

HV MOSFET

> **DTMOS**

Latest Super-Junction Technology

Toshiba has developed the Gen-4 super-junction 600V, 650V and 800V DTMOS IV MOSFET series. Fabricated using the state-of-the-art single epitaxial process, DTMOS IV provides a 30% reduction in R_{on}^*A , a figure of merit (FOM) for MOSFETs, compared to its predecessor, DTMOS III. A reduction in R_{on}^*A leads to smaller R_{DSon} chips in the same packages. This helps users to improve efficiency and reduce the size of power systems. Fast switching X-type and fast body-diode 5-type versions are also available.



> **APPLICATIONS**

- Switched Mode Power Supply (SMPS)
- Lighting
- Power Factor Control (PFC)
- Industrial Applications (including UPS)

> **FEATURES**

> **ADVANTAGES**

> **BENEFITS**

30% reduction in R_{DSon}^*A compared to previous generation	Reduction of chip size at same performance or improved performance at same chip size	<p>Attractive cost effects</p> <ul style="list-style-type: none"> • Reduced heat system costs • Less costs of field failure • Less passive component costs • Reduced BOM costs due to most effective solutions <p>Smart performance increases</p> <ul style="list-style-type: none"> • Easy design-in for faster time to market and product launch • Ready to support high volume markets with competitive prices
Improved figure of merit (FOM) compared to DTMOS III generation	Improved electrical efficiency by reduced switching and static losses	
Reduction in C_{oss}	12% reduction in switching loss, EOSS, compared to the predecessor	
Application of latest process technology: single epitaxial process	Lower increase in on-resistance at temperature rise	
Wide range of on-resistances and packaging options, see tables	Freedom of choice and flexibility on package and on R_{DSon} line-up	
45% reduction of Qgd (gate drain charge) at X-Series	High efficiency switching at PFC	

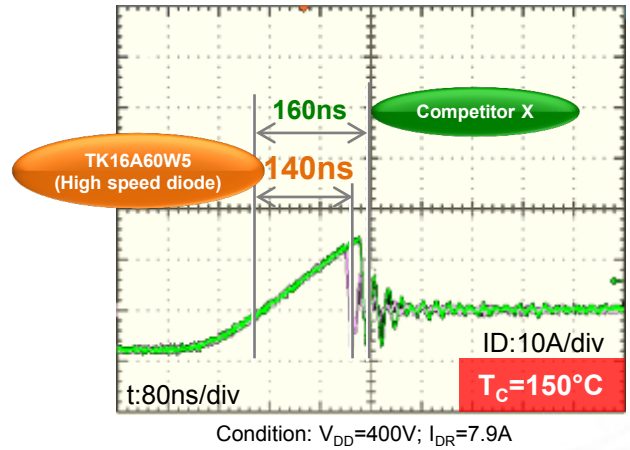
> **DTMOS IV - SERIES**

> **APPLICATIONS**

W-Series: Standard type	For general switching
W5-Series: With high speed body diode	For bridge circuitry, like UPS or server SMPS
X-Series: High speed type	For PFC circuit
X5-Series: High speed type with high speed body diode	For bridge circuitry, like UPS or server SMPS

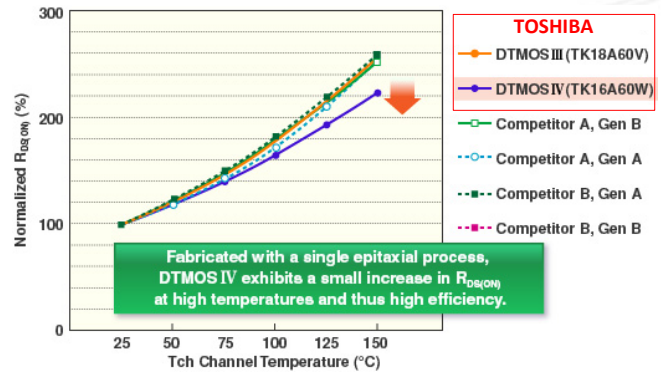
> FAST REVERSE RECOVERY TIME

The DTMOS IV option with fast body diode offers a fast recovery time even at high temperature. This results in lower power losses, less heat generation and lower power costs for a better and more thermally efficient design.



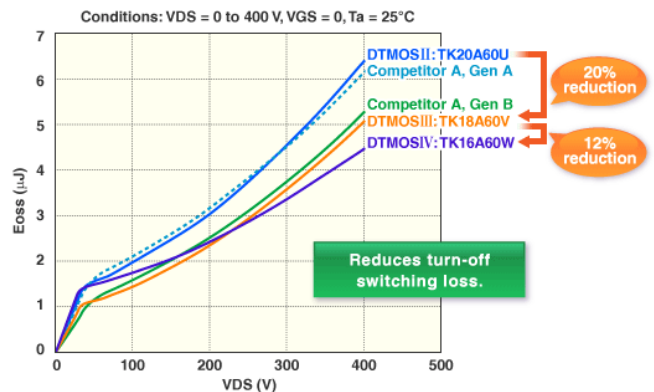
> 15% LOWER $R_{DS(ON)}$ AT MAXIMUM OPERATING TEMPERATURE

For the single-epitaxial process the dependency of $R_{DS(on)}$ from temperature is much smaller compared to multi-epitaxial process. As DTMOS IV is manufactured with a single-epitaxial process, the $R_{DS(on)}$ value will be 15% smaller at operating temperature, resulting in lower power consumption and higher system efficiency. At the same time, system cooling set-up can be relaxed and reliability is increased.



> 12% REDUCTION IN SWITCHING LOSS

The reduced output capacitance of DTMOS IV leads to approximately 12% less stored energy compared to the previous generation. This aids further energy saving at each switching cycle and makes DTMOS IV preferable for fast switching application and also suitable for resonant circuitry.



> DTMOS IV 600V STANDARD "W"-SERIES

PKG	D-PAK	I-PAK	D2-PAK	I2-PAK	DFN 8x8mm	TO-220	TO-220SIS	TO-247
Outline								
0.9Ω	TK5P60W	TK5Q60W					TK5A60W	
0.75Ω	TK6P60W	TK6Q60W					TK6A60W	
0.60Ω	TK7P60W	TK7Q60W					TK7A60W	
0.50Ω	TK8P60W	TK8Q60W					TK8A60W	
0.38Ω	TK10P60W	TK10Q60W			TK10V60W	TK10E60W	TK10A60W	
0.30Ω	TK12P60W	TK12Q60W			TK12V60W	TK12E60W	TK12A60W	
0.19Ω			TK16G60W	TK16C60W	TK16V60W	TK16E60W	TK16A60W	TK16N60W
0.155Ω			TK20G60W	TK20C60W	TK20V60W	TK20E60W	TK20A60W	TK20N60W
88mΩ					TK31V60W	TK31E60W	TK31A60W	TK31N60W
65mΩ							TK39A60W	TK39N60W
40mΩ								TK62N60W
18mΩ								

> DTMOS IV 600V FAST DIODE TYPE "W5"-SERIES

	D-PAK	D2-PAK	DFN 8x8mm	TO-220	TO-220SIS	TO-247
0.99Ω	TK5P60W5				TK5A60W5	
0.65Ω	TK7P60W5				TK7A60W5	
0.54Ω	TK8P60W5				TK8A60W5	
0.45Ω					TK10A60W5	
0.23Ω		TK16G60W5	TK16V60W5	TK16E60W5	TK16A60W5	TK16N60W5
0.175Ω			TK20V60W5	TK20E60W5	TK20A60W5	TK20N60W5
99mΩ			TK31V60W5			TK31N60W5
74mΩ						TK39N60W5
45mΩ						TK62N60W5

> DTMOS IV 600V HIGH SPEED TYPE (LOW Qgd) , FAST DIODE TYPE "X" & "X5"-SERIES

	DFN 8x8mm	TO-220	TO-220SIS	TO-247 4 Pin	TO-247
0.145Ω	TK25V60X5 NEW	TK25E60X5	TK25A60X5		
0.125Ω	TK25V60X (0.13Ω)	TK25E60X	TK25A60X	TK25Z60X*	TK25N60X
88mΩ	TK31V60X (98mΩ)	TK31E60X		TK31Z60X*	TK31N60X
65mΩ				TK39Z60X*	TK39N60X
40mΩ				TK62Z60X*	TK62N60X

* Samples Available

DTMOS IV 650V STANDARD "W"-SERIES

PKG	D-PAK	I-PAK	D2-PAK	I2-PAK	DFN 8x8mm	TO-220	TO-220SIS	TO-247
Outline								
(1.2/1.22) Ω	TK5P65W 1.22 Ω	TK5Q65W 1.22 Ω					TK5A65W	
(1.0/1.05) Ω	TK6P65W 1.05 Ω	TK6Q65W 1.05 Ω					TK6A65W	
(0.78/0.8) Ω	TK7P65W 0.8 Ω	TK7Q65W 0.8 Ω					TK7A65W	
(0.65/0.67) Ω	TK8P65W 0.67 Ω	TK8Q65W 0.67 Ω					TK8A65W	
(0.5/0.56) Ω	TK9P65W 0.56 Ω	TK9Q65W 0.56 Ω					TK9A65W	
(0.39/0.44) Ω	TK11P65W 0.44 Ω	TK11Q65W 0.44 Ω					TK11A65W	
(0.25/0.28) Ω			TK14G65W	TK14C65W	TK14V65W 0.28 Ω	TK14E65W	TK14A65W	TK14N65W
(0.20/0.21) Ω				TK17C65W	TK17V65W 0.21 Ω	TK17E65W	TK17A65W	TK17N65W
(0.11/0.12) Ω					TK28V65W 0.12 Ω	TK28E65W NEW	TK28A65W	TK28N65W
80m Ω							TK35A65W	TK35N65W
55m Ω								TK49N65W

DTMOS IV 650V HIGH SPEED TYPE (LOW Q_{gd}) , FAST DIODE TYPE "W5" & "X5"-SERIES

	D2-PAK	I2-PAK	DFN 8x8mm	TO-220	TO-220SIS	TO-247
Outline						
0.3 Ω	TK14G65W5	TK14C65W5		TK14E65W5	TK14A65W5	TK14N65W5
0.23 Ω					TK17A65W5	
(0.19/0.20) Ω			NEW TK22V65X5*		TK22A65X5 NEW	
(0.13/0.14) Ω			NEW TK28V65W5*			TK28N65W5
95m Ω					TK35A65W5	TK35N65W5
57m Ω						TK49N65W5

* Mass production: Q4/2016

DTMOS IV 800V STANDARD "W"-SERIES

	TO-220	TO-220SIS
Outline		
(0.9 Ω)	TK(7)E80W* NEW	TK(7)A80W* NEW
0.55 Ω	TK10E80W* NEW	TK10A80W* NEW
0.45 Ω	TK12E80W* NEW	TK12A80W* NEW
0.29 Ω	TK17E80W* NEW	TK17A80W* NEW

* Mass production: Q4/2016