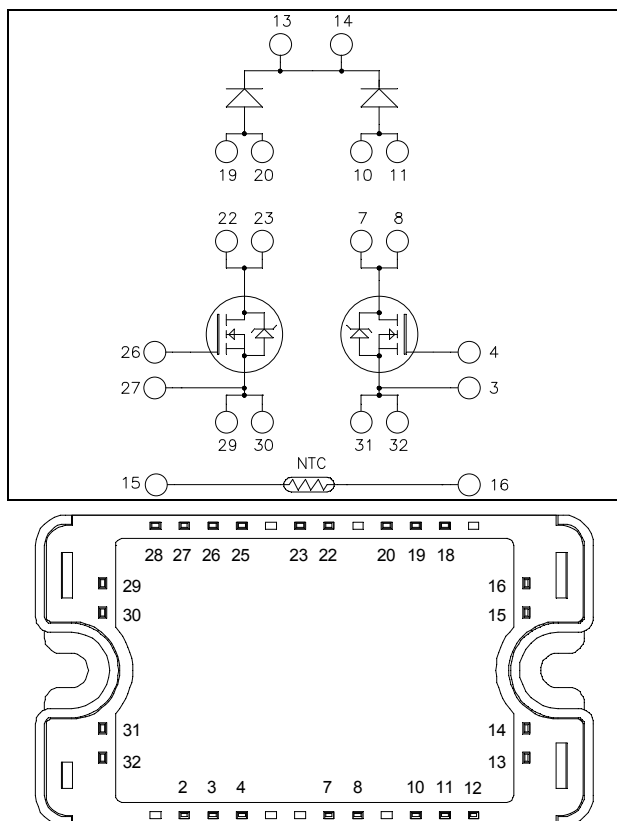


Dual Boost chopper MOSFET Power Module

$$V_{DSS} = 1000V$$
$$R_{DS(on)} = 350m\Omega \text{ typ @ } T_j = 25^{\circ}C$$
$$I_p = 22A @ T_c = 25^{\circ}C$$


All multiple inputs and outputs must be shorted together
Example: 13/14 ; 29/30 ; 22/23 ...

Application

- AC and DC motor control
- Switched Mode Power Supplies
- Power Factor Correction (PFC)
- Interleaved PFC

Features

- Power MOS 7[®] MOSFETs
 - Low R_{DSon}
 - Low input and Miller capacitance
 - Low gate charge
 - Avalanche energy rated
 - Very rugged
- Kelvin source for easy drive
- Very low stray inductance
 - Symmetrical design
- Internal thermistor for temperature monitoring
- High level of integration

Benefits

- Outstanding performance at high frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Solderable terminals both for power and signal for easy PCB mounting
- Low profile
- Each leg can be easily paralleled to achieve a single boost of twice the current capability
- RoHS Compliant

Absolute maximum ratings

<i>Symbol</i>	<i>Parameter</i>	<i>Max ratings</i>	<i>Unit</i>
V _{DSS}	Drain - Source Breakdown Voltage	1000	V
I _D	Continuous Drain Current	T _c = 25°C 22	A
		T _c = 80°C 17	
I _{DM}	Pulsed Drain current	88	
V _{GS}	Gate - Source Voltage	±30	V
R _{DSon}	Drain - Source ON Resistance	420	mΩ
P _D	Maximum Power Dissipation	T _c = 25°C 390	W
I _{AR}	Avalanche current (repetitive and non repetitive)	25	A
E _{AR}	Repetitive Avalanche Energy	50	mJ
E _{AS}	Single Pulse Avalanche Energy	3000	



CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed. See application note APT0502 on www.microsemi.com

All ratings @ $T_j = 25^\circ\text{C}$ unless otherwise specified

Electrical Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS} = 0V, V_{DS} = 1000V$ $T_j = 25^\circ\text{C}$			100	μA
		$V_{GS} = 0V, V_{DS} = 800V$ $T_j = 125^\circ\text{C}$			500	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 11A$		350	420	$\text{m}\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 2.5\text{mA}$	3		5	V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 30V, V_{DS} = 0V$			± 100	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1\text{MHz}$		5.2		nF
C_{oss}	Output Capacitance			0.88		
C_{rss}	Reverse Transfer Capacitance			0.16		
Q_g	Total gate Charge	$V_{GS} = 10V$ $V_{Bus} = 500V$ $I_D = 22A$		186		nC
Q_{gs}	Gate – Source Charge			24		
Q_{gd}	Gate – Drain Charge			122		
$T_{d(on)}$	Turn-on Delay Time	Inductive switching @ 125°C $V_{GS} = 15V$ $V_{Bus} = 670V$ $I_D = 22A$ $R_G = 5\Omega$		18		ns
T_r	Rise Time			12		
$T_{d(off)}$	Turn-off Delay Time			155		
T_f	Fall Time			40		
E_{on}	Turn-on Switching Energy	Inductive switching @ 25°C $V_{GS} = 15V, V_{Bus} = 670V$ $I_D = 22A, R_G = 5\Omega$		900		μJ
E_{off}	Turn-off Switching Energy			623		
E_{on}	Turn-on Switching Energy	Inductive switching @ 125°C $V_{GS} = 15V, V_{Bus} = 670V$ $I_D = 22A, R_G = 5\Omega$		1423		μJ
E_{off}	Turn-off Switching Energy			779		

Chopper diode ratings and characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
V _{RRM}	Maximum Peak Repetitive Reverse Voltage			1000			V
I _{RM}	Maximum Reverse Leakage Current	V _R =1000V	T _j = 25°C			100	μA
			T _j = 125°C			500	
I _F	DC Forward Current		T _c = 80°C		40		A
V _F	Diode Forward Voltage	I _F = 40A			2.5	3	V
		I _F = 80A			3.1		
		I _F = 40A	T _j = 125°C		2		
t _{rr}	Reverse Recovery Time	I _F = 40A V _R = 667V di/dt=200A/μs	T _j = 25°C		250		ns
	T _j = 125°C			310			
Q _{rr}	Reverse Recovery Charge			T _j = 25°C		415	
			T _j = 125°C		1650		

Thermal and package characteristics

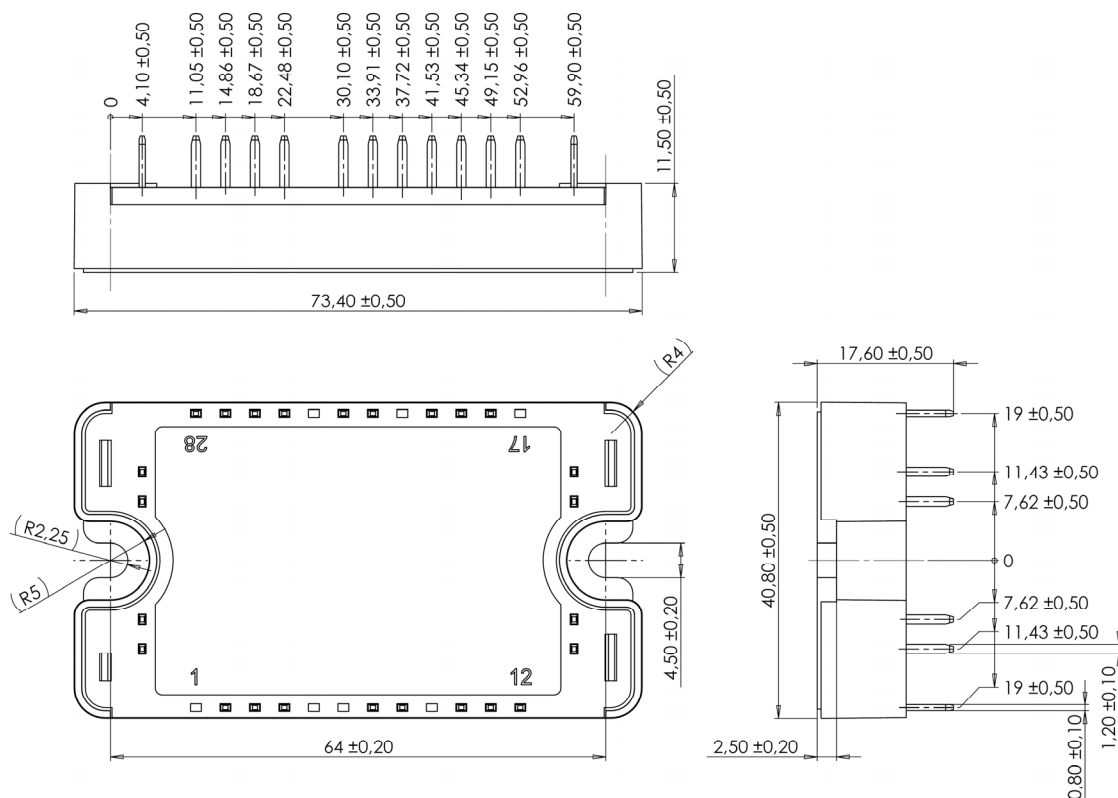
Symbol	Characteristic			Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance			Transistor		0.32	°C/W
				Chopper diode		1.2	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz			4000			V
T _J	Operating junction temperature range			-40		150	°C
T _{STG}	Storage Temperature Range			-40		125	
T _C	Operating Case Temperature			-40		100	
Torque	Mounting torque	To heatsink	M4	2		3	N.m
Wt	Package Weight					110	g

Temperature sensor NTC (see application note APT0406 on www.microsemi.com for more information).

Symbol	Characteristic	Min	Typ	Max	Unit
R ₂₅	Resistance @ 25°C		50		kΩ
ΔR ₂₅ /R ₂₅			5		%
B _{25/85}	T ₂₅ = 298.15 K		3952		K
ΔB/B	T _C = 100°C		4		%

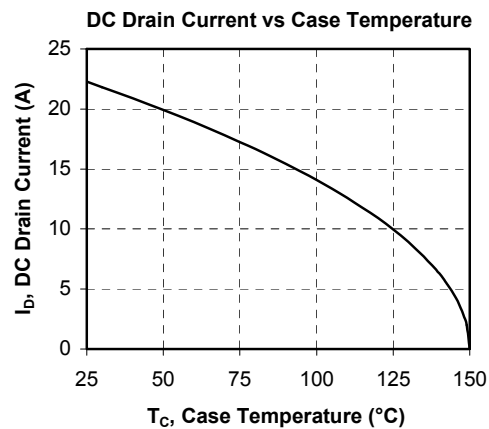
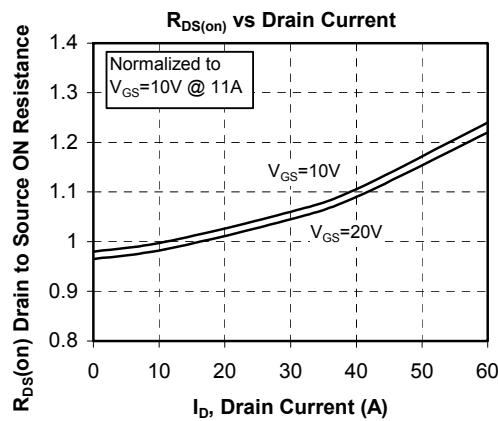
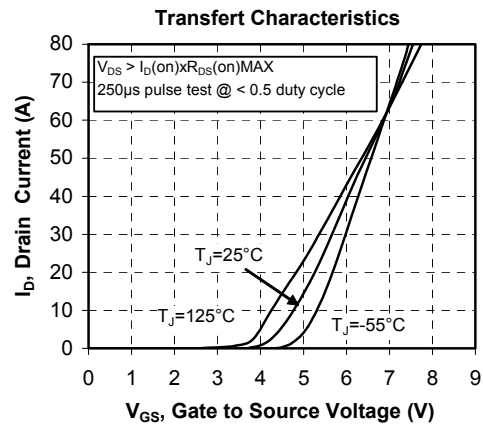
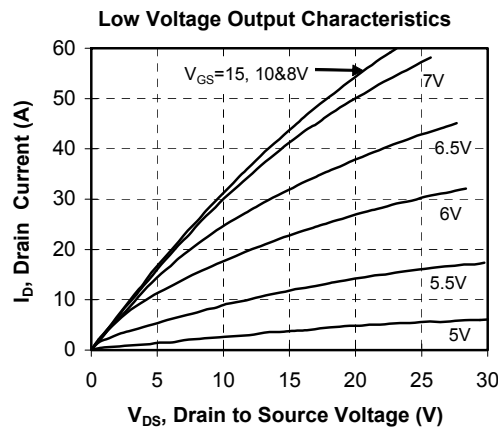
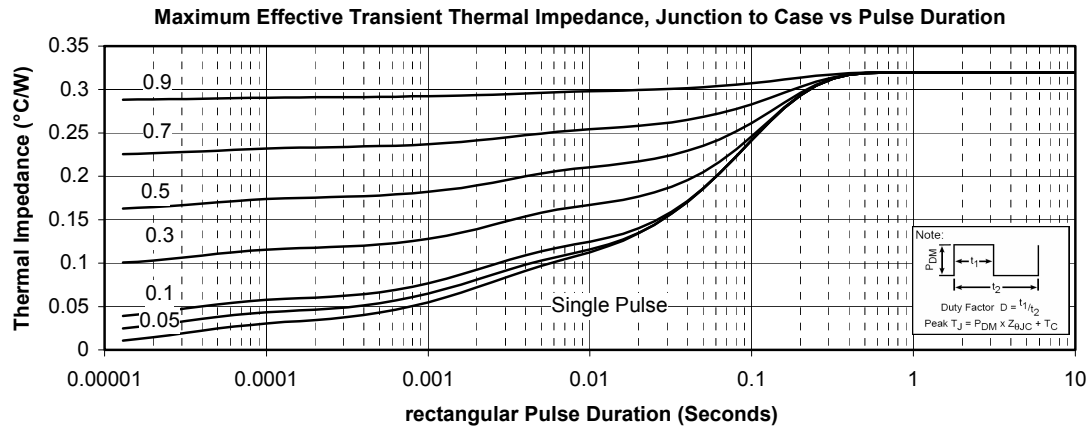
$$R_T = \frac{R_{25}}{\exp \left[B_{25/85} \left(\frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

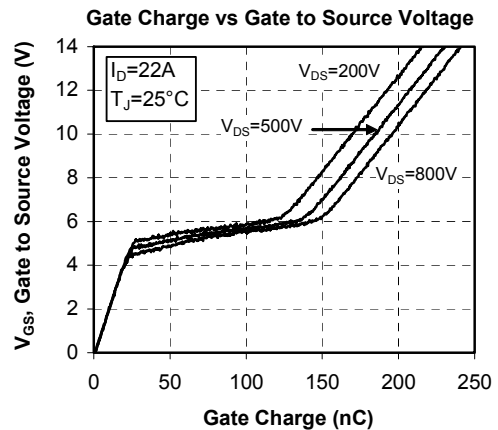
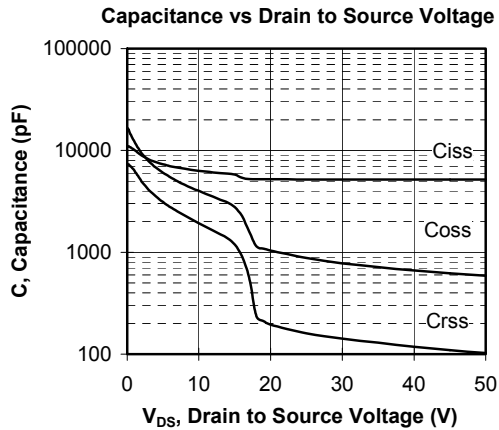
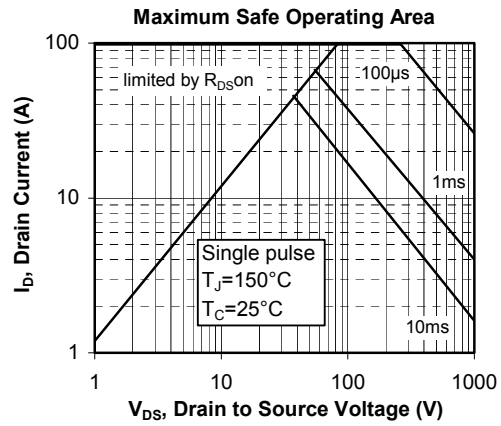
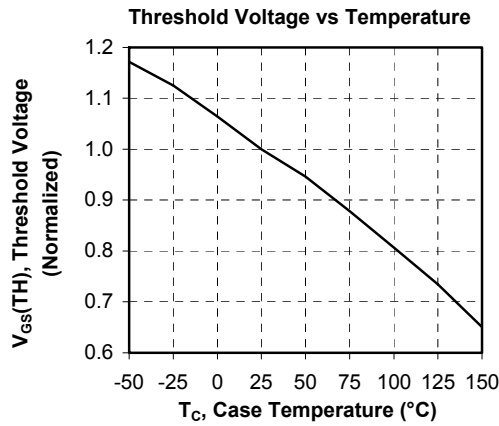
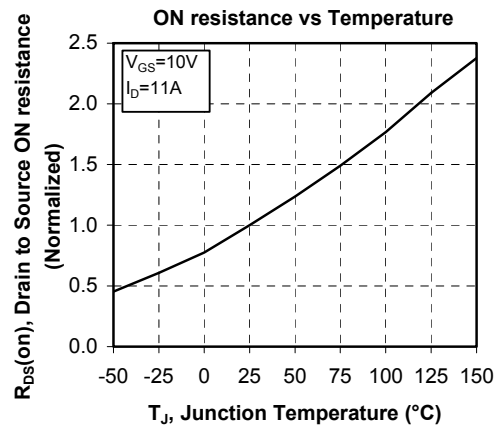
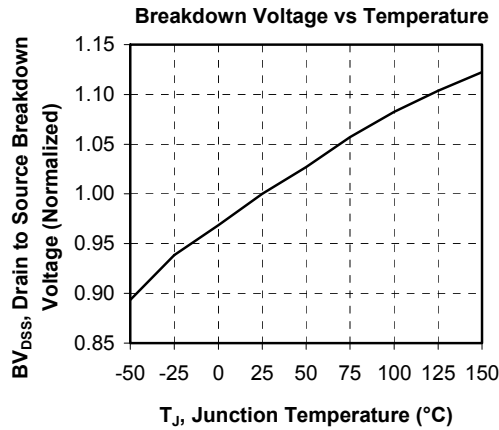
T: Thermistor temperature
 R_T: Thermistor value at T

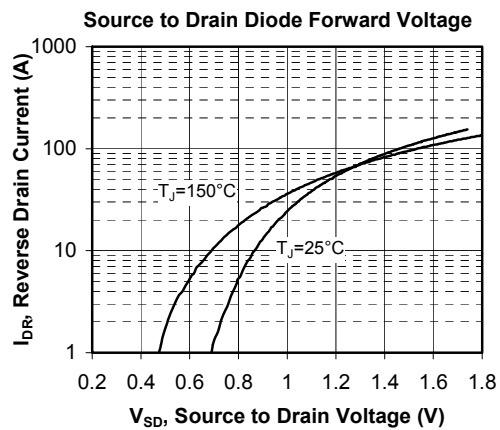
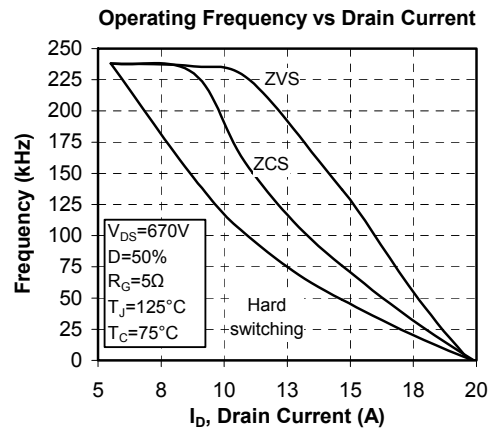
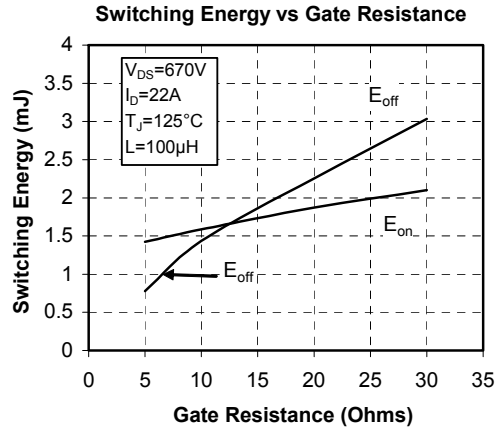
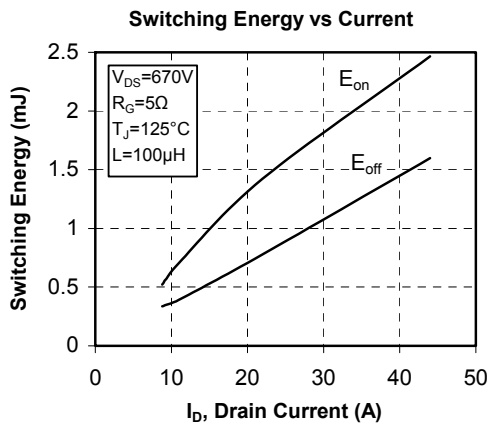
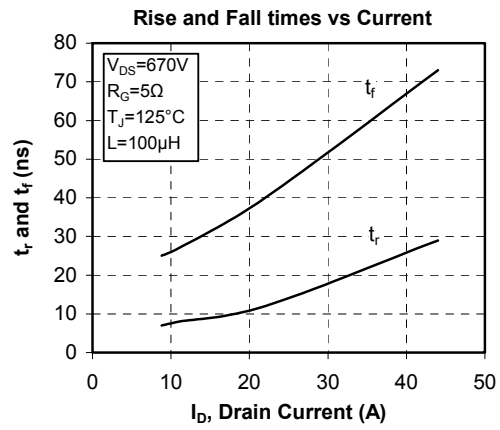
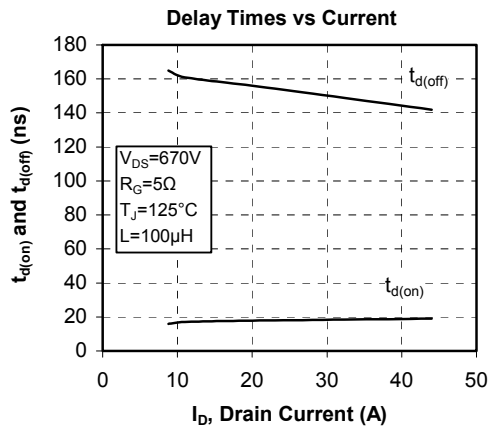
SP3 Package outline (dimensions in mm)


See application note 1901 - Mounting Instructions for SP3 Power Modules on www.microsemi.com

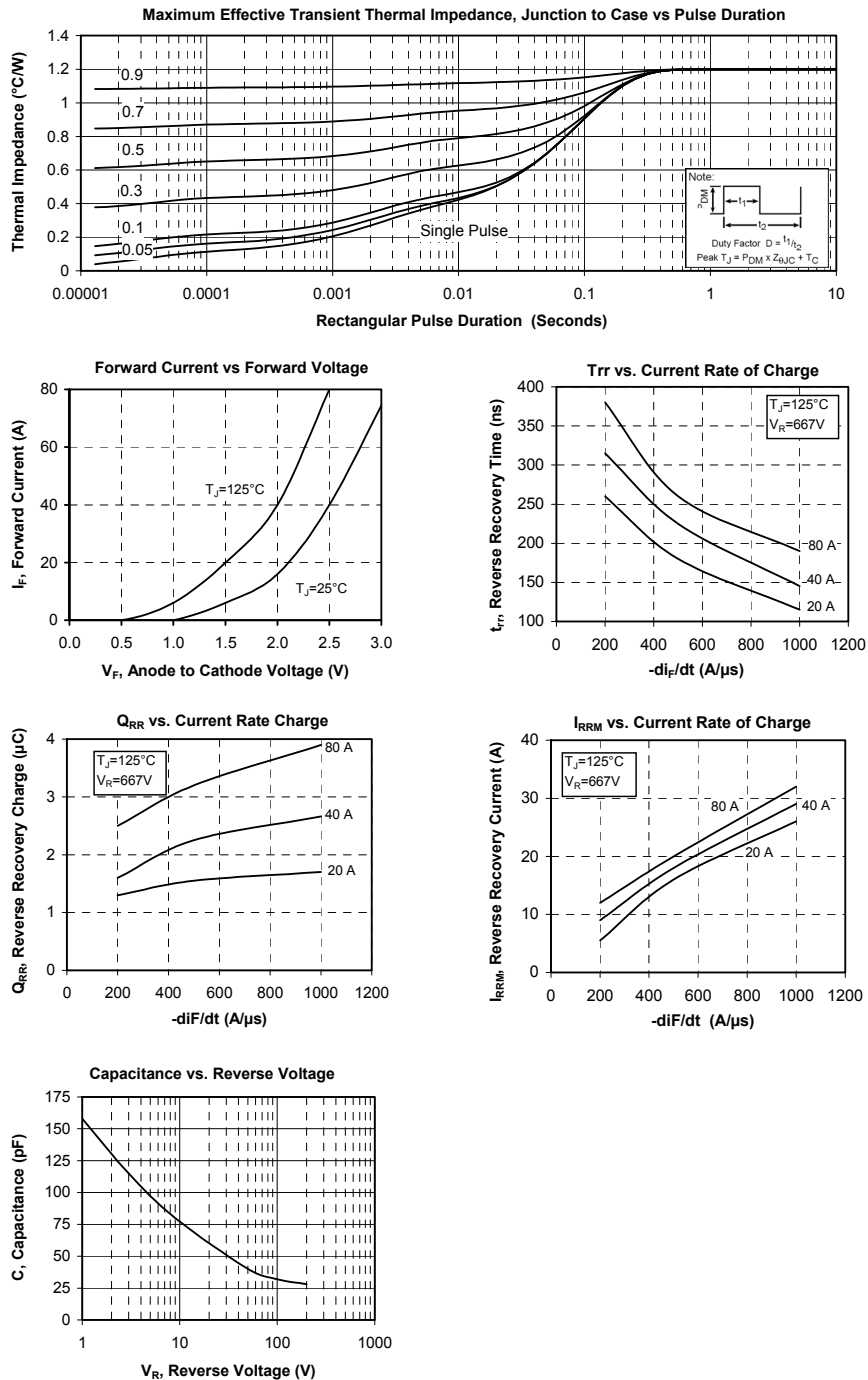
Typical CoolMOS Performance Curve







Typical chopper diode performance curve



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