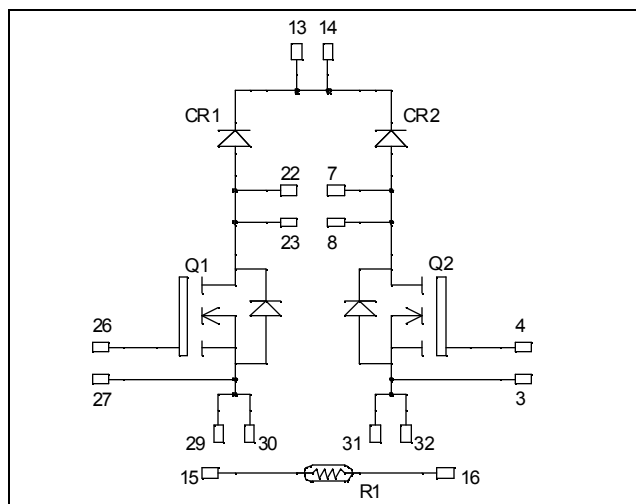


Dual boost chopper Super Junction MOSFET Power Module

$V_{DSS} = 600V$

$R_{DSon} = 70m\Omega$ max @ $T_j = 25^\circ C$

$I_D = 39A$ @ $T_c = 25^\circ C$



Application

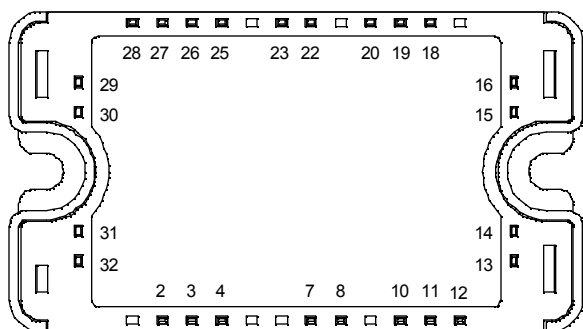
- AC and DC motor control
- Switched Mode Power Supplies
- Power Factor Correction

Features

- **COOLMOS** Power Semiconductors
 - 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
 - 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



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

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Breakdown Voltage	600	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	A
		$T_c = 80^\circ C$	
I_{DM}	Pulsed Drain current	120	A
V_{GS}	Gate - Source Voltage	± 20	V
R_{DSon}	Drain - Source ON Resistance	70	$m\Omega$
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	W
I_{AR}	Avalanche current (repetitive and non repetitive)	20	A
E_{AR}	Repetitive Avalanche Energy	1	mJ
E_{AS}	Single Pulse Avalanche Energy	1800	

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

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

Electrical Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
BV_{DS}	Drain - Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	600			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS} = 0V, V_{DS} = 600V, T_j = 25^\circ\text{C}$		0.5	25	μA
		$V_{GS} = 0V, V_{DS} = 600V, T_j = 125^\circ\text{C}$			250	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 39A$			70	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 2.7mA$	2.1	3	3.9	V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 20V, V_{DS} = 0V$			± 100	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0V$		7		nF
C_{oss}	Output Capacitance	$V_{DS} = 25V$		2.56		
C_{rss}	Reverse Transfer Capacitance	$f = 1MHz$		0.21		
Q_g	Total gate Charge	$V_{GS} = 10V$		259		nC
Q_{gs}	Gate – Source Charge	$V_{Bus} = 300V$		29		
Q_{gd}	Gate – Drain Charge	$I_D = 39A$		111		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching @ 125°C $V_{GS} = 15V$ $V_{Bus} = 400V$ $I_D = 39A$ $R_G = 5\Omega$		21		ns
T_r	Rise Time			30		
$T_{d(off)}$	Turn-off Delay Time			283		
T_f	Fall Time			84		
E_{on}	Turn-on Switching Energy ❶	Inductive switching @ 25°C $V_{GS} = 15V, V_{Bus} = 400V$ $I_D = 39A, R_G = 5\Omega$		670		μJ
E_{off}	Turn-off Switching Energy ❷			980		
E_{on}	Turn-on Switching Energy ❶	Inductive switching @ 125°C $V_{GS} = 15V, V_{Bus} = 400V$ $I_D = 39A, R_G = 5\Omega$		1096		μJ
E_{off}	Turn-off Switching Energy ❷			1206		

Diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		600			V
I_{RM}	Maximum Reverse Leakage Current	$V_R = 600V$			250	μA
		$T_j = 125^\circ\text{C}$			750	
$I_{F(AV)}$	Maximum Average Forward Current	50% duty cycle $T_c = 70^\circ\text{C}$		30		A
V_F	Diode Forward Voltage	$I_F = 30A$		2.2	2.7	V
		$I_F = 60A$		2.7		
		$I_F = 30A, T_j = 150^\circ\text{C}$		1.5		
t_{rr}	Reverse Recovery Time	$I_F = 30A, V_R = 400V$		74		ns
		$T_j = 100^\circ\text{C}$		74		
Q_{rr}	Reverse Recovery Charge	$di/dt = 200A/\mu s$		123		nC
		$T_j = 100^\circ\text{C}$		288		

❶ E_{on} includes diode reverse recovery.

❷ In accordance with JEDEC standard JESD24-1.

Thermal and package characteristics

Symbol	Characteristic	Min	Typ	Max	Unit
R _{thJC}	Junction to Case	IGBT		0.5	°C/W
		Diode		1.2	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t = 1 min, I _{isol} < 1mA, 50/60Hz	2500			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	N.m
Wt	Package Weight			110	g

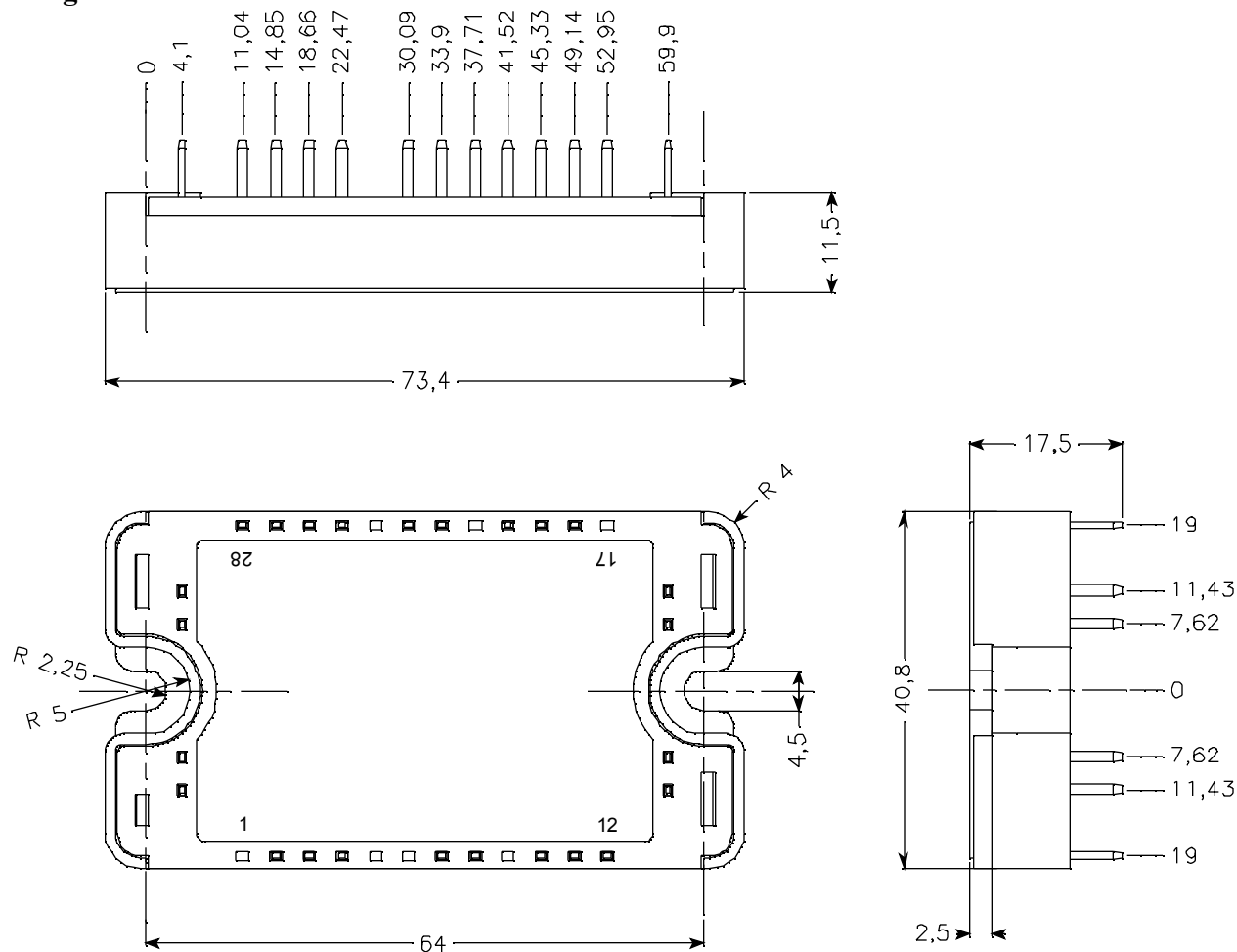
Temperature sensor NTC

Symbol	Characteristic	Min	Typ	Max	Unit
R ₂₅	Resistance @ 25°C		68		kΩ
B _{25/85}	T ₂₅ = 298.16 K		4080		K

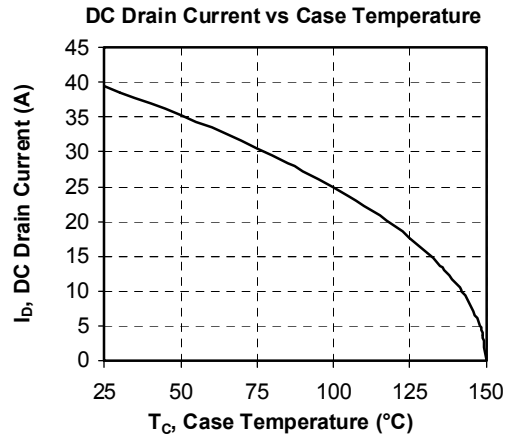
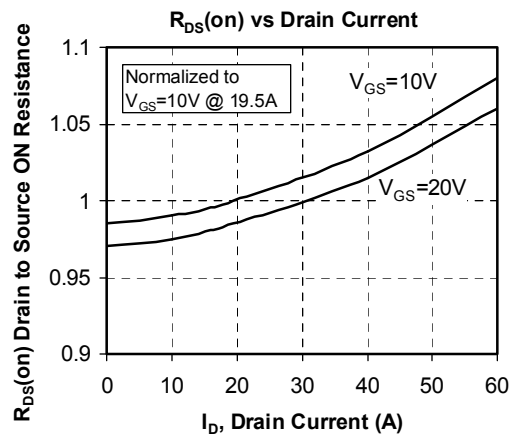
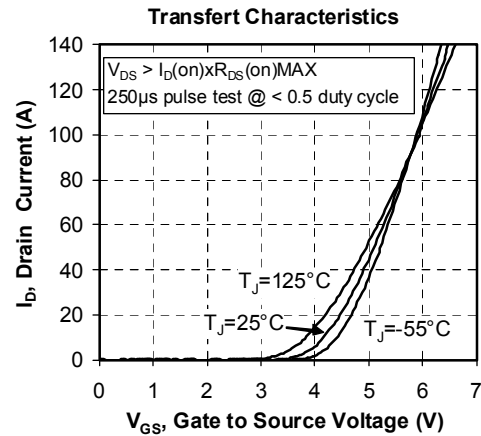
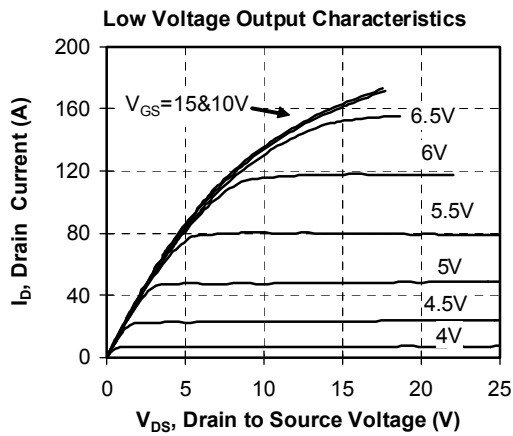
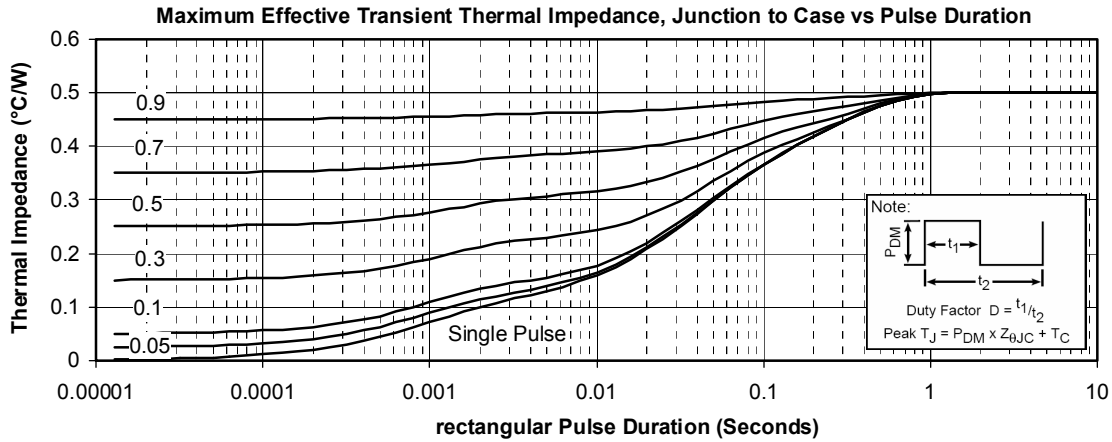
$$R_T = \frac{R_{25}}{\exp \left[B_{25/85} \left(\frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

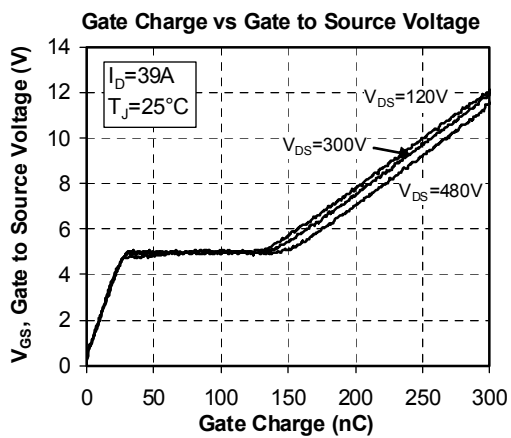
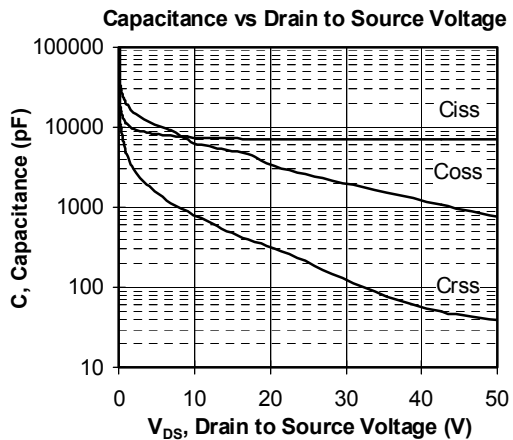
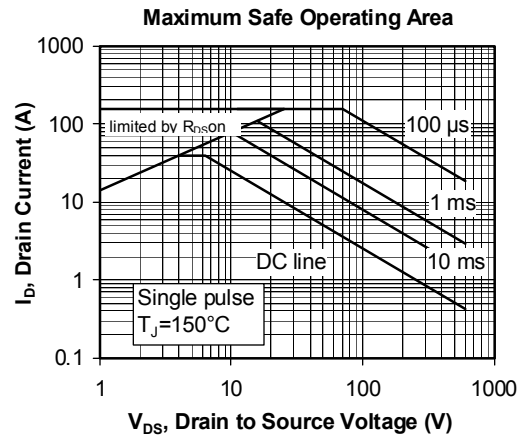
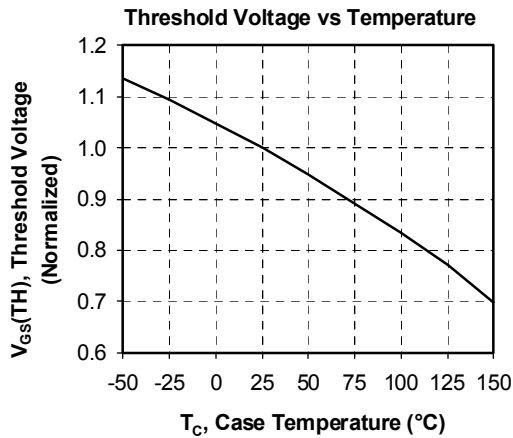
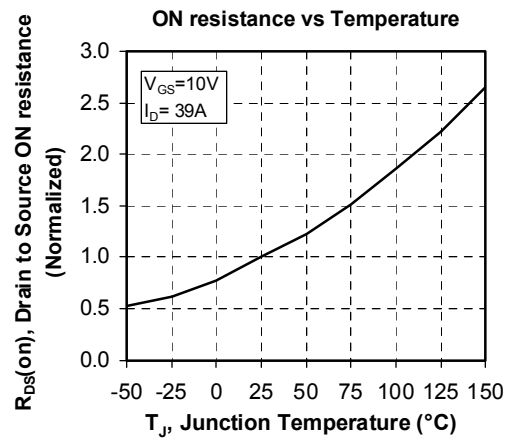
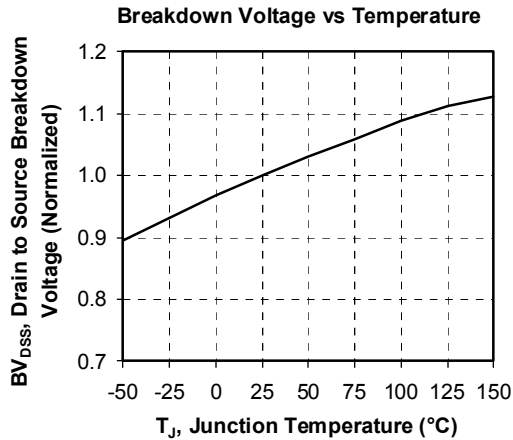
T: Thermistor temperature
R_T: Thermistor value at T

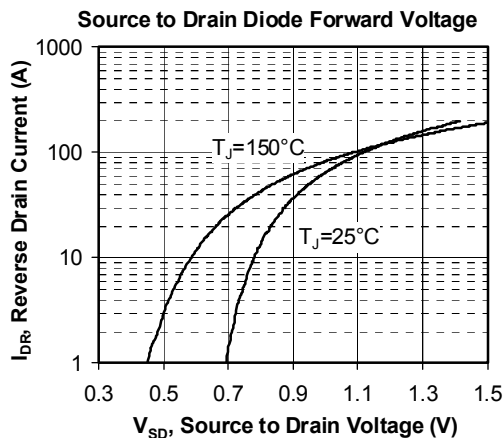
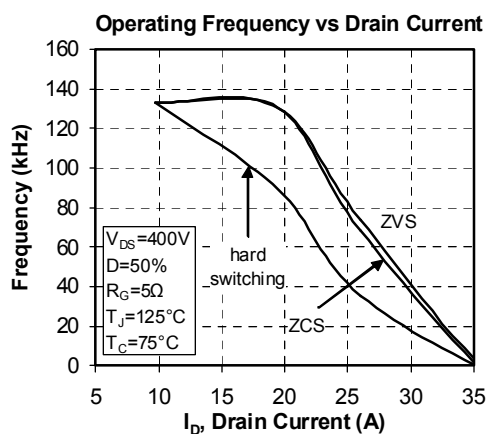
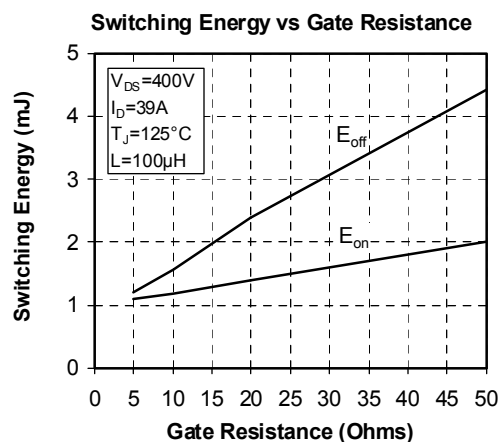
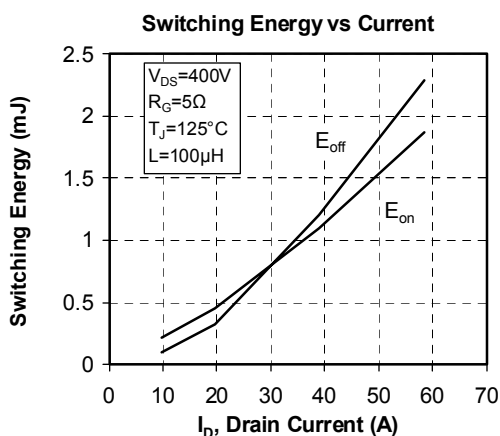
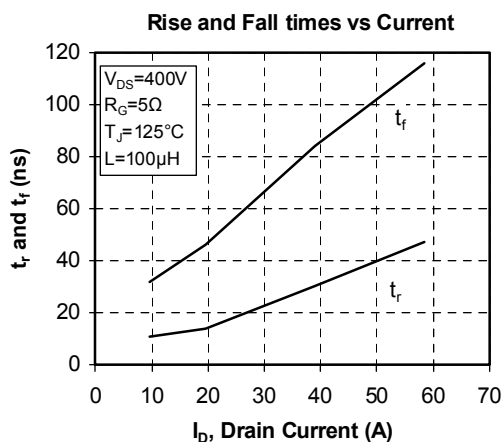
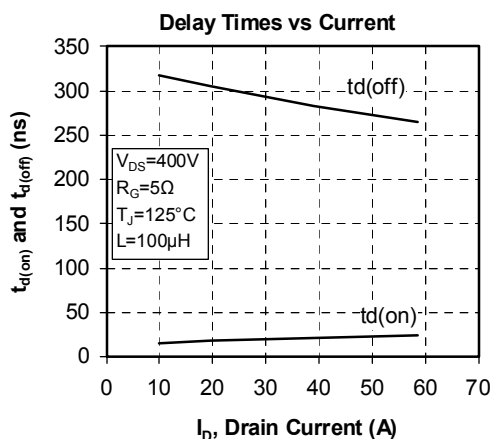
Package outline



Typical Performance Curve







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