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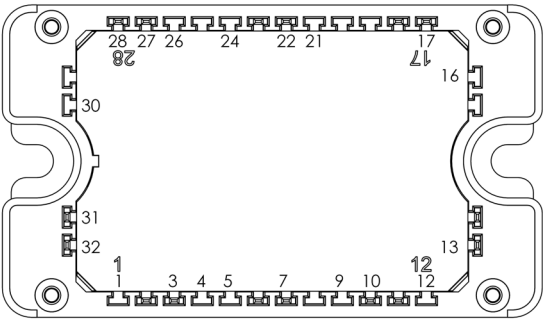
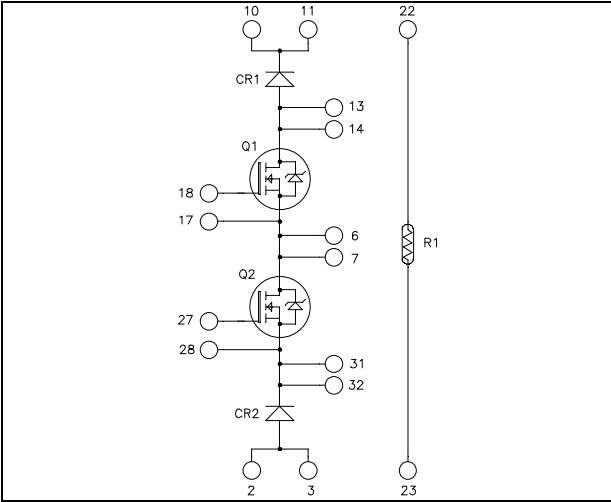
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Boost buck chopper MOSFET Power Module

$V_{DSS} = 600V$
 $R_{DSon} = 24m\Omega \text{ max @ } T_j = 25^\circ C$
 $I_D = 95A \text{ @ } T_c = 25^\circ C$



All multiple inputs and outputs must be shorted together
 Example: 10/11 ; 13/14 ; 6/7 ...

Application

- AC and DC motor control
- Switched Mode Power Supplies
- Power Factor Correction

Features

- CoolMOS™
 - Ultra low R_{DSon}
 - Low Miller capacitance
 - Ultra low gate charge
 - Avalanche energy rated
 - Very rugged
- Kelvin source for easy drive
- Very low stray inductance
- 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
- RoHS Compliant

Absolute maximum ratings (per CoolMOS)

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Breakdown Voltage	600	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	95
		$T_c = 80^\circ C$	70
I_{DM}	Pulsed Drain current	260	A
V_{GS}	Gate - Source Voltage	± 20	V
R_{DSon}	Drain - Source ON Resistance	24	m Ω
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	462
I_{AR}	Avalanche current (repetitive and non repetitive)	15	A
E_{AR}	Repetitive Avalanche Energy	3	mJ
E_{AS}	Single Pulse Avalanche Energy	1900	

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 (per CoolMOS)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} = 0V, V _{DS} = 600V			350	μA
		T _j = 25°C				
		V _{GS} = 0V, V _{DS} = 600V			600	
R _{DS(on)}	Drain – Source on Resistance	V _{GS} = 10V, I _D = 47.5A			24	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} = V _{DS} , I _D = 5mA	2.1	3	3.9	V
I _{GSS}	Gate – Source Leakage Current	V _{GS} = ±20 V, V _{DS} = 0V			200	nA

Dynamic Characteristics (per CoolMOS)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit	
C _{iss}	Input Capacitance	V _{GS} = 0V ; V _{DS} = 25V f = 1MHz		14.4		nF	
C _{oss}	Output Capacitance				17		
Q _g	Total gate Charge	V _{GS} = 10V V _{Bus} = 300V I _D = 95A		300		nC	
Q _{gs}	Gate – Source Charge				68		
Q _{gd}	Gate – Drain Charge				102		
T _{d(on)}	Turn-on Delay Time	Inductive Switching (125°C) V _{GS} = 10V V _{Bus} = 400V I _D = 95A R _G = 2.5Ω		21		ns	
T _r	Rise Time				30		
T _{d(off)}	Turn-off Delay Time				100		
T _f	Fall Time				45		
E _{on}	Turn-on Switching Energy	Inductive switching @ 25°C V _{GS} = 10V ; V _{Bus} = 400V I _D = 95A ; R _G = 2.5Ω		1350		μJ	
E _{off}	Turn-off Switching Energy				1040		
E _{on}	Turn-on Switching Energy	Inductive switching @ 125°C V _{GS} = 10V ; V _{Bus} = 400V I _D = 95A ; R _G = 2.5Ω		2200		μJ	
E _{off}	Turn-off Switching Energy				1270		

Chopper diode ratings and characteristics (per diode)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit	
V _{RRM}	Maximum Peak Repetitive Reverse Voltage		600			V	
I _{RM}	Maximum Reverse Leakage Current	V _R = 600V	T _j = 25°C		500	μA	
			T _j = 125°C		1000		
I _F	DC Forward Current	T _c = 80°C		120		A	
V _F	Diode Forward Voltage	I _F = 120A	T _j = 25°C		1.6	1.8	V
		I _F = 240A			1.9		
		I _F = 120A	T _j = 125°C		1.4		
t _{rr}	Reverse Recovery Time	I _F = 120A V _R = 400V di/dt = 400A/μs	T _j = 25°C		130	ns	
			T _j = 125°C		170		
Q _{rr}	Reverse Recovery Charge	I _F = 120A V _R = 400V di/dt = 400A/μs	T _j = 25°C		440	nC	
			T _j = 125°C		1840		

Thermal and package characteristics

Symbol	Characteristic	Min	Typ	Max	Unit	
R _{thJC}	Junction to Case Thermal Resistance	Per CoolMOS		0.27	°C/W	
		Per diode		0.46		
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

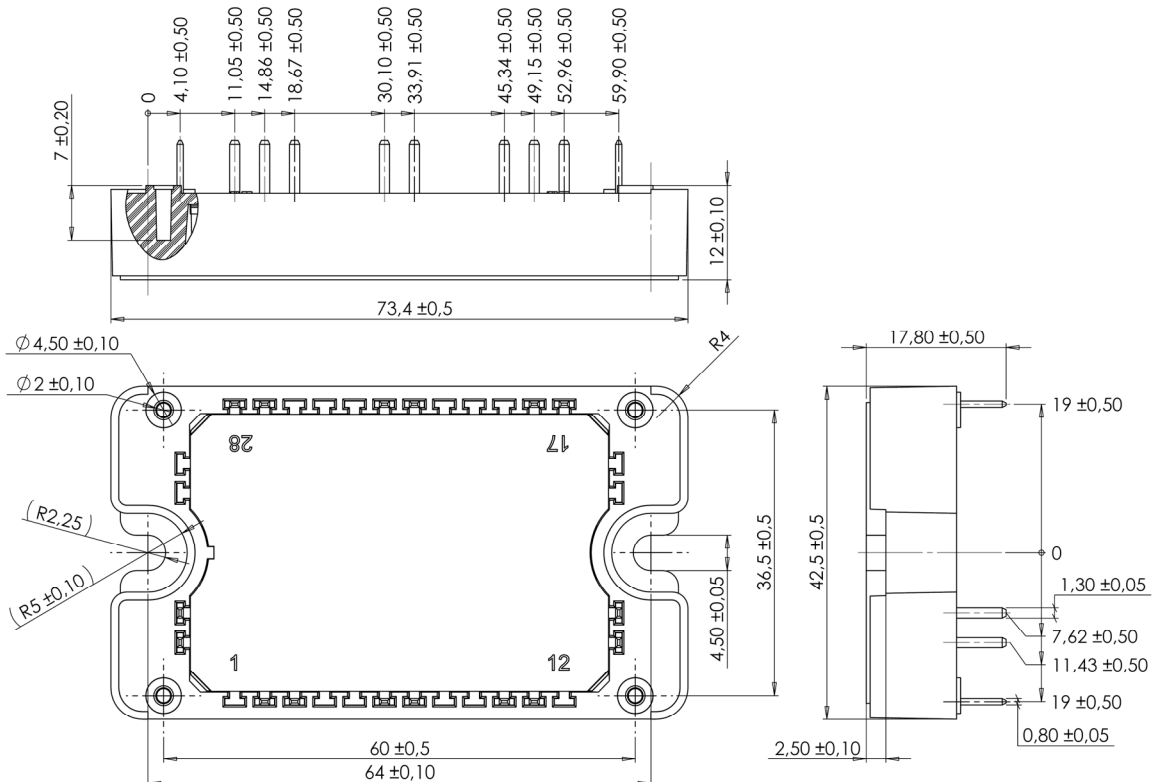
Temperature sensor NTC

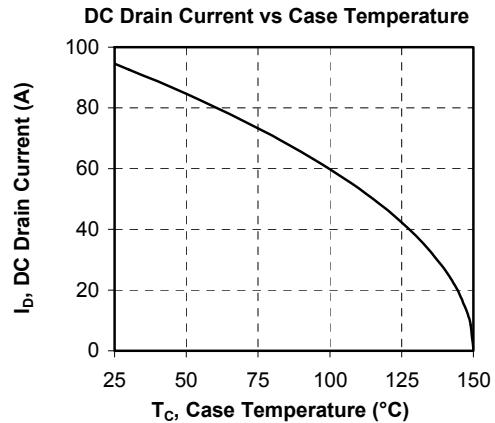
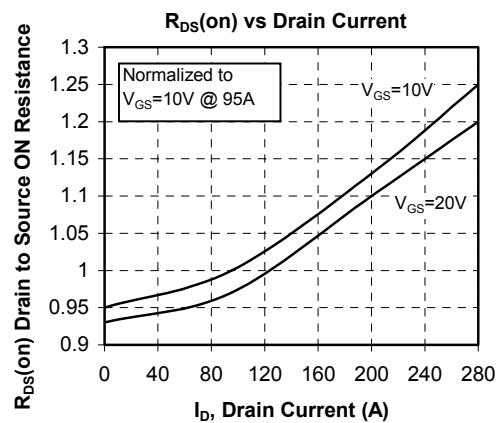
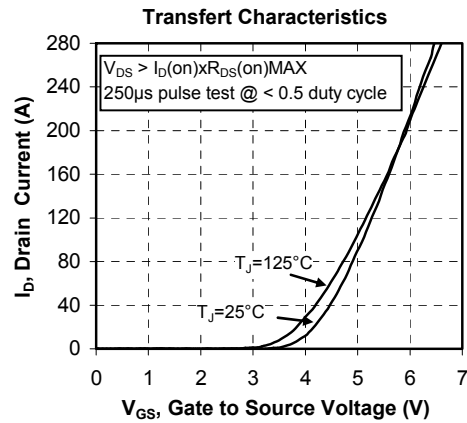
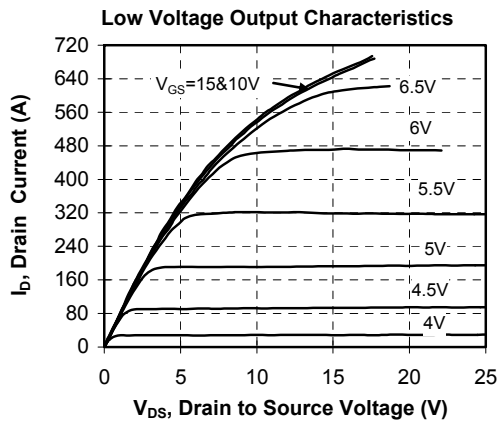
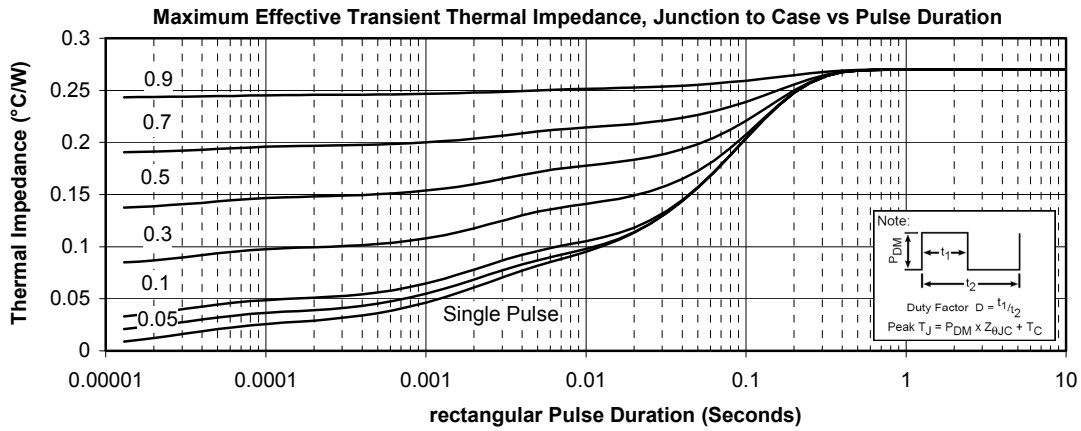
Symbol	Characteristic	Min	Typ	Max	Unit
R ₂₅	Resistance @ 25°C		22		kΩ
ΔR ₂₅ /R ₂₅	Resistance tolerance			5	%
ΔB/B	Beta tolerance			3	
B _{25/100}	T ₂₅ = 298.16 K		3980		K

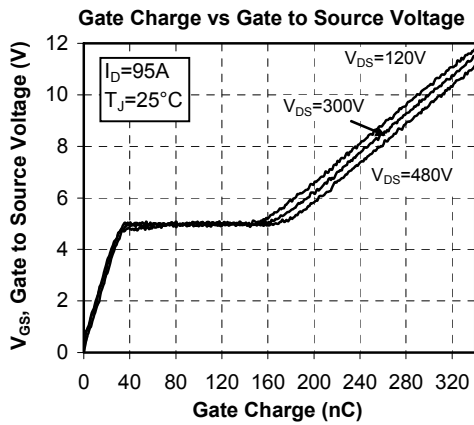
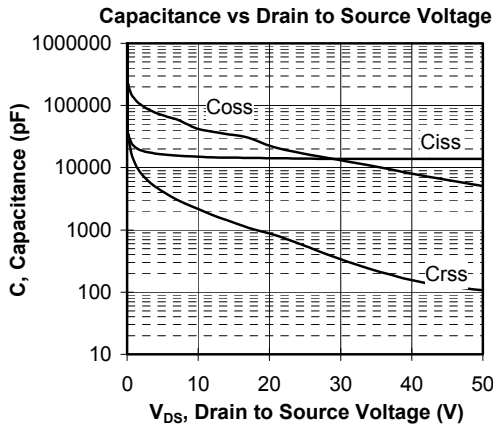
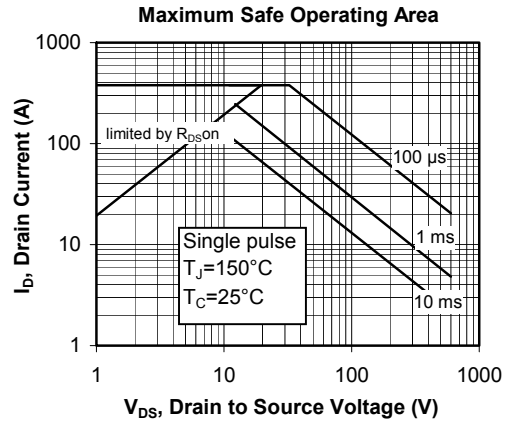
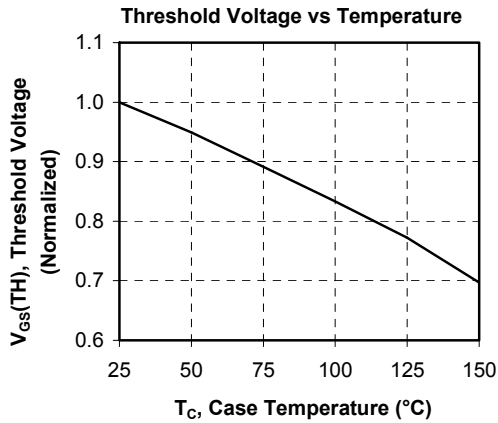
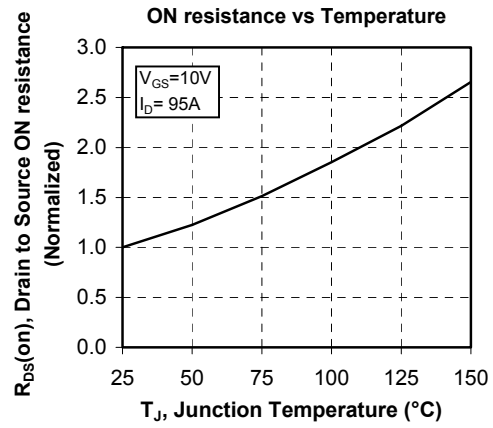
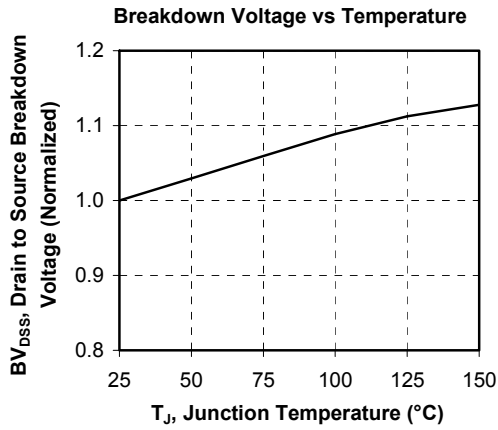
$$R_T = \frac{R_{25}}{\exp \left[B_{25/100} \left(\frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

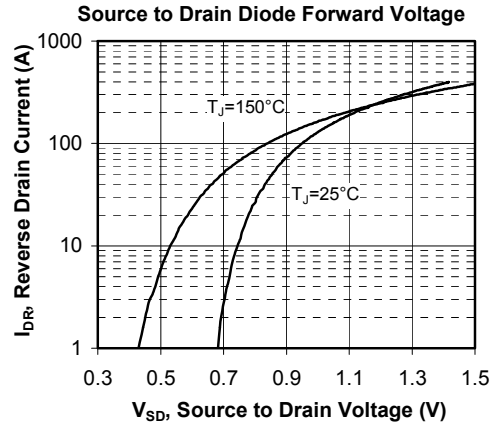
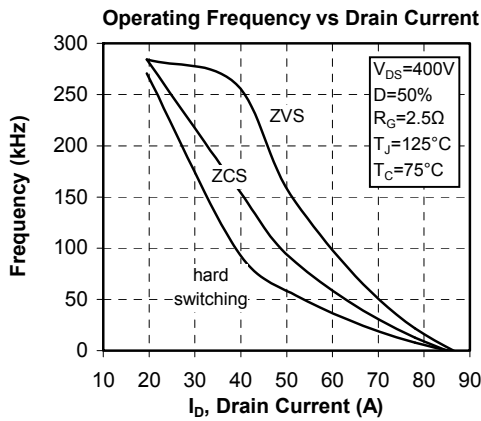
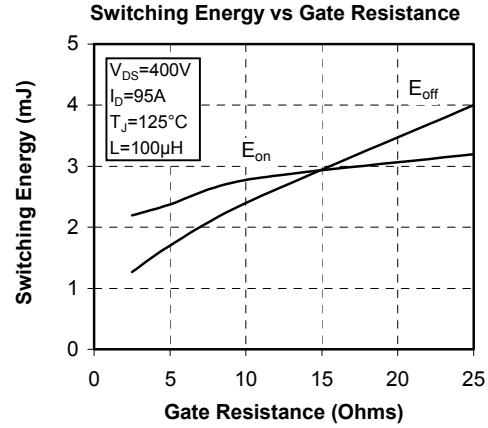
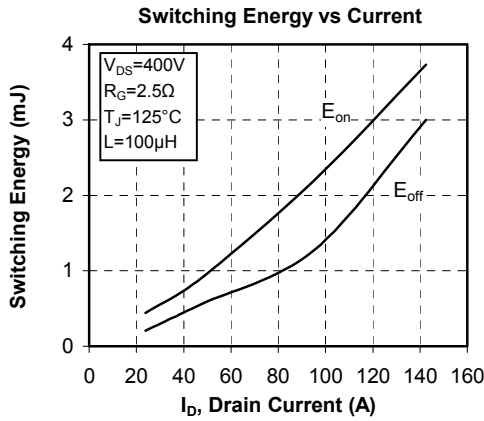
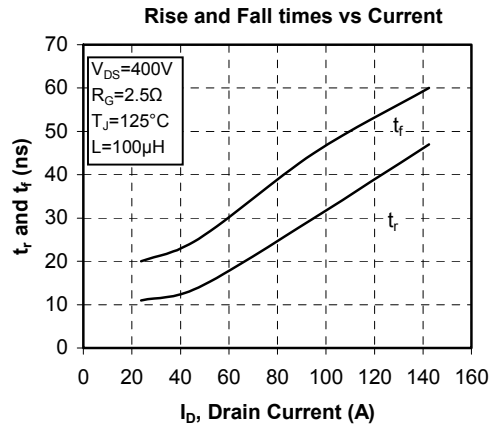
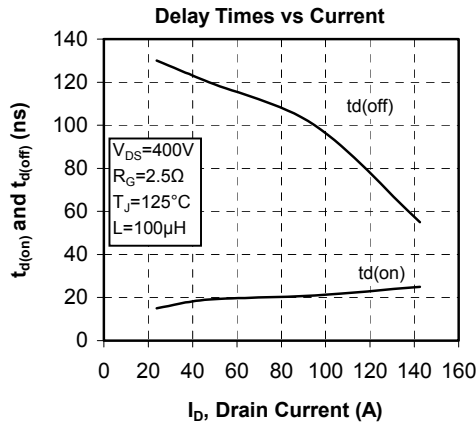
T: Thermistor temperature
 R_T: Thermistor value at T

SP3F Package outline (dimensions in mm)

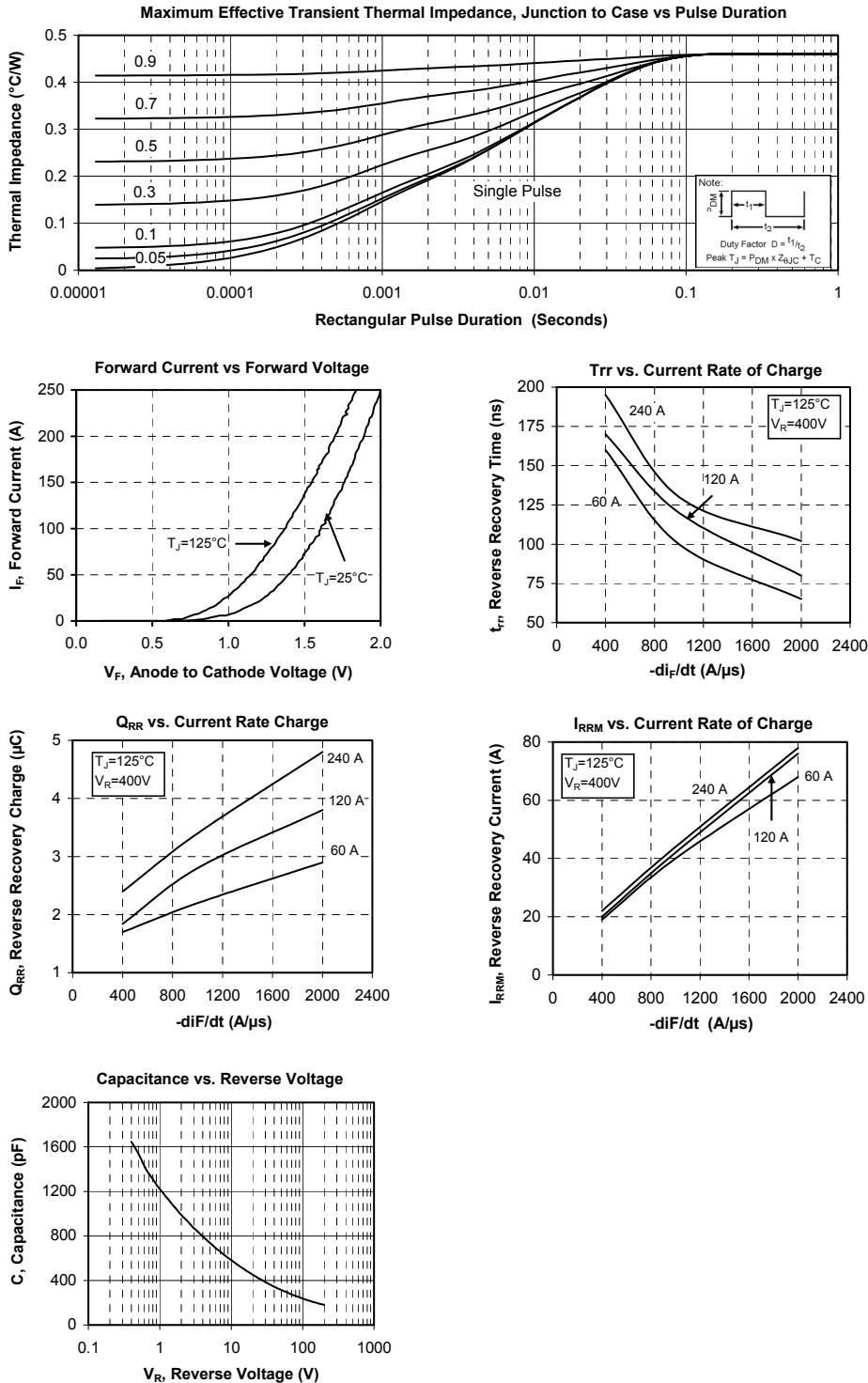


Typical CoolMOS Performance Curve






Typical diode performance curves



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