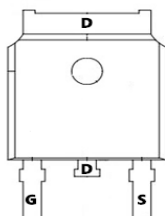
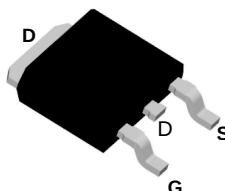
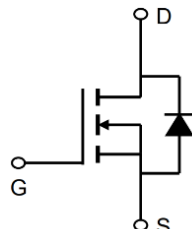


TMG120N04D

N-Channel Enhancement Mosfet

General Description • Low $R_{DS(ON)}$ • RoHS and Halogen-Free Compliant Applications • Load switch • PWM	General Features $V_{DS} = 40V$ $I_D = 120A$ $R_{DS(ON)} = 2.1m\Omega$ (Typ.) @ $V_{GS} = 10V$ 100% UIS Tested 100% R_g Tested 																																																	
D:TO-252-3L  Marking: G120N04  																																																		
Absolute Maximum Ratings ($T_C = 25^{\circ}C$ unless otherwise noted) <table><tr><th>Symbol</th><th>Parameter</th><th>Ratings</th><th>Units</th></tr><tr><td>V_{DS}</td><td>Drain-Source Voltage</td><td>40</td><td>V</td></tr><tr><td>V_{GS}</td><td>Gate-Source Voltage</td><td>± 20</td><td>V</td></tr><tr><td rowspan="3">I^D</td><td>Continuous Drain Current-$T_C = 25^{\circ}C$</td><td>120</td><td rowspan="3">A</td></tr><tr><td>Continuous Drain Current-$T_C = 125^{\circ}C$</td><td>59</td></tr><tr><td>I_{DM}</td><td>Pulsed Drain Current²</td><td>240</td></tr><tr><td>I_{AR}</td><td>Avalanche Current, Repetitive²</td><td>20</td><td>A</td></tr><tr><td>E_{AS}</td><td>Single Pulse Avalanche Energy³</td><td>170</td><td>mJ</td></tr><tr><td>P_D</td><td>Power Dissipation</td><td>70</td><td>W</td></tr><tr><td>T_J, T_{STG}</td><td>Operating and Storage Junction Temperature Range</td><td>-55 to +150</td><td>$^{\circ}C$</td></tr></table> Thermal Data <table><tr><th>Symbol</th><th>Parameter</th><th>Max</th><th>Units</th></tr><tr><td>$R_{\theta JC}$</td><td>Thermal Resistance, Junction to Case</td><td>1.8</td><td>$^{\circ}C/W$</td></tr><tr><td>$R_{\theta JA}$</td><td>Thermal Resistance Junction to mbient</td><td>62</td><td>$^{\circ}C/W$</td></tr></table>		Symbol	Parameter	Ratings	Units	V_{DS}	Drain-Source Voltage	40	V	V_{GS}	Gate-Source Voltage	± 20	V	I^D	Continuous Drain Current- $T_C = 25^{\circ}C$	120	A	Continuous Drain Current- $T_C = 125^{\circ}C$	59	I_{DM}	Pulsed Drain Current ²	240	I_{AR}	Avalanche Current, Repetitive ²	20	A	E_{AS}	Single Pulse Avalanche Energy ³	170	mJ	P_D	Power Dissipation	70	W	T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	$^{\circ}C$	Symbol	Parameter	Max	Units	$R_{\theta JC}$	Thermal Resistance, Junction to Case	1.8	$^{\circ}C/W$	$R_{\theta JA}$	Thermal Resistance Junction to mbient	62	$^{\circ}C/W$
Symbol	Parameter	Ratings	Units																																															
V_{DS}	Drain-Source Voltage	40	V																																															
V_{GS}	Gate-Source Voltage	± 20	V																																															
I^D	Continuous Drain Current- $T_C = 25^{\circ}C$	120	A																																															
	Continuous Drain Current- $T_C = 125^{\circ}C$	59																																																
	I_{DM}	Pulsed Drain Current ²		240																																														
I_{AR}	Avalanche Current, Repetitive ²	20	A																																															
E_{AS}	Single Pulse Avalanche Energy ³	170	mJ																																															
P_D	Power Dissipation	70	W																																															
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	$^{\circ}C$																																															
Symbol	Parameter	Max	Units																																															
$R_{\theta JC}$	Thermal Resistance, Junction to Case	1.8	$^{\circ}C/W$																																															
$R_{\theta JA}$	Thermal Resistance Junction to mbient	62	$^{\circ}C/W$																																															



TMG120N04D

N-Channel Enhancement Mosfet

Electrical Characteristics: ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Sourtce Breakdown Voltage	V _{GS} =0V,I _D =250 μ A	40	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =40V	---	---	1	μ A
I _{GSS}	Gate-Source Leakage Current	V _{GS} =± 20V, V _{DS} =0A	---	---	± 100	nA
On Characteristics						
V _{GS(th)}	GATE-Source Threshold Voltage	V _{GS} =V _{DS} , I _D =250 μ A	1.2	1.7	2.4	V
R _{DS(ON)}	Drain-Source On Resistance	V _{GS} =10V,I _D =35A	---	2.1	3.0	m Ω
		V _{GS} =4.5V,I _D =15A	---	3 1	4.2	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =20V, V _{GS} =0V, f=1MHz	---	1800	---	pF
C _{oss}	Output Capacitance		---	758	---	
C _{rss}	Reverse Transfer Capacitance		---	50	---	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DD} =20V , V _{GS} =10V , R _G =1.6 Ω , I _D =35A	---	9	---	ns
t _r	Rise Time		---	32	---	ns
t _{d(off)}	Turn-Off Delay Time		---	32	---	ns
t _f	Fall Time		---	7	---	ns
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =20V, I _D =35A	---	6.1	---	nC
Q _{gs}	Gate-Source Charge		---	4.7	---	nC
Q _{gd}	Gate-Drain “Miller” Charge		---	40	---	nC
Drain-Source Diode Characteristics						
Symbol	Parameter	Conditions	Min	Typ	Max	Units
V _{SD}	Source-Drain Diode Forward Voltage ³	V _{GS} =0V,I _S =35A	---	0.84	---	V
trr	Continuous Source Current	V _R =20V, I _F =35A dI _F /dt=100A/us	---	52	---	ns
qrr	Pulsed Source Current		---	91	---	nC

Notes:

1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. Repetitive Rating: Pulse width limited by maximum junction temperature
3. $I_{AS}=20.0A, V_{DD}=20V, R_G=25\ \Omega$, Starting $T_J=25^{\circ}\text{C}$

Typical Characteristics: ($T_C=25^\circ\text{C}$ unless otherwise noted)

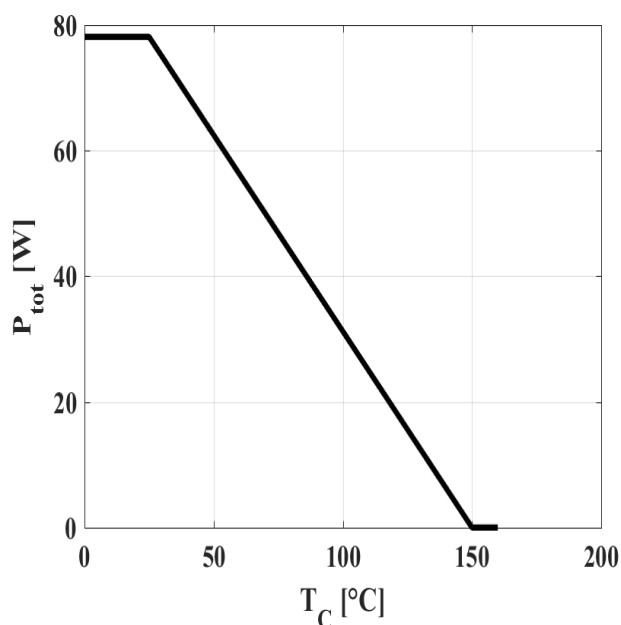


Figure 1: Power Dissipation

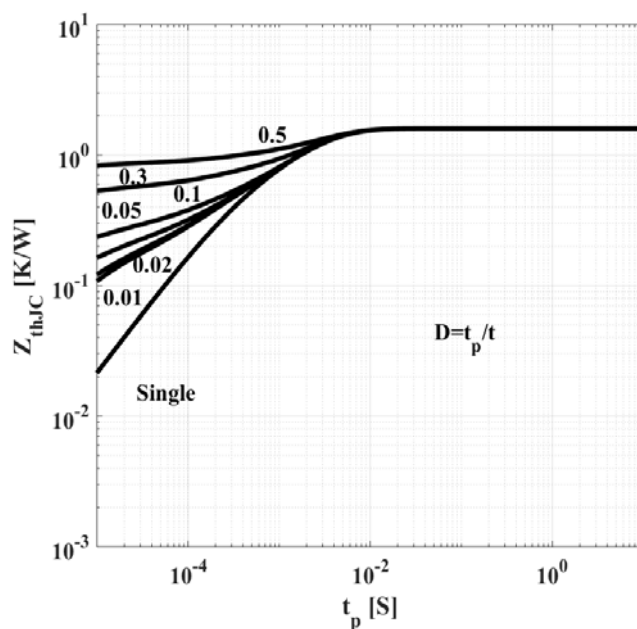


Figure 2: Max. Transient Thermal Impedance

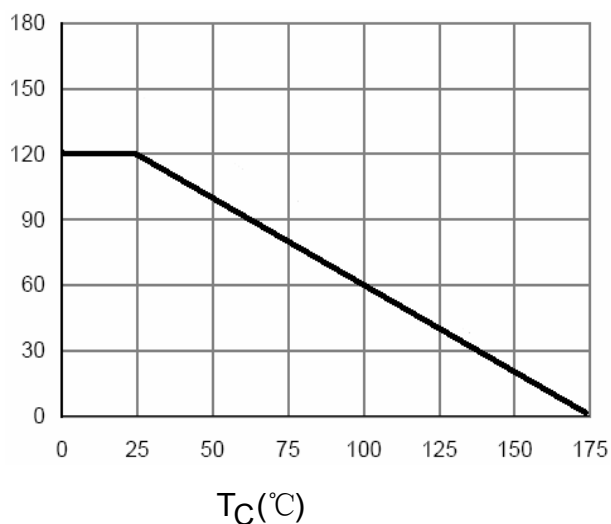


Figure3: Drain Current

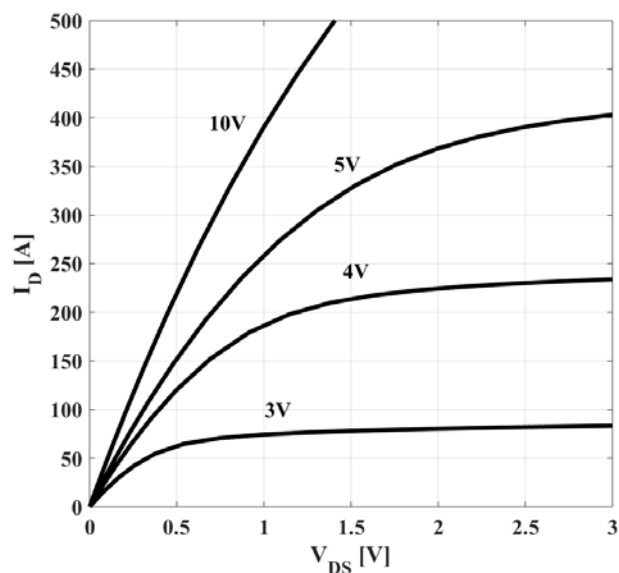


Figure4: Typ. Output Characteristics

TMG120N04D

N-Channel Enhancement Mosfet

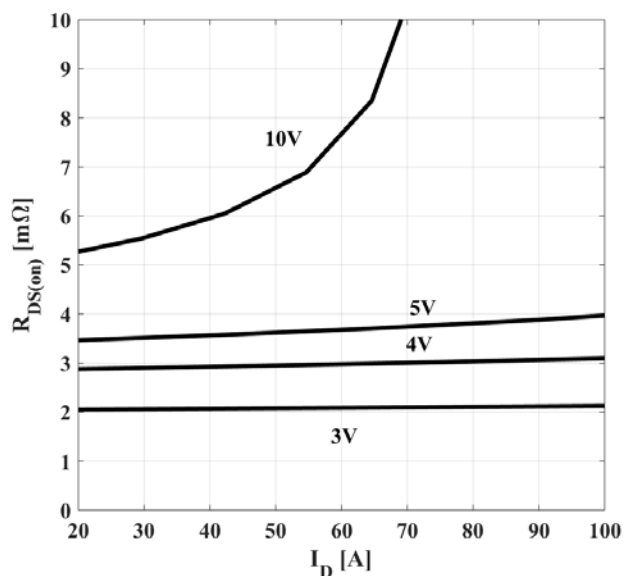


Figure5: Typ. Drain-Source On-State Resistance

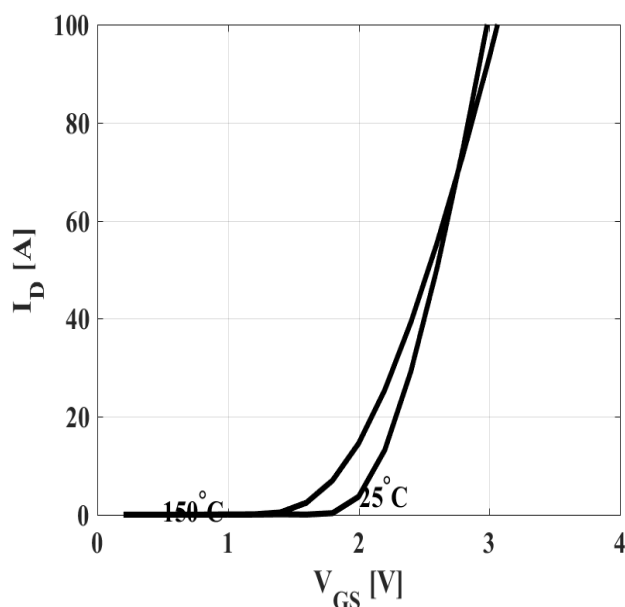


Figure6: Typ. Transfer Characteristics

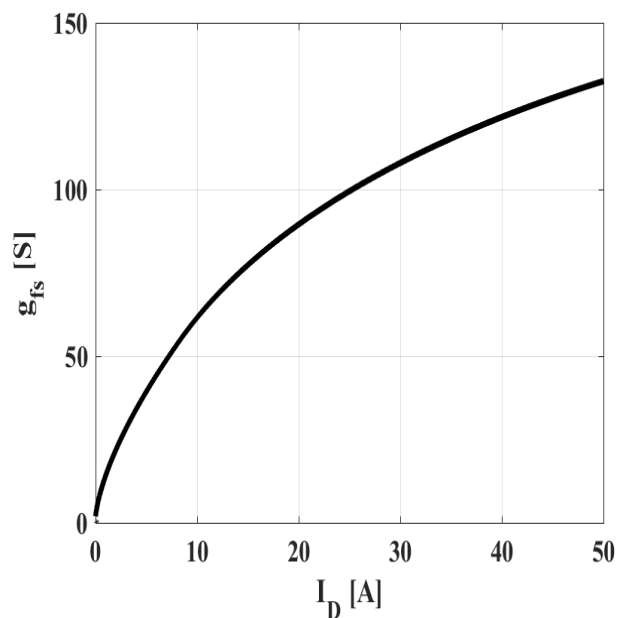


Figure7: Typ. Forward Transconductance

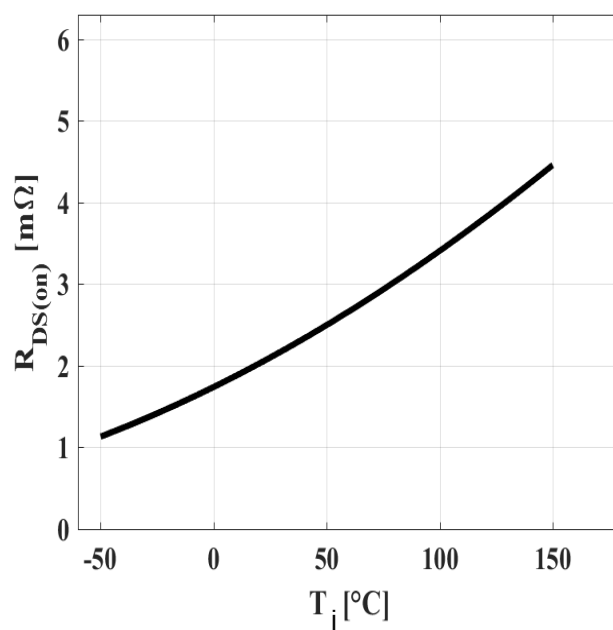


Figure8: Typ. Drain-Source On-State Resistance

TMG120N04D

N-Channel Enhancement Mosfet

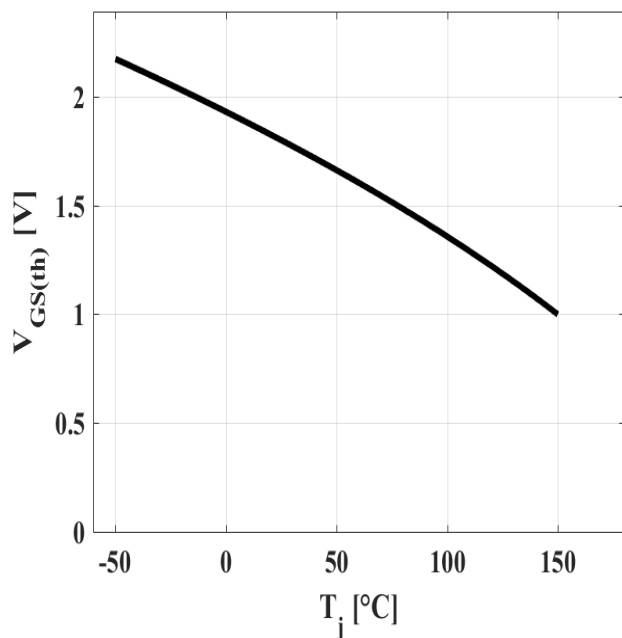


Figure9: Typ. Gate Threshold Voltage

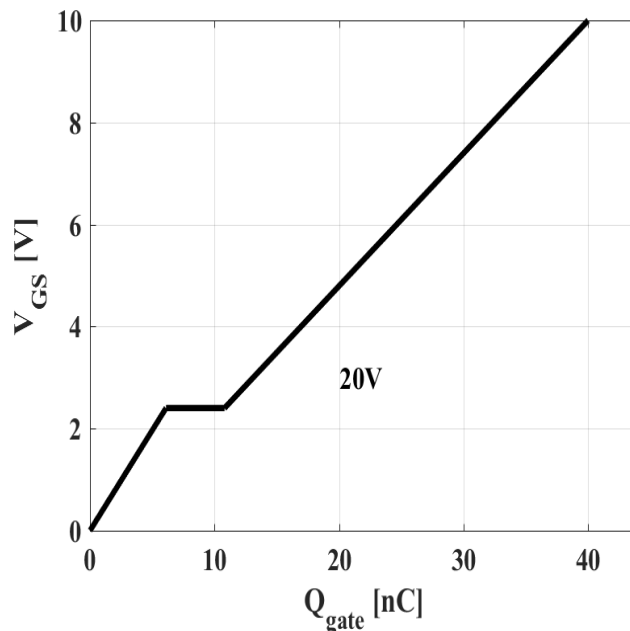


Figure 10: Typ. Gate Charge

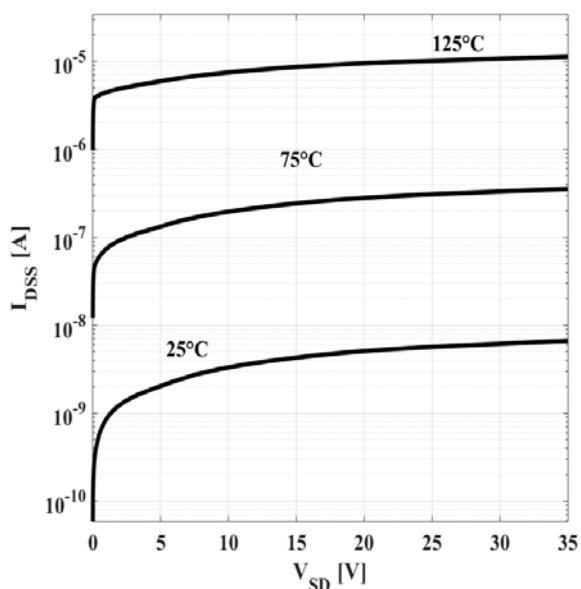


Figure 11: Drain-Source Leakage Current

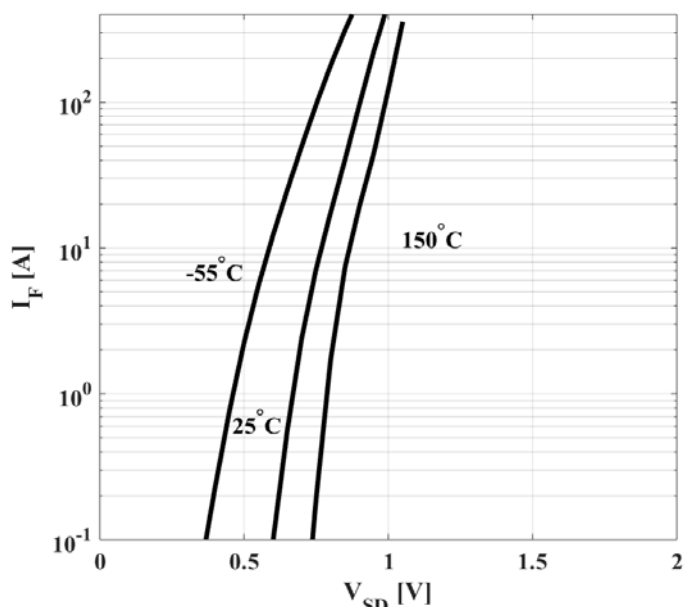


Figure 12: Forward Characteristics of Reverse Diode



TMG120N04D

N-Channel Enhancement Mosfet

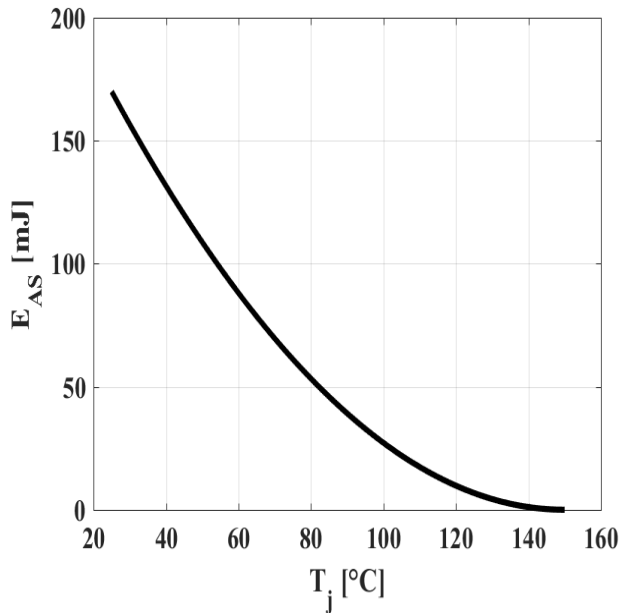


Figure 13: Avalanche Energy

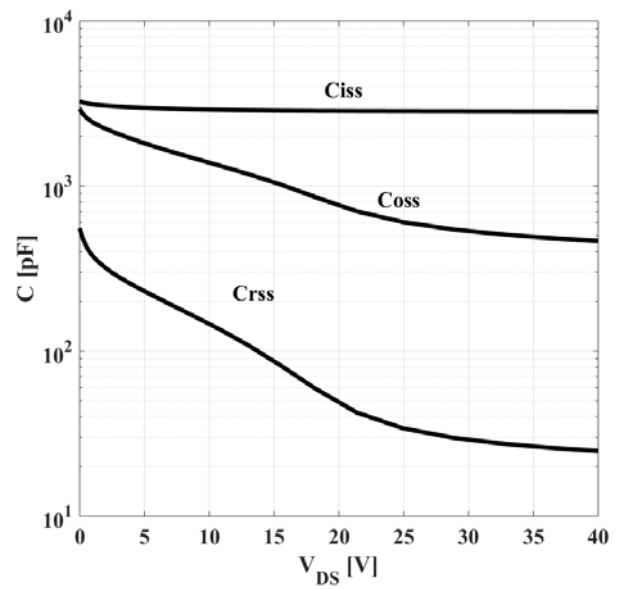


Figure 14: Typ. Capacitances

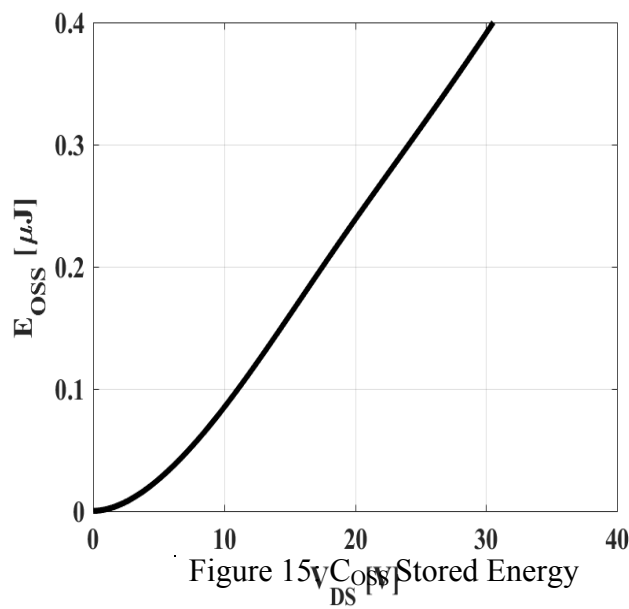
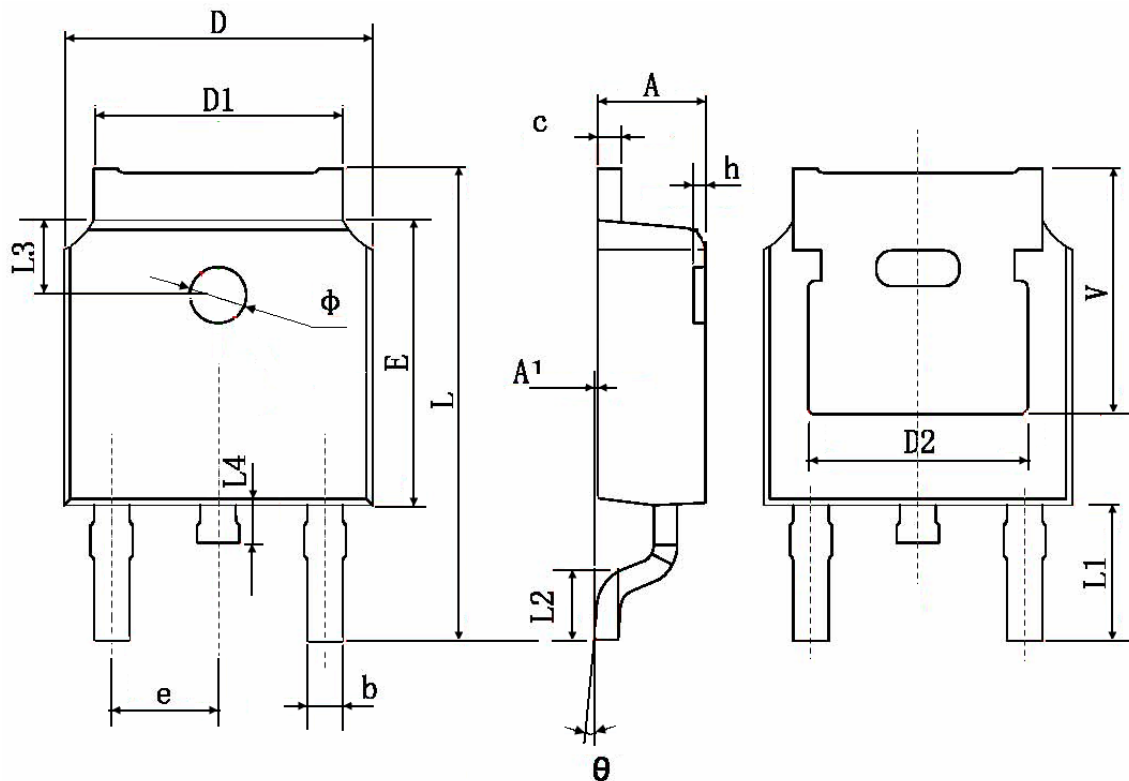


Figure 15: Output Capacitor Stored Energy

Package Information: TO-252-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	