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ABSOLUTE MAXIMUM RATINGS (Note 1) (T_J = 25° C unless otherwise noted)

Rating	Symbol	Value	Unit
BOOST MOSFET			
Drain-Source Voltage	V _{DS}	1200	V
Gate-Source Voltage	V _{GS}	-15/+25	V
Continuous Drain Current (@ $V_{GS} = 20 \text{ V}, T_C = 80^{\circ}\text{C}$)	۱ _D	38	А
Pulsed Drain Current @ $T_C = 80^{\circ}C (T_J = 175^{\circ}C)$	I _{D(Pulse)}	114	А
Maximum Power Dissipation @ $T_C = 80^{\circ}C (T_J = 175^{\circ}C)$	P _{tot}	118	W
Minimum Operating Junction Temperature	T _{JMIN}	-40	°C
Maximum Operating Junction Temperature	T _{JMAX}	175	°C
BOOST DIODE			
Peak Repetitive Reverse Voltage	V _{RRM}	1200	V
Continuous Forward Current @ T _C = 80°C	١ _F	45	А
Repetitive Peak Forward Current ($T_J = 175^{\circ}C$, tp limited by T_{Jmax})	I _{FRM}	135	А
Maximum Power Dissipation @ $T_C = 80^{\circ}C (T_J = 175^{\circ}C)$	P _{tot}	118	W
Minimum Operating Junction Temperature	T _{JMIN}	-40	°C
Maximum Operating Junction Temperature	T _{JMAX}	175	°C
BYPASS DIODE			
Peak Repetitive Reverse Voltage	V _{RRM}	1200	V
Continuous Forward Current @ $T_C = 80^{\circ}C (T_J = 150^{\circ}C)$	١ _F	50	А
Repetitive Peak Forward Current ($T_J = 150^{\circ}C$, t_p limited by T_{Jmax})	I _{FRM}	150	А
Power Dissipation Per Diode @ $T_C = 80^{\circ}C (T_J = 175^{\circ}C)$	P _{tot}	61	W
Minimum Operating Junction Temperature	T _{JMIN}	-40	°C
Maximum Operating Junction Temperature	T _{JMAX}	150	°C
THERMAL PROPERTIES			
Storage Temperature Range	T _{stg}	-40 to 125	°C
INSULATION PROPERTIES			
Isolation Test Voltage, t = 1 sec, 60 Hz	V _{is}	3000	V _{RMS}
Creepage Distance		12.7	mm

Suresses exceeding mose listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.
Refer to ELECTRICAL CHARACTERISTICS, RECOMMENDED OPERATING RANGES and/or APPLICATION INFORMATION for Safe Operating parameters.

RECOMMENDED OPERATING RANGES

Rating	Symbol	Min	Max	Unit
Module Operating Junction Temperature	TJ	-40	(T _{Jmax} –25)	°C

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

ELECTRICAL CHARACTERISTICS (T_J = 25° C unless otherwise noted)

Parameter	Test Conditions	Symbol	Min	Тур	Max	Unit
BOOST MOSFET CHARACTERISTICS						
Zero Gate Voltage Drain Current	$V_{GS} = 0 \text{ V}, V_{DS} = 1200 \text{ V}, T_{J} = 25^{\circ}\text{C}$	I _{DSS}	-	-	200	, A
Static Drain-to-Source On Resistance	$V_{GS} = 20 \text{ V}, \text{ I}_{D} = 40 \text{ A}, $ T_J = 25°C	R _{DS(on)}	-	40	55	m
	$V_{GS} = 20 \text{ V}, \text{ I}_{D} = 40 \text{ A}, T_{J} = 175^{\circ}\text{C}$		_	60	_	
Gate-Source Leakage Current	$V_{GS} = -15 \text{ V} / +25 \text{ V},$ $V_{DS} = 0 \text{ V}$	I _{GSS}	-	-	1	, A
Turn-on Delay Time	$T_J = 25^{\circ}C, V_{DS} = 700 V,$	t _{d(on)}	-	17	-	ns
Rise Time	$I_D = 40 \text{ A}_{C} \text{V}_{GS} = -5 \text{ V} / 20 \text{ V},$ $R_G = 4.7 \text{ C}$	t _r	-	7.5	-	
Turn–off Delay Time		t _{d(off)}	-	43.8	-	
Fall Time		t _f	-	17	-	
Turn-on Switching Loss per Pulse		Eon	-	255	-	, J
Turn-off Switching Loss per PulseG		•	•	•	•	•

ELECTRICAL CHARACTERISTICS (T_J = 25° C unless otherwise noted) (continued)

Parameter	Test Conditions	Symbol	Min	Тур	Max	Unit
BOOST DIODE CHARACTERISTICS						
Reverse Recovery Time	$T_{\rm J} = 125^{\circ}C$	t _{rr}	-	16.9	-	ns
Reverse Recovery Charge	$ \begin{array}{c} \hline V_{DS} = 700 \text{ V}, \text{ I}_{D} = 40 \text{ A} \\ V_{GS} = -9 \text{ V} / 20 \text{ V}, \\ R_{G} = 4.7 \end{array} $	Q _{rr}	-	361	-	nC
Peak Reverse Recovery Current	$R_{G} = 4.7$ k	I _{RRM}	-	37	-	Α
Peak Rate of Fall of Recovery Current		di/dt	-	8067	-	A/, s
Reverse Recovery Energy		Err	-	209.1	-	, J
Thermal Resistance – Chip-to-Case	Thermal grease, Thickness = 2.1 Mil ±2%	R _{thJC}	-	0.70	-	K/W
Thermal Resistance – Chip-to-Heatsink	= 2.9 W/mK	R _{thJH}	-	1.14	-	K/W
BYPASS DIODE CHARACTERISTICS						

Diode Reverse Leakage Current	V_R = 1200 V, T_J = 25°C	I _R	-	-	250	, A
Diode Forward Voltage	$I_F = 50 \text{ A}, \text{ T}_J = 25^{\circ}\text{C}$	V _F	-	1.11	1.3	V
	$I_F = 50 \text{ A}, \text{ T}_J = 150^{\circ}\text{C}$		-	1.00	-	
Thermal Resistance – Chip-to-Case	Thermal grease, Thickness = 2.1 Mil ±2%	R _{thJC}	-	1.15	-	K/W
Thermal Resistance – Chip-to-Heatsink	= 2.9 W/mK	R _{thJC}	I	1.75	—	K/W

THERMISTOR CHARACTERISTICS

THERIMISTOR CHARACTERISTICS						•
Nominal Resistance		R ₂₅	I	22	I	ĸĹ
Nominal Resistance	T = 100°C	R ₁₀₀	I	1486	I	Υ.
Deviation of R25		$\Delta R/R$	-5	I	5	%
Power Dissipation		PD	-	200	-	

TYPICAL CHARACTERISTICS - MOSFET, BOOST DIODE AND BYPASS DIODE

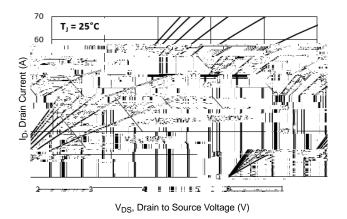
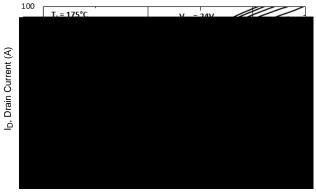


Figure 2. MOSFET on Region Characteristics



 $V_{\text{DS}},$ Drain to Source Voltage (V)

Figure 3. MOSFET on Region Characteristics

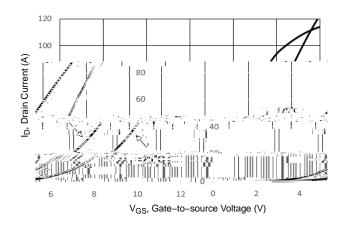


Figure 4. MOSFET Transfer Characteristics

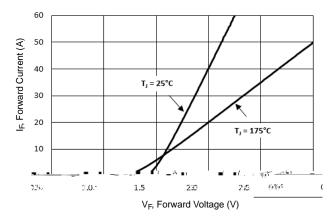


Figure 5. Boost Diode Forward Characteristics

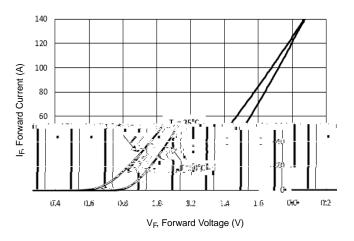


Figure 6. Bypass Diode Forward Characteristics

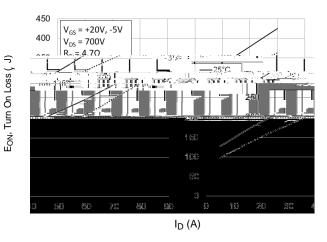
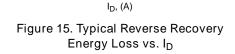


Figure 7. Typical Turn On Loss vs. ${\sf I}_{\sf D}$

TYPICAL CHARACTERISTICS - MOSFET, BOOST DIODE AND BYPASS DIODE (continued)





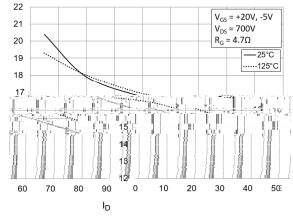
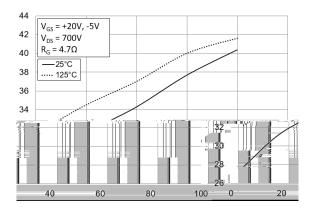
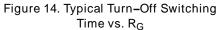


Figure 17. Typical Reverse Recovery Time vs. ID



Rg, Gate Resistor (



Err, Reverse Recovery Energy (, J)

R_g(t) Figure 16. Typical Reverse Recovery Energy Loss vs. R_G

Figure 18. Typical Reverse Recovery Charge vs. ID

Time (ns)

TYPICAL CHARACTERISTICS - MOSFET, BOOST DIODE AND BYPASS DIODE (continued)

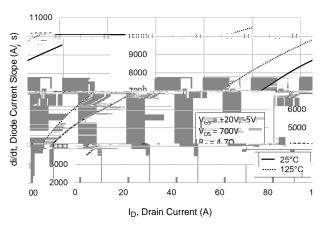


Figure 20. Typical di/dt Current Slope vs. ID

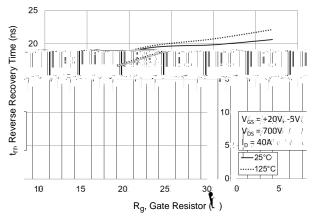
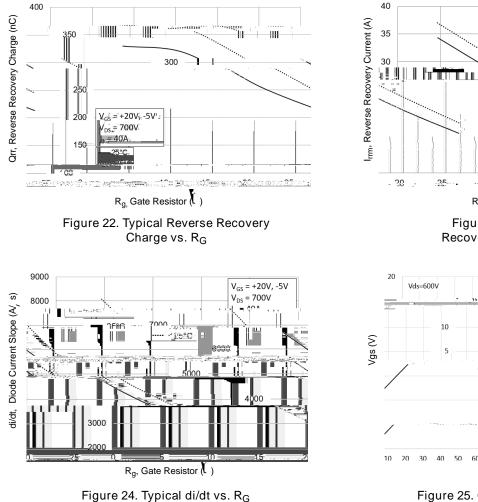


Figure 21. Typical Reverse Recovery Time vs. R_G



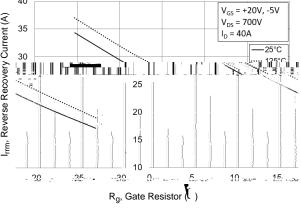
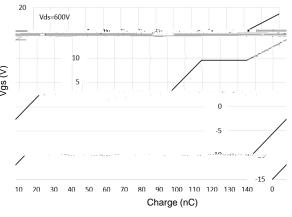
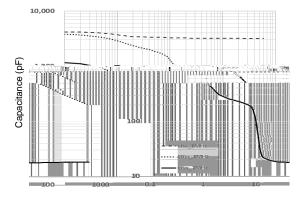


Figure 23. Typical Reverse Recovery Peak Current vs. R_G

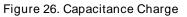


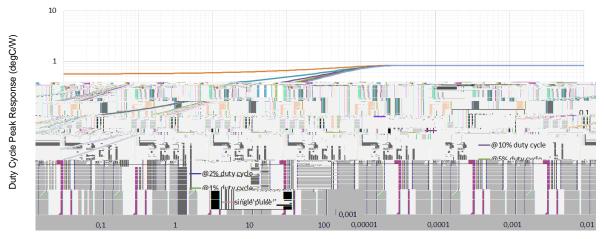


TYPICAL CHARACTERISTICS - MOSFET, BOOST DIODE AND BYPASS DIODE (continued)



Vds (V)





Pulse on Time (s)

Figure 27. Mosfet Transient Thermal Impedance

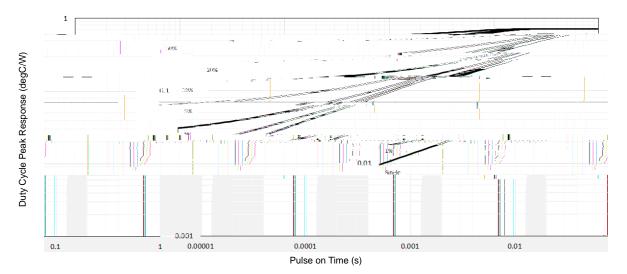


Figure 28. Boost Diode Transient Thermal Impedance

TYPICAL CHARACTERISTICS - MOSFET, BOOST DIODE AND BYPASS DIODE (continued)

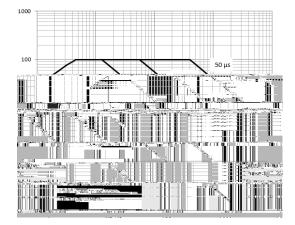
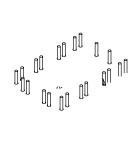


Figure 29. Bypass Diode Transient Thermal Impedance



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