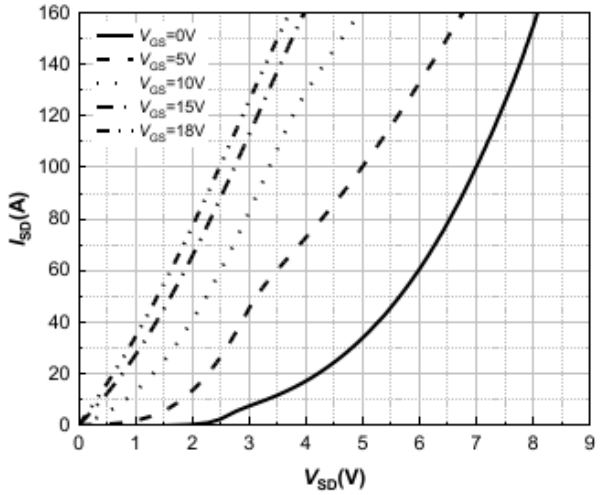


Figure 13. 3rd Quadrant Characteristic (Tj=-40°C)

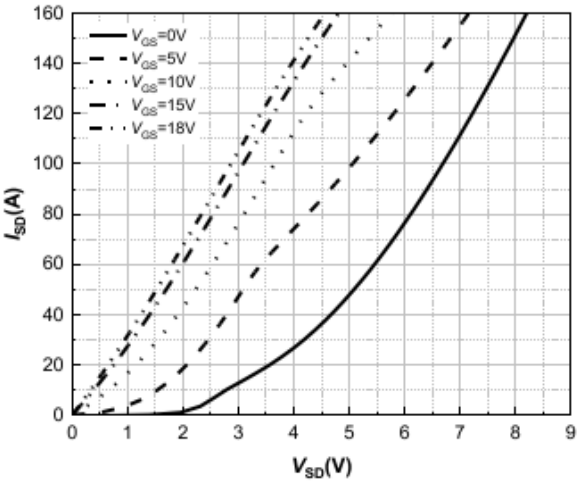


Figure 14. 3rd Quadrant Characteristic (Tj=25°C)

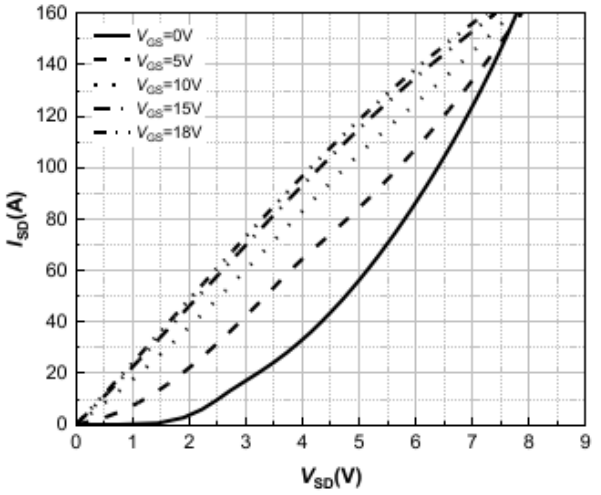


Figure 15. 3rd Quadrant Characteristic (Tj=175°C)

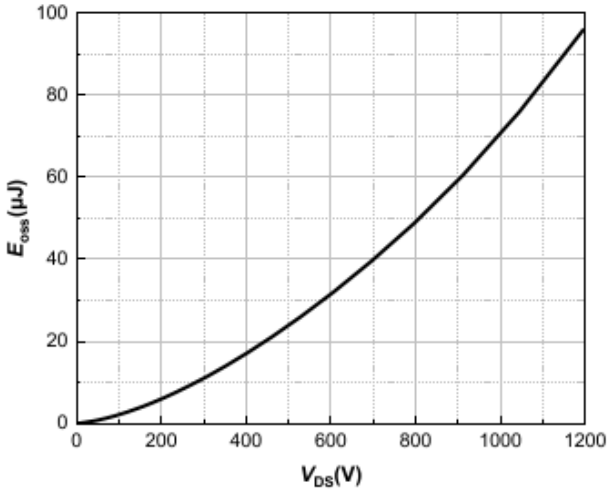


Figure 16. Output Capacitor Stored Energy

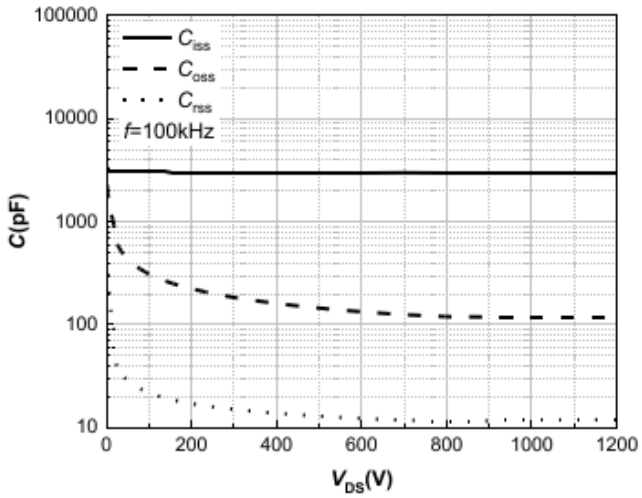


Figure 17. Capacitances vs. Drain-Source

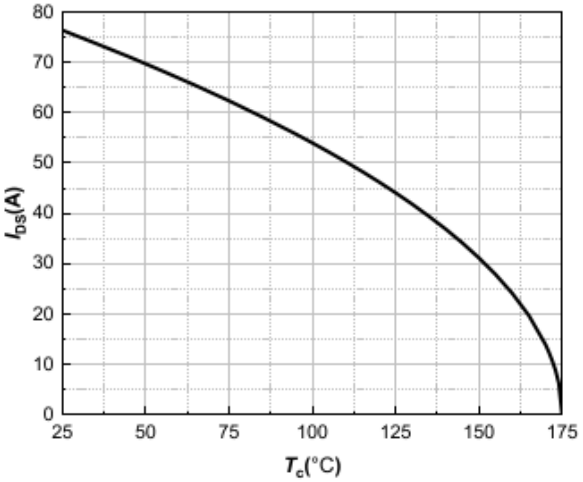


Figure 18. Continuous Drain Current Derating vs. Case Temperature

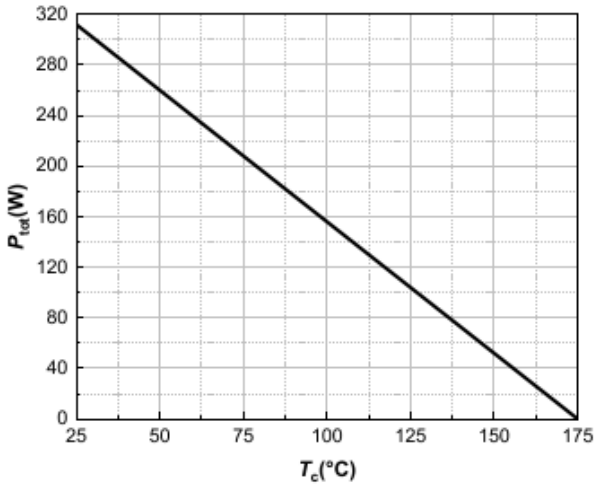


Figure 19. Maximum Power Dissipation Derating vs. Case Temperature

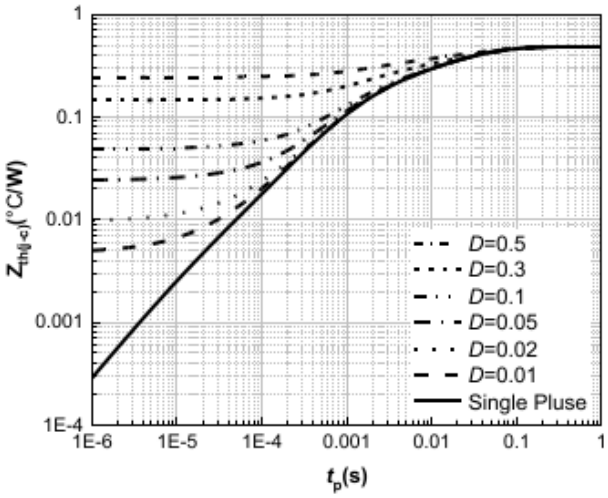
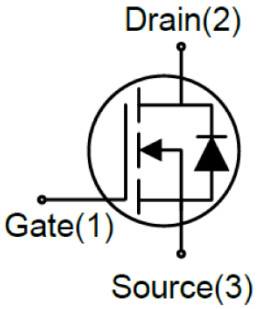
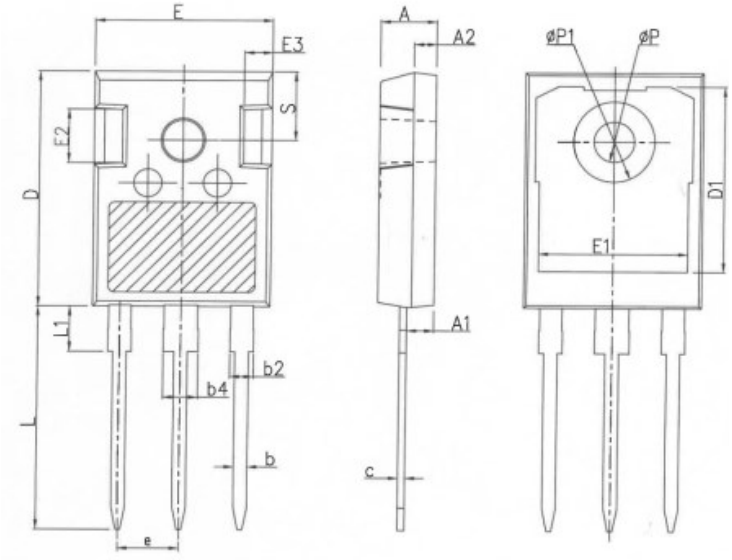


Figure 20. Transient Thermal Impedance

• Circuit diagram



• TO-247-3L Package outlines Dimensions in (mm)



SYMBOL	Unit: mm		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.59
A2	1.85	2.00	2.15
b	1.11	1.21	1.36
b2	1.91	2.01	2.21
b4	2.91	3.01	3.21
c	0.51	0.61	0.75
D	20.70	21.00	21.30
D1	16.25	16.55	16.85
E	15.50	15.80	16.10
E1	13.00	13.30	13.60
E2	4.80	5.00	5.20
E3	2.30	2.50	2.70
e	5.44 BSC		
L	19.62	19.92	20.22
L1	-	-	4.30
ΦP	3.40	3.60	3.80
ΦP1	-	-	7.30
S	6.15 BSC		

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